



BUDGET The United States Department of the Interior **JUSTIFICATIONS**

and Performance Information
Fiscal Year 2008

U.S. GEOLOGICAL SURVEY

NOTICE: These budget justifications are prepared for the Interior, Environment and Related Agencies Appropriations Subcommittees.

Approval for release of the justifications prior to their printing in the public record of the Subcommittee hearings may be obtained through the Office of Budget of the Department of the Interior.

**U.S. GEOLOGICAL SURVEY
FY 2008 BUDGET JUSTIFICATION**

TABLE OF CONTENTS

Organization

Organization Chart v
Acronyms vi

A – General Statement

Overview A-1
 Table: Total 2008 Budget Estimates A-1
 Table: 2008 Budget Request by Interior Mission Area A-1
Strategic Plan Revision and Adjustment A-9
2008 Performance Summary A-11
 Achieving Department Mission Goals A-11
 Resource Protection A-13
 Resource Use A-14
 Serving Communities A-15
 Management Excellence A-17
 Means and Strategies A-18
 Science Planning A-19
 Science Strategy A-19
 Strategic Change A-21
 Program Evaluations A-21
 Data Validation and Verification A-23
 Partnerships A-23
President’s Management Agenda A-28
 Budget and Performance Integration A-28
 Human Capital A-31
 Competitive Sourcing A-31
 Financial Performance A-32
 E-Government A-33
 Asset Management A-35
 Energy Management A-37
 Transportation A-37
 Environmental Management A-37
 Environmental Safeguard Plans A-37
Research and Development A-38
 Research and Development Investment Criteria A-38
 Basic, Applied, and Development A-40
 Research and Development Funding by Goal A-44

B – Key Budgetary Changes

Introduction B-1
Healthy Lands Initiative B-2
Performance for Key Budgetary Changes Table B-3

Table of Contents

C – Goal Performance Information

Funding Goals Table	C-1
Goal Performance Table	C-2

D – 2008 Budget at a Glance

2008 Budgetary Changes at a Glance Table	D-1
Program Increases	D-5
Program Decreases	D-9

E – Surveys, Investigations, and Research

Analysis by Activity	E-1
Appropriation Language	E-2
Justification of Proposed Language Change	E-3
Appropriation Language and Citations	E-4
Administrative Provisions Language	E-9
Justification of Proposed Administrative Provisions Language Change	E-10
Administrative Language and Citations	E-11
Justification of Fixed Costs and Related Changes: USGS	E-14
Summary of Requirements	E-17

F – Science on the Landscape — Regional and Crosscutting Activities

Science on the Landscape	F-1
USGS Integrated Science Initiatives	F-2
Integrated Multi-Hazards	F-2
Healthy Lands Initiative — Green River, Wyoming	F-4
Ocean Action Plan	F-11
Regional and Crosscutting Activities	F-17
Science on the DOI Landscape	F-20
Priority Ecosystems Science	F-22
Department Crosscuts	F-26

G – Geographic Research, Investigations, and Remote Sensing

Activity Summary	G-1
Land Remote Sensing Subactivity	G-5
Geographic Analysis and Monitoring Subactivity	G-21

H – Geologic Hazards, Resources, and Processes

Activity Summary	H-1
Geologic Hazard Assessments Subactivity	
Earthquake Hazards	H-5
Volcano Hazards	H-17
Landslide Hazards	H-23
Global Seismographic Network	H-29
Geomagnetism	H-35
Geologic Landscape and Coastal Assessments Subactivity	
Earth Surface Dynamics	H-41
National Cooperative Geologic Mapping	H-49
Coastal and Marine Geology	H-57
Geologic Resource Assessments Subactivity	
Mineral Resources	H-65
Energy Resources	H-77

I – Water Resources Investigations

Activity Summary	I-1
Hydrologic Monitoring, Assessments, and Research Subactivity	
Ground-Water Resources Program	I-5
National Water-Quality Assessment	I-11
Toxic Substances Hydrology	I-21
Hydrologic Research and Development.....	I-25
National Streamflow Information Program	I-31
Hydrologic Networks and Analysis.....	I-43
Cooperative Water Program Subactivity	I-51

J – Biological Research

Activity Summary	J-1
Biological Research and Monitoring Subactivity	J-5
Status and Trends of Biological Resources	J-11
Contaminant Biology	J-14
Fisheries: Aquatic and Endangered Resources	J-14
Wildlife: Terrestrial and Endangered Resources.....	J-17
Terrestrial, Freshwater, and Marine Ecosystems.....	J-20
Invasive Species	J-22
Biological Information Management and Delivery Subactivity.....	J-31
Science Centers and Field Stations Summary.....	J-39
Cooperative Research Units Subactivity.....	J-45

K – Enterprise Information

Activity Summary	K-1
Enterprise Information Security and Technology Subactivity	K-5
Enterprise Information Resources Subactivity	K-13
National Geospatial Program Subactivity	K-19

L – Science Support

Science Support.....	L-1
----------------------	-----

M – Facilities

Activity Summary	M-1
Rental Payments Subactivity.....	M-5
Operations and Maintenance Subactivity	M-7
Deferred Maintenance and Capital Improvement Subactivity	M-11

N – Working Capital Fund

Working Capital Fund Overview	N-1
Appropriation Language and Citations	N-4
Program and Financing	N-6
Balance Sheet.....	N-7
Object Classification	N-8
Personnel Summary.....	N-8

O – Surveys, Investigations, and Research – Exhibits

Summary of Requirements by Object Class	O-1
Program and Financing	O-3

Table of Contents

Object Classification.....O-5
Personnel Summary.....O-7

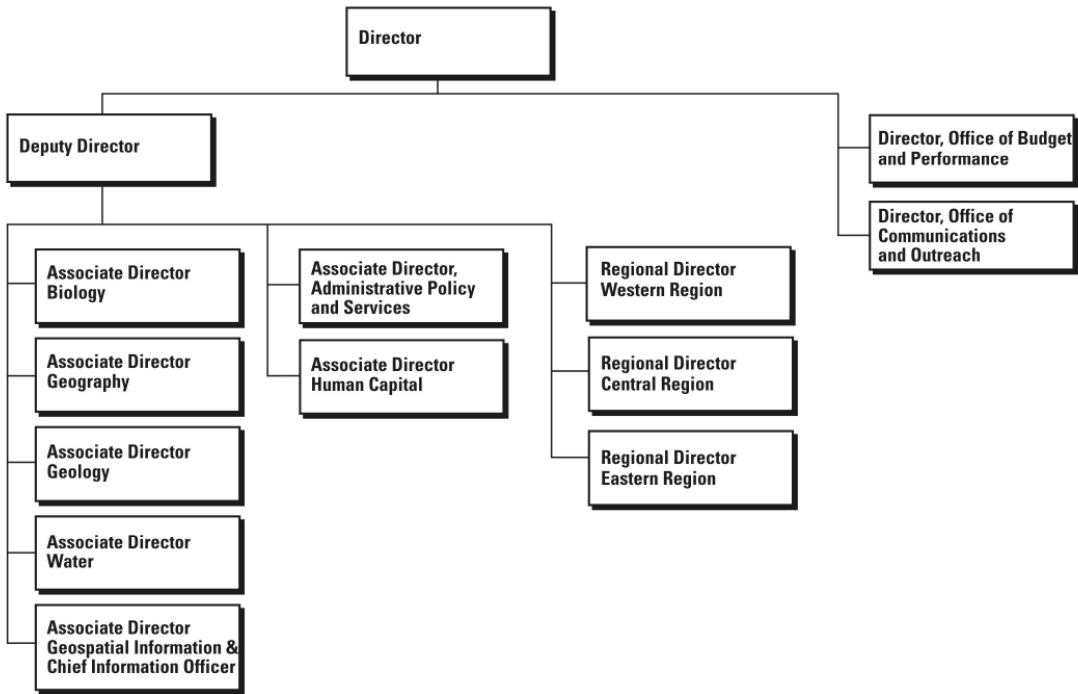
P – Sundry Exhibits

Funding of U.S. Geological Survey Programs (Obligations) P-1
Contributed Funds..... P-13
Employee Count by Grade P-15
Mandatory Budget and Offsetting Collection Proposals P-16
Program/Project Support of Bureau, Department, and Governmentwide Costs..... P-17

Q – Authorizations

AuthorizationsQ-1

U.S. Geological Survey



USGS Regional Structure

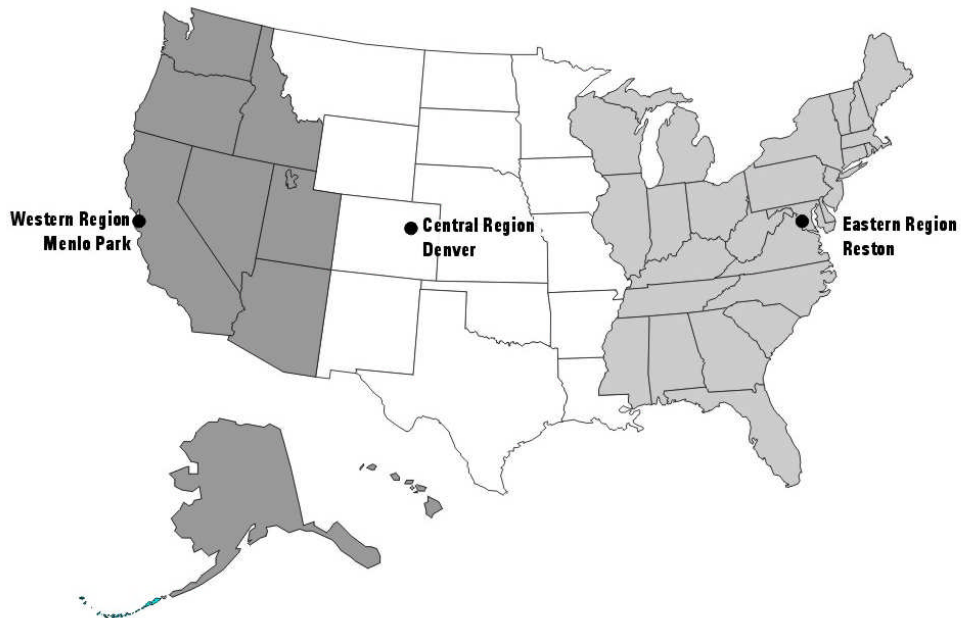


Table of Contents

Alphabetical List of Acronyms

AAAS	American Association for the Advancement of Science
ABC/M	Activity-Based Costing/Management
ACWI	Advisory Committee on Water Information
ANSS	Advanced National Seismic System
ANWR	Arctic National Wildlife Refuge
APS	Administration and Policy Services
AR	Accounts Receivable
ARMI	Amphibian Research and Monitoring Initiative
ASC	Alaska Science Center
ASIWPCA	Association of State and Interstate Water Pollution Control Administrators
AVO	Alaska Volcano Observatory
BASIS+	Budget and Science Information System
BEN	Balkan Endemic Nephropathy
BIA	Bureau of Indian Affairs
BIS	Commerce - Bureau of Industry and Security
BOR	U.S. Bureau of Reclamation
BLM	U.S. Bureau of Land Management
BLT	Business Leaders Team
BRD	Biological Resources Division
BSR	Business Strategy Review
CA	Condition Assessment
CAC	Civil Applications Committee
CALFED	California Federal (Bay-Delta Authority program)
CAP	Cooperative Agreements Program
C&A	Certification and Accreditation
CBM	Coalbed Methane
CBP	Chesapeake Bay Program
CCSP	U.S. Climate Change Science Program
CDC	Centers for Disease Control and Prevention
CEQ/NSTC	Council on Environmental Quality/National Science and Technology Council
CERC	Columbia Environmental Research Center
CERP	Comprehensive Everglades Restoration Plan
CFO	Chief Financial Officer
CISN	California Integrated Seismic Network
CMGP	Coastal and Marine Geology Program
CNMI	Commonwealth of the Northern Mariana Islands
CPIC	Capital Planning and Investment Control
CR	Central Region
CRADA	Cooperative Research and Development Agreement
CRSSP	Commercial Remote Sensing Space Policy
CRWA	Charles River Watershed Association
CSRS	Civil Service Retirement System
CTBTO	Comprehensive Test Ban Treaty Organization
CTM	Cooperative Topographic Mapping
CUES	Comprehensive Urban Ecosystems Studies
CUSEC	Central United States Earthquake Consortium
CVO	Cascades Volcano Observatory
CWD	Chronic Wasting Disease

CWP	Cooperative Water Program
DCIA	Debt Collection Improvement Act
DEM	Digital Elevation Model
DEP	[State] Department of Environmental Protection
DEQ	[State] Department of Environmental Quality
DGH	Indian Directorate General of Hydrocarbons
DiGIR	Distributed Generic Information Retrieval
DSS	Decision Support System
EAL	Energy Analytical Laboratory
EDMAP	Education Mapping program (in National Cooperative Geologic Mapping Program)
EEOC	Equal Employment Opportunity Commission
EFT	Electronic Funds Transfer
EHP	Earthquake Hazards Program
EO	Executive Order
EOP	Executive Office of the President
EPA	U.S. Environmental Protection Agency
EPCA	Energy Policy and Conservation Act
ER	Eastern Region
EROS	Earth Resources Observation and Science
ERP	Energy Resources Program
ETM+	Enhanced Thematic Mapper Plus
EVMS	Earned Value Management System
FAA	Federal Aviation Administration
FACA	Federal Advisory Committee Act
FASAB	Federal Accounting Standards Advisory Board
FBMS	Financial Business Management System
FBWT	Fund Balance with Treasury
FCI	Facilities Condition Index
FEA	Federal Enterprise Architecture
FECA	Federal Employee Compensation Act
FEDMAP	Federal lands Mapping program (in National Cooperative Geologic Mapping Program)
FEGLI	Federal Employees Group Life Insurance
FEHB	Federal Employees Health Benefit
FEMA	Federal Emergency Management Agency
FERS	Federal Employees Retirement System
FFMIA	Federal Financial Management Improvement Act of 1996
FGDC	Federal Geographic Data Committee
FICA	Federal Insurance Contributions Act
FISC	Florida Integrated Science Center
FISMA	Federal Information Security Management Act
FMT	Field Managers Team
FMFIA	Federal Managers' Financial Integrity Act of 1982
FMMS	Facilities Maintenance Management System
FRB	Federal Reserve Board
FSA	Farm Service Agency
FTE	Full-Time Equivalent
FWS	U.S. Fish and Wildlife Service
GAAP	Generally Accepted Accounting Principles
GAM	Geographic Analysis and Monitoring Program
GAO	Government Accountability Office

Table of Contents

GEODE	GEO-Data Explorer
GeoMAC	Geospatial Multi-Agency Coordination
GBIP	Great Basin Information Project
GCDAMP	Glen Canyon Dam Adaptive Management Program
GCMRC	Grand Canyon Monitoring and Research Center
GCP	Global Change Program
GIS	Geographic Information System
GLSC	Great Lakes Science Center
GEOSS	Global Earth Observation System of Systems
GOS	Geospatial One-Stop
GPRA	Government Performance and Results Act
GPS	Global Positioning System
GSA	General Services Administration
GSN	Global Seismographic Network
GWRP	Ground-Water Resources Program
HAZUS	Federal Emergency Management Agency's Earthquake Loss Estimation Program
HBN	Hydrologic Benchmark Network
HDOA	Hawaii Department of Agriculture
HHS	[Department of] Health and Human Services
HNA	Hydrologic Networks and Analysis [program]
HPO	High Performing Organization
HR	Human Resources
HR&D	Hydrologic Research and Development [program]
HVO	Hawaii Volcano Observatory
HWATT	Hemlock Woolly Adelgid Action Team
IAGA	International Association of Geomagnetism and Aeronomy
ICL	International Consortium on Landslides
ICWP	Interstate Council on Water Policy
IEAM	Integrated Environmental Assessment and Management
IGPP	Institute for Geophysics and Planetary Physics
IOOS	Integrated Ocean and coastal Observing System
IP	Investment Plan
IRB	Investment Review Board
IRIS	Incorporated Research Institutions for Seismology
InSAR	Interferometric Synthetic Aperture Radar
IT	Information Technology
JFA	Joint Funding Agreement
KSF	Thousand Square Feet
LAS	Local Action Strategy
LDCM	Landsat Data Continuity Mission
LEAG	Long-term Estuary Assessment Group
LHP	Landslide Hazards Program
LiDAR	Light Detecting and Ranging
LMV	Lower Mississippi Valley
LRS	Land Remote Sensing
LTRMP	Long-Term Resource Monitoring Program
LVO	Long Valley Volcano Observatory
MBtu	Million British thermal units
MD	Management Directive
MITS	(Department) Management Initiatives Tracking System

MMS	Minerals Management Service
MODIS	Moderate Resolution Imaging Spectroradiometer
MRDS	Mineral Resources Data System
MRERP	Mineral Resources External Research Program
MRP	Mineral Resources Program
MSCP	Multi-Species Conservation Program
MSH	Mount St. Helens
MTBE	methyl tert-butyl ether
NACO	National Association of Counties
NADP	National Atmospheric Deposition Program
NARA	National Archives and Records Administration
NAS	National Academy of Sciences
NASA	National Aeronautics and Space Administration
NASQAN	National Stream Quality Accounting Network
NAWQA	National Water-Quality Assessment
NBC	Dept. of Interior - National Business Center
NBII	National Biological Information Infrastructure
NCAP	National Civil Applications Program
NCGMP	National Cooperative Geologic Mapping Program
NCRDS	National Coal Resources Data System
NED	National Elevation Dataset
NEHRP	National Earthquake Hazards Reduction Program
NEIC	National Earthquake Information Center
NEPA	National Environmental Policy Act
NGA	National Geospatial-Intelligence Agency
NGIC	National Geomagnetic Information Center
NGMDP	National Geologic Map Database Project
NGO	Nongovernmental organization
NGTOC	National Geospatial Technical Operations Center
NHD	National Hydrology Dataset
NIEHS	National Institute of Environmental Health Sciences
NIFC	National Interagency Fire Center
NIH	National Institute of Health
NIST	National Institute of Standards and Technology
NIWR	National Institutes for Water Resources
NLCD	National Land Cover Database
NLIC	National Landslide Information Center
NOAA	National Oceanic and Atmospheric Administration
NPRA	National Petroleum Reserve, Alaska
NPS	National Park Service
NRIS	Natural Resource Information System
NRC	National Research Council
NRCS	Natural Resources Conservation Service
NRP	National Research Program (research organization in USGS Water discipline)
NSDI	National Spatial Data Infrastructure
NSF	National Science Foundation
NSIP	National Streamflow Information Program
NSMP	National Strong Motion Program
NTN	National Trends Network
NVEWS	National Volcano Early Warning System

Table of Contents

NWIS	National Water Information System
NWQL	National Water Quality Laboratory
NWS	National Weather Service
OAFM	USGS Office of Accounting and Financial Management
OAP	Ocean Action Plan
OBP	USGS Office of Budget and Performance
OES	Office of Emergency Services
OFEE	Office of the Federal Environmental Executive
OFR	Open-File Report
OIG	Office of the Inspector General
OGDB	Organic Geochemistry Database
OLI	Operational Land Imager
OMB	Office of Management and Budget
OMS	Office of Management Services
OPM	Office of Personnel Management
ORPPIS	Ocean Research and Priorities Plan and Implementation Strategy
OSHA	Occupational Safety and Health Administration
OSTP	Office of Science and Technology Policy
PAGER	Prompt Assessment of Global Earthquakes for Response
PART	Program Assessment Rating Tool
PES	Priority Ecosystems Science
PP&E	Property, Plant, and Equipment
PI	Principal Investigator
PRB	Powder River Basin
PSNER	Puget Sound Near Shore Ecosystem Restoration
PTWC	Pacific Tsunami Warning Center
R&D	Research and Development
RCOOS	Regional Coastal Ocean Observing Systems
RGIO	Regional Geospatial Information Office(r)
RSSI	Required Supplementary Stewardship Information
RTS	Reports Tracking System (Water Resources)
SAFOD	San Andreas Fault Observatory at Depth
SAIN	Southern Appalachian Information Node
SBFD	San Francisco Bay and freshwater delta
SBSP	South Bay Salt Pond Restoration Project
SCEC	Southern California Earthquake Center
SDR	Subcommittee for Disaster Reductions
SETAC	Society of Environmental Toxicology and Chemistry
SFWMDC	South Florida Water Management District
SLC	Scan Line Corrector
SGL	Standard General Ledger
SIR	Surveys, Investigations, and Research
STATEMAP	State mapping program (in Cooperative Geologic Mapping Program)
SPARROW	SPATIally Referenced Regressions on Watershed Attributes
SPRESO	South Pole Remote Earth Science Observatory
SRTM	Shuttle Radar Topographic Mission
TCOM	Tahoe Constrained Optimization Model
TMDL	Total Maximum Daily Loads (Clean Water Act requirement)
TSP	Thrift Savings Plan
TROR	Treasury Report on Receivables

TRPA	Tahoe Regional Planning Agency
USACE	U.S. Army Corps of Engineers
USAID/OFDA	U.S. Agency for International Development/ Office of Foreign Disaster Assistance
USDA	U.S. Department of Agriculture
UDDOE	U.S. Department of Energy
USFS	U.S. Forest Service
USGCRP	U.S. Global Change Research Program
USGEO	U.S. Group on Earth Observations
USGS	U.S. Geological Survey
VHP	Volcano Hazards Program
V&V	Validation and Verification
VSIP/VERA	Voluntary Separation Incentive Payment/Voluntary Early Retirement Authority
WAN	Wide Area Network
WCF	Working Capital Fund
WNV	West Nile Virus
WPA	World Petroleum Assessment 2000
WR	Western Region
WRIR	Water Resources Investigation Report
WRRRA	Water Resources Research Act
WRRIs	[State] Water Resources Research Institutes
WSC	[USGS State] Water Science Center
WSWC	Western States Water Council
YMP	Yucca Mountain Program
YVO	Yellowstone Volcano Observatory

General Statement

Total 2008 Budget Estimates

(Dollars in thousands)

Budget Authority	2006 Actual	2007 President's Budget	2007 CR	2008 Request	2008 Request Change from 2007
Discretionary	965,345	944,760	962,676	974,952	12,276
Mandatory	2,487	7,603	7,628	1,096	-6,532
Total	967,832	952,363	970,304	976,048	5,744
<i>FTEs</i>	<i>8,578</i>	<i>8,396</i>	<i>8,217</i>	<i>8,078</i>	<i>-139</i>

Note: After development of account level FTEs for the FY 2008 President's Budget Appendix, further refinements to the estimates were made. As a result, the FY 2008 FTE levels in this presentation are lower than those presented in the Budget Appendix.

2008 Budget Request by Interior Mission Area

(Dollars in thousands)

Mission Area	2006 Enacted	2007 CR	2008 Request	2008 Request Change from 2007
Resource Protection	765,113	766,730	794,653	27,923
Resource Use	97,278	72,734	72,643	-91
Serving Communities	102,954	105,296	107,656	2,360
Total	965,345	944,760	974,952	30,192
Impact of the CR		17,916		-17,916
Adjusted Total	965,345	962,676	974,952	12,276

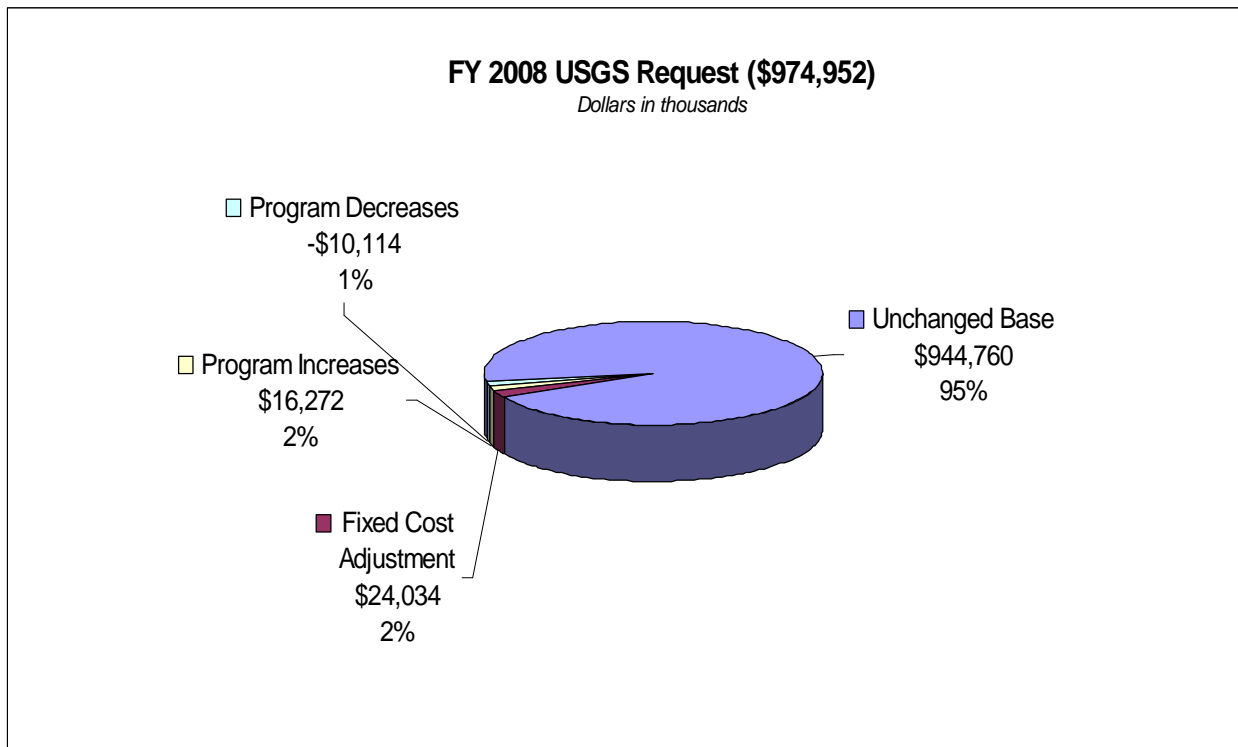
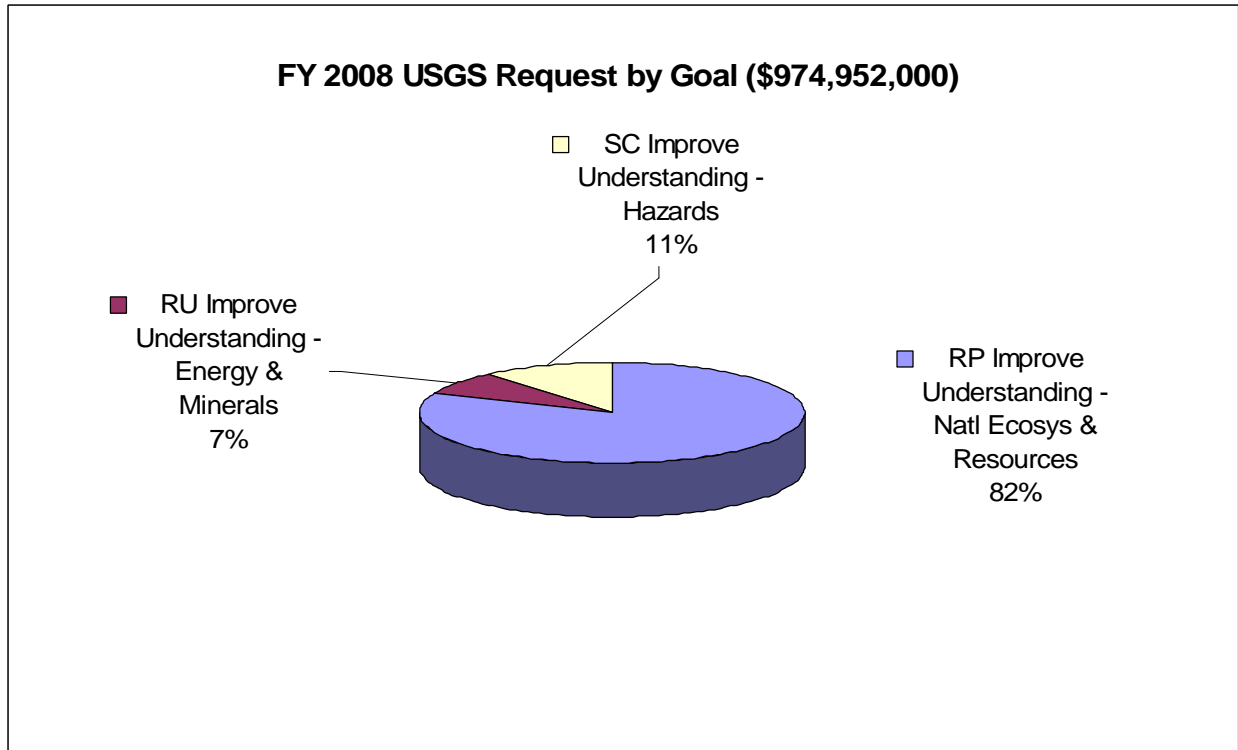
Overview

The 2008 request advances both Presidential and Secretarial priorities, ensures the continued implementation of the President's Management Agenda, and addresses the planned outcomes of the Department's Unified Strategic Plan. For the most part, the request also keeps initiatives set forth in 2007 intact. In selecting those programs or initiatives that should receive increased funding within the request, the USGS considered the following criteria in weighing the value of the science: interdisciplinary science, collaboration and partnerships, results of program evaluations, demonstration of progress toward meeting both Department and bureau performance goals, and whether the science contributes to building stronger communities.

The USGS remains a valuable source of research and information for the American taxpayer. Under the proposed request, the USGS will continue to:

- Work closely with Interior bureaus to ensure that their science and information needs are an integral part of USGS science plans,
- Carry out large-scale, regional and national, investigations that build the base of knowledge about the Earth,

General Statement



- Apply multi-disciplinary scientific expertise in the fields of biology, geography, geology, hydrology, and geospatial information,
- Sustain long-term monitoring and assessment of natural resources,

- Collect, monitor, and analyze data and provide scientific understanding about natural resource conditions, issues, and problems, and
- Provide relevant, timely, impartial, peer-reviewed natural resource information and products.

These combined efforts, coupled with a non-regulatory, non-land management mandate, position the USGS as a leader in understanding complex natural science questions of the day; performing objective, policy-neutral analysis; and providing the scientific products to lead to solutions. For more than a century, natural resource managers, emergency response organizations, land use planners, decisionmakers at all levels of government, and citizens in all walks of life have come to depend on the USGS for reliable information to use as tools to address pressing societal issues such as public safety and health, natural resource management, and environmental protection.

2008 Major Focus

The major focus of the 2008 USGS budget request is to build stronger and safer communities through research and monitoring in areas of science most needed by the Nation through the:

- Secretary's Healthy Lands Initiative;
- Development of near-term opportunities under the Oceans Research and Priorities Plan for both short-term forecasts and long-term, probabilistic assessments of coastal vulnerability to extreme events, persistent natural processes, and human influences across the coastal zone;
- Pilot effort for an interagency National Water Quality Monitoring Network, which supports the goals of the Ocean Action Plan;
- Improved data collection and analysis to predict floods and droughts and monitor streamflow through the enhancement of the National Streamgaging Network; and
- Continued delivery of products to improve prediction, emergency management, decisionmaking, and systems and networks needed to reduce the risk to Americans from natural hazards.

Healthy Lands Initiative — The Department's Healthy Lands Initiative promotes the concept of cooperative conservation and supports the Department's Resource Protection strategic goal of improving the health of watersheds, landscapes, and marine resources by conserving and restoring coastal wetlands, which are those critical habitats linking terrestrial and marine ecosystems. The role of USGS is to provide the framework science necessary for Interior bureaus and other partners to use in restoration and conservation efforts. The USGS will work in close collaboration with government and non-government partner institutions and contractors to identify resource management issues and the science data and information needed to resolve these issues. Initiative efforts will build upon the existing USGS knowledge base and expertise in conducting interdisciplinary studies to examine the environmental impacts of natural events and land use change.

Wildlife-Energy Interface in Green River, Wyoming (\$5 million and 10 FTE) — the landscape and habitats of Wyoming's Green River Basin are undergoing rapid change in response to energy resource development. The USGS will collaborate with Bureau of Land Management and U.S. Fish and Wildlife Service, other Federal and State partners, industry, and non-governmental organizations to build the geospatial framework for sharing information, assess the health of habitats and their resources, and monitor

General Statement

changes in landscape and habitats as energy development proceeds, all to ensure the long-term viability and sustainability of wildlife and habitat in energy development areas. For example, focusing on sage grouse, the USGS will apply landscape-scale species and habitat science for the ecoregional analysis of sagebrush ecosystems within the basin, utilize ground and remote-sensing technologies, conduct surveys to sample the distribution of species (e.g., sage grouse), assess landscape and habitat conditions, identify unique ecological and critical habitats, assess priority conservation targets, and test the response of species to human disturbance, all to provide an accurate species and habitat assessment and assist in development of species and habitat monitoring to meet specific management objectives.

Ocean Research and Priorities Plan/Ocean Action Plan — The 2008 budget request continues USGS efforts to implement the President's Ocean Action Plan (OAP) and to engage in interagency efforts to advance the implementation strategy of the Near-term Priorities of the Ocean Research and Priorities Plan. The 2008 proposed activities address the Department's Resource Protection strategic goal in support of the end outcome goal to "improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment." Coordinated activities of the Hydrologic Networks and Analysis and Coastal and Marine Geology Program (CMGP) will advance the goals of the USGS National Coastal Program Plan, in partnership with other USGS programs, other Federal agencies and in response to State, local, and regional needs. Resulting research and operational products will provide coastal resource managers, coastal zone planners, and emergency and public health officials with observations and short- and long-term forecasts of changing coastal conditions. Initiative efforts will build upon the existing USGS knowledge base and expertise in conducting interdisciplinary studies to examine the impacts on coastal ecosystems of natural events and human and natural forces.

Near-term Priorities of the Ocean Research and Priorities Plan (ORRP) (+\$1,500,000 / +1 FTE) — Coastal ecosystems are subject to a variety of forcing factors, ranging from extreme events, human activities, and changing ocean and climatic conditions. Understanding the response of natural and constructed landscapes and ecosystems; forecasting the frequency, intensity, and impact of these forcing factors; and providing tools to develop policy and management responses is integral to constructing more resilient structures and communities and protecting the natural environment. Research, seafloor mapping, observations, and evaluation of models to forecast responses to extreme weather events on the coast will be undertaken consistent with the ORRP. Efforts will focus on establishing the basis for short-term forecasts and long-term (probabilistic) assessments of coastal vulnerability to extreme weather events, persistent natural processes, and human influences across the coastal zone. This effort will enhance regional observing systems and models, integrating substantial existing observations and incorporating new observations to address critical regional data gaps. Results from this effort will, for example, inform hazard mitigation and response plans, provide forecasting data to support navigation safety, and assist regional resource managers and public health officials in sustaining ecosystem and public health and promoting hazard resilience.

National Water Quality Monitoring Network (+\$1,500,000 / +5 FTE) — This initiative funds initial implementation of the National Water Quality Monitoring Network called for in the OAP and defined through the efforts of the USGS, U.S. Environmental Protection Agency (EPA), National Oceanic and Atmospheric Administration (NOAA), and other Federal and State partners in the plan for a "National Water Quality Monitoring Network

for U.S. Coastal Waters and their Tributaries." This plan, approved by members of the Advisory Committee on Water Information (ACWI) and by the Council on Environmental Quality/National Science and Technology Council (CEQ/NSTC), provides the basis for interagency pilot studies in FY 2007 to inventory existing monitoring assets, identify gaps between network design specifications and current data collection, refine the Network's observational and data sharing requirements, and identify next steps for Network implementation. FY 2008 activities supported by the proposed increase will build upon pilot study results, leading to demonstration implementation for selected regions as proof-of-concept of network design and application of network-derived products to resource and public safety management. Approximately \$1.0 million will be for assessments, while the remaining \$500,000 increase will provide for and support streamgages for the Network.

National Streamgaging Network — Under the USGS 2008 request, the National Streamflow Information Program will be increased by \$1.7 million to cover full fixed costs for the program, allowing USGS to maintain operations of the streamgaging network at the 2007 planned level of 6,195 streamgages that meet one or more Federal needs. This will help to maintain the core network of streamgages needed to ensure the USGS can provide the data needed by various government, industry, and private organizations that rely on streamflow information to ensure public safety during floods, conduct business, provide appropriate engineering design for bridges and culverts, and ensure efficient and effective allocation of the water resources among competing needs. The increase includes \$250,000 that would enable installation of three new streamgages in Southern California and deployment of storm surge monitors in support of the bureau's ongoing hazards program. The \$500,000 increase for streamgages under the National Water Quality Monitoring Network is in addition to the streamgages provided for under the NSIP. The program increase supports the Resource Protection goal of the Department's strategic plan.

Hazards Assessment and Mitigation — Continuing the integrated multi-hazards demonstration project in Southern California requested in the 2007 President's Budget, the USGS will merge information about disparate hazards into integrated hazard information products and deliver them to government agencies, community leaders, and the public through an enhanced Information Technology system to support hazards mitigation, disaster preparedness, emergency response, and recovery efforts. These activities will encompass monitoring efforts to collect data about hazards, targeted research efforts to better predict hazard impacts and assess appropriate mitigation strategies, and partnership programs to prepare communities to use the information. This demonstration project is in line with the Secretarial priority to protect lives, resources, and priority, as identified in the Serving Communities goal of the Department's strategic plan.

Crosscuts — Science support for most Departmental crosscutting activities is preserved within funding levels in this budget. Activities range from environmental issues such as coral reef protection in the Pacific Islands to resource management issues such as salmon recovery in the Pacific Northwest. Other activities include the National Invasive Species Management Plan, California Bay-Delta, global change, Geospatial One-Stop, and other electronic government initiatives, and the Klamath River Basin Federal Working Group. The 2008 USGS budget request will affect work on priority ecosystems such as the Everglades, the Chesapeake Bay, and San Francisco Bay, with a reduction of \$2.0 million in Geographic, Analysis and Monitoring. The reduction is proposed so that funding can be used to cover higher priority initiatives.

General Statement

Five-Year Program Plans — Five-year program plans are the heart of the bureau planning model, providing the basis for annual decisionmaking. These plans support the Department's strategic plan and articulate program goals, priorities, outcomes, measures of success, and products over a 5-year period. Customers, cooperators, and partners play a key role in providing input on science needs, emerging issues, and priorities; these participants also provide external review of the plans. Annual project decisions flow from bureau 5-year program plans. Plans are completed for each USGS program on a staggered cycle that results in a new plan for each program every 5 years. In addition to an operational plan that describes the decisionmaking processes for the program, each 5-year plan is designed to –

- Evaluate the quality of USGS science,
- Ensure communication and collaboration among USGS scientists during the review process,
- Determine the relevancy of USGS science,
- Evaluate USGS efforts in meeting partner needs,
- Evaluate performance in meeting program goals, and
- Guide future scientific endeavors.

Base Analysis

For the purposes of developing the 2008 budget request, USGS analyzed the productivity that would remain in each of its programs at the 2008 funding levels, including the program's remaining effectiveness for meeting goals and objectives, customer and partner expectations for base efforts, and the impact of the base reductions on reimbursable income and receipt of in-kind services. Programs were selected for reduction or redirection where effectiveness and external support could be best maintained.

The USGS conducts quarterly reviews of its fiscal status, examining availability of funds, expenditures, and obligations to date, actual expenditures compared to plans, carryover balances, earned unbilled revenue, delinquent debt, unliquidated obligations, FTE usage, working capital fund investments, and estimates of reimbursable income. Senior managers are briefed on these financial statuses and then expected to address any necessary actions.

The USGS regularly conducts internal control reviews of its programs and organizations. Selected programs are reviewed each year, with the objective of all programs being reviewed once every five years for program management, accountability to program goals and objectives, and responsiveness to customer requirements. The organizational internal control reviews, which includes administrative and financial reviews, consist of reviews being conducted at the science centers, reviewing science center management, fiscal responsibility, program management, and customer satisfaction.

Continual renewal of the USGS scientific talent base to meet the Nation's future science needs is both a necessity and a responsibility of the bureau. To this end, USGS has been offering a Voluntary Separation Incentive Program and Voluntary Early Retirement Authority in a number of its science disciplines, including geography, geology, and water resources to reinvigorate the skills of its workforce to meet the science needs of today and the future. In 2007, the National Research Program, which has been at the forefront of the Nation's fundamental hydrologic process research for almost 50 years, will offer a VSIP/VERA so that it can continue to maintain a high level of scientific capability and relevance in meeting its science goals in a time of

declining budgets. The VSIP/VERA will be offered to a variety of NRP positions identified through a workforce planning process. These positions include both scientists and administrative and support staff. Savings from the VSIP/VERA will be redirected to address high priority science needs, including those faced by USGS' sister bureaus.

USGS efforts are ongoing to develop management efficiencies and streamlining, facilities cost reductions, and to evaluate funding experiments for improved utilization of funds. USGS has been working to reduce costs at the Menlo Park campus, the largest facility in the Western Region. The region offered a VSIP/VERA in the Office of Western Regional Services that promises to provide funding savings, leadership redistribution, and facilitate migration of the Menlo Park facility to Sacramento.

Redirections between science projects are another way that USGS manages its base funding to be able to fund high-priority science when the need arises. In 2005 and 2006, \$400,000 from both the Water and Biology disciplines were redirected into work in the Klamath Basin. This expanded effort successfully brought new research capabilities to bear on critical issues at Klamath. The redirections were also something of a management experiment in how the different science discipline' funding and management models impact the implementation of research – nationally directed funding accountability vs. regional-level accountability and decisions. The lessons learned from these original redirections will help to achieve increased efficiencies and program effectiveness in 2007.

Cost and performance information are also factors that are considered in setting priorities and justifying programs. All decisionmaking requires various processes to ensure objectivity, and also to ensure an equitable use of subjectivity. It is important to acknowledge these processes as well as use of cost and performance data in a formal decisionmaking process. Examples include:

Geography Program focuses on Science Plan Goals and Strategic Actions — The program's Program Assessment Rating Tool (PART) Improvement Plan for 2006 recommended that the USGS Geography Program develop priorities for the geography science plan. In April 2006, the Geography discipline engaged collaborative decision support software and services from Expert Choice to help prioritize the goals and strategic actions of the science plan and align its research program to the priority goals. The geography science plan, *Geography for a Changing World, 2005*, goals are ambitious and exceed the funding available to achieve all simultaneously so prioritization is necessary to ensure that current funding is focused on the most important goals. Funding allocations are based on projected, prioritized and planned results. The Analytical Hierarchical Process used is designed for collaborative decision making sessions that build consensus and return quantifiable and well documented results that provide transparency for the whole process. In addition to the immediate results, the transparency of the process and the wealth of statistical information provided, allows management to reconsider decisions in the future and understand when changing conditions require a change in priorities.

Geology Program focuses on Science Plan Goals and Strategic Actions — Since 1996, Geology Programs have been a leader in conducting a division-wide competitive project proposal process using a prototype of the BASIS+ system now in use across the Bureau. Geology issues an annual call for project proposals called the Geology Annual Science Plan (also known as the Geology Prospectus) which contains scientific and funding guidance for all projects. The annual plan uses the Geology Science Strategy

General Statement

and Program 5-year plans for its organizing framework. Scientists are required to submit annual project proposals into the BASIS+ system for program review. The system is used to examine strengths and weaknesses in staff, scientific methodology, progress on goals, budgetary structure, use of funds and capital investments, and formulate final funding allocations. Reviews are conducted by scientific peers and include external scientific or stakeholder review.

Water Resources Use of Cost and Performance Information — The USGS recently completed an evaluation of the cost of the USGS providing streamflow information compared to two State agencies and one regional water agency. The evaluation showed that the USGS costs for providing the streamflow information were slightly higher than two of the agencies used for comparison and nearly identical for the third.

However, an evaluation of the quality and availability of the streamflow information showed that the two agencies providing the information at a lower cost than the USGS were not providing the same quality data and the availability of the data was not the same. For example, some agencies collect the data for immediate use but do not maintain the historical archives that enable analysis of long-term trends, which are vital for determining the 100-year flood risk and for forecasting water availability as it relates to changes in climate or land use. For the agency with similar costs to the USGS, it was determined that the quality and availability of the streamflow information was comparable to the USGS's.

Based on this analysis, there is an indication that this program is operating in the most cost-efficient way currently possible. The USGS, however, continues to study the issue and will seek additional cost efficiencies where possible. Meanwhile, funding adjustments will be needed to keep program performance level in the face of rising costs, which historically have increased about 3.8 percent per year.

Another tool in analyzing the base budget are program evaluations. Approximately 200 reviews are performed each year within 4 types of components:

- Program,
- Information Technology,
- Administration (Administrative, Financial, and Departmental Function Reviews),
- Other (Human Capital, Facilities, Safety & Environmental).

Departmental Functional Reviews (DFRs) are included in these reviews. As directed, selected DFRs are performed on information technology systems, property and acquisition management, accounting system compliance, and other functional areas deemed necessary. These reviews are performed to comply with various regulations such as the OMB Circular A-123 and the Federal Managers' Financial Integrity Act.

USGS will continue to implement internal and external program reviews, which can take several years to complete. The recommendations provided from the reviews are used by USGS to improve accountability and quality of programs; identify and address gaps in programs; redirect or reaffirm program direction; identify and provide guidance for development of new programs; and reward and/or motivate managers and scientists. The plans for internal controls on the program components are annual for the PART improvement plans but other external program reviews are not routinely scheduled two

years in advance. The external program reviews known to date are: Earth Science Applications from Space, River Science Program, Center of Excellence in GIOScience, and Research Priorities in Earth Science and Public Health which will be completed in 2007, and the Water Resources and Volcano Hazard programs which will be completed in 2008.

USGS will also continue to improve upon and implement Activity Based Costing (ABC) in cooperation with the Department. The continued commitment to ABC will improve the overall analysis and use of all funding within USGS, including its base funding. An analysis of ABC data has led USGS to conclude that more specificity was needed to begin to make appropriate use of the data for cost analysis. During 2006, USGS began capturing ABC data at the task level rather than the project level and is also in the process of analyzing the data to determine what impact it will have on the cost of the bureau's work. General ABC reports and data can be extracted for all managers at all levels on a daily basis for verifying and validating costs to help with decisionmaking. Continued efforts are being applied to standardize processes and ensure consistency of interpretation before ABC data can be confidently used to manage. Several years of implementation will be needed to identify trends in the data that can lead to programmatic decisions. The use of ABC will help USGS better explain how it serves the public and what the American public in turn, gets from the funding invested in the USGS. USGS will continue to verify and validate ABC data, improve understanding and process application, and standardize outputs tracked by ABC, the strategic plan, and PART to enable costing of performance measures. Close linkages will allow for improved costing of work, understanding of relationships, and leveraging of management information.

USGS will also continue to improve upon its established budget, allocation, and spending processes where and when necessary to ensure that all funds, including base funding, are obligated in a timely manner, spent for the intended purposes, and accurately reported. The USGS will continue to monitor its base funding through annual planning for the use of the funds, quarterly and monthly reviews of all spending, and review of funds allocation changes over \$25,000. Budget planning to object class will continue to be done in the BASIS+ system, which ties budget to intended use and provides easy verification for the use of funding in an analysis. Allocation tables are constructed from BASIS+ and the Federal Financial System to provide monthly and quarterly spending information for review of obligation and debt of the bureau and its programs so that corrective action can be taken if necessary. The USGS will also continue to improve its base analysis through the monthly and annual review of project budgets by line and program managers, including the review and certification of unliquidated obligations. In its quarterly status of funds reviews, USGS will also continue to improve the use of reporting against performance goals.

Strategic Plan Revision and Adjustment

The Government Performance and Results Act (GPRA) of 1993 requires Federal Agencies to revise their Strategic Plans every three years. The Department of the Interior just concluded this process and published a revised GPRA Strategic Plan 2007-2012 that can be found at http://www.doi.gov/ppp/Strategic%20Plan%20FY07-12/strat_plan_fy2007_2012.doc.

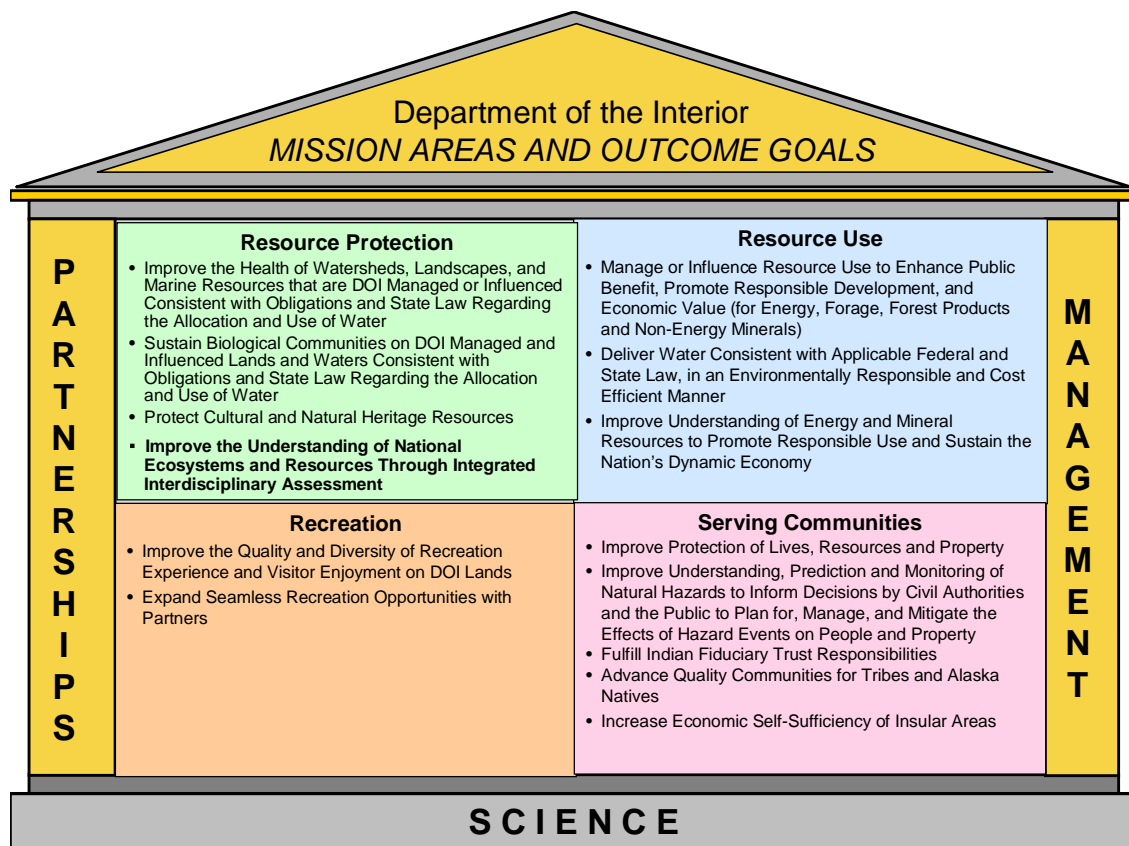
Science continues to lie at the foundation of Interior programs and USGS programmatic outcomes remain in the same three mission areas (Resource Protection, Resource Use, Serving Communities) as in the initial Strategic Plan 2003-2008. However, science's programmatic presence shifted from intermediate to end outcome level in the Resource

General Statement

Protection and Resource Use mission areas and resolved to a single end outcome in Serving Communities. As a result, science goals now support all three mission areas "to improve understanding of":

- Resource Protection: National ecosystems and resources (Biology, Geography, Geology, Mineral Resources and Enterprise Information's geospatial programs)
- Resource Use: Energy and mineral resources (Geology's Energy & Mineral Resources programs)
- Serving Communities: Natural hazards (Geology's Hazards programs)

USGS also supports Management Excellence goals through two budget activities: Science Support and Facilities as well as infrastructure functions of Enterprise Information. These changes ensure that Interior's science mission has clearly defined goals and improved performance measures to gage their progress in achieving this mission. Several of these



performance measures derived their origin from the Program Assessment Rating Tool evaluation process making a closer linkage of the plan to the programs and performance budget. In the construct of the strategies to achieve the end outcome goals for science, the Administration's Research and Development criteria were used as the accountability premise for science investments. These criteria are performance, quality and relevance. Therefore, the first strategy for each goal focuses on performance and the second strategy on quality and relevance with standardized language as follows:

<p>Performance:</p>	<p>1. <u>Ensure availability of ... scientific data and information...</u></p>
<p>Quality and Relevance:</p>	<p>2. <u>Ensure the quality and relevance of science information and data to support decision making</u></p>

Wording Adjustment: Strategy 1 for all 3 goals is correct in the final published document. Strategy 2 for Resource Protection is correct. Strategy 2 for Resource Use and Serving Communities should be changed from "Ensure availability of tools and methodologies" to comply with the construct so that all three goals state **Strategy 2: Ensure the quality and relevance of science information and data to support decisionmaking.** The performance measures for strategy 2 were revised appropriately for all 3 goals to the new construct addressing quality and relevance. In all cases, the tools and methodologies performance is consolidated with other science products in strategy 1 of each goal rather than being a separate strategy.

Rebaselining: Because existing performance measures derived from the PART process were used in many instances to improve performance measures in the Strategic Plan, we have provided historical performance data in the performance budget for the revised plan. However, some prior plan measures have changed in scope which requires rebaselining in FY 2007. For example, Tribes were added to the "Percent of communities using DOI science on hazard mitigation, preparedness and avoidance for each hazard management activity" measure. In other instances, experience in using the measures over the past 3 years has led us to clarify some of our definitions to improve the understanding of "what counts" and therefore improve consistency of interpretation and application across the organization. An example is "systematic analyses." All such measures are being rebaselined in FY 2007 and targets will be provided in the next plan.

2008 Performance Summary

Achieving Department Mission Goals

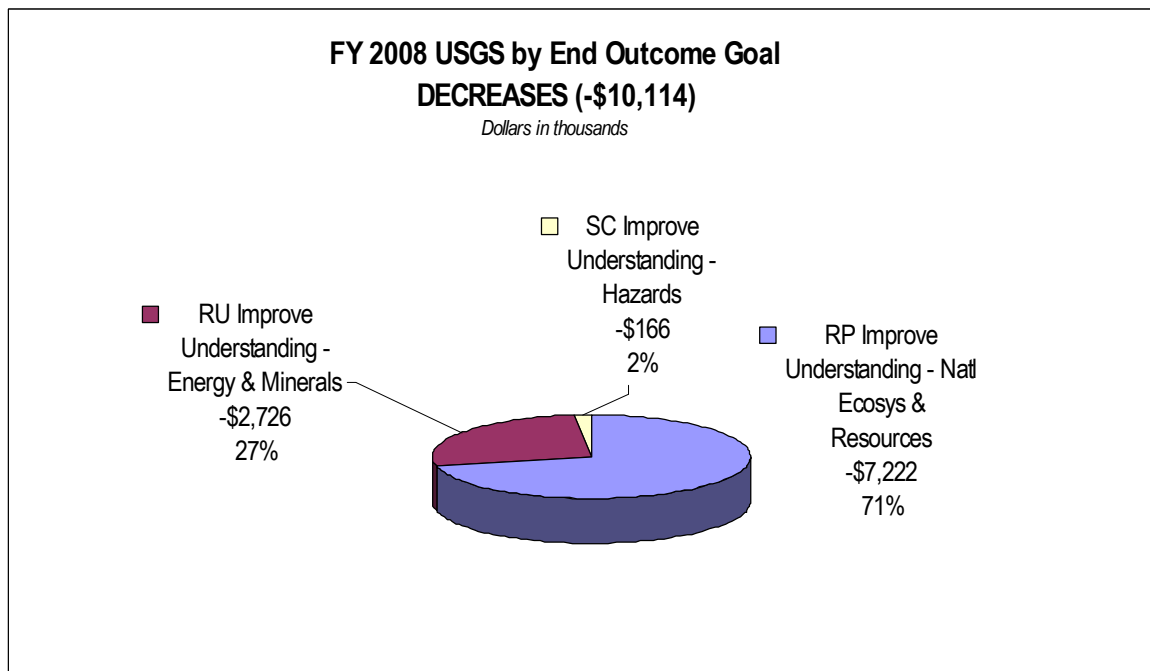
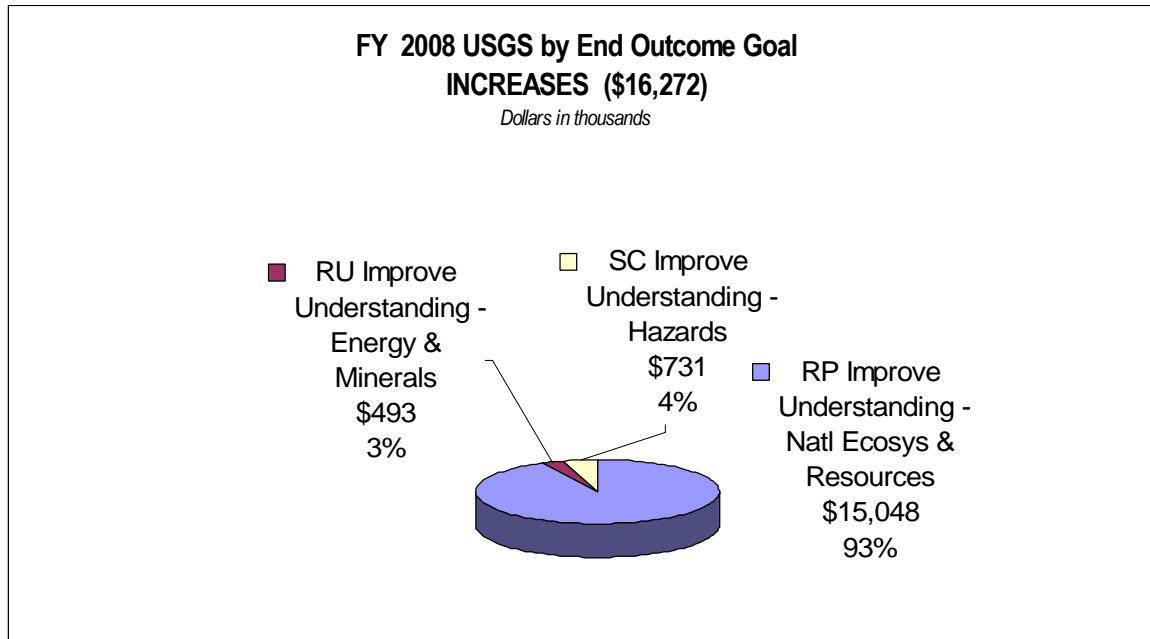
The FY 2008 budget requests \$620,091,000 for **Resource Protection**, a net programmatic increase of \$20,105,000 from FY 2007 President's Request, including increases totaling \$9,650,000 for the Healthy Lands Initiative, Ocean Action Plan, Hydrologic Networks and Analysis program, and decreases totaling \$6,000,000 for Priority Ecosystem Science, Commercial Remote Sensing Space Policy Support, Cooperative Water Program, and Wildlife Ecology and Contaminant Biology. Resource Protection goal represent 59 percent of proposed USGS increases, and 59 percent decreases, and 63 percent of the total USGS budget. In addition, a Facilities funding increase to improve the Patuxent Wildlife Research Center will support the Resource Protection goal.

The FY 2008 budget requests \$56,686,000 for **Resource Use**, a net programmatic decrease of \$230,000 from FY 2007 President's Request, including a decrease of \$2,614,000 in mineral research and assessment activities. Resource Use represents 26 percent of proposed USGS decreases, and 6 percent of the total USGS budget.

The FY 2008 budget requests \$84,008,000 for **Serving Communities**, a net programmatic change of \$1,612,000 from the FY 2007 President's Request. Serving Communities presents 9 percent of the total USGS budget.

General Statement

The 2008 budget requests \$214,167,000 for **Management Excellence**, a net programmatic change of \$8,705,000 from 2007 President's Request, including increases totaling \$6,622,000 for the FBMS and Patuxent Wildlife Research Center Improvement, and decreases totaling \$1,500,000 for Enterprise Information. The Management Excellence goal represents 41 percent of proposed increases, 15 percent of proposed decreases, and 22 percent of the total budget.



The USGS vision, mission, and strategic direction focus on responsiveness and customer service, underscoring the application of science to customer, partner, and other stakeholder

needs. They direct the combined expertise of the bureau's scientific disciplines and define its commitment to pursuing a multidisciplinary approach to providing science for a changing world. An overview of how the USGS science and information support the Department's Strategic Plan follows.

Resource Protection

Improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment

Interior's resource protection mandate has grown dramatically, both in terms of the numbers and types of resources involved and in the complexity of the associated management issues. Interior administers resource protection programs on thousands of upland, wetland, and aquatic parcels within the Department's direct jurisdiction and provides resources for conservation activities on non-Federal lands. Extreme changes in the environment are less costly if their likely effects can be mapped, quantified, and anticipated. Resources can be more efficiently used if the impacts of their extraction can be predicted and mitigated. Damaged or endangered ecosystems can be repaired more effectively if the natural processes that form and maintain them are accounted for in remediation and restoration plans. Strategies for conserving and using the Nation's lands and resources are improved when the natural processes at work are incorporated into predictive models and management plans in an adaptive manner. USGS science programs work collaboratively with many organizations across the country to provide critical information to assist land and resource management agencies, partners, stakeholders, customers, and the general public with timely information to inform their decisionmaking. (see Partnerships, page A-24, for examples).

Interior addresses four outcome goals in the Resource protection mission area: lands and waters, fish and wildlife, culture and heritage, and improving understanding of ecosystems and natural resources. To improve understanding, the USGS produces scientific assessments and information on the quality and quantity of our Nation's water resources; collects, processes, integrates, archives, and provides access to geographic, geospatial and natural resource data; and conducts multi-purpose natural science research to promote understanding of earth processes. USGS' multiple scientific disciplines combine their expertise in interagency ecosystem initiatives across the United States, from South Florida to the Puget Sound, where scientists are working together to understand, evaluate, and provide options for better resource management decisions. The development of new methods and techniques allow USGS scientists to work more efficiently and cost effectively. For example, the USGS developed data collection protocols for use with palm pilots/personal digital assistants in the field for collecting amphibian information. This technology allows field scientists to collect data in real time for the Amphibian Research and Monitoring Initiative database without having to return to the office to enter the data on computers.

For FY 2008 the USGS is requesting a funding increase of \$5 million for the **Healthy Lands** Initiative to conduct the research needed to ensure the long-term viability of wildlife and habitat of the Green River Basin in Wyoming, which are undergoing rapid change in response to energy resource development. An additional 6 systematic analyses will result in the budget year and an additional 14 systematic analyses in the outyears will accrue as a result of the funding increase. Three additional workshops and 4 real-time groundwater sites will also be installed and operated. For the **Oceans Plan**, an increase of \$3 million is requested to augment USGS ability to work with other Federal agencies, local entities, State partners, and existing observing systems to identify

General Statement

critical observational needs, address observational gaps, and identify model development priorities that will lead to improved support for decision-making relevant to those issues of greatest concern to the management community. Initially one additional workshop will be held and new water-quality monitoring sites will be added after an evaluation and gap analysis of current regional water quality monitoring networks is completed. This approach to the Network design has been approved by Council on Environmental Quality, National Science and Technology Council and the interagency Advisory Committee on Water Information. For the **National Streamflow Information Program**, an additional \$1,650,000 will increase the number of real-time streamgages reporting in the National Water Information System by 103. All programs contributing to these initiatives have been rated "moderately effective" or better in the PART evaluations. Additional support for the Resource Protection goal is provided by a Facilities funding increase jointly proposed by USGS and FWS on a roughly equal basis to support critical utility infrastructure replacement for their collocated facilities on the Patuxent Wildlife Research Center, Laurel, MD.

Resource Use

Improve the understanding of energy and mineral resources to promote responsible use and sustain the nation's dynamic economy

Managing the vast resources of America's public lands has been a core Interior responsibility since the Department was founded in 1849. The lands and offshore areas that fall under Interior's sphere of influence today supply roughly 30 percent of the Nation's domestic energy production, including 35 percent of the natural gas, 35 percent of the oil, 44 percent of the coal, 17 percent of the hydropower, and 50 percent of the geothermal energy. Managing resources has become increasingly more complex. Today, we are often called upon to determine where, when, and to what extent renewable and non-renewable economic resources on public lands should be made available. That task demands that we balance the economy's call for energy, minerals, forage, and forest resources with our resource protection and recreation responsibilities. USGS research on and assessments of undiscovered non-fuel mineral and energy resources assist the Department's land management agencies in their goal of providing responsible management of resources on Federal lands.

Each Interior bureau has a role in implementing the President's National Energy Policy addressing more than 100 actions dealing with the development of renewable and alternative energy sources such as solar, geothermal, wind, gas hydrates, and oil shale. The USGS is the primary provider of earth science energy resource information and assessments for a variety of stakeholders in addition to Interior, including Federal agencies such as the U.S. Department of Agriculture Forest Service, and Department of Energy, local and State agencies and coal and electric power producers. The USGS Energy Resources Program (ERP) conducts national and global energy research on and assessments of oil, natural gas, coalbed methane, gas hydrates, coal, geothermal resources, oil shale, and uranium; evaluates environmental and human health impacts associated with production, use, and occurrence of energy resources; and provides information for the Nation to make sound decisions regarding increases or changes in domestic energy production or mix with an understanding of potential impacts on the environment.

The United States is the world's largest user of mineral commodities. Processed materials of mineral origin accounted for more than \$478 billion in the U.S. economy in 2005. This represents an increase of 14 percent in a year when the GDP increased by just under 8 percent. U.S. manufacturers and consumers of mineral products depended on other countries for

100 percent of 16 mineral commodities and for more than 50 percent of 42 mineral commodities that are critical to the U.S. economy. Current and reliable information about both domestic and international mineral resources and the consequences of their development informs decisions about supply and development of mineral commodities. The USGS Mineral Resources Program is the sole Federal provider of scientific information for objective resource assessments and unbiased research results on mineral potential, production, consumption, and environmental effects. Land managers and policymakers use this information to support resource use decisions to enhance public benefit, promote responsible use, and ensure optimal value. Among the tools and technologies developed and employed in these functions are new robotic technologies that automate geochemical analyses, saving both time and money, and Web-based data delivery tools that serve 125 years of mineral resource, geochemical and geophysical data to land managers, Federal agencies responsible for national security and economic policy, the public, and other research scientists.

The 2008 budget proposes to reduce the Mineral Resources Program to 97 percent of the 2007 funding level to maintain a limited Federal program, providing selected information and analyses that focus on the Department's goals. The scaled-back program in 2008 will complete one site-specific mineral resource project for Federal land management agencies in the lower 48 States, provide regional-scale geologic data and mineral resource assessments in one area of Alaska, collect data on domestic and international production and utilization of approximately 70-80 essential mineral commodities, and manage four national-scale long term databases.

Serving Communities

Improve the understanding, prediction, and monitoring of natural hazards to inform decisions by civil authorities and the public to plan for, manage, and mitigate the effects of hazard events on people and property

The Department is responsible for protecting lives, resources, and property; providing scientific information to reduce risks from earthquakes, landslides, and volcanic eruptions, and fulfilling the Nation's trust and other special responsibilities to American Indians, Native Alaskans, and residents of Island Communities. The United States is subject to a variety of natural hazards that can result in considerable human suffering and billions of dollars in property and business losses. The occurrence of these hazardous events is inevitable and largely uncontrollable. However, the extent of damage and loss of life can be reduced through preventative planning; social, economic, and engineering adaptations; real-time warning capabilities; and more effective post-event emergency response. Central to this preplanning is the availability of accurate, scientifically based geologic hazards assessments and real-time warning systems that define the nature and degree of risk or potential damage. The more precisely risks can be defined the greater the likelihood that appropriate mitigation strategies will be adopted (e.g., building codes for new construction and retrofitting; land-use plans; and design and location/routing of critical infrastructure such as highways, bridges, subways, water, sewer, gas, electric, local zoning regulations, and petroleum-distribution networks). The sooner information reaches emergency response centers the sooner teams can be dispatched to resolve time-sensitive medical, utility, or other infrastructure problems. Under the Stafford Act (P.L. 93-288), Interior is responsible for issuing timely warnings of potential geologic disasters to the affected populace and civil authorities in the United States and delegates this responsibility to USGS. For foreign disasters, the USGS works with the Agency for International Development's Office of Foreign Disaster Assistance (USAID/OFDA) in responding to appeals for technical assistance from affected countries.

General Statement

USGS geologic hazards programs conduct targeted research, gather long-term data, operate monitoring networks, perform assessments and modeling, and disseminate findings to the public, enabling the Nation's emergency management capabilities to warn of impending disasters, better define risk, encourage appropriate response, and mitigate damage and loss. These programs are designed to produce information and understanding that will lead to a reduced impact of natural hazards and disasters on human life and the economy.

For earthquakes, the USGS operates the Advanced National Seismic System (ANSS), which includes a national Backbone network, the National Earthquake Information Center, the National Strong Motion Project, and 15 regional seismic networks operated by USGS and its partners. When earthquakes strike, ANSS delivers real-time information, providing situational awareness for emergency-response personnel. In regions with sufficient seismic stations, that information includes—within minutes—a ShakeMap showing the distribution of potentially damaging ground shaking, information used to target post-earthquake response efforts. When fully implemented, ANSS will provide such dense station coverage for all at-risk urban areas. Information from ANSS is a key input to the USGS National Seismic Hazard Maps, which help communities in earthquake-prone regions develop safer building practices.

For volcanoes, the USGS has made steady annual progress on both monitoring and hazard-assessment efforts. Using supplemental funds provided by the FAA, the volcano monitoring network has been expanded, on average, each year to include two previously unmonitored volcanoes. At the end of FY 2006, the program was monitoring 51 volcanoes. On average, one to two volcano hazard assessments have been released to customers each year, and there has been steady progress on development of community response plans in the Cascades. The program estimates that 256 counties or comparable jurisdictions are threatened by volcano hazards. At the end of FY 2006, 190 had adopted or were served by emergency management organizations that had adopted response plans based on USGS volcano hazard assessments. Development of a National Volcano Early Warning System (NVEWS) is now a major goal of the USGS following an assessment of volcanic threat and monitoring capabilities for all 169 of the Nation's active volcanoes (USGS Open-File Report 2005-1164; <http://pubs.usgs.gov/of/2005/1164/>).

For landslides, hazard assessments provide the scientific basis for land-use, emergency management, and loss reduction measures. Landslide hazard research concentrates on understanding landslide processes, developing and deploying instruments that monitor threatening landslides, and forecasting the onset of catastrophic movement of future landslides. Research into processes and forecasting methodologies is conducted on the types of landslides that produce losses in the United States such as landslides related to steep slopes, heavy rains, and vegetation loss due to wildfires. The USGS deploys near-real-time monitoring systems at sites in California, near Yosemite National Park and in Oregon in Portland and near Newport. These sites provide continuous rainfall and soil-moisture and pore-pressure data needed to understand the mechanisms of landslide occurrence. The USGS provides timely information through the National Landslide Information Center (NLIC) which maintains several databases: the Landslide Bibliography (more than 15,000 entries), the International Landslide Experts Roster of about 2,000 entries, and Major Landslide Events of the United States (part of the USGS National Atlas). The NLIC also has real-time measurements from on-going landslide monitoring projects available for viewing via the Internet. These measurements are used to forecast landslide movement or changes in an individual landslide's behavior. Monitoring can detect early indications of rapid catastrophic movement. Up-to-the-minute or real-time monitoring provides immediate notification of landslide activity, potentially saving lives and

property. Continuous information from real-time monitoring also provides a better understanding of landslide behavior for scientists, engineers, and public officials.

No change in funding is proposed for geologic hazards programs in FY 2008.

Management Excellence

Manage the Department to be highly skilled, accountable, modern, functionally integrated, citizen-centered, and result-oriented

Successful management is imperative to meet strategic mission goals. To succeed, USGS will need increased accountability for results, more effective means of leveraging available resources, and the continuous introduction and evaluation of process, structural, and technology improvements. The Department's management approach is guided by the Secretary's key business principles: accountability and modernization/integration. In the Interior Strategic Plan, our goals of Accountability and Modernization/Integration and the President's Management Agenda converge to form a non-mission area of the strategic plan—Management Excellence. Like the programmatic mission areas, Management Excellence is structured to include outcome goals and strategies with associated performance measures. Each aspect of the President's Management Agenda is reflected within this framework. USGS supports Management Excellence goals throughout the organization with dedicated funding in Science Support and Facilities as well as the information security, technology, and resource components of Enterprise Information (EI).

Science Support funds the executive and managerial direction of the bureau, as well as bureau sustaining support services. Science Support has four components: leadership activities, the Office of Administrative Policy and Services, the Office of Human Capital and bureauwide costs. Facilities funds provide safe and functional workspace and facilities for accomplishing the bureau's scientific mission. The appropriated funds cover approximately 80 percent of recurring USGS facilities costs. Customers, through reimbursable funding provide approximately 14 percent, and USGS science programs provide the remaining funds. The Facilities Activity comprises rental payments, operations and maintenance, and deferred maintenance and capital improvement.

The EI Activity serves as the focal point for the bureau's information-related resources and activities; information technology infrastructures (networks, hardware and software); information and communications policies and standards; and information services (such as libraries, information centers, and the USGS presence on the Internet). EI strengthens scientific inquiry within USGS and the broader natural science community by having a more efficient and less complex path to relevant USGS information in all forms – and enhanced access to services that deliver science information that can easily be understood, shared, and applied. Through a randomly selected, telephone survey in early 2006, the Pew Internet and American Life Project report found that 40 million Americans rely on the internet as their primary source for news and information about science. Half of the Internet users reported using at least one of the following six websites: National Geographic, USGS, NASA, the Smithsonian, Science.com, and Nature.com. When these websites were ranked according to the number of Internet users looking for general information, USGS's website tied for third place with National Geographic, while Discovery and PBS ranked first and second, and NASA was fourth. **About 23 percent [of internet users] have been to the main website of the U.S. Geological Survey, considered**

General Statement

the main U.S. government site for earth science information

(http://www.pewinternet.org/PPF/r/191/report_display.asp).

The 2008 budget request includes an increase of \$1.972 million for implementation of a Department-wide Financial and Business Management System (FBMS), to support the Bureau's share of the 2008 charge from the Centralized Billing Working Capital fund. Department-wide, the 2008 budget includes \$40.4 million in appropriated funding for implementation of FBMS. The 2008 request supports implementation of new modules for property and initial budget formulation. The 2008 budget proposes to increase the Deferred Maintenance & Capital Improvement Subactivity by \$4,650,000. USGS and the FWS are jointly proposing to fund, on a roughly equal basis, critical utility infrastructure replacement for their collocated facilities on the Patuxent Wildlife Research Center, Laurel, MD.

Means and Strategies

USGS employs a robust and cyclic requirement for science planning, program reviews, cost center reviews, management control reviews, peer reviews, Capital Planning and Investment Control and continues to refine these processes. This array of tools is coordinated with PART evaluations, base analysis, and is also beginning to include the results of ABC/M to further instruct our planning processes. Quarterly Status of Funds and Performance reviews with the Executive Leadership Team and Quarterly Investment Review Board meetings maintain cognizance of the infrastructure supporting science, expenditures, and results.

Workforce planning and strategic management of human capital are crucial to achieving science goals and are an integral part of the USGS planning processes. Workforce plans focus on building and maintaining internal capacity and using creative solutions to address rapid changes in technology and ensuring workforce flexibility through the use of contractors and term appointments. USGS organizations continue to implement various strategies such as utilization of VSIP/VERA authorities, restructuring programmatic activities, organizations and positions, and training and targeted recruitment to achieve workforce goals. Organizational development efforts continue through the use of the USGS Organizational Excellence Model as a tool to analyze the linkage between organizational dimensions (people, processes, structures and leadership and management) and organizational performance in order to focus on the most critical levers for success and to effectively manage organizational change brought about by competitive sourcing, workforce adjustments and restructuring activities. The Administrative Management business area is now the focus of our largest business strategy review, to-date, with over 1,800 fulltime equivalent (FTE) positions. A Steering Committee and three Review Teams have been created to handle this effort. Business strategy reviews are a preliminary step in determining whether cost-savings and greater efficiency can be achieved by competitively sourcing or reengineering all or parts of the business area--or leaving it as it is. The reviews take into consideration future program/function directions; organizational and geographic structures; current and future workforce skills; and those activities that need to be accomplished by USGS employees.

At the USGS, science is our mission--but the business behind the science is equally important in helping to keep our research going. Leaders must stay on top of ever-increasing mandates and internal controls related to management and administrative issues while supporting employees, customers, and the science. This past year the USGS held managers' workshops. Through ten 2-hour courses during two November meetings in Nashville, TN, and Phoenix, AZ, USGS cost-center chiefs spent 9 hours a day learning the latest on accountability, project management, acquisition, and contract topics, among others. Fellow USGS employees from

across the bureau taught nearly all of these courses relative to their area of expertise. These meetings were followed in March by a national meeting of Administrative officers. It's rare for all our leaders to be in the same place at the same time. The meeting allowed USGS to provide a large number of employees consistent information on policies, procedures, and guidelines and allowed greater potential to share resources by not duplicating effort. Sharing important administrative information face to face and hearing perspectives from those who meet the challenges of implementation were valuable aspects of these meetings. The workshops were more cost effective than having multiple meetings at multiple locations throughout the bureau. USGS is reviewing all the feedback received from the attendees to figure out not *if*, but *how often* we should conduct these excellent collaborative, cost-saving learning opportunities.

Science Planning

One of USGS strengths is the variety of backgrounds and perspectives represented in our disciplines and many offices across the Nation. The value of this variety holds especially true at the highest levels of decisionmaking—that's why the Bureau Program Council (BPC) was created by the Director in 2005. The BPC reports to the Director and consists of the Associate Directors, Regional Directors, Associate Director for Administrative Policy and Services (also serves as the Bureau's CFO), and Associate Director of Budget and Performance representing our major science, administrative, and regional offices. Using the Director's Outlook as reference, these leaders guide high-level funding decisions and program planning at the USGS.

Program planning is the process through which good ideas become excellent science. This process depends on collaboration--collaborative program planning helps ensure that ideas that originate at every level of the USGS have a real chance of being implemented. This process brings a level of corporate commitment to endeavors. The BPC:

- Conducts the annual program planning process across organizational structures and disciplines,
- Ensures the planning is responsive to the Director's Outlook, meets the Department's bureau science needs, and supports decisionmaking by customers and partners,
- Seeks input from chief scientists, program coordinators, regional executives, and science center directors, as well as customers and stakeholders, and
- Reviews program 5-year plans and recommends approval by the Director.

By bringing unique viewpoints from their various backgrounds, BPC members work together to review ideas from throughout the bureau and from our partners and stakeholders. The BPC then uses these ideas to help guide future USGS activities with recommendations to the Director of USGS.

Science Strategy

There is broad consensus in the United States and worldwide that the Earth is facing enormous pressure from growing human populations and the increasing impact of societal activities. The challenges associated with observing, understanding, interpreting, and managing natural resources require broad thinking and concerted action. In response to this need, the Acting USGS Director formed a team of scientists in early February 2006, with a charge to develop a unified science strategy to outline how USGS might effectively respond to major emerging societal issues using our wealth of scientific capabilities. This does not mean that USGS is abandoning its core programs and activities, but rather the bureau will be using the Science

General Statement

Strategy to help identify the most significant opportunities for advancement and benefit to society to help USGS establish its science priorities for the next decade.

The Science Strategy Team (SST) reviewed literature from within and outside USGS to identify the greatest societal challenges the Nation is facing now and into the future. The following societal issues/topics emerged from these deliberations: 1) Energy and Minerals, 2) Natural Hazards, 3) Environmental Aspects of Human Health, 4) Water, 5) Climate, and 6) Ecosystems. Challenges and science questions were developed in relation to these societal issues and were vetted through customer and partner listening sessions and the Department's R&D Council in May 2006 to validate and begin prioritizing them.

Next the SST solicited ideas from all USGS employees for large scale bold science initiatives that could help USGS answer these science questions with societal relevance. The SST received nearly 100 suggestions for big science ideas and met to review and synthesize these suggestions. The SST utilized these ideas to develop six strategic science directions which became the framework for its report. The Science Strategy Team spent the month of August drafting its report and this report was submitted to USGS leadership in September. The Executive Summary of the draft Science Strategy "Facing Tomorrow's Challenges: USGS Science in the Coming Decade" presents the following six science directions (not in priority order):

- Understanding Ecosystems and Predicting Ecosystem Change: Ensuring the Nation's Economic and Environmental Future
- The Role of the Environment and Wildlife in Human Health: A Warning System for Environmental Risk to Public Health in America
- A Water Census of the United States: Quantifying, Forecasting, and Securing Freshwater for America's Future
- A National Hazards, Risk, and Resilience Assessment Program: Ensuring the Long-Term Health and Wealth of the Nation
- Climate Variability and Change: Clarifying the Record and Assessing the Consequences
- Energy and Minerals for America's Future: Providing a Scientific Foundation for Decision Makers

In addition, the Team's report emphasizes the importance of the USGS developing state-of-the-art cyber infrastructure and informatics tools necessary for effective internal collaboration and external communication with our clients and customers.

The six strategic science directions and the computational infrastructure enhancements outlined above are themselves interrelated. Their interaction, correlation, and interplay reveal the complexity of the Earth's natural, physical, and life systems. Developing new understanding therefore requires a "systems" approach that calls upon the full range of USGS capabilities. The USGS, with its breadth of scientific expertise, can provide an important perspective on the entire web of interrelated natural processes that affect national and global well-being. Each strategic direction contains an associated set of recommended strategic actions that are designed to achieve this systems approach and enhance the USGS tradition of science in service to the Department of the Interior and the Nation.

During the fall and early winter of 2006/7 the SST met with the USGS Executive Leadership Team, the Bureau Planning Council, and the Director to present the recommendations

contained in the Science Strategy Report, and to gather and discuss comments from these reviewers. The SST is currently planning to reissue its report in March 2007 with modifications reflecting comments and suggestions received during the review process.

Strategic Change

In a strategic move to strengthen geographic research and to consolidate geospatial data programs, the Director instituted a forward-looking program realignment in 2006 and an associated budget restructure was proposed in the 2007 Budget request. The decision to reorganize geospatial information and geographic research is in direct response to:

- Discussions with constituent groups about how best to meet their geospatial data needs;
- Recommendations from a report by the NRC of the National Academies; and
- Improvements generated in response to PART evaluations.

In January 2005, in an effort to further strengthen and align the geospatial data activities of USGS, the bureau created the National Geospatial Technical Operation Center (NGTOC), a single organization having a national capability and the potential to consolidate its four mapping centers (Reston, VA; Rolla, MO; Lakewood, CO; and Menlo Park, CA). The NGTOC supports all map production activities and technical services associated with the National Geospatial Program, including the previous Cooperative Topographic Mapping program, management of the Federal Geographic Data Committee, Geospatial One Stop, and Interior's Enterprise Geospatial Information System. Services provided by NGTOC include geospatial data integration and quality assurance, cartographic production, contract management, software and applications development, and hosting of geospatial data and applications. An A-76 study is underway that allows the Denver and Rolla offices to compete as Most Efficient Organizations. The Menlo Park, CA, office closed October 27, 2006; and the Reston, VA, office closed January 5, 2007. The NGTOC A-76 study is proceeding, with an anticipated award date of September-October 2007.

Program Evaluations

Program evaluations are an important tool in analyzing the effectiveness and efficiency of our programs, and evaluating whether they are meeting their intended objectives. Programs are evaluated through a variety of means, including performance audits, PART, financial audits, internal control reviews, and external reviews from Congress, OMB, Office of the Inspector General, and other organizations, such as the National Academy of Public Administration and the National Academy of Science. These reviews, which may take several years to complete, are critical to maintaining the USGS reputation for scientific excellence and credibility as well as providing guidance for future research needs. The evaluations improve the accountability and quality of programs, but also identify and address gaps in programs; redirect or reaffirm program directions; identify and provide guidance for development of new programs; and review and (or) motivate managers and scientists.

Two recent external reviews of the USGS Cooperative Water Program (CWP) were conducted under the auspices of the Advisory Committee on Water Information. The most recent, in 2004-2005, was a 5-year progress review on implementation of recommendations from the first review, conducted in 1999.

General Statement

The review Task Force found that "Significant progress has been made by the USGS since the release of the 1999 Cooperative Water Program Task Force report. Although the total number of water monitoring stations is slightly lower now than in past years, the number of stations across the country for which real-time water resources monitoring data are available is significantly higher, which has been of great benefit to water users, water managers and the general public. Furthermore data quality has improved, due in part to the ability of the new telemetry equipment to help identify faults in a timely manner and the advent and use of acoustic technology."

In choosing budget offsets for 2008, the USGS opted to reduce the number of interpretive cooperative studies, rather than reduce cooperative data collection activities. This continues the trend of preserving and improving monitoring activities so vital to the program's stakeholders.

Both internal and external reviews are conducted by USGS and non-USGS scientists, technicians, or specialists not involved in the specific proposal, project, program, or product under review. The goal is to conduct an independent external peer review of ongoing programs about every 5 years, combined with more frequent independent internal management reviews.

Additional examples of program reviews

2006 Completed

National Academy of Science/National Research Council

- National Academy of Science "Beyond Mapping: The Challenges of New Technologies in the Geographic Information Sciences"
- American Society of Photogrammetry and Remote Sensing, "Panel Report to USGS on Digital Orthoimagery" (External Review)

Scientific Advisory Committees

- National Cooperative Geologic Mapping Program
- Earthquake Hazards Program
- National Satellite Land Remote Sensing Data Archive (Archive Advisory Committee)
- Review of USGS Cooperative Water Program (Advisory Committee on Water Information)
- Cost Benefit Analysis of WRD Streamgaging Program (National Hydrologic Warning Council)
- Vulnerability and Risk Analysis for Decision Making

PART

- Coastal and Marine Geology Program

2007 Planned

National Academy of Science/National Research Council

- Earth Science Applications from Space
- River Science
- Center of Excellence in GIScience
- Research Priorities in Earth Science and Public Health

2008 Planned

National Academy of Science/National Research Council

- Water Resources Program
 - Volcano Hazard Program External Review
-

Data Validation and Verification

In keeping with departmental and OMB policy for performance data validation and verification, USGS complies with requirements for performance data credibility. USGS approach to achieving performance data credibility includes providing extensive Budget and Performance Integration and ABC/M training, performance measures linked to appraisals of SES and subordinates, and implementation of the Department Data Validation and Verification (V&V) Assessment Matrix. During 2008, USGS will continue the Data V&V process and procedures including USGS-specific measures, outputs, PART and Management Excellence performance measures. This extends assurance of credibility to more performance data ensuring usability for management decisionmaking and oversight.

Completion of Department Data V&V Assessment Matrix for all performance data is vital to support audits ensuring that quality assurance measures are in place to verify and certify performance data accuracy. During 2006, USGS provided 2005 Data V&V materials and data sources to the Department's contractor, Grant Thornton, who performed a review of performance V&V practices throughout the Department. Grant Thornton's report dated April 18, 2006, states:

"USGS complies with the requirements for performance data credibility, utilizing an approach that includes providing Budget and Activity Based Cost Management training, SES performance measure alignment, and implementation of the Department Data V&V Assessment Matrix. In FY 2004, USGS expanded the initial scope for data V&V to include USGS-specific measures, outputs, all PART and Management Excellence performance measures. Strong compliance of data V&V procedures was found across all program offices within the USGS."

"The USGS has a standardized checklist of validation and verification procedures that is distributed to all program offices. This standardized form has worked well for USGS, and has the potential to be a model for how other Bureaus and agencies in DOI document validation and verification procedures."

Specific areas of weakness that were identified in the report have been a Plan of Action.

Partnerships

One of the pillars of achieving Interior's Strategic Plan is developing partnerships to advance our missions. The USGS values collaborative relationships and actively seeks out opportunities to build mutually productive partnerships. The importance of partnerships in keeping science relevant and in leveraging scarce resources has been demonstrated throughout the description of achieving mission goals. Various types of partnership vehicles employed by USGS programs are described at <http://www.usgs.gov/partnerships.html> to encourage and facilitate collaborative endeavors.

The USGS has actively supported the Administration's **Cooperative Conservation** initiative and has submitted a request for increased funding in 2008 on the basis of the Wyoming Cooperative Conservation initiative. Executive leadership participated in the White House Conference on Cooperative Conservation in August 2005. Case studies and keynote speeches highlighted many of the USGS programs and collaboration efforts. A data base of case studies, some of which were presented at the Conference can be found at:

General Statement

www.cooperativeconservationamerica.org. Senior leadership is actively involved on *both the* DOI Partners and Cooperators Team *and the* Interagency Cooperative Conservation Team, which is developing implementation plans for key recommendations from the Conference. *USGS also provides leadership for the DOI Human Capital effort to design department-wide leadership training focused on partnership development*. Additionally, USGS employees have provided leadership in the development and support of a new Cooperative Conservation Web site at: <http://cooperativeconservation.gov>.

Since 2000, the USGS organization has been aligned with collaborator-based regions to, in part, promote collaboration with partners in the development of science and information management. Additionally, the bureau continued to expand partnership capability by establishing new geospatial liaison officers in five additional States. In FY 2006, the USGS held its first bureau-wide scientific modeling conference. Modeling is a fundamental component of USGS science. USGS scientists develop and use increasingly sophisticated models as a way of understanding complex systems and phenomena as varied as earthquakes, invasive species, or ground water. A wide variety of USGS modeling work was showcased. Scientists from the Bureau of Reclamation, the EPA, NASA, and the USDA provided perspectives about modeling programs and capabilities in other agencies, and on opportunities for interagency collaboration. Participants were charged to focus on where the USGS can make the most significant advancements, on what critical partnerships and relationships would be needed, and to consider the data and information technology infrastructure requirements of their future modeling environments. USGS committed to supporting virtual environments where modelers from different organizations could co-develop integrated models and to providing future opportunities for modelers to interact. For more information about the conference's key recommendations:

<http://modelingconference.er.usgs.gov/fmi/iwp/cgi?-db=Registration-v2&-loadframes>.

In FY 2006 the USGS, FWS, NPS, and BLM signed a historic agreement with the International Association of Fish and Wildlife Agencies (IAFWA). Building on a previous agreement among the USGS, the USFWS, and IAFWA, this new accord expanded, combined, and strengthened resources on common science and research issues. Through coordination by IAFWA, this agreement encourages the agencies to work together to address threats of diseases such as avian influenza or the West Nile virus, handle the ecological impacts of hurricanes, or measure the economic effects of invasive and prevalent species, as well as other challenges that threaten our Nation's human, wildlife, and land health.

The USGS was instrumental in the development of the Department's "partnership and collaboration" element of the SES performance standards. USGS also designed a "Partnership Development Tool" that promotes partnerships with purpose and has since become the benchmark for the Department. The tool is being used by Interior bureaus as well as other agencies to facilitate true partnering by drawing each collaborator into discussions and promoting shared ideas and growth opportunities. USGS employs a formal "listening session" approach and takes quite seriously the opportunity for dialog that regular engagement with customers and partners affords us. The most recent listening session solicited input to the USGS Science Strategy (see page A-19). The bureau plans to strengthen that foundation of partnership and relationship and to make the opportunities for collaboration readily available and more robust. As evidence of the commitment to partners and collaborators, the entire USGS Executive Leadership Team (ELT) is involved in the listening sessions, as each of them is vigorously involved with their constituents throughout the year. The Director has charged each member of that team to actively pursue the feedback provided at the listening sessions and to address how to meet customer needs and input, underscoring this commitment with

partnership-focused measures in ELT performance plans. Customer satisfaction surveys are routinely conducted for partnerships throughout our organization. USGS works with partners to develop shared performance measures. Examples of the depth of partnerships are documented throughout the budget document. The breadth of USGS coordination may be demonstrated in the following representative listing of USGS crosscutting relationships with Federal, State, local, non-government, and international organizations.

NASA and USGS are working in partnerships to ensure continued acquisition and availability of Landsat-quality data to support long-term global monitoring and other important Land Remote Sensing programs of national significance (<http://dcm.usgs.gov>). In addition, the USGS, NASA, and other Federal agencies, under the direction of National Science and Technology Council (NSTC) are working together to develop a plan to ensure the long-term continuity of operational land imaging for the U.S. The National Geospatial Program Office has worked closely with the States, counties, and Local government to help coordinate geospatial data collection with Federal bureaus and private entities in support of Homeland Security and other critical national needs.

The USGS works closely with its partners and customers in defining priorities, developing science plans, and carrying out research to support their needs. Key partners in many of these endeavors include Interior bureaus, other Federal agencies, States, and private organizations with regional and ecosystem-specific interests. An example is the effort to involve managers in private, public, and non-governmental organizations in understanding the effects of energy development and energy-distribution networks, particularly in the western United States, on achieving multiple-use, sustained-yield, and conservation goals for a variety of cultural and natural resources. USGS participated in a workshop which brought together energy industry, State governments, universities, NGOs, Bureau of Land Management, U.S. Forest Service, and U.S. Fish and Wildlife Service, to derive a common understanding of energy development and raptor conservation issues. The event defined priority goals and strategies and began to assemble the resources and partnerships necessary to implement them.

The USGS collaborated with U.S. Fish and Wildlife Service and Colorado State University to develop a volunteer-based invasive species monitoring program for National Wildlife Refuges. USGS researchers developed sampling protocols, trained refuge staff, and advised volunteers from the local community to gather extensive field data on high-priority weeds in the Hart Mountain National Wildlife Refuge in Oregon. Other Refuges plan to build on the success of this collaboration and implement programs based on the same protocols in the coming year. Creating networks of trained volunteers for invasive species surveys is the first step in creating a cost-efficient early detection and rapid response program in the National Refuge System.

Each node of the NBII is developed through the collaboration of the partners and customers involved with that node. All together, NBII has over 250 partner organizations and agencies that help define the direction both of individual nodes and of the NBII as a whole.

The USGS serves as the primary source of hydrologic information to many other Federal agencies and to American Indian and Alaska Native governments. USGS work through reimbursable and cost-share programs prevents the need to duplicate a hydrologic staff in the partner agencies and ensures that the collected data will be entered into a standardized national database so the information will be readily available to all potential users. The diverse programs also result in new techniques and capabilities that are then put to use in the appropriated programs of the USGS.

General Statement

The breadth of USGS coordination may be demonstrated in the following representative listing of USGS cross-cutting relationships with Federal, State, local, and non-government, and international organizations.

Federal
National/Governmentwide: National Geospatial Program Office, The National Map, National Spatial Data Infrastructure, National Biological Information Infrastructure, National Earthquake Hazards Reduction Program, U.S. Global Change Research Program, National Atlas, Geographic Names, Imagery, elevation and hydrography data collection programs, Civil Applications Committee, lead implementation of Commercial Remote Sensing Space Policy for civilian agencies
Agriculture/Forest Service: Endangered Species, Conservation genetics, Habitat management, Forest planning, Wildlife, Invasive species, Fire science, National Forest maps, Drought/Fire fuel monitoring and management, Energy and mineral resources, Natural hazards, Mine lands, Land cover characteristics, Hydrologic data collection/studies. Topographic maps, digital orthophoto and elevation data, <i>The National Map</i> , National Hydrography Dataset, and geographic names
Commerce/NOAA: Endangered Species, Salmonid restoration, Coral reefs, Hazards monitoring and research, Geomagnetism, Vegetation change, Coastal erosion, Fish habitat, Marine sanctuaries, GIS, Commerce/NIST: Earthquake Hazards, coastal and bathymetric mapping
Defense: Geospatial Coordination with States, Endangered Species, Salmonid restoration, Coral reefs, Coastal erosion, mapping support during conflict, Natural hazards, Test ban monitoring, Strategic minerals and energy resources, Geomagnetism, Terrain visualization, Hydrologic data collection/studies. Environmental contamination and remediation studies on military bases, NORTHCOMM, High-resolution imagery over urban areas
Defense/Army Corp of Engineers: Endangered Species, Habitat assessment, Fish behavior, Fish physiology, Dam impacts, Wetlands restoration, Seafloor mapping, Shoreline stability, Floodplain morphology, Mine lands, Energy resources, Natural Hazards, Hydrologic data collection/studies
Energy: Endangered Species, Bio-resource monitoring, Contaminant cause and effects, Gas Hydrates, Mining technology, Energy resources, Geologic hazards, Groundwater framework, Coalbed methane, Hydrologic data collection/studies
EPA: Endangered Species, Endocrine disruption, Contaminant effects, Status/Trends, Mine lands and drainage, Emissions modeling/clean air, Water quality, Seafloor mapping, Geochemical analyses, Coal resources and mining, Urban dynamics/land characterization, Hydrologic data collection/studies Remote sensing, Mineral baselines, GAP Analysis, National Hydrography Dataset
Homeland Security/Federal Emergency Management Agency: Hazards monitoring and mitigation, Hydrologic data collection/studies, Floodplain mapping, providing emergency maps, elevation data
Health and Human Services: Chemical Analyses
Intelligence Community: Information coordination, Environmental/ resource studies, Hazards Support, Geospatial data coordination.
Interior/BLM: Rangeland Health, Wild Horse Management, Invasive Species, Abandoned Mine Lands, Air Quality, Threatened and Endangered species, Water Quality, Mineral Resource Assessments, Prescribed Fire, mapping of National Petroleum Reserve/Alaska (NPR/A), mapping and geospatial data and analysis, National Hydrography Dataset
Interior/BOR: Water quality, Ecological models, Decision Support Systems, Seismic Monitoring.
Interior/FWS: Inventory and Monitoring, Aquatics and Contaminants, Biological resources, Threatened and Endangered species, Water Quantity/Quality, GAP Analysis, Geospatial data
Interior/MMS: Gas hydrates
Interior/NPS: Water quantity/quality, Geologic mapping, Biological resources, Volcano hazard assessment, mapping and geospatial data, National Hydrography Dataset
Interior/OSM: Acid mine drainage
Justice: GIS
Labor: Energy resources
National Academy of Science: Hazards studies, Geographic research, Evaluating licensing of geospatial data, K-12 geography curricula

National Aeronautics and Space Administration (NASA): Planetary research, Landsats 5 and 7 operations, design of Landsat Data Continuity Mission. Natural hazards, Earth Science research, Data management, Land Processes Distributed Active Archive Center, GIS, United Nations Environment Program clearinghouse, Remote sensing, Spaceflight support; Shuttle Radar Topography Mission
National Institutes of Health: Human health and environment, West Nile virus mapping with CDC
Interior: FWS, NPS; USDA: Animal and Plant Health Inspection Service, the Centers for Disease Control and Prevention: Highly Pathogenic Avian Influenza
National Science Foundation: Hazards studies, Antarctic research and mapping, Global seismology
Smithsonian Institution: North American vertebrate collections, Volcanic hazards
State: Natural hazards, Energy resources, Global seismology, Hydrologic data collection/studies, Famine Early Warning System, Pan American Institute of Geography and History, Geospatial Support.
Tennessee Valley Authority: Hydrologic data collection/studies
Transportation/Federal Highway Administration: Hazards studies, Hydrologic data collection/studies
Transportation/Federal Aviation Administration: Volcanic hazards
U.S. Agency for International Development: Geologic hazards, Hydrologic data collection/studies, Energy resources, Atmospheric moisture index
State and Local Government
Airports: Volcanic hazards
American Indians/Alaska Natives: K-12 educational resources, Streamgaging, Water quality/quantity, Technical training and capability upgrade, Environmental hazards, Fisheries research, Invasive species, NativeView for American Indian colleges and universities, and geospatial support
Civil Defense: Hazards mitigation
Departments of Natural Resources/Geographic Information Councils: Volcanic hazards, Map data integration, Hydrologic data collection/studies , Orthoimagery
Departments of Environmental Protection/Quality/Health: Hydrologic data collection/studies, Mapping data
Departments of Fish and Game/Conservation Commission/Wildlife and Parks: Endangered species, Population dynamics, Habitat requirements, Fire management, Fisheries, Wildlife disease, Invasive species, Waterfowl surveys, Bird banding, Aquaculture, GAP Analysis, Geospatial support
Offices of Emergency Management: Hazards monitoring and mitigation, Providing emergency maps
Planning Commissions/Transportation/Engineering/Municipalities: Conservation plans, Hydrologic data collection/studies, Topographic mapping, Hazards monitoring/assessment, Creating decision support systems for local decisionmaking
State Geological Surveys: Geologic and topographic mapping, Hazards assessment
Higher Education: University participation in AmericaView
Water Resources Authorities/Public Works/Sanitation: Contaminant Transport, Hydrologic data collection/studies
Non-government Organizations
American Farm Bureau/American Society of Civil Engineers/Chemical Manufacturers Association/etc.: Coordination of hydrologic programs
American Red Cross: Hazards monitoring and mitigation
Electric Power Research Institute: Coal quality
FERC Permittees/Licensees: Hydrologic data collection/studies, Restoration of Threatened and Endangered migratory fish
Industry: Spatial data modeling, Spatial data browsing and retrieval, Product development, registration, and production, Environmental monitoring, Acid rain deposition program, Hazard monitoring, research and assessments
The Nature Conservancy: Endangered species, Species at Risk, Ecological research, Biological Status/Trends, Coordination of hydrologic programs, GAP Analysis, Decision Support System
National Geographic: Geospatial information coordination
Universities/Cooperative Fish and Wildlife Research Units/State Water Resources Research Institutes: Planetary research, Space-based instrumentation, Natural science information delivery, Natural science research and applications, Hazards research and monitoring networks,

General Statement

Training/education, Geologic mapping, Hydrologic data collection/studies, GAP Analysis
Southern California Earthquake Center (University consortium): Earthquake hazard research and assessment
Utilities: Seismic studies, Hydrologic data collection/studies
NatureServe: NBII, Geospatial Support, Decision Support System
International Association of Fish and Wildlife Agencies: chronic wasting disease
Ducks Unlimited: database development and data access for Latin American And Caribbean waterfowl surveys
The General Public: Breeding bird survey, Bird banding, Water resources education/outreach, topographic maps, topographic mapping
International
Global: The USGS has conducted earth science studies and provided natural hazards support in foreign countries for over 50 years. Authorization is provided under the Organic Act, as revised, and the Foreign Assistance Act and related legislation when such studies are deemed by the U.S. Department of the Interior and Department of State to be in the interest of the U.S. Government.

President's Management Agenda

Budget and Performance Integration

The integration of budget and performance is critical to the planning for and evaluation of success achieved by the USGS in the application of its science to building long term bodies of data and information and ensuring their relevance to partner and customer need. Since 2002, USGS has worked with the Department and the Administration to establish accurate and meaningful performance measures for its programs and to tie the performance to resources in accordance with the President's Management Agenda (PMA). The USGS has been particularly successful in this endeavor, owing to the physical integration of its budget, regional, and planning and performance teams in its Office of Budget and Performance (OBP). Working in constant contact, these teams jointly develop and produce budget and performance documents that are fully integrated with respect to description of base programs and analyses, their funding and FTE implications, what the standards of their performance will be and how they will be evaluated. The three teams work closely with bureau program staff to understand, evaluate, and plan the science programs' budget and performance levels, ensuring responsiveness to USGS executive management decisions, departmental concerns, and Administration policies. USGS has been commended for outstanding program management as evidenced in the consistently high ratings that USGS has received from the Program Assessment Rating Tool (PART). PART outcome and continuous program improvement being major criteria for defining scorecard success, USGS has consistently scored well. The USGS is further advancing performance to the next level in a new set of measures and goals in the legislatively mandated 3-year revision of the Departmental Strategic Plan just published in December 2006.

Program Assessment Rating Tool (PART) — The USGS has a long and rigorous record of conducting external peer reviews for research, performance evaluations for programs, and management control reviews. The PART is another tool for the Bureaus' evaluation processes. Both peer and management reviews as well as PART evaluations are conducted to improve the accountability and quality of programs; identify and address gaps in programs; redirect or reaffirm program direction; identify and provide guidance for development of new programs; and reward and (or) motivate managers and scientists. The National Academy of Science/NRC has conducted recent program reviews of the Water Cooperative Program, and Beyond Mapping: Meeting National Needs Through Enhanced Geographic Information Science. Recent Scientific Advisory Committee reviews include Earthquake Hazards Program, and the National Cooperative Geologic Mapping Program. Other reviews include Panel Report to USGS on

Digital Orthoimagery, Vulnerability and Risk Analysis for Decision Making, and Cost Benefit Analysis of Water Resource Discipline Streamgaging Program. Program reviews planned for FY 2007 include River Science, Center of Excellence in GIScience, Research Priorities in Earth Science and Public Health, and Earth Science Applications from Space.

USGS has particularly focused on program improvement through the PART process. By the end of 2006, USGS PART evaluations stand at nine programs "moderately effective," one program "effective," and none rating "adequate," "ineffective" or "results not demonstrated." During 2005, the Administration introduced a new PART Improvement Plan Process. Every program that had been PARTed was given a PART Summary and set of follow-up actions, which addressed PART findings and improved program performance published on PARTWeb. In essence, PART Improvement Plans replaced previous PART Action Plans. The Administration intends to pursue continuous improvement in all evaluated programs. USGS has addressed all PART recommendations with action plans having milestones and targets approved by the Department and OMB and tracked in the Department's Management Initiatives Tracking System (MITS). All actions are on schedule or, when milestones appear to be delayed for cause, are renegotiated with OMB and the Department and amended in MITS. The Department quarterly reviews ensure accountability of PART programs, milestone progress explanation, target delay explanations and any pertinent implementation impacts of Action Plan implementation.

Cost and Performance — The Department and its bureaus have been working together to implement Activity Based Costing/Management (ABC/M) in concert with a Unified Strategic Plan since 2004. USGS continues to verify and validate data, improve understanding and process application, and has also worked to standardize ABC, Strategic Plan, and PART outputs so that the building blocks of the Strategic Plan can be costed, relationships understood, and management information leveraged. The Department has with this budget submission begun to cost end and intermediate outcome "measures" rather than outputs or end outcome goals. End outcomes by their nature are the cumulative effect of many end and intermediate outcome "measures" which in turn result from the cumulative effect of many outputs. As such, the measures are not necessarily mutually exclusive for costing purposes. Many measures are not budget sensitive and are therefore not costed.

Analysis of ABC data led USGS to conclude that more granularity was needed and USGS began capturing ABC data at the task level rather than project level in 2006. USGS is in the process of analyzing the data to determine what impact it will have on the cost of the bureau's work. General ABC reports and data can be extracted by all managers at all levels on a daily basis for verifying and validating and for performing analyses for decisionmaking. Continued efforts are being applied to standardize processes and ensure consistency of interpretation before ABC data can be confidently used to manage. Several years of implementation will be needed to identify trends in the data that can lead to programmatic decisions.

Examples of how USGS is using ABC/M data follow. Additional examples are provided in each budget activity.

- In the geologic hazards programs, USGS wants to make sure that investments in data collection (monitoring networks); data management (Web sites, national databases, data consortia); and assessments (hazard assessment and mitigation) do not impact robust research on improving our understanding of landslides, earthquakes, and volcanoes. It is this research that is critical in creating the next generation of monitoring and assessment methodologies. In earthquake hazards, for example, USGS tries to retain a

General Statement

steady investment of at least 20 percent of the funding for research through its external grants program and internal research activities. **ABC/M data enable USGS to maintain the correct balance of monitoring, assessment, data management and research for long term viability of the programs.**

- In the coastal States there has been a growing need for technical assistance, hazard monitoring, and hazard assessments with the increase in fires, hurricanes, flooding and population growth. These increases impact investments in other areas, which means a need to shift priorities and funding, create a sustainable increase in emphasis in those areas, plan efficiencies, and leverage coastal State and Federal resources more to ensure investments in supporting activities like coastal hazard research. **ABC/M data enable USGS to monitor long term trends and define regional patterns for the kinds of work our partners need.**
- ABC data for 2004, 2005, and 2006 demonstrate that the cooperative water program has maintained a rough proportion of half data collection activities and half research. Given Administration priorities and PART recommendations for emphasizing data collection, USGS has chosen to reduce research studies (systematic investigations) to maintain data collection (number of streamgages reporting real-time) to the extent possible. **ABC/M data enable USGS to monitor operations to mitigate the effect of erosion of buying power on priorities.**
- One cost USGS is concerned about in the geologic hazards arena is the cost of planning and evaluating programs and meetings associated with this activity. There are many stakeholders who wish to have a voice in planning and evaluation. Also, costs in this area have increased over time. During 2004 these costs were 13 percent of the budget. Subsequent object class analysis of that ABC coded cost revealed that travel was a source of the increase. As a result program managers looked for efficiencies in travel through instituting more conference calls and fewer attendees at meetings, but still achieving planning and evaluation goals. More money for education and technical assistance for landslide hazard mitigation in Southern California. During 2005, planning and evaluation costs were reduced to 11 percent of the budget. In 2006, planning and evaluation costs were targeted at 10 percent and at year-end had achieved a reduction to 8.6 percent. **ABC/M data enable USGS to identify efficiencies in operations to increase funding toward new priorities.**

Capital Asset Planning and Investment Control — Interior uses capital planning and investment control processes to ensure that investments (costs) in capital assets best advance mission goals with minimal risk and lowest life-cycle costs. The USGS IT Capital Planning Coordinator is responsible for developing a maturity framework and goals to ensure that effective capital planning procedures and policies are developed and implemented consistently throughout the bureau. The IT Capital Planning Coordinator manages the process to review and submit USGS capital asset plans for major IT investments, non-major IT investments, and contributions to Department and E-government initiatives. This review includes validation of business cases against current plans by subject matter area experts. The USGS Investment Review Board (IRB) meets quarterly to review IT investments. The USGS IT portfolio business cases approved by the USGS IRB are provided to the Department's Information Technology Management Council and IRB for review. Successful business cases are then included in the Department's IT portfolio as part of the Interior budget submission

GPRA Performance Data Validation and Verification — In keeping with Departmental and Administration policy for performance data validation and verification, USGS complies with requirements for performance data credibility. The USGS approach to achieving performance data credibility includes providing extensive Budget and Performance Integration and ABC/M training, Senior Executive Service (SES) performance measures linked to appraisals, and implementation of the Department Data Validation and Verification (V&V) Assessment Matrix. During 2006 USGS continued the Data V&V to include USGS-specific measures, outputs, PART and Management Excellence performance measures. During 2007 and 2008, the annual recertification process and procedures will continue for performance validation and verification. Completion of Department Data V&V Assessment Matrix for all performance data is vital to support performance audits ensuring that quality assurance measures are in place to verify and certify performance data accuracy.

During 2006, USGS provided 2005 Data V&V materials and data sources to the Department's contractor, Grant Thornton, who performed a review of performance V&V practices throughout the Department. Grant Thornton's findings cited USGS as having V&V certificates in place not just for key Interior measures but also for ALL measures -- Bureau specific and PART as well. Grant Thornton also made four recommendations for improvement and USGS developed and is implementing an Action Plan to address recommendations.

Human Capital

A critical aspect of achieving USGS science goals is an effective human capital management strategy for recruiting, developing, retaining, and managing a highly skilled, flexible, motivated, and diverse workforce. During 2007 and 2008, human capital initiatives will focus largely on continuing: workforce planning and adjustments; succession planning; the completion of business strategies studies in various scientific, management, and administrative program areas for the purpose of competitive sourcing consideration; implementing and updating diversity activities in support of Equal Employment Opportunity Commission (EEOC) Management Directive 715 (MD-715); implementing core competencies for supervisors and managers with additional emphasis on partnering and collaboration skills; developing core competency models for mission critical occupations; identifying organizational measures; developing and deploying E-government initiatives for more effective and efficient human capital program operations; and assisting, researching, and providing logistics on training across the bureau.

Competitive Sourcing

The USGS performs scientific and support activities through a combination of Federal employees and external capabilities and staff. The current workforce balance will require competitive sourcing aspects of scientific and administrative activities in response to mandates contained in the Federal Activities Inventory Reform (FAIR) Act.

The USGS will continue execution of its Business Strategy Review (BSR) process, outlined in the USGS Competitive Sourcing Green Plan 2005–2008. All FTE positions have been grouped into nine functional business areas. In 2007, USGS will complete a Business Strategy Review on *Information Technology* and launch a BSR on *Science*, accounting for approximately 50 percent of total positions on the USGS FAIR Act Inventory. During 2006, USGS completed a BSR on Administrative Management, accounting for approximately 1,800 FTE, and launched a BSR on Information Technology.

Studies will have been completed for the National Water Quality Laboratory, accounting for approximately 112 FTE, and the National Geospatial Technical Operations Center (NGTOC), accounting for approximately 400 FTE (the largest study announced to date by Interior). Both

General Statement

studies will be completed in 2007. USGS completed two studies in the *Science Technician and Science Technical Support* business area, accounting for approximately 58 FTE. Additional studies may be launched based on the results of completed BSRs.

Funds will be required for external expertise for these reviews and studies. The USGS anticipates expending up to \$600,000 in base funds in 2007 (Interior is adjusting caps for bureaus) to support contractor costs (support of Performance Work Statement and Most Efficient Organization development teams), travel, and training in support of the PMA. In addition, USGS FTE resources are required to implement and manage the USGS competitive sourcing initiative, including the oversight of contractor support, development of competitive sourcing plans and management of the FAIR Act inventory collection process. In 2008, the USGS anticipates expending up to \$500,000 in base funds in support of the PMA's Competitive Sourcing initiative.

Financial Performance

A world class financial management organization can best be defined in terms of the business outcomes it produces — outcomes such as improved business analysis, innovative solutions to business problems, reduced operating costs, increased capability to perform ad-hoc analyses, and improved overall business performance. A world class financial management organization performs activities that support optimal investment strategies and systems, as well as optimal alignment of human, physical and financial resources with customer and stakeholder requirements. These activities should be consistent with the broader USGS Strategic Plan and improve the financial rigor and reality we inject into the strategic planning process. USGS has identified several areas where improved financial management can have significant impact and benefit to our external and internal customers.

USGS Financial Managers (FMs) will take a leadership role in developing an enterprise-wide approach to provide reliable and consistent information for decision-making purposes. USGS FMs will work with our program partners to select performance measures that enable managers to effectively assess program results with a focus on outcome measures that achieves superior enterprise performance. USGS FMs will work to engage program managers in using data and targets to evaluate program performance, identify timely opportunities for improvement, and make decisions. To realize this vision, USGS needs to develop automated financial and management reporting capabilities that provide managers with timely strategic information regarding the agency's performance.

During 2006, USGS effectively implemented the new requirements set forth in the revised OMB Circular A-123. The bureau was able to report to the Department that USGS has effective internal control over financial reporting. USGS held a two-day meeting to prepare the guidance for the FY 2007 A-123 Internal Control Reviews Plan (ICRP) and developed its Risk Assessment Methodology to identify where future IC Reviews will occur. The bureau also developed a web-based system to track the location, progress, results and corrective action plans from all IC, program, Inspector General, outside auditor reviews and audits.

USGS is starting a Business Strategy Review (BSR) of its nationwide Administrative and Finance functions. The BSR will seek to identify a minimum of three viable options to improve the efficiency, effectiveness and regulatory compliance of USGS Administrative and Business functions. This will be a significant undertaking, including approximately 1,100 FTE, multiple locations, and touching upon virtually every area of USGS operations. The ensuing analysis will identify, document, and support recommendations made on whether the Finance area or parts

of the Finance area should be maintained as-is, reengineered, proposed for HPO status, or submitted for competitive sourcing study.

USGS continues to dedicate significant resources to the development of the Department's new Financial and Business Management System (FBMS). Interior began work with a new integrator, IBM, during March 2006 and successfully implemented two bureaus in November 2006 with core finance and limited executive management information system functionality.

The scope of the project is to provide a Department-wide solution that significantly improves access to reliable, accurate, current and complete financial and business management information to support the decision-making process throughout all levels of the Department, affecting all employees and operations. FBMS will replace current systems for budget formulation, core finance, personal and real property, financial assistance, acquisition, fleet management, and the executive management information system. High level functionality for budget formulation and project planning will also be replaced.

The Department is currently revising the schedule for out-year bureaus. The changes to the new schedule will include bringing up all functional areas in deployments beginning in fiscal year 2009.

In FY 2006, the bureau received a reportable condition for its Performance and Accountability Report for charge card statements not being signed and dated by the cardholder and the cardholder's supervisor on a timely basis. USGS also received a finding of non-compliance with Single Audit Act of 1984. The bureau has implemented corrective actions to improve our performance in these areas and expects to receive an unqualified financial audit opinion in 2007 and future years, with no instances of reportable conditions or non-compliance with laws and regulations.

E-Government

The Bureau will contribute \$460,400 to support the President's E-Government initiatives through the Department's Working Capital Fund Account. The Departmental Management budget justification includes amounts for each initiative and describes the benefits received from each E-Government activity.

Capital Asset Justifications for the bureau's major IT investments can be viewed at <http://www.doi.gov/ocio/cp/index.html>.

Geospatial One Stop (GOS) — In 2008, USGS has a goal of serving between 20,000 and 25,000 users per month through the Geospatial One-Stop portal. At the end of 2006, the GOS portal catalog contained more than 120,000 geospatial references. This information comes from Federal, State, local, Tribal, and private industry partners. An additional portal feature links information on planned geospatial investments with users seeking information, in order to encourage collaborative projects and leverage resources. These services help promote discovery of and access to geospatial data resources to enhance sharing and reduce duplication. In 2008, USGS will be in year 2 of its managing partner role for GOS, responsible for hosting, leading, and managing the project which has been elevated to be an institutional part of the National Geospatial Program. The USGS also provides the operational funds for the GOS portal. In 2008, GOS will add the capability to view maps in globe view with a search capability that gets more detailed as the zoom increases. The GOS will also be integrated with the National Atlas of the United States and *The National Map* by resolving overlapping

General Statement

functionality where necessary so that GOS can provide reusable catalog, search, and viewing capability for all systems.

Through funding, in-kind technical expertise, collaboration, and scientific data, the USGS also contributes to other E-government initiatives, including Disaster.Gov, Recreation One-Stop, SAFECOM, and E-Records Management.

Enterprise Geographic Information Management (EGIM) — The USGS has a leadership role in the Department's EGIM and Analytical Tools to Support Advanced Integrated Science. Key focus areas of EGIM in 2008 will include: reducing overall GIS training costs; consolidating GIS software test lab functions; enabling more effective software release/update distribution mechanisms; easy access across bureaus to information on best management practices for GIS; integrating across the Department the GIS Help Desk support; and increasing emphasis on cross-bureau sharing and reuse of GIS tools, techniques, and data through a shared knowledge base. The EGIM project will continue to develop guidance and procedures on the Authoritative Data Sources for geospatial data layers in OMB Circular A-16.

Information Security — In 2008, USGS will continue to maintain compliance with the IT security mandates in the Federal Information Security Management Act (FISMA). The resulting improvements to the USGS security infrastructure will include (1) improved IT security plans, (2) enhanced computer incident response capabilities including reporting of security incidents to the Department of the Interior Computer Incident Response Center and United States Computer Emergency Readiness Team, (3) annual incident response training of all USGS personnel, and (4) standard procedures for system configuration and patch management.

Ensuring that bureau networks and systems are secure and protect the integrity of the data are two of the most critical issues facing USGS. Ongoing activities will consist of training and awareness, including both annual IT security awareness training for users and role-based training for employees and contractors with significant IT security responsibilities, as well as assurance and compliance. Management and internal control reviews will be conducted, as well as internal site reviews.

Monitoring and assessment of systems and networks to ensure security compliance will continue to identify potential vulnerability, to detect security intrusions, and to respond effectively to IT security events and incidents, including network penetration testing. The USGS continues to emphasize the improvement of the information security program as one of the bureau's highest overall priorities.

Security Certification and Accreditation — In 2008, USGS will continue to maintain certification and accreditation (C&A) for all 12 of its major IT systems. In addition, the bureau will support the recertification of systems as mandated by Federal law and regulations. The USGS continues to maintain its systems in compliance with FISMA. All 12 C&A documentation packages are current and independently validated. The USGS C&A manager will continue to work closely with system owners across the bureau to ensure that all requirements are satisfied. The USGS submits all 12 C&A documentation packages on a semi-annual basis to the Department's Office of the Chief Information Officer and updates the Department's Enterprise Architecture Repository databases as needed. Improving the quality of IT contingency plan documents and testing procedures continue to be high priority activities for USGS.

Federal Enterprise Architecture — In 2008, the USGS architecture team will be working closely with the bureau Investment Review Board, National Geospatial Program (including

Geospatial One-Stop, Federal Geographic Data Committee, and the Enterprise Geospatial Information Management projects) and the National Geospatial Enterprise Architecture Management Advisory Council in developing the geospatial blueprint for the Department.

The USGS Enterprise Architecture builds upon the Federal Enterprise Architecture (FEA) and Department of the Interior Enterprise Architecture (IEA) frameworks and identifies requirements that are unique to USGS. This includes documenting the architecture for USGS scientific and administrative systems of high strategic value. The USGS Enterprise Architecture (EA) team will continue to identify major USGS IT investment projects and business process re-engineering efforts that are planned or underway. The USGS EA team works closely with the USGS IRB and the bureau C&A team to ensure alignment between investments, systems security, and the architecture.

Capital Planning and Investment Control — The USGS will maintain successful, repeatable processes in the selection, evaluation, and control of major IT investments in 2008. The Capital Planning and Investment Control (CPIC) program will continue to address major IT investments, non-major IT investments, and bureau-specific infrastructure IT investments in the CPIC selection, evaluation, and control process.

Enterprise Services Network (ESN) — By 2008, the Department's ESN project will have gained critical mass, as all bureaus will have (1) passed the connection approval process and will have connected for Internet 1 services at the five Department ESN Internet 1 nodes, (2) connected to the Intranet, and (3) completed "flattening" their networks to ESN. By 2008, it is expected that USGS will have completed connecting all field offices to the ESN, which previously had dedicated circuit connections. Thus, by the end of 2008, all field offices should be monitored and managed by ESN with full 24x7x365 support. USGS will continue its active oversight of the ESN service to ensure that all Service and Operational Level Agreements are met.

During 2008, USGS will be aggressive in completing the migration of its many remote access servers to the Department service, avoiding duplicate expenditures and making the remote access sites easier to manage. With growing use of Internet 2 services, USGS will work with Interior to propose institutionalizing Internet 2 as a departmentwide service, not just a USGS-provided service.

Asset Management

The USGS continues its efforts to manage both real property and other assets and to implement Executive Order 13327, Real Property Asset Management. Asset management principles and practices provide the tools that help USGS provide the space and facilities that are appropriate for world-class science while controlling costs.

Inventory — December 2006, the USGS completed the requirement to provide 24 specific data elements for all USGS owned, leased and State or foreign government-owned assets into the Federal Real Property Profile (FRPP) as required by the Department's Asset Management Plan. The inventory included 56 land, 368 buildings, and 274 structures records. In 2008 and 2009, the USGS will update respectively, the 2007 and 2008 FRPP databases including revised inventory data elements as stated by the Federal Real Property Council (FRPC). USGS will also continue to refine the inventory and participate in Department workgroups that are meeting to develop inventory information in the Financial and Business Management System.

General Statement

Planning — In 2007, USGS completed its first update to the bureau Asset Management Plan in accordance with the Department's Asset Management Plan. The USGS Plan provides a framework, strategic vision and plan of action for effective bureau facilities management. It is a succinct document that is being used by field and management staff for implementing the Department's Asset Management Plan requirements.

In 2007, USGS completed detailed asset business plans for USGS regions, key science centers, and installations. These plans describe the life-cycle issues and portfolio characteristics for the site. They present a 5- and 10-year snapshot of associated assets using standard performance metrics, integrate science and facility planning and thereby align mission needs to facilities in terms of space types, amount of space, cost, location, timing, and space quality.

The first USGS 5-Year Space Management plan was completed in 2007. The USGS 5-Year Space Management plan supports the bureau's Asset Management Plan and Site Specific Asset Business Plans. This plan provides a framework, strategic vision, and plan of action for effective bureau space management of GSA-provided space, USGS direct leases, and owned property. It is used by USGS management to implement bureau space goals, including consolidation, collocation, and disposal. Information contained in this document is focused on mission dependency and program requirements for space.

In 2008, USGS will continue developing planning requirements outlined in the Department's Asset Management rolling 3-year timeline. These include: establishing targets for meeting performance metrics identified by the FRPC; reporting accomplishments in asset performance; and implementing a standardized practice for calculating the current replacement value of facilities and repair projects.

Governance — The USGS has implemented capital planning and investment control procedures to manage more effectively the entire USGS real property portfolio. The USGS IRB reviews proposed facility renovation and construction investments valued at \$2 million or more and proposed leases and GSA occupancy agreements costing \$1 million or more annually. Each USGS region also has a regional investment review board that reviews projects before they are sent to the bureau IRB and reviews projects below the dollar thresholds established for USGS-level review. In another key governance action and pursuant to Executive Order 13327, the USGS has established a Senior Asset Management Officer position to provide executive oversight of bureauwide asset management.

Maintaining Facilities — The USGS conducts comprehensive condition assessments of owned facilities on a 5-year cycle. In 2007, 10 assessments were performed bringing the total number of assessments completed to 24 of 44 in this second 5-year cycle. In 2008, an additional nine assessments are scheduled. These assessments provide baseline information on facility deficiencies and are used to develop a rolling 5-year deferred maintenance plan. Trend analysis on the deferred maintenance backlog can begin as the second round of assessments is completed.

Energy Management

During 2006, the USGS developed a metering plan which outlined how the bureau would meet the requirements of Section 203 in the Energy Policy Act 2005, which requires the installation of advanced electrical meters in all facilities where practical. The metering plan established objectives and the metrics necessary to monitor progress. In 2007, the USGS will begin taking the steps outlined in the metering plan. To measure our progress toward energy reduction goals mandated in the Energy Policy Act 2005, we will re-compete a contract for a web-based system to assist in capturing, storing and analyzing utility cost/consumption data. Also in 2007, the USGS will take advantage of energy-saving opportunities identified during energy audits, condition assessments, etc. In 2008, USGS will continue efforts begun in 2007.

Transportation

In 2006, the USGS made significant progress in implementing the short-term goals of the Fleet Management Strategic Plan (FMSP). The accuracy of fleet data improved and the number of vehicles for which utilization data was routinely entered went from 65 percent to 95 percent of the fleet after programming changes were made to the bureau's data collection application. Bank Charge Card Reports were developed which provide the bureau with more accurate fuel and maintenance cost data. Comprehensive bureau performance measures and utilization goals/standards were established. The DOI Memorandum of Understanding with the Oregon State Agency for Surplus Property was issued to the field, enabling the bureau to sell vehicles via on-line public sales services, thus improving the efficiency of the fleet disposal program, which over time will aid in the long-term goal of reducing the size and age of the fleet. In 2007, the fleet inventory validation and feasibility study will be completed. In 2007 and 2008, the USGS will be implementing the long-range goals of the FMSP, focusing on reducing fleet costs, the average age of the fleet, and fossil fuel consumption.

Environmental Management

The USGS continues to aggressively pursue Environmental Management Systems (EMS) implementation and documentation efforts, with expectations to have all 28 appropriate facilities (those facilities with large enough scope of environmental operations/activities to warrant implementation of EMS) reaching self-declaration by 2008. The USGS is committed to promoting procurement of green products in accordance with the Department's draft affirmative procurement plan, comporting requirements, and guidance within USGS policy, inclusive of screening construction requirements for green purchasing opportunities. The USGS expects to finalize a personal computer disposal policy to support Electronics Stewardship and future reuse and recycling of computer electronics and green purchasing/life cycle management. EMS Conformance and Environmental Compliance audits are accomplished annually and documented within the USGS Inspection and Abatement or Environmental Management Facilitation Systems as appropriate. These systems allow all organizational levels to self assess environmental compliance, inclusive of tracking findings through final abatement action.

Environmental Safeguard Plans

The USGS has significant support functions for many of the Environmental Safeguard Plans. These are outlined in the Emergency Support Functions (ESFs) identified in the National Response Plan (NRP) (e.g., ESF 5, 7, 9, 10, and 11). In each ESF, the USGS support consists of providing scientific information to the principal responding agencies and to other support agencies. However, the scientific information required is of the type that results from our primary mission of scientific observation and research. Consequently, the development of the science needed for emergency response falls well within the capability of the bureau for providing scientific information during normal times.

Research and Development

Research and Development Investment Criteria

The Department is using the Administration's Research and Development (R&D) investment criteria to demonstrate the value of its R&D programs as directed in the 2008 R&D priorities joint guidance from OMB and OSTP. The criteria were developed by the Administration in response to limited financial resources and the multitude of R&D opportunities that exist governmentwide. The criteria are used to rigorously justify new programs and to re-evaluate existing programs for modification, redirection, or termination, in keeping with national priorities and needs. The investment criteria evaluate the **relevance, quality, and performance** for all R&D programs.

To ensure the best value of its limited R&D resources, the Department's R&D Council assists in planning, coordinating, and assessing agency R&D activities. In 2006 the R&D Council provided input to the USGS Science Strategy. Council membership includes one program and one budget representative from each bureau, as well as representatives from the Department.

Integrity remains the foundation of all the Department's science: impartiality, honesty in all aspects of scientific enterprise, and a commitment to ensure that information is available to the public as a whole. The Department is committed to developing common standards for peer review for all scientific research and information across the Department. Departmental standards and practices, developed through a collaborative exercise among Interior scientists, and approved by R&D Council have been introduced as **A Code of Scientific Conduct** with new, commonly agreed upon guidelines on information quality, objectivity, utility, and integrity. The USGS took a leadership role in the development of the Code, which has undergone rigorous review by all bureaus and external stakeholders. As part of the code of scientific conduct, each bureau and office is required to establish procedures to provide appropriate scientific expertise to investigate allegations of misconduct and provide for due process in the conduct of such investigation. The Department asked the USGS to create a model procedure to handle allegations of misconduct. A USGS team of scientists, managers, and human resource specialists worked with Interior's human resource specialists and solicitors to craft the procedure. Violating the Department's Code of Scientific Conduct is currently identified as a violation under "general misconduct." The USGS also developed a process to readily identify employees covered by the code of scientific conduct using the personnel information.

The Office of Management and Budget (OMB) directive, **Final Information Quality Bulletin for Peer Review**, dated December 15, 2004, requires that there be a "systematic process of peer review planning" and access to a list of information products for official dissemination that will be peer reviewed as either influential scientific information or highly influential scientific assessments. "Influential scientific information" means scientific information that USGS reasonably determines will have or does have a clear and substantial impact on important public policies or private sector decisions. An "assessment" is defined by the Administration as: "an evaluation of a body of scientific or technical knowledge, which typically synthesizes multiple factual inputs, data, models, assumptions, and/or applies best professional judgment to bridge uncertainties in the available information." A scientific assessment is considered "highly influential" by the Administration if: "the agency or the OIRA Administrator [Office of Information and Regulatory Affairs in OMB] determines the dissemination could have a potential impact of more than \$500 million in any one year on either the public or private sector or that the dissemination is novel, controversial, or precedent setting, or has significant interagency interest."

USGS developed specific guidance to respond to Administration guidelines and posts required information at http://www.usgs.gov/peer_review/ announcing products that will be peer reviewed as "highly influential scientific assessments." This effort is maintained by the USGS Geospatial Information Office. There currently are no plan entries of influential scientific information. The following titles will be peer reviewed as "highly influential science" and have Peer Review Plans posted on the Web site

- *Southeast Extension of the Southern Whidbey Island Fault, Washington: Implications for Earthquake Hazards*
- *A Preliminary Investigation of the Quantity, Quality, and Potential of the Coal Resources of Afghanistan*
- *Investigation of the Correlation Between the Burning of Locally Mined Coal in Residential Stoves by Navajo People in New Mexico and Respiratory Disease*

Thorough and broad scientific review is central to the **quality** of USGS products. The Executive Leadership Team has developed a set of **fundamental science practices**, philosophical premises, and operational principles that are the foundation for all USGS research and monitoring activities. These fundamental science practices do not address what work the USGS should do but rather how the science is carried out and how the resulting information products are developed, reviewed, approved, and released.

On June 5, 2006, The Fundamental Science Practices Policies were approved and added to the USGS Manual. The new policy was developed to ensure that we adhere to new policies for science quality, to create consistency in how USGS reviews and approves its products, and to ensure that our products receive the appropriate level of policy review. The links to these policies are given below:

SM 502.1 — Fundamental Science Practices: Foundation Policy (<http://www.usgs.gov/usgs-manual/500/502-1.html>)

SM 502.2 — Fundamental Science Practices: Planning and Conducting Data Collection and Research (<http://www.usgs.gov/usgs-manual/500/502-2.html>)

SM 502.3 — Fundamental Science Practices: Peer Review (<http://www.usgs.gov/usgs-manual/500/502-3.html>)

SM 502.4 — Fundamental Science Practices: Review, Approval, and Release of Information Products (<http://www.usgs.gov/usgs-manual/500/502-4.html>)

SM 205.18 — Authority to Approve Information Products (<http://www.usgs.gov/usgs-manual/200/205-18.html>)

The Regional Directors and Associate Directors are responsible for ensuring adherence to these policies and for all decisions related to their implementation. The Associate Director for Geospatial Information and Chief Information Officer, with input from the Regional Directors and Associate Directors, established an implementation team with appropriate representation across the bureau. **Full implementation of the policy will take place May 1, 2007.**

General Statement

The scientific reputation of the USGS for excellence, integrity, and objectivity is one of the Bureau's most important assets. This reputation for reliable science brings authority to data and findings, creates and protects long-term credibility, and ensures that the public trust is met. Peer review has been the **quality** standard for USGS scientific publications and a documented component of USGS policy throughout its 127-year history. USGS policy states that peer review is required for all information products, whether published and disseminated by the USGS or by an outside entity, and regardless of media (print, digital, audiovisual, or Web), if the work was funded, whole or in part, by the USGS or if USGS affiliation is identified with the authorship. Peer review is scrutiny of work or ideas by one or more others (peers) who are sufficiently well qualified, who are without conflict of interest, and who are not associated with the work being performed. USGS programs are also evaluated to ensure the quality and timeliness of their science. The evaluations not only improve the accountability and quality of programs, but also identify and address gaps in programs; redirect or reaffirm program directions; identify and provide guidance for development of new programs; and review and motivate managers and scientists. All USGS programs evaluated by the PART process have a "moderately effective" rating or better.

USGS provides the Knowledge Creation and Management mode of delivery for the Government's Environmental Management, Natural Resources, and Disaster Management services for citizens as defined by the Administration's Business Reference Model. To get at the impact of USGS science on land and resource decisionmaking and therefore its **relevance**, USGS measures customer satisfaction with quality, availability and utility of our science products and measures the use of information in decisionmaking processes such as the Energy Resources Program tracking use of investigations by partners within 3 years of science product delivery and Geologic Hazards programs tracking the percent of communities/Tribes using our science on hazard mitigation, preparedness and avoidance. USGS also takes our ability to leverage resources through partnerships as an additional indication of relevance. To further advance measurement of relevance, USGS has in the PART process pursued development of shared or paired performance measures with other bureaus or agencies. For the PART year just ended, the **Coastal and Marine Geology Program** developed shared or linked measures with the National Park Service and is developing measures with the hazards mitigation community.

The USGS primary product is scientific information. Quantitative measures of our **performance** are tangible and directly related to inputs, but they are primarily outputs (e.g., number of scientific papers published, data collected). The ultimate outcome related to our providing scientific information is that a stakeholder has the information (land manager's inputs) with which to make an informed decision. Quantitative impact measures (e.g., the acreage of ecosystems restored by a land manager) are only indirectly linked to USGS outcomes.

Basic, Applied, and Development

In accordance with OMB Circular A-11, USGS research activities are classified as basic, applied, or developmental research. A definition of each of the categories follows:

Basic — systematic studies directed toward fuller knowledge or understanding of the fundamental aspects of phenomena and observable facts without specific applications toward processes or products in mind.

Applied — systematic studies to gain knowledge or understanding necessary for determining the means by which a recognized and specific need may be met.

Development — systematic application of knowledge or understanding, directed toward the production of useful materials, devices, and systems or methods, including design, development, and improvement of prototypes and new processes to meet specific requirements.

Of USGS \$547 million R&D funding request for 2008, 7 percent is classified as basic research, 83 percent applied research, and 10 percent development. The distribution of basic, applied, and developmental research to goals is provided at the end of this section. USGS science is increasingly being used for decisionmaking, further demonstrating increasing relevance. That does not mean that the entirety of USGS science needs to be applied; as former Director Walter C. Mendenhall said, "There can be no applied science unless there is science to apply."

(Dollars in Thousands)

Budget Activity	2006 Actual	2007 CR	2008 Request
Geographic Research, Investigations, & Remote Sensing	39,372	44,100	42,321
Provides scientific information to describe and interpret America's landscape by mapping the Nation's terrain, monitoring changes over time and analyzing how and why these changes have occurred.			
Geologic Hazards, Resources, & Processes	213,559	212,394	198,216
Geologic hazards programs gather long term data, operate monitoring networks, perform assessments and modeling, and disseminate findings to enable planners to design hazard resistant buildings in areas at risk and emergency responders to warn of impending disasters. Geologic resources programs assess the availability and quality of the Nation's energy and mineral resources. Geologic processes programs research, monitor, and assess the landscape to understand geologic processes to help distinguish natural change from those resulting from human activity.			
Water Resources Investigations	126,949	126,396	118,504
Conducts a wide variety of work related to water availability, water quality, and flood hazards, with efforts including: (1) collection, management, and dissemination of hydrologic data; (2) analysis of hydrologic systems through modeling or statistical methods; and (3) research and development leading to new methods and new understanding.			
Biological Research	180,134	177,581	180,764
Generates and distributes scientific information needed in the conservation and management of the Nation's biological resources.			
Enterprise Information	1,476	5,070	6,970
Conducts information science research to enhance <i>The National Map</i> and National Spatial Data Infrastructure. Investigates methods to derive, display, and utilize seamless, generalized, consistent geospatial data from distributed Federal, State, and local government and private sector data sources. Federal Geospatial Data Committee grants fund developmental research on geospatial data topics.			
TOTAL R&D	561,490	565,541	546,775
TOTAL BUDGET	976,845	962,676	974,952

The following examples demonstrate USGS **basic, applied, and development** research.

Basic Research

New Geochemical Method to Evaluate Bio-available Metals in Low Temperature Water — Performance

Understanding the relationships between metal concentrations and their availability and toxicity to aquatic biota is critical for land managers and regulatory agencies that must assess the impacts of mine drainage to the environment or develop remediation strategies for areas affected by historical mining activities. MRP scientists, in work completed in FY2006, have used a new method, called Diffusion Gradients in Thin Films (DGT), in combination with the Biotic

General Statement

Ligand Model (TBLM) to determine metal bio-availability and toxicity to aquatic organisms and to assist in evaluating the environmental impacts of mine drainage. The DGT method measures the concentration of a dissolved metal that is able to diffuse through membranes with very small pore sizes. It has been postulated that this concentration is similar to the portion of total dissolved metal that is available for uptake by organisms. The Biotic Ligand Model uses the composition of a solution to determine whether dissolved metal concentrations at a given site are too high to maintain a healthy aquatic community. The DGT and TBLM results in several mine drainage systems were in very good agreement with previously conducted toxicity studies at the sites and demonstrated that the relatively easy DGT and TBLM methods can provide land managers with a faster and less expensive alternative to assess and monitor water quality in such systems.

Applied Research

Survival of Paddlefish Released as Bycatch in a Commercial Gill Net Fishery — Relevance

Paddlefish are commercially used for their caviar in six States in the Mississippi River Basin.

Tennessee usually leads the Nation in the amount of eggs harvested each year. Last year, the commercial harvest in Tennessee exceeded 12,000 kg of eggs, which had a retail value of more than \$5.0 million. USGS scientists in close cooperation with Tennessee Wildlife Resources Agency (TWRA) biologists had previously concluded that Tennessee paddlefish stocks were being over-fished. They also noted that too many males and immature female paddlefish were being

caught in commercial gill nets. Many of these males and immature female paddlefish were dead when nets were retrieved, particularly when it was warm. Those fish that were alive were released, but the fate of these accidentally caught fish (known as "bycatch") was unknown. The harmful effect of bycatch on aquatic ecosystems has received considerable attention in recent decades. Bycatch is a serious obstacle to rebuilding depleted marine and freshwater fish stocks around the world. USGS scientists and TWRA biologists teamed up to attach radio transmitters to more than 100 paddlefish that were caught in commercial fishing gear and then released by commercial fishermen because the fish did not have eggs or were too small to keep. The tagged fish were closely monitored for several weeks and researchers concluded that most of the paddlefish released alive as bycatch subsequently survived. Based on these data, TWRA biologists worked with the commercial fishing industry to shorten future fishing seasons, thus eliminating fishing when temperatures are too warm to ensure the survival of undersized paddlefish. Knowing that most released fish will survive improves the chances that future efforts by the State of Tennessee will protect this fishery from being over-fished.

Pesticides in the Nation's Streams and Ground Water, 1992-2001 Relevance

The USGS released a report in March 2006 describing the occurrence of pesticides in streams and ground water between 1992 and 2001. The report concluded that pesticides are typically present throughout the year in most streams in urban and agricultural areas of the Nation but are less common in ground water. Findings show that pesticides are seldom at concentrations likely to affect humans; however, they do occur in many streams (particularly those draining urban and agricultural areas) at concentrations that may affect aquatic life or fish-eating wildlife. The USGS worked closely with the U.S. Environmental Protection Agency (EPA) during the 10-year study because the EPA uses the data extensively in their exposure- and-risk assessments for regulating the use of pesticides. For example, the EPA used USGS data in its risk assessments for the re-evaluation of diazinon, chlorpyrifos, cyanazine, and alachlor. Uses of three of these pesticides (diazinon, chlorpyrifos, and cyanazine) have now been significantly limited, and the usage of alachlor was voluntarily reduced and largely replaced by a registered alternative. The USGS findings show strong relationships between the occurrence of pesticides and their effects, and point out that some of the frequently detected pesticides are declining. As new pesticides are approved for use, the EPA will continue to need monitoring data to ensure that levels in the environment are safe.

Development Research

**USGS EROS Launches New "Virtual" LIDAR Center —
Relevance**

Demand for research using all data generated from Light Detection and Ranging (LIDAR) remote-sensing equipment has increased. This technology has been a proven mapping tool and has been most effective for generating bare-earth Digital Elevation Models (DEMs); however, research on using the entire capability of the data for scientific applications has been hampered by the high cost of collecting LIDAR and by a steep learning curve on using the complexities of LIDAR data. EROS launched a new Web portal designed to assist users in accessing LIDAR remote-sensing data. The Center for LIDAR Information Coordination and Knowledge (CLICK) is designed to facilitate innovation in the scientific community by providing a place for all LIDAR users—inside and outside the USGS—to visit, ask and answer questions, and coordinate with others who are either seeking or have data in their study area. By having ready access to LIDAR data and information, scientists have the opportunity to incorporate that data into their applications. CLICK's main mission is to invite people in the LIDAR community to exchange ideas, information, and even raw point-cloud data for scientific needs. The importance of this idea came from LIDAR users at the 2002 USGS LIDAR workshop in St. Petersburg, Florida. The activity is supported by the USGS Land Remote Sensing Program. To learn more about CLICK, visit <http://lidar.cr.usgs.gov>. CLICK currently holds and is disseminating over 2 terabytes of LIDAR data, has 143 registered members from 23 countries, and has had over 12,000 topic views on its bulletin board since it went public in February 2006.

**Landsat 5 Flight Operations Anomaly Team Wins AIAA Award
Quality**

The USGS Landsat 5 Flight Operations Anomaly Team was selected by the American Institute of Aeronautics and Astronautics (AIAA) to receive the International Space Operations Award for Outstanding Achievement for 2006. The team received the award at the 9th International Conference on Space Operations in Rome on June 19 to 23, 2006. Quoting the citation, the USGS team received the award, "for dedicated efforts in recovering Landsat 5 from two potentially mission ending hardware anomalies and restoring the mission to full operations." In November 2005, the solar array that generates power for Landsat 5 stopped working properly; in March 2006, the downlink transmitter that sends image data to ground stations tripped a circuit breaker and stopped transmitting data. In each case, the Flight Operations Anomaly Team was able to devise corrective procedures and restore the 22-year-old Landsat 5 spacecraft to full operations. As a result of the team's efforts, image data from Landsat 5 continues to be available to scientists around the world.

General Statement

Research and Development Funding by Goal

(Dollars in Thousands)

DOI Goals and R&D Type	FY 2005 <u>Actual</u>	FY 2006 <u>Actual</u>	FY 2007 <u>CR</u>	FY 2008 <u>PB Req</u>
Resource Protection				
1.4 Improve the understanding of nat'l ecosystems & resources				
R&D Basic	18,162	24,577	24,265	25,232
R&D Applied	365,993	377,128	375,104	371,320
R&D Development	28,625	24,924	31,385	33,256
Subtotal, R&D for Resource Protection #1.4	412,780	426,629	430,754	429,808
Resource Use				
2.4 Improve the understanding of energy & mineral resources				
R&D Basic	15,453	15,364	15,307	11,337
R&D Applied	61,816	61,460	61,227	45,349
R&D Development	0	15	59	57
Subtotal, R&D for Resource Use #2.4	77,269	76,839	76,593	56,743
Serving Communities				
4.2 Improve the understanding, prediction, & monitoring of natural hazards				
R&D Basic	2,072	2,147	2,147	2,204
R&D Applied	33,080	34,788	34,841	36,073
R&D Development	21,015	21,087	21,206	21,947
Subtotal, R&D for Serving Communities #4.2	56,167	58,022	58,194	60,224
Total				
R&D Basic	35,687	42,088	41,719	38,773
R&D Applied	460,889	473,376	471,172	452,742
R&D Development	49,640	46,026	52,650	55,260
Subtotal, R&D for All DOI Goals	546,216	561,490	565,541	546,775
USGS Budget Authority	948,564	976,845	962,676	974,952

Key Budgetary Changes

Introduction

R&D Investment Review Process — As required by the President's Management Agenda and the OMB and OST Joint memo on FY 2008 R&D priorities, USGS uses the Administration's R&D investment criteria (relevance, quality, and performance) to improve investment decisions. The bureau reviews R&D investments across its disciplines and weighs the value of existing programs against changing needs and priorities. In general, the USGS Director establishes program priorities for the budget year and issues a call for new initiatives in response to those priorities. He also accepts recommendations for all new ideas, regardless of whether they address the priorities. The Director prioritizes the proposed initiatives on the basis of the following criteria: interdisciplinary science; collaboration and partnerships with Department bureaus, other government agencies, and universities (**relevance**); results of program evaluations; and demonstration of progress toward meeting the Department's **performance** goals and objectives. He selects from the prioritized initiatives those that he feels he can accommodate within the funding target. The amount of increase is directly related to whether there is an allowance within the target for growth, whether all increases must be offset, whether the target itself requires reductions from base, whether fixed cost increases can be requested or must be offset and what efficiencies and economies can be achieved in meeting the priority. The request also addresses those items specifically required by the Department. The CPIC process provides support for decisions on technology and facilities necessary to support science and the business processes of the bureau. The IRB, chaired by the Deputy Director and comprised of senior executives from across the organization, ensures that the Bureau's capital investment portfolio provides the best blend of investments that meet mission and strategic goals and holds asset managers accountable by quarterly review of cost and milestones.

R&D Funding — Research and development is the core of USGS mission. The current USGS 2008 R&D funding request is \$547 million or 56 percent of the USGS budget, an increase of \$14.7 million over the FY 2007 President's Request for R&D funding, but a net decrease of \$18.8 million from the 2007 CR. This net decline is due to decreases in research programs such as the Geographic Analysis and Monitoring Programs, the Mineral Resources Program and the Cooperative Water Program, offset by lesser total increases for research and development initiatives such as the Ocean Action Plan and Healthy Lands Initiatives. Administration priorities and PART recommendations for emphasizing data collection as well as technology and facilities requirements have resulted in proposing increases in some programs that do not increase the level of R&D.

USGS R&D Increases — The 2008 budget proposes R&D funding for a strategic initiative focused on providing the framework science necessary for Interior bureaus and other partners to use in restoration and conservation efforts for Healthy Lands, Communities, and Economies through the Secretary's Healthy Lands Initiative;

Healthy Lands Initiative

Relevance — The Healthy Lands Initiative promotes the concept of cooperative conservation focusing on research that supports healthy upland landscapes. The role of the USGS is to provide the framework science necessary for Interior bureaus and other partners to use in restoration and conservation efforts. The landscape and habitats of Wyoming's Green River Basin are undergoing rapid change in response to energy resource development. The USGS will collaborate with BLM, FWS, USFS, Wyoming State agencies, industry, and non-governmental organizations to build the geospatial framework for sharing information, assess the health of habitats and their resources, and monitor changes in landscape and habitats as energy development proceeds, all to ensure the long-term viability and sustainability of wildlife and habitat in energy development areas.

Healthy Lands Initiative — Relevance

Wyoming's Green River Basin — The USGS brings its portfolio of science expertise to address the real-time land management issues identified by Department resources managers to help decisionmakers build and implement adaptive management solutions. This work builds on past and present scientific studies and assessments in the Wyoming Green River Basin such as the recently completed energy assessment of the basin; land use and land cover studies, vegetative mapping studies, and long-term baseline water monitoring.

The USGS will work with Federal and State land management agencies to identify their highest priority issues that will guide the scientific priorities.

Performance — Initiative efforts will build upon the existing USGS knowledge base and expertise in conducting interdisciplinary studies to examine the environmental impacts of natural events and land use change. This initiative supports the Department's Resource Protection strategic goal of improving the understanding of national ecosystems and resources through integrated interdisciplinary assessment. All programs contributing to this initiative have scored moderately effective or better in PART evaluations, and PART program metrics will be used to measure performance. Activities were defined within the framework of activity based cost/management including establishing and implementing a monitoring strategy and protocols and developing decision support models and adaptive management strategies.

Quality — Peer review and customer satisfaction with new products will define the quality framework.

Performance for Key Budgetary Changes

Healthy Lands – Green River Wyoming +\$5 million										
	2004 Actual	2005 Actual	2006 Enacted	2007 Pres. Budget	2007 Plan	2008 Plan	2009 Est	2010 Est	2011 Est	2012 Est
Resource Protection: Percent of targeted science products that are used by partners for land or resource management decisionmaking	1/1 100%	1/1 100%	1/1 100%	1/1 100%	1/1 100%	7/7 100%	14/14 100%	21/21 100%	21/21 100%	21/21 100%
Resource Protection: Quality: X% of studies validated through appropriate peer review or independent review	1/1 100%	1/1 100%	1/1 100%	1/1 100%	1/1 100%	7/7 100%	14/14 100%	21/21 100%	21/21 100%	21/21 100%
Resource Protection: # of systematic analyses and investigations. Initiative accelerates completion of systematic analyses and investigations to evaluate treatments and develop adaptive management options for sage habitats for the benefit of sage grouse on Department of the Interior managed lands. Initiative starts a total of 20 new systematic analyses and investigations in 2008. Of the 20, 6 will be delivered in FY 2008, 7 in 2009, and 7 in 2010. As funds are incorporated into the base, cycle repeats each year. Performance shown is incremental and not cumulative.										
Performance at Proposed Budget Level	1	1	1	1	1	7	14	21	21	21
Performance Change	0	0	0	0	0	+6	+13	+20	+20	+20
Total actual/projected cost at Budget Level (\$000)	\$200	\$200	\$200	\$200	\$200	\$4,200	\$4,200	\$4,200	\$4,200	\$4,200
Total actual/projected cost without initiative (\$000)	\$200	\$200	\$200	\$200	\$200	\$200	\$200	\$200	\$200	\$200
Actual/projected cost per systematic analysis (whole dollars)	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000
Comments	Systematic analyses, the product of research, require 1 to 5 years for completion. Some studies already underway in these areas will be completed in 2007 and 2008. The influx of new funding will accelerate completion of some research projects in progress as well as initiate other research projects that will conclude in the outyears. The USGS used an annual snapshot of the Resource Protection ABC research work activity cost data averaged over time as a surrogate cost per unit. To this the USGS added a proportional share of the cost derived for the Resource Protection science management activity. For 2004 through third quarter 2006, the average unit cost for systematic analyses is approximately \$200,000 for the Resource Protection mission area, which correlates to the average cost that the program had historically used before implementation of ABC.									
Resource Protection: # of formal workshops and training provided to customers										
Performance at Proposed Budget Level	1	2	2	2	2	5	5	5	5	5
Performance Change	0	0	0	0	0	+3	+3	+3	+3	+3
Total actual/projected cost at Budget Level (\$000)	\$80	\$160	\$160	\$160	\$160	\$400	\$400	\$400	\$400	\$400
Total actual/projected cost without initiative (\$000)	\$80	\$160	\$160	\$160	\$160	\$160	\$160	\$160	\$160	\$160
Actual/projected cost per workshop (whole dollars)	\$80,000	\$80,000	\$80,000	\$80,000	\$80,000	\$80,000	\$80,000	\$80,000	\$80,000	\$80,000

Key Budgetary Changes

Healthy Lands – Green River Wyoming +\$5 million										
	2004 Actual	2005 Actual	2006 Enacted	2007 Pres. Budget	2007 Plan	2008 Plan	2009 Est	2010 Est	2011 Est	2012 Est
Comments	For workshops, which support land managers in applying the science, and are a shorter term product, the USGS used the average unit cost of \$80,000 based on the technical assistance and proportional share of the science management work activity for 2005 for the Resource Protection mission. Other Interior goals will also accrue performance from systematic analyses produced, workshops conducted, and monitoring stations added to the network.									
Resource Protection: # of real-time ground-water sites reporting in NWIS-Web										
Performance at Proposed Budget Level	0	0	0	0	0	4	4	4	4	4
Performance Change	0	0	0	0	0	+4	+4	+4	+4	+4
Total actual/projected cost at Budget Level (\$000)	Costs range from \$1,000 to \$25,000 per well, depending on location, geology, well depth and instrumentation, and need to drill a new well instead of retrofitting an existing one.									
Total actual/projected cost without initiative (\$000)	0	0	0	0	0	0	0	0	0	0
Actual/projected cost per ground water site (whole dollars)	--	--	--	--	--	*	*	*	*	*
Comments	* In the first year of operation, the cost of a single well ranges from \$4,000–\$10,000 and includes the cost of getting permission to use a landowner's existing well, characterization of the site (depth of well, type of pump, establishment of measurement benchmark), and installation of scientific instruments. Wherever possible, the USGS retrofits existing wells with the needed equipment, but if a well is required in a location where none are available, drilling costs can range from \$5,000–\$25,000, depending on terrain, rock type, and the depth and diameter of the well. After the first year, annual operating costs range from \$1,000–\$7,000, depending on frequency of sampling, presence or absence of a recorder, real-time capability, distance of the well from the office, and other factors.									
Note: Because no decisions have been made on outyear funding levels, this table assumes funding will be provided at 2008 current services levels. However, no adjustments have been made to either the funding or cost information for projected increases to accommodate inflation, as it would be a wash.										
Note: The 2007 plan is the performance level based upon a projection of 2007 likely enacted made during the first quarter of 2007. The 2008 plan and out-year targets build on the 2007 Plan. To the extent Congress enacts a 2007 appropriation that is different from the 2007 projection, the 2008 and out-year targets may require revision.										

Goal Performance Table

Funding Goals Table
(Dollars in thousands)

	1.4	2.4	4.2	
RESOURCE PROTECTION				TOTAL
Account/Budget Activity	Improve the Understanding of National Ecosystems and Resources Through Integrated Interdisciplinary Assessment	Improve the Understanding of Energy and Mineral Resources to Promote Responsible Use and Sustain the Nation's Dynamic Economy	Improve Understanding, Prediction, and Monitoring of Natural Hazards to Inform Decisions by Civil Authorities and the Public to Plan for, Manage, and Mitigate the Effects of Hazard Events on People and Property	
Surveys, Investigations, and Research				
Geog Res, Investigations, & Remote Sensing	74,955			74,955
Geologic Hazards., Resources, and Processes	81,391	56,686	84,008	222,085
Water Resources Investigations	212,454			212,454
Biological Research	181,114			181,114
Enterprise Information	104,364	3,125	4,631	112,120
Science Support	57,601	5,266	7,804	70,671
Facilities	82,774	7,566	11,213	101,553
SIR Appropriation, Total	794,653	72,643	107,656	974,952

Please note that the following DOI goals were not applicable to USGS and therefore were not displayed in the table above:
Resource Protection 1.1, 1.2, and 1.3; Resources Use 2.1, 2.2, and 2.3; Recreation 3.1 and 3.2; Serving Communities 4.1, 4.3, 4.4, and 4.5; Management Excellence 5.1 and 5.2 and Other.

Goal Performance Table

Goal Performance Table

Target Codes: SP = Strategic Plan measures PART = PART measures
 TBD = Targets have not yet been developed UNK = Prior year data unavailable
 BUR = Bureau specific measures NA = Long-term target are inappropriate to determine at this time

Type Codes: C = Cumulative Measures A = Annual Measures F = Future Measures

End Outcome Goal: 1.4: Resource Protection: Improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment

End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	Type	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
GPRA End Outcome Measures										
% of targeted science products that are used by partners for land or resource management decision making (SP)	A	UNK	UNK	UNK	UNK	UNK	≥90%	≥90%	0	≥90%
Intermediate Outcome Measures and Bureau and PART Outcome Measures										
Ensure availability of long-term environmental and natural resource information, data and systematic analyses needed by land and resource managers for informed decision making										
% of North American migratory birds for which scientific information on their status and trends are available (SP) (PART) (BRM)	A	UNK	26%	26%	26%	26% (169/650)	26% (169/650)	27.1% (176/650)	+1.1%	27.1% (176/650)
% of targeted fish and aquatic populations for which information is available regarding limiting factors (SP) (PART) (BRM)	A	UNK	31%	31%	31%	37% (44/119)	37% (44/119)	41% (49/119)	+4%	51% (61/119)
% of targeted invasive species for which scientific information and decision support models are available to improve early detection (including risk assessments) and invasive species management (SP) (PART) (BRM)	A	UNK	51.6%	51.6%	51.6%	52.5% (3.15/6)	52.5% (3.15/6)	53.3% (3.2/6)	+0.8%	54% (3.25/6)

Goal Performance Table

End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	Type	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
X% improvement in detectability limits for selected, high priority environmentally available chemical analytes (PART) (BRM)	A	UNK	UNK	6%	6%	12%	12%	20%	+8%	48%
Increase long-term trend precision (decrease bias) for existing species monitored through the Breeding Bird Survey to enable a detection of 50% population decline of relevant species within 20 years (PART) (BRM)	A	UNK	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0	0.0008
X% of CRU students that work on subsequent fish and wildlife science advance degrees or obtain employment in the fish and wildlife or other natural resources field, within targeted dates post-graduation (CRU) (BUR)	A	UNK	UNK	Baseline	95%	TBD	95%	95%	0	95%
X% of focal migratory bird populations for which scientific information is available to support resource management decisionmaking (USGS in coordination with FWS) (PART) (BRM)	A	UNK	UNK	Baseline	UNK	UNK	UNK	UNK	0	NA
X% of US land with land characterization and species distribution information available for resource management decision-making updated in the last 5 years (BIMD PART)	C	18.3%	23.3%	28.3%	42.3%	34%	34%	39%	+5%	18%

Goal Performance Table

End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	Type	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
X% of North American migratory birds for which scientific information on their status (species distribution and number) and trends are available in a standardized and exchangeable format, to improve conservation plans of federal and state agencies (BIMD PART)	C	15%	20%	25%	25%	30%	30%	35%	+5%	55%
X% of North American amphibians and reptiles for which scientific information on their status (species distribution) are available in a standardized and exchangeable format, to improve conservation plans of federal and state agencies (BIMD PART)	C	88%	90%	91%	91%	92%	92%	93%	+1%	97%%
X% of North American mammals for which scientific information on their status (species distribution) are available in a standardized and exchangeable format, to improve conservation plans of federal and state agencies (BIMD PART)	C	91%	93%	94%	94%	94%	94%	95%	+1%	99%
X% of US federally-listed threatened and endangered or indicator fish species for which scientific information on A species status is available in a standardized and exchangeable format to improve conservation plans of federal and state agencies (BIMD PART)	C	2.6%	7.5%	12.5%	12.4%	17.5%	17.5%	20%	+2.5%	28.5%

Goal Performance Table

End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	Type	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
X% of river basins that have streamflow stations (SP) (WRD PART)	C	77%	82% (1825/ 2223)	81% 1800/ 2223)	81% 1800/ 2223)	84% (1870/ 2223)	84% (1870/ 2223)	84% (1870/ 2223)	0	72% (1606/ 2223)
X% of the Nation's 65 principal aquifers with monitoring wells used to measure responses of water levels to drought and climatic variations to provide information needed for water-supply decisionmaking (SP) (WRD PART)	C	60% (39/65)	61% (40/65)	62%	61% (40/65)	60% (39/65)	60% (39/65)	58% (38/65)	-2% (-1)	66% (43/65)
X% of targeted contaminants for which methods are developed to assess potential environmental and human health significance (SP) (WRD PART)	C	10%	20%	30%	85%	33%	33% (55/168)	33% (74/223)	0	73% (72/99)
X% of streamflow stations with real-time measurement/ reporting of water quality (WRD PART)	C	6% (450/ 7451)	7% (520/ 7451)	8%	9%	6% (450/ 7451)	8% (600/ 7451)	5% (400/ 7451)	-3% (-200)	9% (698/ 7451)
X% of ground-water stations that have real-time reporting capability in the ground water climate response network (WRD PART)	C	57%	67% (233/ 347)	67%	47%	63% (220/ 347)	63% (220/ 347)	60% (209/ 347)	-3% (-11)	70% (244/ 347)
X% of U.S. with ground water quality status and trends information to support resource management decisions (WRD PART)	C	0	39%	45%	58%	51%	51%	54%	+3%	54%
X% of States with web based Streamflow statistics tools to support water management decisions (WRD PART)	C	4%	10% (5/50)	18%	14%	20% (10/50)	20% (10/50)	25% (12.5/50)	+5%	30% (15/50)
X% of U.S. with ground water availability status and trends information to support resource management decisions (WRD PART)	C	5% (3.5/65)	7% (4.5/65)	8% (5.5/65)	8% (5.5/65)	7% (4.5/65)	9% (6/65)	6% (4/65)	-3% (-2)	9% (6/65)

Goal Performance Table

End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	Type	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
X% improvement in accuracy of watershed (SPARROW) model prediction for total nitrogen and total phosphorus (measured as reduced error) (WRD PART)	C	40%	31%	32%	24%	32%	32%	32%	0	32%
% of proposed streamflow sites currently in operation that meet one or more federal needs (WRD PART)	C	64%	61%	62%	61%	62%	64%	64%	0	64%
			(2700/ 4425)	(2754/ 4425)	(2700/ 4425)	(2742/ 4425)	(2845/ 4425)	(2845/ 4425)		(2845/ 4425)
% of surface area of the coterminous U.S. for which high-resolution geospatial datasets are cataloged, managed, and available through <i>The National Map</i> (SP) (NGP)	F	UNK	UNK	UNK	UNK	UNK	83% (581/700)	84% (587/700)	+1%	90% (630/700)
% of the area of 11 Western States for which orthoimagery have been acquired through a FSA/USGS partnership with other entities to achieve a 5-year cycle for 1-meter NAIP imagery (BUR) (NGP)	A	UNK	43%	36%	23%	62%	62%	62%	0	62%
% of total cost FSA and USGS saved through partnering with other entities for imagery acquisition of 1-meter NAIP orthoimagery (BUR) (NGP)	A	UNK	44%	40%	41%	36%	36%	0	-36%	0
% of data acquisition costs for <i>The National Map</i> funded by partners (RePART Eff. Measure) (NGP)	F	45%	47%	20%	74%	60%	60%	60%	0	75%

Goal Performance Table

End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	Type	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
% of customers that identify or indicate (via a survey) that USGS NGP Outreach materials and activities (information and publications, conferences, training and workshops) met their needs/requirements (BUR) (NGP)	F	UNK	UNK	UNK	UNK	UNK	UNK	Baseline	N/A	TBD
% of time that USGS managed geospatial data and information dissemination systems (i.e., Geospatial One-Stop Portal, <i>The National Map</i> , NSDI Clearinghouses) are accessible online to customers (BUR) (NGP)	F	UNK	UNK	UNK	UNK	UNK	UNK	Baseline	N/A	TBD
% of GIO partners reporting satisfaction with partnership agreements (BUR) (EIR & NGP)	F	UNK	UNK	UNK	UNK	UNK	UNK	Baseline	N/A	TBD
% of total cost of geospatial data and geospatial services saved through Geospatial Line of Business Joint Business Case (BUR) (NGP)	F	UNK	UNK	UNK	UNK	UNK	UNK	Baseline	N/A	TBD
% of US surface area with contemporary land cover data needed for major environmental monitoring and assessment programs (SP) (Geography) (PART)		45%	65%	75%	75%	95% (286/3)	95% (286/3)	100% (300/3)	+5% (+14)	60% (180/3)

Goal Performance Table

End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	Type	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
% of surface area with temporal and spatial monitoring, research, and assessment/data coverage to meet land use planning and monitoring requirements (Geography) (PART) (Number of completed eco-region assessments out of a total of 84 eco-regions)		31%	37%	48%	48%	53%	60% (50/84)	69% (58/84)	+9% (+8)	Plan completion FY2010
<i>Content and expanse of knowledge base:</i> X% of data accessible: X% of satellite data available from archive within 24 hours of capture (PART Geography)	A	90%	97.2%	90%	98.7%	95%	95%	95%	0	95%
X% of US with regional geologic map coverage that is available to customers through the NGMDB (PART)	C	50.25%	53%	55%	55%	57.5%	57.5%	60.0%	+2.5%	TBD
X% of geologic investigations in National Park Service (NPS) units that are cited for use by the NPS within three years of delivery (NCGM PART)	A	UNK	80%	80%	80%	80%	80%	80%	0	80%
X% of EDMAP students that work on subsequent geoscience degrees or obtain a job in a geoscience field (NCGM PART)	A	95%	94%	95%	95%	95%	95%	95%	0	95%
X% of U.S. with geologic maps that are being integrated into ground-water availability status and trends to support resource management decisions (NCGM PART)	A	3%	5%	6%	6%	8%	8%	10%	+2%	10%

Goal Performance Table

End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	Type	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
# of counties or comparable jurisdictions that have adopted hazard mitigation measures based in part on geologic mapping and research (NCGM PART)	C	UNK	10	12	12	14	14	14	0	19
% of NPS units for which environmental characterization based on airborne remote sensing is provided as digital GIS products and for which products are cited or use by NPS within 2 years (C&M PART)	C	UNK	50%	50%	50%	60%	60%	75%	+15%	75%
% of regional and major topical studies for which interpretive and synthesis products are cited by identified partners and users within 3 years of study completion (C&M PART)	C	60%	80%	80%	80%	80%	80%	80%	0	80%
Intermediate Outcome Measures and Bureau and PART Outcome Measures										
Ensure the quality and relevance of science information and data to support decision making										
% of studies validated through appropriate peer review or independent review (SP)	A	100%	100%	100%	100%	100%	100%	100%	0	100%
% satisfaction with scientific and technical products and assistance for environment and natural resource decision making (SP)	A	90%	96%	≥80%	91%	≥90%	≥90%	≥90%	0	≥90%
PART Efficiency and Other Output Measures										
Average cost per sample for selected, high priority environmentally available chemical analytes (BRM PART Eff Measure)	A	UNK	\$700	\$700	\$680	\$680	\$680	\$650	-\$30	\$567
# of cumulative gigabytes managed (BUR) (BIMD)	C	360	791.25	800	1,134.22	820	820	841	+21	925

Goal Performance Table

End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	Type	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
# of annual gigabytes of geospatial data collected (BUR) (NGP)	A	34,815	6,023	26,728	76,550	25,428	25,428	24,344	-1,084	35,000
# of cumulative gigabytes of geospatial data managed (BUR) (NGP)	C	85,857	108,035	175,207	187,842	200,635	200,635	249,679	+49,044	400,000
# of annual terabytes collected (BUR) (Geography)	A	527.2	438.8	534.0	537.9	534.0	534.0	658.0	+124	658.0
# of cumulative terabytes managed (Geography)	C	2,448.3	2,887.4	3,509.8	3,425.3	4,043.8	4,043.8	4,701.8	+658	7,388.8
# of annual gigabytes collected (Geology)	A	407.2	117.8	210.8	218.8	210.8	210.8	210.8	0	TBD
# of cumulative gigabytes managed (Geology)	C	898.2	1,016.0	1,226.8	1235.0	1,445	1,445	1655	+210.8	TBD
# of systematic analyses & investigations delivered to customers (Total)	A	1,526	2,127	1,632	2,157	1,601	1,732	1,692	-40	1,713
Comments	Improved measure definition during revision of Strategic Plan and rebaselined to improve consistency of application across the Bureau.									
Contributing Programs	Biology Research, Water Resources, Geography, and Geology									
# of formal workshops or training provided to customers (instances/issues/events) (Total)	A	179	403	210	313	192	194	192	-2	194
# of students complete degree requirements for MS, PhD, and post doctoral program under the direction and mentorship of Unit Scientists (CRU) (BUR)	A	106	100	100	103	95	95	90	-5	60
Amount of fire-related data and information available online via the NBII, to assist land managers in fire management decision making (BIMD PART)	C	.5gb	1.5gb	2.0gb	15.42gb	2.5gb	2.5gb	3.0gb	+0.5gb	5.0gb

Goal Performance Table

End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	Type	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
# of Natural History Museum specimen data records available online via the NBII, to assist researchers in identifying and addressing threats to human and animal health (BIMD PART)	C	UNK	20 million		57.6 million	35 million	35 million	42 million	+7 million	53 million
Amount of invasive species data and information available online via the NBII, to assist in modeling and forecasting the spread of invasives (BIMD PART)	C	750 mb	800 mb	900 mb	1,137 mb	920 mb	920 mb	930 mb	+10 mb	970 mb
Average cost per gigabyte of data available through servers under Program control (BIMD PART Eff Measure)	A	\$66,000	\$63,000	\$60,000	\$17,155	\$55,000	\$55,000	\$52,000	-\$3,000	\$44,000
# real-time streamgages reporting in NWIS-Web (WRD PART)	A	5,978	6,246	6,165	6,496	6,195	6,195	6,297	+102	6,297
# real-time ground-water sites reporting in NWIS-Web (WRD)	A	799	796	692	917	685	685	689	+4	689
# real-time water-quality sites reporting in NWIS-Web (WRD)	A	1,062	1,125	896	1,102	887	887	887	0	887
X% of WRD streamflow stations with 30 or more years of record (WRD PART)	C	60% baseline	58% (3622/ 6246)	62%	59%	63% (3902/ 6195)	63% (3902/ 6195)	62% (3913/ 6297)	-1%	66% (4165/ 6297)
X% of daily streamflow measurement sites with data that are converted from provisional to final status within 4 months of day of collection (WRD PART Eff)	C	0% baseline	10%	20%	20%	25%	25%	30%	+5%	50%
Average cost per analytical result, adjusted for inflation, is stable or declining over a 5-year period (WRD PART Eff. Measure)	A	\$8.64	\$8.63	\$8.64	\$8.34	\$8.64	\$8.64	\$8.64	0	\$8.64

Goal Performance Table

End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	Type	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
LDCM: X% of ground system designed, built, and tested (Geography)	C	UNK	UNK	28%	8% (reflects planning stage only)	44%	44% (reflects planning stage only)	85% (reflects planning stage only)	+41%	5% (100%- Mission complete at launch in 2011. Begin planning for next)
# of hours for fieldwork, compilation, and publication of a typical geologic map (NCGM PART Eff. Measure)	A	3,160	3,070	2,980	2,980	2,890	2,890	2,810	-90	2,700
# of State Geological Surveys that add geologic map information to the NGMDB (NCGM PART)	C	47	48	49	49	50	50	51	+1 Measure ends once we reach 51	Measure will end in FY 2008
# of EDMAP students trained each year (NCGM PART)	A	60	62	60	66	60	60	60	0	60
# of conceptual or numerical models developed (Puget Sound GD)	F	2	0	0	0	0	0	1	+1	1
# of digital geographic information products for priority National Park Service units that provide environmental characterization based on airborne remote sensing (C&M PART)	C	3	10	8	8	9	9	10	+1	10
Fraction of significant landfalling hurricanes (coterminous US) for which post-storm assessments of impact are developed (C&M PART)		4/5	3/3	>=3/4	>=3/4	>=3/4	>=3/4	>=3/4	0	>=3/4

Goal Performance Table

End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	Type	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
% of open Ocean and Great-Lakes shoreline of coterminous US for which up-to-date characterization of the shoreline is provided (C&M PART)	C	62%	62%	80%	80%	90%	90%	90%	0	90%
Cost of collection and processing of airborne remote sensing data for coastal characterization and impact assessments (C&M PART Eff Measure)		.58	.56	.55	.55	.47	.47	.35	-.12	.35
# of environmental products in marine protected and managed areas provided for resource management and restoration planning (C&M PART)	C	40	54	63	63	72	72	75	+3	75

Goal Performance Table

End Outcome Goal: 2.4: Resource Use: Improve the understanding of energy and mineral resources to promote responsible use and sustain the nation's dynamic economy

End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	Type	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
GPRA End Outcome Measures										
% of targeted science products that are used by partners and customers for land or resource management decision making (SP)		UNK	UNK	UNK	UNK	UNK	≥80%	≥80%	0	≥80%
Intermediate Outcome Measures and Bureau and PART Outcome Measures										
Ensure availability of energy and mineral resource information and systematic analyses needed by land and resource managers for informed decision making										
# of targeted basins/areas with energy resource assessments available to support management decisions (SP) (ERP PART)	A	5	7	6	6	6	5	5	0	2
% of targeted non-fuel mineral commodities for which up-to-date deposit models are available to support decision making (MRP) (SP)	C	UNK	UNK	UNK	UNK	UNK	Baseline	10%	NA	100%
<i>Baseline Information:</i> Average square miles of the United States with non-energy mineral information available to support management decisions (MRP PART)	C	2,401,329	3,097,647	3,332,038	3,318,208	3,346,737	3,346,737	3,346,737	0	3,346,737
Intermediate Outcome Measures and Bureau and PART Outcome Measures										
Ensure the quality and relevance of science information and data to support decision making										
% of studies validated through appropriate peer review or independent review (SP)	A	100%	100%	100%	100%	100%	100%	100%	0	100%
		(10/10)	(10/10)	(11/11)	(11/11)	(6/6)	(11/11)	(9/9)		(12/12)
% satisfaction with scientific and technical products and assistance for natural resource decision making (SP)	A	UNK	UNK	UNK	UNK	UNK	≥80%	≥80%	0	≥80%
PART Efficiency and Other Output Measures										
# of annual gigabytes collected (ERP)	A	.745	97.793	20.038	158.048	20.038	20.038	20.038	0	TBD

Goal Performance Table

End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	Type	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
# of cumulative gigabytes managed (ERP)	C	211.458	351.289	371.327	509.338	391.365	524.826	544.864	+20.038	TBD
# of cumulative gigabytes managed (MRP)	C	15.420	16.131	16.221	16.221	16.3	16.3	16.3	0	16.3
# of systematic analyses & investigations delivered to customers (assessments) (Total)	A	10	10	11	11	6	11	9	-2	8 or 9
# of formal workshops or training provided to customers (instances/issues/events) (Total)	A	16	16	15	15	11	15	10	-5	11
X% of targeted analyses/investigations delivered which are cited by identified partners within 3 years of delivery (ERP PART)	A	80%	86%	≥80%	82%	≥80%	≥80%	≥80%	0	≥80%
Average cost of a systematic analysis or investigation (ERP PART Eff. Measure)	A	\$2.2M	\$2.73M	\$2.75M	\$1.98M	\$2.75M	\$2.75M	\$2.75M	0	\$2.75M
# of mineral commodity reports available for decisions (BUR)	A	733	746	720	690	700	720	650	-70	600
X% of expected responses for which canvass forms have been converted to electronic format (MRP) (BUR)	C	58%	81%	88%	88%	100%	100%	100%	0	100%
X% of targeted analyses delivered which are cited by identified partners within 3 years after analysis delivered (MRP PART)	A	80%	87%	≥80%	93%	≥80%	≥80%	≥80%	0	≥80%
Average cost of a systematic analysis or investigation (MRP PART Eff. Measure)	A	\$4.31M	\$4.18M	\$4.4M	\$4.3M	\$12.4M	\$3.8M	\$9.0M	+5.2M	\$6M

Goal Performance Table

End Outcome Goal: 4.2: Serving Communities: Improve understanding, prediction, and monitoring of natural hazards to inform decisions by civil authorities and the public to plan for, manage, and mitigate the effects of hazard events on people and property

End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	Type	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
GPRA End Outcome Measures										
% of communities/Tribes using DOI science on hazard mitigation, preparedness and avoidance for each hazard management activity (SP)	C	43.2% (129.7/3)	44.6% (133.7/3)	47.5% (142.5/3)	47.5% (142.5/3)	50.8% (152.5/3)	50.4% (151.3/3)	51.4% (154.1/3)	+0.9%	52.0% (156.1/3)
Comments	The revision of the Strategic Plan added Tribal communities to the metric on % of communities. The tribal component was re-baselined in FY 2007.									
Intermediate Outcome Measures and Bureau and PART Outcome Measures Provide information to assist communities in managing risks from natural hazards										
# of areas for which detailed hazard assessments are completed (SP)	C	UNK	UNK	UNK	49	51	51	53	+2	63
# of urban areas for which detailed hazard maps are completed (PART) (EHP)		2	3	3	3	3	3	4	+1	7
# of metropolitan regions where Shakemap is incorporated into emergency procedures (SP) (PART)	C	5	5	5	5	5	5	5	0	5
% of potentially hazardous volcanoes with published hazard assessments (SP) (PART)	C	61.4%	62.8% (44/70)	64.3% (45/70)	64.3% (45/70)	65.7% (46/70)	65.7% (46/70)	67.1% (47/70)	+4.3%	71.4% (50/70)
<i>Use Rate: Earthquakes:</i> X% of communities/tribes using DOI science on hazard mitigation, preparedness and avoidance for each hazard management activity (07 Plan baseline is 885 at risk counties) (BUR)	C	62.7% (559/891)	63.4% (565/891)	63.9% (569/891)	63.9% (569/891)	64.0% (570/891)	62.8% (556/885) Rebaslined in FY 2007	62.8% (556/885)	0	62.8% (556/885)

Goal Performance Table

End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	Type	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
<i>Use Rate: Landslides:</i> X% of communities/tribes using DOI science on hazard mitigation, preparedness, and avoidance for each hazard management activity (BUR)	C	3.7% (68/1800)	3.9% 71/1800)	4.4% (80/1800)	4.4% (80/1800)	4.9% (89/1800)	4.9% (89/1800)	5.4% (98/1800)	+0.5%	7.4% (134/1800)
<i>Use Rate: Volcanoes:</i> X% of communities/tribes using DOI science on hazard mitigation, preparedness, and avoidance for each hazard management activity (Baseline is 256 at risk counties) (BUR)	C	63.3%	66.4% (170/256)	74.2% (190/256)	74.2% (190/256)	83.6% (214/256)	83.6% (214/256)	85.9% (220/256)	+2.3%	85.9% (220/256)
<i>Use Rate: Landslide Hazards:</i> # of responses to inquiries from the public, educators, and public officials to the National Landslide Information Center on hazard mitigation, preparedness and avoidance strategies for landslide hazards (BUR)	A	1,600	5,200	1,600	1,600	1,600	1,600	1,600	0	1,600
Intermediate Outcome Measures and Bureau and PART Outcome Measures										
Ensure the quality and relevance of science information and data to support decision making										
% of studies validated through peer review or independent review, as appropriate (SP)	A	100%	100%	100%	100%	100%	100%	100%	0	100%
% satisfaction with scientific and technical products and assistance for natural hazard planning, mitigation, and emergency response (SP)	A	UNK	UNK	UNK	UNK	UNK	≥80%	≥80%	0	≥80%
PART Efficiency and Other Output Measures										
# of systematic analyses & investigations delivered to customers (Total)	A	3	6	6	4	5	252	239	-13	197
Comments	Improved measure definition during revision of Strategic Plan and rebaselined to improve consistency of application across the Bureau. Decline in publications in 2008 is due to the increasing priority in recent years to improving earthquake monitoring systems and the level of response to hazardous events necessitated in recent years by the eruption of Mount St. Helens and Augustine									
Contributing Programs	Earthquake, Volcano, Landslide, and Geomagnetism									

Goal Performance Table

End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	Type	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
# of real-time ANSS earthquake sensors (reported yearly and cumulative at the end of the year) (PART) (EHP)	C	95 (cum.523)	40 (cum.563)	106 (cum.669)	27 (cum.723)	40 (cum.763)	40 (cum.763)	17 (cum.780)	+17	0 (cum 780)
Comments	Sensors were rebaselined in FY 2006 to earned-value management accounting.									
% of earthquake monitoring global seismic network stations that have telemetry (increase reporting speed from one hour to 20 minutes)	A	80%	86%	89%	89%	93%	93%	93%	0	95%
# of formal workshops or training provided to customers (instances/issues/events) (Total)	A	14	19	13	15	12	11	12	+1	TBD
# of sites (mobile or fixed) monitored for ground deformation to identify volcanic activity (VHP)	C	85	88	98	94	125	125	128	+3	140
# of areas or locations for which geophysical models exist that are used to interpret monitoring data (PART) (LHP)	C	4	4 1/3	4 2/3	4 2/3	5	5	5 1/3	+1/3	6 2/3
# of volcanoes for which information supports public safety decisions (PART) (VHP)	C	49	+2 (cum 51)	0 (cum 51)	0 (cum 51)	+1 (cum 52)	+1 (cum 52)	0 (cum 52)	0	1 (cum 53)
X% of potentially active volcanoes monitored (x number of 70) (PART) (VHP)	C	67%	72.9% (51/70)	72.9% (51/70)	72.9% (51/70)	74.3% (52/70)	74.3% (52/70)	74.3% (52/70)	0	75.7% (53/70)
# of communities/tribes using DOI science on hazard mitigation, preparedness, and avoidance for Earthquake hazard management activity (PART) (07 Baseline is 885 at risk counties)	C	559	565	569	569	570	556	556	0	556
Comments	The revision of the Strategic Plan added Tribal communities to the metric on % of communities. Rebaselined # counties to 885 in 2007 Plan; EHP using a new counties database.									

Goal Performance Table

End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	Type	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
# of communities/tribes using DOI science on hazard mitigation, preparedness and avoidance of each Landslide management activity (PART) (Baseline is 1,800 counties and parks with moderate to high landslide susceptibility in the U.S. (99-03, 60 adopted measure)	C	68	71	80	80	89	89	98	+9	134
# of communities/tribes using DOI science on hazard mitigation, preparedness, and avoidance for Volcano hazard management activity (PART) (Baseline is 256 at risk counties)	C	162	170	190	190	214	214	220	+6	220
X% data availability for real-time data from the GSN (PART)	A	90.5	89%	90%	88%	87%	87%	86%	-1%	95%
Data processing and notification costs per unit volume of input data from sensors in monitoring networks (in cost per gigabyte) (PART Eff. Measure)	A	0.90 \$/GB (-1%)	0.79 \$/GB	1.42 \$/GB	1.30 \$/GB	1.33 \$/GB	1.33 \$/GB	1.33 \$/GB	0	TBD
Volcano Monitoring Improvements: X% of full monitoring achieved (BUR)	C	UNK	48.9% (227/ 464)	48.7% (226/ 464)	UNK	49.4% (229/ 464)	49.4% (229/ 464)	50.0% (232/ 464)	+0.6%	53.0% (246/ 464)

Goal Performance Table

End Outcome Goal: 5.1: Management Excellence: Increase Accountability

End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	Type	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
GPRA End Outcome Measures										
Obtain unqualified audit (SP)	A	Unqualified Opinion	Unqualified Opinion	Unqualified Opinion	Unqualified Opinion	Unqualified Opinion	Unqualified Opinion	Unqualified Opinion	0	Unqualified Opinion
Establish and maintain an effective, risk-based internal control environment as defined by the Federal Manager's Financial Integrity Act (FMFIA) and revised OMB Circular A-123 (SP)	A	UNK	UNK	100%	100%	100%	100%	100%	0	100%
Intermediate Outcome Measures and Bureau and PART Outcome Measures Improved Financial Management										
Corrective actions: Percent of material weaknesses, and material non-compliance issues that are corrected on schedule (SP)	A	UNK	UNK	100%	100%	100%	100%	100%	0	100%
Corrective Actions: Percent of established targets in Financial Performance Metrics met as defined in FAM No. 2003-015. (SP)	A	UNK	UNK	UNK	UNK	UNK	100%	100%	0	100%

End Outcome Goal: 5.2: Management Excellence: Advance Modernization/Integration

End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	Type	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
GPRA End Outcome Measures										
Percent of systems and lines of business/functional areas associated with an approved blueprint that are managed consistent with that blueprint (SP)	F	UNK	UNK	UNK	UNK	UNK	UNK	Assuming DOI approves GeoLoB blueprint, 2008 will be baseline year.	N/A	TBD

Goal Performance Table

End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	Type	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
Percent of IT systems that have Certification and Accreditation (C&A) and are maintaining C&A status (SP) (EIS&T)	A	UNK	UNK	100%	100%	100%	100%	100%	0	100%
Intermediate Outcome Measures and Bureau and PART Outcome Measures E-Government and Information Technology Management										
<i>Efficient IT Management.</i> Score achieved on the OMB Enterprise Architecture Framework (SP) (EIS&T)	A	UNK	UNK	Level 3	Level 3	Level 4	Level 4	Level 4	0	Level 5
<i>Efficient IT Management.</i> Stage achieved on the GAO IT Investment Management Framework (SP) (EIS&T)	F	UNK	UNK	UNK	63% stage 3	70% stage 3	70% stage 3	100% stage 3	+30%	Stage 4 & 5 targets to be set by DOI
<i>Efficient IT Management.</i> Score achieved on the NIST Federal IT Security Assessment Framework (SP) (EIS&T)	F	UNK	UNK	4	3.37	3.5	3.5	4.5	+1	4.5
<i>Implement Records Management Strategy.</i> % of all bureaus and offices developing consistent records management policy (SP) (EIR)	A	UNK	UNK	UNK	UNK	100%	100%	100%	0	100%
% of USGS IT systems completing the C&A process and/or maintaining C&A status. (BUR) (EIS&T)	F	UNK	UNK	100%	100%	100%	100%	100%	0	100%
IT Investment Management Annual % of USGS IT investments reviewed, approved, and monitored through the CPIC process. (BUR) (EIS&T)	F	UNK	UNK	100%	100%	100%	100%	100%	0	100%
% of earth science instructors in the U.S., K-16, using USGS educational materials (BUR) (EIR)	F	UNK	UNK	UNK	UNK	UNK	UNK	Baseline	N/A	TBD

Goal Performance Table

End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	Type	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
% of customers satisfied with service from USGS IT Service Desk (BUR) (EIS&T)	F	UNK	UNK	93%	94%	94%	94%	94% with expanding customer base	0	97%
% of identified USGS security incidents that receive corrective action within timeframes required by the DOI Incident Response Policy (BUR) (EIS&T)	F	25%	50%	75%	75%	100%	100%	100%	0	100%
Total USGS public web content managed by the enterprise web infrastructure (BUR) (EIR)	F	UNK	UNK	UNK	UNK	UNK	UNK	Baseline	N/A	TBD
Total # of internships and fellowships supported and/or facilitated by the USGS educational program (BUR) (EIR)	F	18	22	30	55	55	55	55	0	55
PART Efficiency and Other Output Measures										
# of new and legacy information products added to the USGS publications database (BUR) (EIR)	F	UNK	UNK	67,500	70,351	67,500	67,500	67,500	0	All legacy completed, and all new added annually.
# of online bibliographic records (BUR) (EIR)	F	4,196	3,872	3,872	6,381	6,381	6,381	6,381	0	80,000
Intermediate Outcome Measures and Bureau and PART Outcome Measures										
Human Capital Management										
<i>Worker Competency:</i> % of employees who have resolved competency gaps in specified occupational groups identified as critical occupations in the Department (SP)	A	65%	65%	65%	65%	UNK	66%	68%	+2%	75%
<i>Safe Workplace:</i> % reduction in lost production days (SP)	C	UNK	6.4 lost production days per 100 employees	6.34 lost production days per 100 employees	5.9 lost production days per 100 employees	UNK	6.28 lost production days per 100 employees	6.21 lost production days per 100 employees	1%	5.97 lost production days per 100 employees

Goal Performance Table

End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	Type	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
<i>Safe Workplace</i> : % reduction in the number of employees on workers compensation rolls (SP) (rounded to the nearest whole number)	C	UNK	UNK	UNK	81%	UNK	79%	76%	+3%	67%
<i>Safe Workplace</i> : % annual reduction in the injury incidence rate (SP)	C	UNK	UNK	UNK	3.25 injuries per 100 employees	UNK	3.16 injuries per 100 employees	3.07 injuries per 100 employees	3%	2.72 injuries per 100 employees
<i>Diversity</i> : The % of managers who have completed the 4-hour required minimum annual diversity/EEO training (BUR)	A	UNK	UNK	UNK	UNK	UNK	20%	30%	+10%	100%
<i>Diversity</i> : The # of MD-715 identified deficiencies that have been corrected (BUR)	A	UNK	UNK	UNK	UNK	UNK	2	3	+1	TBD
<i>Collaboration Capacity</i> : # of volunteer hours per year supporting DOI mission activities (SP)	A	UNK	UNK	UNK	UNK	UNK	200,000	200,000	0	200,000
<i>Cooperative Conservation Internal Capacity</i> : # of employees trained in collaboration and partnering competencies (BUR)	C	UNK	UNK	UNK	UNK	UNK	150 FTE	200 FTE	+50 FTE	400 FTE
<i>Cooperative Conservation External Capacity</i> : % of conservation projects that actively involve the use of knowledge and skills of people in the area, and local resources in priority setting, planning, and implementation processes. (SP)	C	UNK	UNK	UNK	UNK	UNK	Establish Baseline	UNK	UNK	TBD (Establish Baseline in FY 2007)
Intermediate Outcome Measures and Bureau and PART Outcome Measures Organizational Reviews and Acquisitions										

Goal Performance Table

End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	Type	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
<i>Competition:</i> Number of full time equivalent (FTE) in competitive sourcing studies completed during the fiscal year (SP)	F	0 FTE	0 FTE	70 FTE	70FTE	524 FTE	512 FTE	TBD (Unknown until Business Strategy Reviews complete.)	NA	TBD (Unknown until Business Strategy Reviews complete.)
<i>Increase Competition:</i> Percentage of eligible service contract actions over \$25,000 awarded as performance-based acquisitions (SP)	A	37%	48%	40%	25%	40%	40%	40%	0%	40%
Intermediate Outcome Measures and Bureau and PART Outcome Measures Performance-Budget Information										
% of programs with demonstrated use of performance measures in budget justifications and decisions (SP)	C	UNK	UNK	UNK	UNK	UNK	Establish Baseline	TBD	NA	TBD (Establish Baseline in FY 2007)
% of programs that can estimate marginal cost of changing of performance (SP)	C	UNK	UNK	UNK	UNK	UNK	Establish Baseline	TBD	NA	TBD (Establish Baseline in FY 2007)
Intermediate Outcome Measures and Bureau and PART Outcome Measures Facilities Improvement										
% of programs that can estimate marginal cost of changing of performance (SP)		UNK	UNK	UNK	UNK	UNK	Establish Baseline	TBD	NA	TBD (Establish Baseline in FY 2007)
Overall condition of buildings and of structures (as measured by the FCI) that are mission critical and mission dependent (as measured by the API), with emphasis on improving the condition of assets with critical health and safety needs (SP)	A	UNK	UNK	UNK	UNK	UNK	UNK	0.115	0	0.095

Goal Performance Table

End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	Type	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
Percent change in the Operating Costs (operations and maintenance costs) per square foot of buildings that are "Not-Mission Dependent" as reported in the Federal Real Property Profile (FRPP) in the current fiscal year compared to the previous fiscal year. (SP)	A	UNK	UNK	UNK	UNK	UNK	UNK	-5%	0	-5%
Percent change in the total number of buildings (office, warehouse, laboratory, and housing) reported as "Under Utilized" or "Not Utilized" in the Federal Real Property Profile (FRPP) in the current fiscal year compared to the previous fiscal year (SP)	A	UNK	UNK	UNK	UNK	UNK	UNK	-5%	0	-5%
Percent of assets targeted for disposal that were disposed (SP)	A	UNK	UNK	UNK	UNK	UNK	UNK	100%	0	100%
PART Efficiency and Other Output Measures										
# of bureau condition assessments in progress or completed (within a 5-year cycle) (Facilities)	C	41	9	15	14	24	24	32	+8	NA (new 5-yr cycle)
# of deferred maintenance and capital improvements (cumulative) (Facilities)	C	36	53	67	63	74	74	84	+10	96
New Capital Improvement Project (Facilities)	C	UNK	UNK	UNK	UNK	UNK	NA	1	+1	1

Goal Performance Table

This page intentionally left blank.

2008 Budgetary Changes at a Glance
(Dollars in thousands)

	2006 Actual	2007 CR	Fixed Costs Changes	Internal Transfers	Program Changes	2008 President's Budget
Appropriation: Surveys, Investigations and Research						
Geographic Research, Investigations, & Remote Sensing						
Cooperative Topographic Mapping	68,855	0	0	0	0	0
Land Remote Sensing	45,713	61,754	527	0	-850	61,431
Reduce Funding for Commercial Remote Sensing Space Policy Support	[850]	[850]			-850	[0]
Geographic Analysis and Monitoring	14,705	14,860	664	0	-2,000	13,524
Eliminate Priority Ecosystems Science Funding in Geography	[2,000]	[2,000]			-2,000	[0]
Total, GRIRS	129,273	76,614	1,191	0	-2,850	74,955
Impact of the Continuing Resolution [Non-add]		[-11,766]			[11,766]	[0]
Geologic Hazards, Resources, & Processes						
Geologic Hazard Assessments	81,000	82,396	1,612	0	0	84,008
Geologic Landscape & Coastal Assessments	77,752	78,106	1,785	0	1,500	81,391
Increase for Ocean Action Plan (CMG)	NA	NA			1,500	[1,500]
Geologic Resource Assessments	76,534	56,916	2,384	0	-2,614	56,686
Reduce Minerals Research and Assessment Activities	[52,774]	[30,785]	[1,716]		-2,614	[29,887]
Total, GHRP	235,286	217,418	5,781	0	-1,114	222,085
Impact of the Continuing Resolution [Non-add]		[18,067]			[-18,067]	[0]
Water Resources Investigations						
Hydrologic Monitoring, Assessments & Research	142,527	141,876	5,047	0	3,150	150,073
Increase for 3 CA Gages & Gulf Coast Storm Surge Monitoring (NSIP)	NA	NA			250	[250]
Fully Fund National Streamflow Information Program Fixed Costs	[13,944]	[16,764]	[531]		1,400	[18,695]
Increase for Ocean Action Plan (HNA)	NA	NA			1,500	[1,500]
Cooperative Water Program	62,833	62,171	2,410	0	-2,200	62,381
Reduce Cooperative Water Program	[62,833]	[62,171]	[2,410]		-2,200	[62,381]
Water Resources Research Act Program	6,404	0	0	0	0	0
Total, WRI	211,764	204,047	7,457	0	950	212,454
Impact of the Continuing Resolution [Non-add]		[7,839]			[-7,839]	[0]

U.S. Geological Survey

Budget at a Glance

2008 Budgetary Changes at a Glance (continued)
(Dollars in thousands)

	2006 Actual	2007 CR	Fixed Costs Changes	Internal Transfers	Program Changes	2008 President's Budget
Biological Research						
Biological Research and Monitoring	140,086	135,692	3,664	0	4,050	143,406
Secretarial Initiative - Enhance Healthy Lands Studies (Green River, WY)	NA	NA			5,000	[5,000]
Reduce Funding for Wildlife (Mammalian Ecology) Program	[43,900]	[43,900]			-300	[43,600]
Reduce Funding for Contaminant/Endocrine Biology	[2,400]	[2,400]			-650	[1,750]
Biological Information Management & Delivery	23,794	21,967	311	0	0	22,278
Cooperative Research Units	14,664	14,938	492	0	0	15,430
Total, BR	178,544	172,597	4,467	0	4,050	181,114
Impact of the Continuing Resolution [Non-add]		[4,984]			[-4,984]	[0]
Enterprise Information						
Enterprise Information Security and Technology	24,866	25,972	430	0	-1,500	24,902
Reduce Enterprise Functions	[1,500]	[1,500]			-1,500	[0]
Enterprise Information Resources	16,900	16,636	405	0	0	17,041
National Geospatial Program	4,628	68,622	1,555	0	0	70,177
Total, EI	46,394	111,230	2,390	0	-1,500	112,120
Impact of the Continuing Resolution [Non-add]		[-535]			[535]	[0]
Science Support						
Science Support	69,302	67,382	1,317	0	1,972	70,671
Increase for FBMS	NA	NA			1,972	[1,972]
Total, Science Support	69,302	67,382	1,317	0	1,972	70,671
Impact of the Continuing Resolution [Non-add]		[1,920]			[-1,920]	[0]

2008 Budgetary Changes at a Glance (continued)

(Dollars in thousands)

	2006 Actual	2007 CR	Fixed Costs Changes	Internal Transfers	Program Changes	2008 President's Budget
Facilities						
Rental Payments	71,805	72,388	1,240	0	0	73,628
Operations and Maintenance	19,604	19,711	191	0		19,902
Deferred Maintenance and Capital Improvement	3,373	3,373	0	0	4,650	8,023
Increase for Patuxent Wildlife Research Center Facilities Improvement	NA	NA			4,650	[4,650]
Total, Fac Impact of the Continuing Resolution [Non-add]	94,782	95,472 [-2,593]	1,431	0	4,650 [2,593]	101,553 [0]
Subtotal, SIR	965,345	944,760	24,034	0	6,158	974,952
Impact of the Continuing Resolution		17,916			-17,916	0
Total, SIR	965,345	962,676	24,034	0	-11,758	974,952

This page intentionally left blank.

Program Increases

(Dollars in thousands)

Component	FY 2008 Program Change (\$000)	Page Reference
Fixed Costs of National Streamgaging Network	1,400	I-31
Financial Business Management System (FBMS)	1,972	L-1
Patuxent Wildlife Research Center Facilities Improvement	4,650	M-11
Integrated Multi-Hazards	250	F-2, I-31
Healthy Lands Initiative — Green River, Wyoming	5,000	F-4, J-5
Ocean Action Plan ¹	3,000	F-11, H-57, I-43
Total	\$16,272	

¹ \$1.0 million of the Ocean Action Plan increase also supports the Integrated Multi-Hazards Initiative.

Water Resources Investigations

Hydrologic Monitoring, Assessments, and Research Subactivity National Streamflow Information Program

Operational Costs of National Streamgaging Network **+\$1,400,000**

Some of this increase will be used to fully fund operational costs of streamgages in the national streamgaging network that are currently supported by USGS. These operational costs include such items as vehicle costs (acquisition, operation, and maintenance), equipment, supplies, and travel. Most of the rest of the increase will be used to either reactivate recently discontinued NSIP Federal-goal streamgages or to supplement funding for operation and maintenance of NSIP Federal-goal streamgages that are currently active but funded through partnerships with others in cases where there is inadequate funding to keep the streamgage active. The exact allocation of funds between these activities will not be known until late 2007 or early 2008, when partner contributions to network operations for 2008 are better known. This use of funds will help keep the network more stable and reduce the loss of streamgages in the future.

Science Support

Financial Business Management System **+\$1,972,000**

The 2008 budget request includes an increase of \$1.972 million to support the Bureau's share of the 2008 charge from the Centralized Billing Working Capital Fund for implementation of a Department-wide Financial and Business Management System (FBMS). Department-wide, the 2008 budget includes \$40.4 million in appropriated funding for implementation of FBMS. The 2008 request supports implementation of new modules for property and budget formulation. Core financials and eGrants were implemented in the first bureaus in 2006, and the acquisition module is scheduled for 2007. The Department is implementing the system in phases by

Program Changes

Bureaus, with the all bureaus scheduled to be implemented by the end of 2011. The 2008 request will support implementation of the new modules for the Office of Surface Mining and Minerals Management Service, and all modules for the Bureau of Land Management. The 2008 request represents the peak funding year for the project, as it involves the implementation of the remaining modules, and would allow the Department to retire eleven additional legacy systems.

The Departmentwide Programs budget justification includes additional materials supporting this Departmentwide request for FBMS under the Working Capital Fund.

Facilities

Deferred Maintenance and Capital Improvement Subactivity

Patuxent Wildlife Research Center Facilities Improvement **+\$4,650,000**

The 2008 budget proposes to increase the Deferred Maintenance & Capital Improvement Subactivity by \$4,650,000. USGS and the FWS are jointly proposing to fund, on a roughly equal basis, critical utility infrastructure replacement for their collocated facilities on the Patuxent Research Refuge, Laurel, MD.

The Patuxent Wildlife Research Center (PWRC), located between Baltimore and Washington, D.C. has been in operation since 1936. Prior to the creation of the National Biological Survey (NBS) in 1993, the PWRC and the Patuxent Research Refuge (PRR) were within the Fish and Wildlife Service (FWS). During the existence of the NBS, the PWRC and PRR remained closely aligned. After the transfer of the NBS to the U.S. Geological Survey (USGS) in 1996, the Bureaus agreed in a Memorandum of Agreement to institutionalize their joint commitment to maintain the science and management partnership by building upon their collocation.

Other Increases

Integrated Multi-Hazards **+\$1,250,000**

National Streamflow Information Program (\$250,000) — The Nation's coastal areas are particularly vulnerable to the impacts of hurricanes, including flooding from coastal storm surge and inland rivers; damage to barrier islands, mainland beaches, wetlands, and estuaries that provide the first line of defense when a hurricane strikes; and, as the hurricane moves inland, catastrophic landslides in mountainous areas. Additionally, more lives and property are at risk now than even a decade ago because of recent rapid population growth in coastal regions. A substantial effort is needed to improve the science and information base for forecasting and responding to hurricane impacts. Capabilities and products provided by this initiative in 2008 will include three new real-time streamgages added to the Southern California network (+\$100,000) to fill critical gaps in areal coverage for flood, landslide, and debris-flow forecasting and warning. A \$150,000 increase to the National Streamflow Information Program will enhance storm surge monitoring to provide the National Weather Service and emergency managers with storm surge visualization for use in emergency response activities during a hurricane.

Coastal and Marine Geology Program (\$1,000,000) — Of the \$1.5 million increase requested for the Ocean Action Plan under the Coastal and Marine Geology Program, \$1.0 million will also support the Integrated Multi-Hazards Initiative through hurricane research, detailed seafloor and coastal mapping, and observations.

Healthy Lands Initiative

+5,000,000

Biological Research and Monitoring (+5,000,000) — Significant increases in energy demand and development on public land, coupled with explosive population growth in the West, are challenging the Nation's ability to manage and conserve natural resources. A significant (\$11.5 million) component of the Department's Healthy Lands Initiative will focus on southwestern Wyoming where the requirements for energy development and recreation compete on an unprecedented scale with the needs of species, habitat, and long-term conservation goals. The Department will integrate the exceptional capabilities of the BLM (\$4.5 million), USGS (\$5.0 million), and FWS (\$2.0 million) to tackle the issues at this complex wildlife-energy interface. The requested funding would enable aggressive landscape-scale assessment, planning and habitat restoration and enhancement activities in the Green River Basin of Wyoming, including adaptive management approaches to ensure the long-term viability of wildlife habitat. Implementing existing land management plans with consultation would continue to ensure energy development impacts to wildlife are effectively compensated and listing of species is minimized.

Ocean Action Plan

+3,000,000

Coastal and Marine Geology (+1,500,000) — This effort will conduct sea floor mapping studies and evaluate and help implement models to forecast responses to extreme weather events on the coast consistent with the Ocean and Research and Priorities Plan. The USGS will build on established partnerships with NOAA and USACE to provide and integrate monitoring and mapping data from existing and enhanced programs to ensure that the observational basis for forecasting is established. USGS leadership in water quality and hydrologic monitoring, ecosystem monitoring, and geologic and landscape mapping of coastal and submerged resources will be integrated with, for example, NOAA tide and water level monitoring and USACE coastal mapping to provide an observational framework for decision-support and modeling. Efforts will build on existing interagency collaborative efforts through the National Map to establish an integrated geospatial framework and the efforts of national and regional ocean observing systems, including the National Water Quality Monitoring Network, to monitor physical processes and ecological responses. Support will be provided, including for external community efforts, to develop inundation and ecosystem modeling to provide critical information for anticipating hazard vulnerability, contaminant and pathogen movement, and ecological and human impacts. The specific focus for model development will result from assessment of existing assets and capabilities and prioritization through engagement with regional partners and management entities.

Hydrologic Networks and Analysis (+1,500,000) — This increase permits the initial implementation of the National Water Quality Monitoring Network ("the Network") called for in the Ocean Action Plan (OAP) and defined through the efforts of some 40 Federal, State, and local agencies, monitoring associations, or professional organizations including the USGS, EPA, and NOAA and described in the plan entitled, "National Water Quality Monitoring Network for U.S. Coastal Waters and their Tributaries." This plan, approved by members of the Advisory Committee on Water Information (ACWI) and by the Council on Environmental Quality, National Science and Technology Council (CEQ/NSTC), provides for interagency pilot studies in FY 2007 to inventory existing monitoring assets, identify gaps between network design

Program Changes

specifications and current data collection, refine the Network's observational and data sharing requirements, and identify next steps for Network implementation. FY 2008 activities supported by the proposed increase will build upon pilot study results leading to demonstration projects designed to reveal the feasibility of the Network, refine observational parameters and temporal and geographic sampling frequencies and scales, and develop data sharing, summarization, and reporting methodologies. Roughly \$1,000,000 will be for related assessments to create the Network while the remaining \$500,000 will be for streamgages to advance the Network.

FY 2008 Priority Goals and Resources by DOI Goal Increases (\$16,272)

Resource Protection

End Outcome Goal: PEO.1.4. – Improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment			
National Streamflow Information Program	Fixed Costs of National Streamgaging Network	1,400	+2% of proposed streamflow sites currently in operation that meet one or more Federal needs +100 real-time streamgages reporting in NWISWeb +1% of Nation's river basins that have streamflow stations
National Streamflow Information Program	Integrated Multi-Hazards	250	+2 systematic analyses/investigations delivered to customers in 2009 +3 real-time streamgages reporting in NWISWeb
Biological Research and Monitoring	Healthy Lands Initiative — Green River, Wyoming	5,000	+20 systematic analyses/investigations delivered to customers (+6 in 2008; +14 in 2010) +3 workshops or training provided to customers +4 real-time ground water sites reporting on NWISWeb
Coastal and Marine Geology Program/	Ocean Action Plan	1,500	+1 workshop or training provided to customers
Hydrologic Network and Analysis	Ocean Action Plan	1,500	+2% of proposed streamflow sites currently in operation that meet one or more Federal needs +100 real-time streamgages reporting in NWISWeb

Management Excellence

End Outcome Goal: 5.2. – Management Excellence: Advance Modernization/Integration			
Science Support	Financial Business Management System (FBMS)	1,972	NA
Facilities	Patuxent Wildlife Research Center Facilities Improvement	4,650	+1 new capital improvement project

Program Decreases

(Dollars in thousands)

Component	FY 2008 Program Change (\$000)	Page Reference
Support for Commercial Remote Sensing Space Policy	850	G-5
USGS Priority Ecosystems Science	2,000	G-21
Mineral Resources Program	2,614	H-65
Cooperative Interpretive Studies	2,200	I-51
Mammalian Population Ecology and Habitat	300	J-5
Contaminants-Endocrine Disruption and Damage Assessment	650	J-5
Enterprise Functions	1,500	K-5
Total	-\$10,114	

Mapping, Remote Sensing, and Geographic Investigations Land Remote Sensing Subactivity

Commercial Remote Sensing Space Policy (CRSSP) Support -\$850,000

The USGS leads an interagency near-term remote sensing requirements process on behalf of the Federal civil community, by collecting and analyzing civil Federal agencies' remote sensing requirements and communicating these needs to government and industry to maximize use of data and technologies. The USGS allocates \$850,000 within the Land Remote Sensing Program for this function. To provide necessary resources for its higher-priority Landsat Program mission, the USGS proposes to step down from the responsibility to purchase, archive, and distribute commercial remote sensing data to other Federal agencies. The USGS will continue to maintain the highest levels of performance for Federal coordination of moderate-resolution remote sensing data requirements through its Landsat program.

Geographic Analysis and Monitoring Subactivity

USGS Priority Ecosystems Science -\$2,000,000

This reduction in Priority Ecosystem Science (PES) will facilitate the funding of higher priority activities within the GAM Program. PES activities will continue in the six study unit area (Greater Everglades, San Francisco Bay, Chesapeake Bay, Mojave Desert, Platte River, and the Greater Yellowstone area) but at a reduced rate, potentially monitoring activities. The funding for Priority Ecosystems Science (PES) activities is \$10.7 million from across the four science disciplines (Biology, Geography, Geology, Water). PES is managed by a National Coordinator and a National Coordination Council that includes representatives from the Regions and Bureau Program Coordinators. This reduction represents Geography's full contribution to PES activities. GAM research in support of PES is aimed at improving the understanding of the rates, causes, and consequences of natural and human-induced processes that shape and change the landscape over time and to provide comprehensive information needed to understand the environmental, resource, and economic consequences of landscape change.

Program Changes

GAM contributions for PES have included maps of urban growth trends throughout the Chesapeake Bay watershed that are being used by state resource agencies and land conservation organizations to target land preservation efforts and develop urban growth forecasts that consider the potential impacts on stream and estuary water quality. Additionally, GAM contributions are being used in the Greater Everglades to develop and apply technologically advanced elevation measurement systems that provide the foundation for research, management, and restoration of critical ecosystems.

Geologic Hazards, Resources, and Processes Geologic Resource Assessments Subactivity

Mineral Resources

-\$2,614,000

In the FY 2008 budget, a program change of -\$2,614,000 and -30 FTE (along with an offsetting fixed cost change of +\$1,716,000) is proposed. This proposal is made to provide funding resources for higher priority activities in USGS and the Department of the Interior.

The proposed reduction to the budget for MRP will result in a scaled-back program in 2008 that will complete one site-specific mineral resource project for Federal land management agencies in the lower 48 States, provide regional-scale geologic data and mineral resource assessments in Alaska, collect data on domestic and international production and utilization of 70-80 essential mineral commodities, and manage four national-scale long term databases. The proposed reduction will be addressed in 2008 by:

- Discontinuing research on environmental consequences of mined and unmined mineral deposits, if these two bullets will happen in 2007 and not 2008, please delete this bullet (previous bullet citing -22.9m was deleted by OMB)
- Discontinuing research required in preparation for updating the 1995 national assessment of potential for undiscovered mineral deposits in the United States,
- Reducing funding available for managing MRP's digital databases, and
- Reducing the number of mineral commodity reports available for decisions.

The proposed decrease would require that USGS eliminate 30 occupied scientific and technical positions, from nine locations across the United States (Denver, CO; Flagstaff, AZ; Menlo Park, CA; Mounds View, MN; Reno, NV; Reston, VA; Spokane, WA; Seattle, WA; and Tucson, AZ).

The proposed decrease will eliminate one systematic analysis scheduled to be delivered to customers in 2008, and nine more that are underway and scheduled through 2012. Three systematic analyses that are scheduled for delivery in 2009 will be delayed until at least 2011. Starting in 2008, MRP will be able to produce 1-2 systematic analysis per year.

MRP will provide formal two formal workshops or training for customers in 2008 and beyond. The number of mineral commodity and related reports (including materials flow studies) produced annually will be reduced from 700 in 2007 to 650 in 2008 and beyond; the remaining reports will focus on a limited group of commodities for which data are most essential to other Federal agencies, industry, and the public.

Water Resources Investigations Cooperative Water Program Subactivity

Cooperative Interpretive Studies -\$2,200,000

This decrease is proposed to offset the \$1,400,000 increase proposed for the National Streamflow Information Program and other higher priority USGS programs. The decrease would result in 13 fewer interpretive studies of water resources issues that are conducted through the Cooperative Water Program. Studies that were scheduled to conclude at the end of FY 2007 will be targeted. About 263 new studies would begin at this funding level.

Since the cooperators provide about two-thirds of the funding for the program, the content of projects is determined in consultation with those cooperators, and specific focus areas are often not known until workplans and joint funding agreements are established during the fiscal year. Thus, the USGS cannot say which specific studies would be stopped in 2008. However, likely topical areas to be reduced include —

- Water quality issues such as determining the effects of land use practices on water quality,
- Water availability and use,
- Wetlands, lakes, reservoirs, and estuaries,
- Water resources issues in the coastal zone, and
- Environmental effects on human health.

Other impacts of the reduction include the loss of 18 FTEs associated with the reduction in appropriated funds.

Biological Research Biological Research and Monitoring Subactivity

Mammalian Population Ecology and Habitat -\$300,000

The USGS proposes a \$300,000 reduction in 2008 to the Wildlife: Terrestrial and Endangered Resources program in mammalian population ecology and habitat to provide resources for higher priority research activities within the USGS. The proposed reduction would discontinue scientific activities focused on the ecology, populations, and habitats of mammals such as black bears and elk. The proposed decrease impacts support of the Department's Resource Protection goal relative to terrestrial wildlife research by eliminating 1 systematic analysis and investigation in 2010.

Contaminants - Endocrine Disruption and Damage Assessment -\$650,000

The USGS proposes a \$650,000 decrease in 2008 for Contaminants Biology program to provide resources for higher priority research activities within the USGS. The proposed decrease would reduce activities related to resource damage assessment, and endocrine disruption and intersex fish. The requested decrease would not impact the USGS efficiency measure that relates to improvement in detectability limits for selected high-priority environmentally-available chemical analyses. The proposed decrease impacts support of the

Program Changes

Department's Resource Protection goal relative to environmental contaminants research by eliminating 3 systematic analyses and investigations in 2010 and 3 FTEs in 2008.

**Enterprise Information
Enterprise Information Security and Technology Subactivity**

Enterprise Functions **-\$1,500,000**

A decrease of \$1,500,000 would be achieved through economies of IT centralization, consolidated software and hardware purchases, and workforce planning.

**FY 2008 Priority Goals and Resources by DOI Goal
Decreases (\$10,114)**

Resource Protection

End Outcome Goal: PEO.1.4. – Improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment			
Land Remote Sensing	Support for Commercial Remote Sensing Space Policy	-850	NA
Geographic Analysis and Monitoring	USGS Priority Ecosystems Science	-2,000	-2 workshops or training provided to customers -4 systematic analyses/investigations delivered to customers
Cooperative Water Program	Reduce Cooperative Interpretive Studies	-2,200	-13 systematic analyses/investigations delivered to customers -1% of U.S. with ground water availability status and trends information to support resource management decisions
Biological Research and Monitoring	Mammalian Population Ecology and Habitat	-300	-1 systematic analyses/investigation delivered to customers in 2010.
Biological Researching and Monitoring	Contaminants-Endocrine Disruption and Damage Assessment	-650	-3 systematic analyses/investigations delivered to customers in 2010.

Program Decreases

Resource Use

End Outcome Goal: PEO.2.4. – Improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment			
Mineral Resources	Mineral Resources Program	-2,614	-1 workshops or training provided to customers -1 systematic analyses/investigation delivered to customers -70 mineral commodity reports available for decisions

Management Excellence

End Outcome Goal: 5.2. – Management Excellence: Advance Modernization/Integration			
Enterprise Information Security and Technology	Enterprise Functions	-1,500	NA

Analysis by Activity

(Dollars in thousands)

Activity	2007 CR		Fixed Costs and Related Changes		Program Changes		2008 Budget Request		Inc.(+) Dec.(-) from 2007	
	FTE a/	Amount	FTE	Amount	FTE	Amount	FTE a/	Amount	FTE	Amount
Geographic Research, Investigations, & Remote Sensing	175	76,614	0	1,191	-20	-2,850	155	74,955	-20	-1,659
Impact of Continuing Resolution [Non-Add]		[-11,766]				[11,766]		[0]		[11,766]
Geologic Hazards., Resources, and Processes	1,167	217,418	0	5,781	-29	-1,114	1,138	222,085	-29	4,667
Impact of Continuing Resolution [Non-Add]		[18,067]				[-18,067]		[0]		[-18,067]
Water Resources Investigations	1,699	204,047	0	7,457	-13	950	1,686	212,454	-13	8,407
Impact of Continuing Resolution [Non-Add]		[7,839]				[-7,839]		[0]		[-7,839]
Biological Research	1,228	172,597	0	4,467	7	4,050	1,235	181,114	7	8,517
Impact of Continuing Resolution [Non-Add]		[4,984]				[-4,984]		[0]		[-4,984]
Enterprise Information	556	111,230	-45	2,390	-10	-1,500	501	112,120	-55	890
Impact of Continuing Resolution [Non-Add]		[-535]				[535]		[0]		[535]
Science Support	421	67,382	0	1,317	0	1,972	421	70,671	0	3,289
Impact of Continuing Resolution [Non-Add]		[1,920]				[-1,920]		[0]		[-1,920]
Facilities	55	95,472	0	1,431	0	4,650	55	101,553	0	6,081
Impact of Continuing Resolution [Non-Add]		[-2,593]				[2,593]		[0]		[2,593]
Subtotal, SIR Appropriation	5,301	944,760	-45	24,034	-65	6,158	5,191	974,952	-110	30,192
Impact of Continuing Resolution		17,916				-17,916		0		-17,916
Subtotal, SIR Appropriation	5,301	962,676	-45	24,034	-65	-11,758	5,191	974,952	-110	12,276
Spectrum Relocation Costs Transfer		6,159		-6,159				0		-6,159
Total, SIR Appropriation	5,301	968,835	-45	17,875	-65	-11,758	5,191	974,952	-110	6,117

Note: After the development of the account level FTEs for FY 2008 for the President's Budget Appendix, further refinements to the estimates were made. As a result, the FY 2008 direct and reimbursable FTE levels in this presentation do not match and are lower than those FTE levels presented in the Budget Appendix.

a/ The FTE's depicted in the FY 2007 and 2008 columns are only the staff-years associated with appropriated funding. Reimbursable FTE's are 2,758 and 2,542 and Working Capital Fund FTE's are 158 and 345 for FY 2007 and 2008 respectively. USGS total FTE's for FY 2007 and 2008 are 8,217 and 8,078 respectively. FTE may not add to totals and subtotals, due to rounding.

United States Geological Survey

Federal Funds

General and special funds:

SURVEYS, INVESTIGATIONS, AND RESEARCH

For expenses necessary for the United States Geological Survey to perform surveys, investigations, and research covering topography, geology, hydrology, biology, and the mineral and water resources of the United States, its territories and possessions, and other areas as authorized by 43 U.S.C. 31, 1332, and 1340; classify lands as to their mineral and water resources; give engineering supervision to power permittees and Federal Energy Regulatory Commission licensees; administer the minerals exploration program (30 U.S.C. 641); conduct inquiries into the economic conditions affecting mining and materials processing industries (30 U.S.C. 3, 21a, and 1603; 50 U.S.C. 98g(1)) and related purposes as authorized by law; and to publish and disseminate data relative to the foregoing activities; \$974,952,000, of which \$62,381,000 shall be available only for cooperation with States or municipalities for water resources investigations; of which \$7,882,000 shall remain available until expended for satellite operations; of which \$25,925,000 shall be available until September 30, 2009, for the operation and maintenance of facilities and deferred maintenance; of which \$2,000,000 shall be available until expended for deferred maintenance and capital improvement projects that exceed \$100,000 in cost; and of which \$181,114,000 shall be available until September 30, 2009, for the biological research activity and the operation of the Cooperative Research Units: Provided, That none of the funds provided for the biological research activity shall be used to conduct new surveys on private property, unless specifically authorized in writing by the property owner: Provided further, That no part of this appropriation shall be used to pay more than one-half the cost of topographic mapping or water resources data collection and investigations carried on in cooperation with States and municipalities.

Note: A regular 2007 appropriation for this account had not been enacted at the time the budget was prepared; therefore, this account is operating under a continuing resolution (P.L. 109-289, Division B, as amended). The amounts included for 2007 in this budget reflect the levels provided by the continuing resolution.

Justification of Proposed Language Change

The USGS does not propose any language changes in the 2008 President's Budget request.

Appropriation Language and Citations

1. For expenses necessary for the United States Geological Survey to perform surveys, investigations, and research covering topography, geology, hydrology, biology, and the mineral and water resources of the United States,
 - **43 U.S.C. 31(a)** provides for establishment of the Office of the Director of the Geological Survey, under the Interior Department, and that this officer shall have direction of the Geological Survey, and the classification of the public lands and examination of the geological structure, mineral resources, and products of the national domain.
2. its territories and possessions, and other areas as authorized by law.
 - **43 U.S.C 31(b)** provides that, "The authority of the Secretary of the Interior, exercised through the Geological Survey of the Department of the Interior, to examine the geological structure, mineral resources, and products of the national domain, is expanded to authorize such examinations outside the national domain where determined by the Secretary to be in the national interest."
 - **43 U.S.C. 1332(a)** provides that, "It is the declared policy of the United States, that the subsoil and seabed of the Outer Continental Shelf appertain to the United States and are subject to its jurisdiction, control, and power of disposition as provided in this subchapter."
 - **43 U.S.C. 1340** provides that, "Any agency of the United States and any person authorized by the Secretary may conduct geological and geophysical exploration in the Outer Continental Shelf. ..."
3. classify lands as to their mineral and water resources;
 - **43 U.S.C. 31(a)** provides that, "The Director of the Geological Survey, ... shall have the direction of the Geological Survey, and the classification of public lands and examination of the geological structure, mineral resources, and products in the National domain. ..."
4. give engineering supervision to power permittees
 - **43 U.S.C. 959** provides that, "The Secretary of the Interior is authorized and empowered, ... to permit the use of right of way through the public lands, forest, and other reservations of the United States ... for electrical plants, poles, and lines for the generation and distribution of electrical power, ...**Provided**, that such permits shall be allowed within or through any of said parks or any forest, military, Indian, or other reservation only upon approval of the Chief Officer of the Department under whose supervision such park or reservation falls and upon a finding by him that the same is not incompatible with the public interest ..."
 - **43 U.S.C. 961** provides that, "The head of the department having jurisdiction over the lands be, and he is, authorized and empowered, ... to grant an easement for right of way, ... over, across and upon the public lands and reservations of the United States for

electrical poles and lines for the transmission and distribution of electrical power ... upon a finding by him that the same is not incompatible with the public interest ..."

5. and Federal Energy Regulatory Commission licensees;
 - **16 U.S.C. 797(c)** states that, "To cooperate with the executive departments and other agencies of States or National Governments in such investigations; and for such purposes the several departments and agencies of the National Government are authorized and directed upon the request of the commission, to furnish such records, papers and information in their possession as may be requested by the commission, and temporarily to detail to the commission such officers or experts as may be necessary in such investigations."
6. administer the minerals exploration program;
 - **30 U.S.C. 641** provides that, "The Secretary of the Interior is hereby authorized and directed, in order to provide for discovery of additional domestic mineral reserves, to establish and maintain a program for exploration by private industry within the United States, its territories and possessions for such minerals, excluding organic fuels, as he shall from time to time designate, and to provide Federal financial assistance on a participating basis for that purpose."
7. publish and disseminate data relative to the foregoing activities;
 - **43 U.S.C. 41** provides for the publication of geological and economic maps, illustrating the resources and classification of the lands, and reports upon general and economic geology and paleontology. This section also provides for the scientific exchange and sale of such published material.
 - **44 U.S.C. 1318** provides for publication, by the Geological Survey, of various reports, including a report of mineral resources of the United States, bulletins and professional papers, and monographs. This section also specifies, in some instances, numbers of copies to be printed and the distribution thereof.
 - **44 U.S.C. 1320** provides for the distribution by the Director of the Geological Survey of copies of sale publications to public libraries.
8. and to conduct inquiries into the economic conditions affecting mining and materials processing industries...and related purposes as authorized by law and to publish and disseminate data;
 - **30 U.S.C. 3** provides for inquiry into the economic conditions affecting the mining, quarrying, metallurgical, and other minerals industries. This section also provides for the dissemination of information concerning these industries.
 - **30 U.S.C. 21(a)** provides for an annual report on the state of the domestic mining minerals, and mineral reclamation industries, including a statement of the trend in utilization and depletion of resources.

Appropriation Language and Citations

- **30 U.S.C. 1603** provides for ...improved collection, analysis, and dissemination of scientific, technical and economic materials information and data from Federal, state, and local governments, and other sources as appropriate.
 - **50 U.S.C. 98g(1)** provides for scientific, technologic, and economic investigations concerning the development, mining, preparation, treatment, and utilization of ore and other mineral substances.
9. of which () shall be available only for cooperation with States or municipalities for water resources investigations;
- **43 U.S.C. 48** provides that, "...amounts received by the Geological Survey from any State, Territory or political subdivision thereof in carrying on work involving cooperation to be used in reimbursing the appropriation from which the expense of such work was paid, was from the act making appropriations for the Department of the Interior for the fiscal year ending June 30, 1928, and for other purposes, act January 12, 1927, ch. 277, 1, 44 Stat. 963, and has not been repeated in subsequent appropriation acts."
 - Similar provisions were contained in the following act: 1926 - May 10, 1926, ch. 277, 1, 44 Stat. 487.
10. of which () shall remain available until expended for satellite operations;
- **P.L. 107-43, Department of the Interior and Related Agencies Appropriation Act, 2002**
11. of which () shall be available until September 30, (), for the operation and maintenance of facilities and deferred maintenance;
- **P.L. 106-291, Department of the Interior and Related Agencies Appropriations Act, 2001**
12. of which \$1,600,000 shall be available until expended for deferred maintenance and capital improvement projects that exceed \$100,000 in cost;
- **P.L. 108-447, Consolidated Appropriations Act, 2005 (Interior and Related Agencies portion)**
13. and of which () shall be available until September 30, (), for the biological research activity and the operation of the Cooperative Research Units;
- **P.L. 104-208, Omnibus Appropriations Act, 1997 (Interior and Related Agencies portion)**
14. *Provided*, That none of these funds provided for the biological research activity shall be used to conduct new surveys on private property, unless specifically authorized in writing by the property owner:
- **P.L. 104-208, Omnibus Appropriations Act. 1997 (Interior and Related Agencies portion)**

15. Provided further, That no part of this appropriation shall be used to pay more than one-half the cost of topographic mapping or water resources data collections and investigations carried on in cooperation with States and municipalities.
- **43 U.S.C. 50** provides that, "The share of the Geological Survey in any topographic mapping or water resources investigations carried on in cooperation with any State or municipality shall not exceed 50 per centum of the cost thereof. ..."

Permanent authority:

16. Provided further, that in fiscal year 1984 and thereafter, all receipts from the sale of maps sold or stored by the Geological Survey shall be available for map printing and distribution to supplement funds otherwise available, to remain available until expended.
- **43 U.S.C. 42a** Provided further, That in fiscal year 1986 and thereafter, all amortization fees resulting from the Geological Survey providing telecommunications services shall be deposited in a special fund to be established on the books of the Treasury and be immediately available for payment of replacement or expansion of telecommunications services, to remain available until expended.
 - **43 U.S.C. 50a** with the establishment of the Working Capital Fund (WCF) in FY 1991, the Telecommunications Amortization Fund account and its end of year FY 1990 balances were included in the WCF.
17. Provided further, that, heretofore and hereafter, in carrying out work involving cooperation with any State, Territory, possession, or political subdivision thereof, the Geological Survey may, notwithstanding any other provisions of law, record obligations against accounts receivable from any such entities and shall credit amounts received from such entities to this appropriation.
- **43 U.S.C. 50b**
18. Provided further, That in Fiscal Year 1987 and thereafter the Geological Survey is authorized to accept lands, buildings, equipment, and other contributions from public and private sources and to prosecute projects in cooperation with other agencies, Federal, State, or private.
- **43 U.S.C. 36c** This authority for contributions was in the appropriation language annually from FY 1983 through FY 1986 and was made permanent in FY 1987.
19. Provided, That upon enactment of this Act and hereafter, final costs related to the National Petroleum Reserve in Alaska may be paid from available prior year balances in this account.
- **P.L. 100-446, Department of the Interior and Related Agencies Appropriations Act, 1989**

Appropriation Language and Citations

20. Established a Working Capital Fund which is detailed in the Working Capital Fund section of this book.

- **P.L. 101–512, Department of the Interior and Related Agencies Appropriations Act, 1991**

21. Provided further, That beginning October 1, 1990, and thereafter, funds received from any State, territory, possession, country, international organization, or political subdivision thereof, for topographic, geologic, or water resources mapping or investigations involving cooperation with such an entity shall be considered as intragovernmental funds as defined in the publication titled "A Glossary of Terms Used in the Federal Budget Process."

- **P.L. 101–512, Department of the Interior and Related Agencies Appropriations Act, 1991**

This authority exempts non-Federal cooperative funds from sequester as defined in 1985 amendments (P.L. 99–177) to the Budget Impoundment and Control Act of 1974.

22. Provided further, That beginning in fiscal year 1998 and once every five years thereafter, the National Academy of Sciences shall review and report on the biological research activity of the Survey:

- **P.L. 104–208, Omnibus Appropriations Act, 1997 (Interior and Related Agencies portion)**

Administrative Provisions

From within the amount appropriated for activities of the United States Geological Survey such sums as are necessary shall be available for the purchase and replacement of passenger motor vehicles; reimbursement to the General Services Administration for security guard services; contracting for the furnishing of topographic maps and for the making of geophysical or other specialized surveys when it is administratively determined that such procedures are in the public interest; construction and maintenance of necessary buildings and appurtenant facilities; acquisition of lands for gauging stations and observation wells; expenses of the United States National Committee on Geology; and payment of compensation and expenses of persons on the rolls of the Survey duly appointed to represent the United States in the negotiation and administration of interstate compacts: Provided, That activities funded by appropriations herein made may be accomplished through the use of contracts, grants, or cooperative agreements as defined in 31 U.S.C. 6302 et seq.: Provided further, That the United States Geological Survey may enter into contracts or cooperative agreements directly with individuals or indirectly with institutions or nonprofit organizations, without regard to 41 U.S.C. 5, for the temporary or intermittent services of students or recent graduates, who shall be considered employees for the purpose of chapters 57 and 81 of title 5, United States Code, relating to compensation for travel and work injuries, and chapter 171 of title 28, United States Code, relating to tort claims, but shall not be considered to be Federal employees for any other purposes.

Justification of Proposed Administrative Provisions Language Change

The USGS does not propose any administrative provisions language changes in the 2008 President's Budget request.

Administrative Language and Citations

1. From within the amount appropriated for activities of the United States Geological Survey such sums as are necessary shall be available for purchase and replacement of passenger motor vehicles;
 - **31 U.S.C. 638a(a)** provides that, "Unless specifically authorized by the appropriation concerned or other law, no appropriation shall be expended to purchase or hire passenger motor vehicles for any branch of the Government"
 - **31 U.S.C. 638a(b)** provides that, "Excepting appropriations for the military and Naval Establishments, no appropriation shall be available for the purchase, maintenance, or operation of any aircraft unless specific authority for the purchase, maintenance, or operation thereof has been or is provided in such appropriation."
2. reimbursement to the General Services Administration for security guard services; contracting for the furnishing of topographic maps and for the making of geophysical or other specialized surveys when it is administratively determined that such procedures are in the public interest;
 - **No specific authority.** These provisions are required by reason of rulings of the Comptroller General that specific authority is required for reimbursing the General Services Administration for guard services (B-87255); and for contracting with private persons for the performance of duties with which the agency is specifically charged (15 Comp. Gen. 951).
3. construction and maintenance of necessary buildings and appurtenant facilities;
 - **No specific authority.** The Organic Act of 1879, establishing the Geological Survey and providing for "... examination of the geological structure, mineral resources, and products of the national domain" (43 U.S.C. 31) is general authorization for construction of special-purpose laboratory buildings. Specific authorization by the Congressional committees on public works is not needed because of the highly specialized purposes of the building. 40 U.S.C. 612: "The term 'public building' means any building ... which is generally suitable for office or storage space ... but shall not include any such buildings and construction projects: ... (E) on or used in connection with ... or for nuclear production, research, or development projects." 41 U.S.C. 12: "No contract shall be entered into for the erection, repair, or furnishing of any public building ... which shall bind the government to pay a larger sum of money than the amount in the Treasury appropriated for the specific purpose."
4. acquisition of lands for gauging stations and observation wells;
 - **43 U.S.C. 36(b)** provides that, "The Secretary of the Interior may, on behalf of the United States and for the use by the Geological Survey in gaging streams and underground water resources, acquire lands by donation or when funds have been appropriated by Congress by purchase or condemnation"

Administrative Language and Citations

5. expenses of the U.S. National Committee on Geology;
 - **43 U.S.C. 31** participation in and payment of expenses of the U.S. National Committee on Geology is a proper and necessary function of the Geological Survey, and so is authorized by the Survey's Organic Act of March 3, 1879, 43 U.S.C. 31. This Act provides that, "...The Director of the Geological Survey, which office is established, under the Interior Department, shall be appointed by the President by and with the advice and consent of the Senate. This officer shall have the direction of the Geological Survey, and the classification of the public lands and examination of the geological structure, mineral resources, and products of the national domain"
6. and payment of compensation and expenses of persons on the rolls of the Survey duly appointed to represent the United States in the negotiation and administration of interstate compacts:
 - **66 Stat. 453.** The above language first appeared in the Appropriation Act for FY 1953, P.L. 82-470 (66 Stat. 453), and has been repeated in each Act since that date. Article I, Section 10, paragraph 3, of the United States Constitution provides that, No State shall, without the consent of Congress, lay any duty on tonnage, keep troops, or ships of war in time of peace, enter into any agreement or compact with another State, or with a foreign power, or engage in war, unless actually invaded, or in such imminent danger as will not admit or delay." (emphasis supplied)

Thus each interstate compact must be approved by the Congress and signed by the President. The Public Law approving each interstate compact represents the authorizing legislation.

7. *Provided*, That activities funded by appropriations herein may be accomplished through the use of contracts, grants, or cooperative agreements as defined in 31 U.S.C. 6302, et seq.
 - The above language appears in the Department of the Interior and Related Agencies Appropriations Act, 1988, as included in Public Law 100-202.
8. *Provided further*, That the United States Geological Survey may enter into contracts or cooperative agreements directly with individuals or indirectly with institutions or nonprofit organizations, without regard to 41 U.S.C. 5, for the temporary or intermittent services of students or recent graduates, who shall be considered employees for the purpose of chapters 57 and 81 of title 5, United States Code, relating to compensation for travel and work injuries, and chapter 171 of title 28, United States Code, relating to tort claims, but shall not be considered to be Federal employees for any other purposes.
 - The above language appears in the Consolidated Appropriations Act, 2005 (Interior and Related Agencies portion), as included in Public Law 108-447.

Permanent Authority:

1. *Provided*, That appropriations herein and hereafter made shall be available for paying costs incidental to the utilization of services contributed by individuals who serve without compensation as volunteers in aid of work of the Geological Survey, and that within appropriations herein and hereafter provided, Geological Survey officials may authorize either direct procurement of or reimbursement for expenses incidental to the effective use of volunteers such as, but not limited to, training, transportation, lodging, subsistence, equipment, and supplies.
 - **43 U.S.C. 50c**
2. *Provided further*, That provision for such expenses or services is in accord with volunteer or cooperative agreements made with such individuals, private organizations, educational institutions, or State or local government.
 - **43 U.S.C 31(a)**
3. *Provided further*, That the Geological Survey (43 U.S.C. 31(a)) shall hereafter be designated the United States Geological Survey.
 - **Department of the Interior and Related Agencies Appropriations Act, 1992, as included in Public Law 102–154.**
4. *Provided further*, That the United States Geological Survey may hereafter contract directly with individuals or indirectly with institutions or nonprofit organizations, without regard to 41 U.S.C. 5, for the temporary or intermittent services of students or recent graduates, who shall be considered employees for the purposes of chapters 57 and 81 of title 5, United States Code, relating to compensation for travel and work injuries, and Chapter 171 of Title 28, United States Code, relating to tort claims, but shall not be considered to be a Federal employees for any other purposes.
 - **Department of the Interior and Related Agencies Appropriations Act, 2000, as included in Public Law 106–113.**
5. *Provided further*, That notwithstanding the provisions of the Federal Grant and Cooperative Agreement Act of 1977 (31 U.S.C. 6301–6308), the may be United States Geological Survey is authorized to continue existing, and hereafter, to enter into new cooperative agreements directed towards a particular cooperator, in support of joint research and data collection activities with Federal, State, and academic partners funded by appropriations herein, including those that provide for space in cooperator facilities.
 - **Department of the Interior and Related Agencies Appropriations Act, 2004, as included in Public Law 108–108.**

Justification of Fixed Costs and Related Changes: USGS

(Dollars in thousands)

	2007 Budget	2007 Revised*	2008 Fixed Costs Change
Additional Operational Costs from 2007 and 2008 Jan Pay Raises			
1. 2007 Pay Raise, 3 Quarters in 2007 Budget	+\$7,057	+\$7,057	NA
<i>Amount of pay raise absorbed</i>	[\$3,024]	[\$3,024]	NA
2. 2007 Pay Raise, 1 Quarter (Assumed 2.2%)	NA	NA	+\$3,061
3. 2008 Pay Raise (Assumed 3.0%)	NA	NA	+\$13,357
<p>These adjustments are for an additional amount needed to fund estimated pay raises for Federal employees.</p> <p>Line 1 is an update of 2007 budget estimates based upon an assumed 2.2%.</p> <p>Line 2 is the amount needed in 2008 to fund the estimated 2.2% January 2007 pay raise from October through December 2007.</p> <p>Line 3 is the amount needed in 2008 to fund the estimated 3.0% January 2008 pay raise from January through September 2008.</p>			

	2007 Budget	2007 Revised*	2008 Fixed Costs Change
Other Fixed Cost Changes			
Two More Pay Days	NA	NA	+\$4,622
<p>This adjustment reflects the increased costs resulting from the fact that there are two more pay days in 2008 than in 2007.</p>			
Employer Share of Federal Health Benefit Plans	+\$2,773	+\$2,773	+\$2,082
<i>Amount of health benefits absorbed</i>	[\$1,188]	[\$1,188]	0
<p>This adjustment is for changes in the Federal government's share of the cost of health insurance coverage for Federal employees. The increase is estimated at 6.6%, the most current estimated percentage increase for this item.</p>			
Worker's Compensation Payments	\$2,892	\$2,892	-\$102
<p>The adjustment is for actual charges through June 2006, in the costs of compensating injured employees and dependents of employees who suffered accidental deaths while on duty. Costs for 2008 will reimburse the Department of Labor, Federal Employees Compensation Fund, pursuant to 5 U.S.C. 8147(b) as amended by Public Law 94-273.</p>			
Unemployment Compensation Payments	\$732	\$732	-\$19
<p>The adjustment is for estimated changes in the costs of unemployment compensation claims to be paid to the Department of Labor, Federal Employees Compensation Account, in the Unemployment Trust Fund, pursuant to Public Law 96-499</p>			
Rental Payments	\$61,647	\$61,647	+\$1,240
<p>The adjustment is for changes in the costs payable to General Service Administration (GSA) and others resulting from changes in rates for office and non-office space as estimated by GSA, as well as the rental costs of other currently occupied space. These costs include building security; in the case of GSA space, these are paid to DHS. Costs of mandatory office relocations, i.e., relocations in cases where due to external events there is no alternative but to vacate the currently occupied space, are also included.</p>			

Justification of Fixed Costs and Related Changes: USGS

	2007 Budget	2007 Revised*	2008 Fixed Costs Change
Other Fixed Cost Changes (continued)			
Department Working Capital Fund	\$16,134	\$16,134	-\$207
The change reflects expected changes in the charges for services funded through the working capital fund (WCF). These charges are displayed in the Budget Justification for Department Management. In addition to the fixed cost change, an additional \$1,972 is requested as a program increase for FBMS within the Science Support budget activity.			
Related Changes – Internal Transfers and Other Non-Policy/Program Changes			
There are no Program Changes requested for the National Geospatial Program in FY 2008. However, because of the NGTOC closings in Menlo Park, California and Reston, Virginia, the NGP will have a decrease of 45 FTE in FY 2008.			

(*Since no 2007 appropriation has been enacted, 2007 Revised Estimates assume enactment of the 2007 President's Budget. Other revisions have been made for changes in the estimates.)

This page intentionally left blank.

Summary of Requirements
(Dollars in thousands)

Appropriation: Surveys, Investigations, and Research

	<u>FTE</u>	<u>Amount</u>	<u>FTE</u>	<u>Amount</u>
Budget estimate, 2007 President's Budget			5,301	944,760
Impact of Continuing Resolution				17,916
Budget estimate, 2007 CR			5,301	962,676
 Fixed and Related Cost Changes:				
Additional Cost in 2008 of January 2007 Pay Raise		+3,061		
Additional Cost in 2008 of January 2008 Pay Raise		+13,357		
Two More Pay Days		+4,622		
Employer Share of Federal Health Benefit Plans		+2,082		
Worker's Compensation Payments		-102		
Unemployment Compensation Payments		-19		
Rental Payments to GSA and Others		+1,240		
Department Working Capital Fund Charges		-207		
Subtotal, Fixed Cost Adjustments				+24,034
Technical Adjustment			-45	0
Subtotal, Fixed Costs and Related Changes			-45	+24,034
Program Change			-65	+6,158
Impact of Continuing Resolution				-17,916
 TOTAL REQUIREMENTS			5,191	974,952

Note: After the development of the account level FTEs for FY 2008 for the President's Budget Appendix, further refinements to the estimates were made. As a result, the FY 2008 direct and reimbursable FTE levels in this presentation do not match and are lower than those FTE levels presented in the Budget Appendix.

(Dollars in thousands)

Comparison by Activity/Subactivity/Prog Element	2006 Actual		2007 CR		Fixed Costs & Related Changes (+/-)		Program Changes (+/-)		2008 Budget Request		Inc.(+) Dec.(-) from 2007	
	FTE	a/ Amount	FTE	a/ Amount	FTE	Amount	FTE	Amount	FTE	a/ Amount	FTE	Amount
GEOGRAPHIC RESEARCH, INVESTIGATIONS, & REMOTE SENSING												
Cooperative Topographic Mapping	455	68,855	0	0	0		0		0	0	0	0
Land Remote Sensing	77	45,713	99	61,754	527		-850		99	61,431	0	-323
Geographic Analysis and Monitoring	93	14,705	76	14,860	664		-20	-2,000	56	13,524	-20	-1,336
TOTAL	625	129,273	175	76,614	0	1,191	-20	-2,850	155	74,955	-20	-1,659
Impact of Continuing Resolution [Non-Add]				[-11,766]				[11,766]		[0]		[11,766]
GEOLOGIC HAZ., RESOURCES, & PROC.												
Geologic Hazard Assessments												
Earthquake Hazards	220	50,583	220	51,461	1,042		0		220	52,503	0	1,042
Volcano Hazards	127	21,466	127	21,672	370		0		127	22,042	0	370
Landslide Hazards	19	3,042	20	3,284	76		0		20	3,360	0	76
Global Seismographic Network	5	3,914	5	3,949	62		0		5	4,011	0	62
Geomagnetism	14	1,995	14	2,030	62		0		14	2,092	0	62
Subtotal	385	81,000	386	82,396	0	1,612	0	0	386	84,008	0	1,612
Geologic Landscape & Coastal Assessments												
Earth Surface Dynamics	78	13,354	78	13,266	287		0		78	13,553	0	287
National Cooperative Geologic Mapping	133	25,113	133	25,447	601		0		133	26,048	0	601
Coastal and Marine Geology	217	39,285	217	39,393	897		1	1,500	218	41,790	1	2,397
Subtotal	428	77,752	428	78,106	0	1,785	1	1,500	429	81,391	1	3,285
Geologic Resource Assessments												
Mineral Resources	384	52,774	204	30,785	1,716		-30	-2,614	174	29,887	-30	-898
Energy Resources	149	23,760	149	26,131	668		0		149	26,799	0	668
Subtotal	533	76,534	353	56,916	0	2,384	-30	-2,614	323	56,686	-30	-230
TOTAL	1,346	235,286	1,167	217,418	0	5,781	-29	-1,114	1,138	222,085	-29	4,667
Impact of Continuing Resolution [Non-Add]				[18,067]				[-18,067]		[0]		[-18,067]
WATER RESOURCES INVESTIGATIONS												
Hydrologic Monitoring, Assessments & Research												
Ground-Water Resources Program	66	8,027	66	7,422	206		0		66	7,628	0	206
National Water-Quality Assessment	381	62,203	372	62,571	2,354		0		372	64,925	0	2,354
Toxic Substances Hydrology	51	14,386	51	13,215	515		0		51	13,730	0	515
Hydrologic Research & Development	268	14,609	264	13,653	514		0		264	14,167	0	514
National Streamflow Information Program	40	13,944	40	16,764	531		1,650		40	18,945	0	2,181
Hydrologic Networks and Analysis	217	29,358	212	28,251	927		5	1,500	217	30,678	5	2,427
Subtotal	1,023	142,527	1,005	141,876	0	5,047	5	3,150	1,010	150,073	5	8,197
Cooperative Water Program	716	62,833	694	62,171	2,410		-18	-2,200	676	62,381	-18	210
Water Resources Research Act Program	2	6,404	0	0	0		0		0	0	0	0
TOTAL	1,741	211,764	1,699	204,047	0	7,457	-13	950	1,686	212,454	-13	8,407
Impact of Continuing Resolution [Non-Add]				[7,839]				[-7,839]		[0]		[-7,839]

Summary of Requirements (continued)

(Dollars in thousands)

Comparison by Activity/Subactivity/Prog Element	2006 Actual		2007 CR		Fixed Costs & Related Changes (+/-)		Program Changes (+/-)		2008 Budget Request		Inc.(+) Dec.(-) from 2007	
	FTE	a/ Amount	FTE	a/ Amount	FTE	Amount	FTE	Amount	FTE	a/ Amount	FTE	Amount
BIOLOGICAL RESEARCH												
Biological Research and Monitoring	1,035	140,086	1,023	135,692		3,664	7	4,050	1,030	143,406	7	7,714
Biological Information Management & Delivery	82	23,794	75	21,967		311		0	75	22,278	0	311
Cooperative Research Units	130	14,664	130	14,938		492		0	130	15,430	0	492
TOTAL	1,247	178,544	1,228	172,597	0	4,467	7	4,050	1,235	181,114	7	8,517
Impact of Continuing Resolution [Non-Add]				[4,984]				[-4,984]		[0]		[-4,984]
ENTERPRISE INFORMATION												
Enterprise Information Security and Technology	81	24,866	78	25,972		430	-10	-1,500	68	24,902	-10	-1,070
Enterprise Information Resources	94	16,900	91	16,636		405		0	91	17,041	0	405
National Geospatial Program	17	4,628	387	68,622	-45	1,555		0	342	70,177	-45	1,555
TOTAL	192	46,394	556	111,230	-45	2,390	-10	-1,500	501	112,120	-55	890
Impact of Continuing Resolution [Non-Add]				[-535]				[535]		[0]		[535]
SCIENCE SUPPORT												
	421	69,302	421	67,382		1,317		1,972	421	70,671	0	3,289
Impact of Continuing Resolution [Non-Add]				[1,920]				[-1,920]		[0]		[-1,920]
FACILITIES												
Rental Payments	0	71,805	0	72,388		1,240		0	0	73,628	0	1,240
Operations & Maintenance	54	19,604	54	19,711		191		0	54	19,902	0	191
Deferred Maintenance & Capital Improvement	1	3,373	1	3,373		0		4,650	1	8,023	0	4,650
TOTAL	55	94,782	55	95,472	0	1,431	0	4,650	55	101,553	0	6,081
Impact of Continuing Resolution [Non-Add]				[-2,593]				[2,593]		[0]		[2,593]
Subtotal, SIR Appropriation	5,627	965,345	5,301	944,760	-45	24,034	-65	6,158	5,191	974,952	-110	30,192
Impact of Continuing Resolution				17,916				-17,916		0		-17,916
Subtotal, SIR Appropriation	5,627	965,345	5,301	962,676	-45	24,034	-65	-11,758	5,191	974,952	-110	12,276
Emergency Approp. (P.L. 109-148) [Katrina]		5,300										
Emergency Approp. (P.L. 109-234) [Katrina]		10,200										0
Transfer to BIA		-4,000										
Spectrum Relocation Costs Transfer				6,159		-6,159				0		-6,159
TOTAL, SIR Appropriation	5,627	976,845	5,301	968,835	-45	17,875	-65	-11,758	5,191	974,952	-110	6,117

Note: After the development of the account level FTEs for FY 2008 for the President's Budget Appendix, further refinements to the estimates were made. As a result, the FY 2008 direct and reimbursable FTE levels in this presentation do not match and are lower than those FTE levels presented in the Budget Appendix.

a/ The FTE's depicted in the FY 2006, 2007, and 2008 columns are only the staff-years associated with appropriated funding. Reimbursable FTE's are 2,793, 2,758 and 2,542 and Working Capital Fund FTE's are 158, 158 and 345 for FY 2006, 2007 and 2008 respectively. USGS total FTE's for FY 2006, 2007, and 2008 are 8,578, 8,217 and 8,078 respectively. FTE may not add to totals and subtotals, due to rounding.

This page intentionally left blank.

Science on the Landscape — Regional and Crosscutting Activities



Featured Interdisciplinary Science on the Landscape

⚙️	Multi-Hazards Initiative – Southern California	Page F - 2
◻️	Healthy Lands Initiative – Southwestern Wyoming	Page F - 4
▲	Ocean Action Plan Initiative	Page F - 11
◊	Science on the DOI Landscape	Page F - 20
●	Priority Ecosystems Science	Page F - 22
✕	Department Crosscuts	Page F - 26

Science on the Landscape — The Regional and Crosscutting Activities section showcases USGS multidisciplinary science that addresses issues important to regional partners and customers. Recent interdisciplinary activities conducted across the Nation and featured in this section are indicated on the map above.

Three FY 2008 initiatives are presented in this section: Multi-Hazards Demonstration Project in Southern California, Healthy Lands Initiative in Southwestern Wyoming, and Oceans Initiative. Other efforts reported here include Science on the DOI Landscape, a regionally funded program that focused on the partner needs of Interior bureaus; Priority Ecosystems Science, which addresses five priority ecosystems of Everglades, Chesapeake Bay, Platte River, Mojave Desert, and San Francisco Bay/Delta; and departmental crosscuts of California Bay-Delta, Columbia River Basin Salmon Recovery, Coral Reef Protection, Global Change, Greater Everglades Ecosystem Restoration, Invasive Species, Klamath River Basin, and Middle Rio Grande.

USGS Integrated Science Initiatives

Integrated Multi-Hazards

(+\$1,250,000)

Integrated Multi-Hazards (\$000s)	2006 Enacted	2007 CR	2008			Change From 2007 (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Integrated Multi-hazards Demonstration Project for Southern California						
Geographic Analysis and Monitoring		300			300	0
Earthquake Hazards		300			300	0
Landslide Hazards		200			200	0
Coastal and Marine Geology		200			200	0
National Streamflow Information Program		200		+100	300	+100
Biological Research and Monitoring		300			300	0
National Geospatial Program		680			680	0
TOTAL Southern California Integrated Multi-hazards Demonstration Project		2,180		+100	2,280	+100
Hurricane Science for the Gulf Coast						
Coastal and Marine Geology				+1,000	1,000	+1,000
National Streamflow Information Program				+150	150	+150
TOTAL Hurricane Science for the Gulf Coast				+1,150	1,150	+1,150
Total Requirements (\$000)		2,180		+1,250	3,430	+1,250
<i>Total FTE</i>		3		+1	4	+1

The FY 2008 request for the USGS Natural Hazards Initiative is \$1,250,000. Additionally, \$2.18 million was requested in the FY 2007 President's budget. Final disposition of this amount will be determined when Congress enacts FY 2007 spending legislation and the Survey receives its FY 2007 Budget Appropriation.

USGS, in partnership with many collaborators, proposes expanding its natural hazards initiative to help build stronger communities by significantly reducing the vulnerability of the millions of people most at risk from having their lives and livelihoods endangered by natural hazards. This initiative relies and builds on ongoing work in USGS hazards programs. The hazards initiative will continue and enhance the work to be started in the FY 2007 Integrated Multi-Hazards demonstration project in Southern California and will use the concepts and lessons learned from that project and begin to apply them to hazards and areas not emphasized in the demonstration project. The goal of the demonstration project when it is initiated in FY 2007 is to reduce losses from natural hazards by developing better hazards science and facilitating its application to decisionmaking in the Southern California community. Through the requested increase of \$100,000 to the National Streamflow Information Program, three new streamgages with the ability to transmit data in real time via satellite telemetry will be added to the Southern California network to fill critical gaps in areal coverage in FY 2008. These data are used in flood, landslide, and debris-flow forecasting and warning.

In addition, the region bordering the Gulf of Mexico is particularly vulnerable to the impacts of hurricanes, and the Integrated Multi-Hazards Initiative builds on current USGS activities to improve the science and information base for forecasting and responding to hurricane impacts to this most vulnerable of coastal settings. These impacts include flooding from coastal storm surge and inland rivers; damage to physical features such as barrier islands, mainland beaches, wetlands and estuaries that provide the first line of defense when a hurricane strikes; and, as the hurricane moves inland, catastrophic landslides in mountainous areas. Current forecasts suggest that the frequency and magnitude of hurricanes making landfall in this region in coming years is likely to remain elevated relative to the past several decades. More lives and property are at risk now than even a decade ago because of recent rapid population growth in the region.

In the aftermath of the historic hurricane seasons of FY 2004 and FY 2005, scientific information and understanding is required to (1) assess the physical, ecological, and socio-economic vulnerability of these coastal settings and predict the potential impacts of storm events, (2) provide emergency responders with timely and accurate information needed to direct critical resources for activities such as evacuations, search and rescue missions, and damage assessments, (3) assess the effectiveness of post-storm restoration and enhancement activities (including those in response to Hurricanes Katrina and Rita) in reducing future vulnerability, and (4) provide coastal zone managers with rapid and reliable assessments of the impacts of future storms and the resulting changes in coastal vulnerability to future hurricanes.

The requested increase of \$150,000 to the National Streamflow Information Program will enhance storm surge monitoring to provide the National Weather Service and emergency managers with visualization of storm surge for use in conducting emergency response activities during a hurricane. *Additional information on this initiative can be found in the Water Resources Investigations/Hydrologic Monitoring, Assessments, and Research/National Streamflow Information Program section of this document.*

Understanding the response of natural and constructed landscapes and ecosystems; forecasting the frequency, intensity, and impact of these changes; and providing tools to develop policy and management responses is integral to constructing more resilient structures and communities. Of the \$1.5 million increase requested for the Ocean Action Plan (OAP) under the Coastal and Marine Geology Program, \$1.0 million will also support the Integrated Multi-Hazards Initiative related to hurricane science. OAP research, detailed seafloor and coastal mapping, and observations will focus on establishing the basis for short-term forecasts and long-term (probabilistic) assessments of coastal vulnerability to extreme weather events consistent with the Ocean Research and Priorities Plan. Working with regional alliances, State partners, and existing observing systems the USGS and other Federal agencies will identify critical observational needs, address observational gaps, develop new Geographic Information System (GIS) tools, and identify model development priorities that will lead to improved support for decisionmaking relevant to those issues of greatest concern to the management community. In 2008, the effort will result, for each of three potential pilot regions, in an inventory of existing observational programs and an assessment of critical data gaps to be addressed by enhanced mapping and monitoring. For each pilot region, a 5-year objective will be developed to provide at least one forecast tool each for future hazard vulnerability, for example, inundation susceptibility. *Additional information on this initiative can be found in the Geologic Hazards, Resources, and Processes/Geologic Landscape and Coastal Assessments /Coastal and Marine Geology Program section of this document.*

Healthy Lands Initiative — Green River, Wyoming

	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Biological Research (\$000)	178,544	172,597	+4,467	+4,050	181,114	+8,517
Biological Research & Monitoring (\$000)	140,086	135,692	+3,664	+4,050	143,406	+7,714
Healthy Lands — Green River, Wyoming	220	140	0	+5,000	5,140	+5,000
Total FTE	2	1	0	+10	11	+10
Other USGS Support	265	610	0	0	610	0
Other Major Resources:						
Reimbursable	570	490	0	0	490	0

Summary of 2008 Program Changes for Healthy Lands Initiative

Request Component	(\$000)	FTE
• Green River, Wyoming	+5,000	+10
TOTAL Program Changes	+5,000	+10

Justification of 2008 Program Changes

Green River, Wyoming

(+\$5,000,000 / +10 FTE)

Significant increases in energy demand and development on public land, coupled with explosive population growth in the West, are challenging the Nation’s ability to manage and conserve natural resources. A significant (\$11.5 million) component of the Department’s Healthy Lands Initiative will focus on southwestern Wyoming where the requirements for energy development and recreation compete on an unprecedented scale with the needs of species, habitat, and long-term conservation goals. The Department will integrate the exceptional capabilities of the BLM (\$4.5 million), USGS (\$5.0 million), and FWS (\$2.0 million) to tackle the issues at this complex wildlife-energy interface.

The Department has determined that immediate action must be taken to prevent degradation to the land and the species that rely on this land. Of note, habitats of numerous listed, candidate, and proposed Federal species coincide with energy producing areas. This initiative will provide the required long-term science-based effort to assess and enhance aquatic and terrestrial habitats in southwestern Wyoming, while facilitating responsible energy development. USGS inventories of species and habitats, water resource monitoring, syntheses of habitat and energy information, and monitoring of lands, waters, and species are critical to informed land management decisions and restoration plans.

The requested funding would enable aggressive landscape-scale assessment, planning and habitat restoration and enhancement activities in the Green River Basin of Wyoming, including adaptive management approaches to ensure the long-term viability of wildlife habitat. Implementing existing land management plans with consultation would continue to ensure

energy development impacts to wildlife are effectively compensated and listing of species is minimized.

The Wyoming Green River Basin is a priority site of the Wildlife-Energy Interface component of the Healthy Lands Initiative because the landscape and habitats of the basin are undergoing rapid change in response to recent energy resource development. Current practices neither promote efficient energy production nor the most effective wildlife protections. Although the greater sage grouse presents a particularly significant challenge, sagebrush habitat supports significant numbers of other plants and animals that depend on this ecosystem for all or part of their existence, including species that are candidates for listing or are already federally listed, threatened, or endangered species. Listing of the sage grouse alone would lead to significant adverse impacts on the local economy. Adverse impacts would affect energy production, hunting, livestock grazing, and recreation.



Greater Sage-Grouse depend solely on sagebrush for food and cover during the winter months. Disturbance of winter habitats could have drastic implications for sage-grouse populations.
Photo by Mike Swystun.

Initiative efforts will build upon the existing USGS knowledge base and expertise in conducting interdisciplinary studies to examine the environmental impacts of natural events and land use change. In collaboration with partners, the USGS will build the geospatial framework for sharing information, assess the health of habitats and their resources, and monitor changes in landscape and habitats as energy development proceeds, all to ensure the long-term viability and sustainability of wildlife and terrestrial and aquatic habitat in energy development areas. The result will be scientific information, knowledge, and tools to ensure future decisions regarding land and resource use, management practices, and energy development are based on understanding the relationships of biological resources to physical changes.

These activities will assist partners as they develop and assess habitat restoration strategies that benefit species of concern. For example, the USGS will integrate landscape-scale species and habitat science with energy assessments for the ecoregional analysis of terrestrial and aquatic ecosystems within the basin, utilize ground and remote-sensing technologies, conduct surveys to sample the distribution of species (e.g., sage grouse), assess landscape and habitat conditions, identify unique ecological and critical habitats in relation to energy resources, assess priority conservation targets, and test the response of species to human disturbance, all to

Science on the Landscape — Regional and Crosscutting Activities

provide an accurate species and habitat assessment and assist in development of species and habitat monitoring to meet specific management objectives.

The Healthy Lands Initiative promotes the concept of cooperative conservation and supports the Department's Resource Protection strategic goal of improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment. The USGS will collaborate with government and non-government partner institutions and contractors to identify resource management issues and the science data and information needed to resolve these issues. All programs contributing to this initiative have scored moderately effective or better in the Administration's PART evaluation, and Program metrics, some which were developed during the PART process, will be used to measure performance.

Means and Strategies — Work will be accomplished by USGS scientists and technicians, in collaboration with government and non-government partner institutions and contractors. Initiative efforts will build upon the existing USGS knowledge base and expertise in conducting interdisciplinary studies that examine the environmental impacts of natural events and land use change.

Program Performance Change

	2004 Actual	2005 Actual	2006 Actual	2007 CR ¹	2008 Base Budget (2007 PB + Fixed Costs)	2008 Plan	Program Change Accruing in 2008	Program Change Accruing in Outyears
					A	B=A+C	C	D
Resource Protection: Percent of targeted science products that are used by partners for land or resource management decision making	1/1 100%	1/1 100%	1/1 100%	1/1 100%	1/1 100%	7/7 100%	6/6 --	14/14 100%
Resource Protection: Quality: X% of studies validated through appropriate peer review or independent review	1/1 100%	1/1 100%	1/1 100%	1/1 100%	1/1 100%	7/7 100%	6/6 --	14/14 100%
Resource Protection: # of systematic analyses and investigations	1	1	1	1	1	7	+6	+14
Total actual/projected cost (\$000)	\$200	\$200	\$200	\$200	\$200	\$4,200	+\$4,000	\$0
Actual/projected cost per systematic analysis (whole dollars)	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	--	--

Science on the Landscape — Regional and Crosscutting Activities

	2004 Actual	2005 Actual	2006 Actual	2007 CR ¹	2008 Base Budget (2007 PB + Fixed Costs)	2008 Plan	Program Change Accruing in 2008	Program Change Accruing in Outyears
					A	B=A+C	C	D
Comments	<p>Initiative accelerates completion of systematic analyses and investigations to evaluate treatments and develop adaptive management options for sage habitats for the benefit of sage grouse on Interior managed lands. A total of 21 systematic analyses and investigations will be delivered in the outyears.</p> <p>Systematic analyses, the product of research, require one to five years for completion. Some studies already underway in these areas will be completed in FY 2007 and FY 2008. The influx of new funding will accelerate completion of some research projects currently in progress as well as initiate other research projects that will conclude in the outyears. The USGS used an annual snapshot of the Resource Protection ABC research work activity cost data averaged over time as a surrogate cost per unit. To this the USGS added a proportional share of the cost derived for the Resource Protection science management activity. For FY 2004 through third quarter FY 2006, the average unit cost for systematic analyses is approximately \$200,000 for the Resource Protection mission area which correlates to the average cost that the program had historically used before implementation of ABC.</p>							
Resource Protection: # of formal workshops and training provided to customers	1	2	2	2	2	5	+3	0
Total actual/projected cost (\$000)	\$80	\$160	\$160	\$160	\$160	\$400	+\$240	\$0
Actual/projected cost per workshop (whole dollars)	\$80,000	\$80,000	\$80,000	\$80,000	\$80,000	\$80,000	--	--
Comments	<p>For workshops, which support land managers in applying the science, and are a shorter term product, the USGS used the average unit cost of \$80,000 based on the technical assistance and proportional share of the science management work activity for FY 2005 for the Resource Protection mission. Other Interior goals will also accrue performance from systematic analyses produced, workshops conducted, and monitoring stations added to the network.</p>							
Resource Protection: # of real-time ground-water sites reporting in NWIS-Web	0	0	0	0	0	4	+4	0
Total actual/projected cost (\$000)	\$0	\$0	\$0	\$0	\$0	*	*	\$0
Actual/projected cost per ground water site (whole dollars)	--	--	--	--	--	*	*	--
Comments	<p>* In the first year of operation, the cost of a single well ranges from \$4,000–\$10,000 and includes the cost of getting permission to use a landowner's existing well, characterization of the site (depth of well, type of pump, establishment of measurement benchmark), and installation of scientific instruments. Wherever possible, the USGS retrofits existing wells with the needed equipment, but if a well is required in a location where none are available, drilling costs can range from \$5,000–\$25,000, depending on terrain, rock type, and the depth and diameter of the well. After the first year, annual operating costs range from \$1,000–\$7,000, depending on frequency of sampling, presence or absence of a recorder, real-time capability, distance of the well from the office, and other factors.</p>							

Science on the Landscape — Regional and Crosscutting Activities

	2004 Actual	2005 Actual	2006 Actual	2007 CR ¹	2008 Base Budget (2007 PB + Fixed Costs)	2008 Plan	Program Change Accruing in 2008	Program Change Accruing in Outyears
					A	B=A+C	C	D

¹ The performance and cost data in the 2007 CR column is presented at the 2007 plan level, which is based upon a projection of 2007 likely enacted made during the first quarter of 2007. The 2008 plan builds on the 2007 plan. To the extent Congress enacts a 2007 appropriation that is different from the 2007 projection, the 2008 plan may require revision. Note: Projected costs may not equal program change as these are full costs, which may include funds from other sources and (or) use averages.

Column A: The level of performance and costs expected in FY 2008 at the FY 2007 level plus funded fixed costs. Reflects the impact of prior year funding changes, management efficiencies, absorption of prior year fixed costs, and trend impacts, but does not reflect the proposed program change.

Column D: Outyear performance beyond FY 2008 addresses lagging performance — those changes occurring as a result of the program change (not total budget) requested in FY 2008. It does not include the impact of receiving the program change again in a subsequent outyear.

Program Overview

The USGS brings its portfolio of science expertise to address the real-time land management issues identified by Department resources managers to help decisionmakers build and implement adaptive management solutions. This work builds on past and present scientific studies and assessments in the Wyoming Green River Basin such as the recently completed energy assessment of the basin, land use and land cover studies, vegetative mapping studies, and long-term baseline water monitoring. The USGS will work with Federal and State land management agencies to identify their highest priority issues that will guide the scientific priorities. Specific partners include BLM, FWS, National Park Service, U.S. Forest Service, Wyoming State agencies, and non-governmental organizations. The following are examples of proposed USGS actions.

Use of Cost and Performance Information

Cost information was determined using past performance information as characterized by ABC information for similar types of work and products. The USGS moved from project level to task level coding of ABC work activities in 2006. This greater level of granularity should refine cost estimates over time.

Inventory Southwest Wyoming Species and Habitats — Integrate landscape-scale species and habitat science with energy assessments for the ecoregional analysis of terrestrial and aquatic ecosystems within the basin. Utilize ground and remote-sensing technologies, conduct surveys to sample the distribution of species, assess landscape and habitat conditions, identify unique ecological and critical habitats in relation to energy resources, assess priority conservation targets, and test the response of species to human disturbance, all to provide an accurate species and habitat assessment and assist in development of species and habitat monitoring to meet specific management objectives. The USGS has met with partners and prioritized science and technical assistance needs related to sagebrush habitats and developed integrated proposals for research in sagebrush ecosystems for FY 2007. The USGS evaluated species models for the ecoregional analysis of sagebrush ecosystems in Wyoming as part of a large collaborative ecoregional assessment. These models are being used by land managers to develop management plans over a large geographic area.

The USGS evaluated the use of Landsat data in determining winter habitat for sage grouse resulting in identification of additional data requirements for accurately mapping winter habitat. These requirements will be applied in FY 2007 to produce a final set of maps depicting winter habitat for sage grouse in southwestern Wyoming. The BLM will use these maps through an analytical modeling tool to develop management plans for different management units. The USGS finalized methods for mapping sagebrush ecosystems in pilot field sites, conduct accuracy assessments and implement mapping in other areas. The BLM manages about 50 percent of the remaining sagebrush habitats in southwestern Wyoming. They will use these results to meet their management objectives by accurately assessing and monitoring habitats at landscape scales. Information obtained will build upon the knowledge base used to evaluate a species status and distribution and contributes to PART measures in Biological Research and Monitoring and Biological Information Management and Delivery.

One important product that will be developed prior to 2008 is a Green River Basin data inventory to establish baseline conditions, present the current level of knowledge, and identify gaps in that data and information. The inventory will include mapped information on the biologic, hydrologic, and geologic resources integrated with mapped information on roads, utility corridors, land ownership, and other data contributed by Federal and State land management agencies.

Monitor and Assess Water Resources — Using historical and current monitoring data to assess surface-water and ground-water quantity and quality to support adaptive management decisions designed to ensure the protection and wise use of water resources. Design and implement a basinwide surface-water and ground-water monitoring network. Integrate and interpret data from the network in ways that are directly usable for land management decisionmaking. Monitor and assess aquatic communities and habitat to better understand current conditions and potential impacts to aquatic biota. Design and implement a monitoring program to identify and track changes in aquatic communities. Monitoring stations will contribute to PART measures that ensure water information is available as an integrating component in resource management decisions.

Integrate Energy Resources and Habitat Data — Synthesize information on critical habitat with known locations of energy resources to assess the effect of potential development on habitat. To assess the occurrence of other energy resources such as coal and uranium to ensure that resource managers can consider the full range of future energy development. Integrated assessments contribute to Program measures in geology by adding energy resources information for land characterization.

Ensure the Availability of the Full Range of Geographic and Geospatial Information — Develop a Green River Basin data inventory to establish baseline conditions, present the current level of knowledge, and identify gaps in that data and information. The inventory will include mapped information on the biologic, hydrologic, and geologic resources integrated with mapped information on roads, utility corridors, land ownership and other data contributed by Federal and State land management agencies. The inventory will establish the framework for building an information management tool where new data will be added and where integration of information will be used to produce secondary products used to evaluate management alternatives. Geospatial data collected and made accessible, such as land cover and invasive species distribution, will contribute to Program measures in all disciplines.

Conduct Integrated Inter-Agency Monitoring — Develop and implement a long-term a monitoring strategy to assess the effects of natural processes and human actions, as well as conservation action implementation. Data resulting from this monitoring program will contribute

to adaptive management decisions. Geologic data integrated into ground water status and trends contributes directly to this Program measure in the National Cooperative Geologic Mapping program.

2008 Program Performance

This initiative directly contributes to the Department's Resource Protection strategic goal of improving the understanding of natural ecosystems by assessing the current health of the Green River Basin, monitoring the changes as energy resources are developed, and informing conservation and restoration efforts, all to ensure the long-term viability of wildlife and habitats in these areas. The "percent of targeted science products that are used by partners for land or resource management decisionmaking" under Resource Protection will increase as a result of this initiative.

The USGS will —

- Consult with Federal and State land management agencies to identify their highest priority issues through workshops and partner meetings,
- Establish and implement a monitoring strategy and protocols to provide information needed to assess alternative management decisions which includes evaluating geospatial, automated and real-time technologies; installing or operating ground-water, stream, and water quality stations; and developing formats for sharing information,
- Integrate biologic, geologic, geographic, and hydrologic information and data into tools that evaluate outcomes of alternative resource management strategies which includes building models to evaluate alternatives; deriving new information by combining existing geospatial data; and developing new alternatives,
- Develop scientific information, knowledge, and tools to ensure future decisions regarding land and resource use, management practices, and energy development are based on understanding the relationships of biological resources to physical changes which includes synthesizing of information on critical habitat in relation to energy resources; evaluating the impact of roads and other infrastructure development on species distribution and habitat fragmentation; and assessing the effects of natural processes and human actions on species distribution and habitat change, and
- Develop habitat restoration strategies and models that benefit species of concern based on ecoregional analysis of landscape-scale species and habitat science within the basin.

The USGS brings a diverse portfolio of interdisciplinary science expertise to address the real-time land management issues identified by Department resource managers. Outputs from this effort will provide the information and knowledge for decisionmakers to build and implement adaptive management solutions as energy resources are developed to ensure the long-term viability of wildlife and habitats in these areas. The partnership among USGS, BLM, FWS, and others will be a long-term science-based effort to assess and enhance aquatic and terrestrial habitats at a landscape scale in southwestern Wyoming while facilitating responsible energy development. Tools and technologies developed in this effort will be transferable to other areas in the Nation where there are similar issues of energy development and impacts to wildlife habitat.

Ocean Action Plan: Hydrological and Ecological Impacts of Persistent and Extreme Events

	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Geologic Hazards, Resources, and Processes	235,286	217,418	+5,781	-1,114	222,085	+4,667
Coastal and Marine Geology	0	0	0	+1,500	1,500	+1,500
<i>FTE</i>	234	235	0	+1	1	+1
Water Resources Investigations	211,764	204,047	+7,457	+950	212,454	+8,407
Hydrologic Networks and Analysis (oceans component only)	0	0	0	+1,500	1,500	+1,500
<i>FTE</i>	0	0	0	+5	5	+5
Total Requirements (\$000)				+3,000	3,000	3,000
Total FTE				+6	6	+6

Summary of 2008 Program Changes for Ocean Action Plan

Request Component	(\$000)	FTE
• Coastal and Marine Geology	+1,500	+1
• Hydrologic Networks and Analysis	+1,500	+5
TOTAL Program Changes	+3,000	+6

Justification of 2008 Program Changes

The 2008 budget request for the Ocean Action Plan continues USGS efforts to implement the President’s Ocean Action Plan (OAP) and to engage in interagency efforts to advance the implementation strategy of the Ocean Research Priorities Plan in support of the Near-term Priorities. The 2008 proposed activities address the Department’s Resource Protection strategic goal in support of the end outcome goal to “improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment.” Coordinated activities of the Hydrologic Networks and Analysis and Coastal and Marine Geology Program (CMGP) will advance the goals of the USGS National Coastal Program Plan, in partnership with other USGS programs, other Federal agencies and in response to State, local and regional needs, through:

- Initial implementation of the National Water Quality Monitoring Network (“the Network”) called for in the OAP and defined through the efforts of the USGS, U.S. Environmental Protection Agency (EPA), National Oceanic and Atmospheric Administration (NOAA), and other Federal and State partners in the plan for a “National Water Quality Monitoring Network for U.S. Coastal Waters and their Tributaries”. This plan, approved by members of the Advisory Committee on Water Information (ACWI) and by Council on Environmental Quality/National Science and Technology Council (CEQ/NSTC), provides

Science on the Landscape — Regional and Crosscutting Activities

the basis for interagency pilot studies in FY 2007 to inventory existing monitoring assets, identify gaps between network design specifications and current data collection, refine the Network's observational and data sharing requirements, and identify next steps for Network implementation. FY 2008 activities supported by the proposed increase (\$1,500,000 to Hydrologic Networks and Analysis) will build upon pilot study results leading to demonstration implementation for selected regions as proof-of-concept of network design and application of network-derived products to resource and public safety management.

- Initial implementation, coordinated where feasible with the Network implementation described above, of the Ocean Research Priorities Plan and Implementation Strategy (ORPPIS) Near-term Priority to "Forecast the Response of Coastal Ecosystems to Persistent Forcing and Extreme Events". FY 2008 activities supported by the proposed increase (\$1,500,000 to CMGP) will be developed and implemented collaboratively with other Federal agency efforts, for example those activities in support of the Coastal Storms Pilot described in NOAA's FY 2008 budget request, to support end-to-end development and integration of seafloor and coastal mapping observations, research, and forecast models. Specifically, this development and integration will lead to decision-support tools to help policy makers and managers (coastal, resource, and emergency) anticipate and prepare for the coastal ecosystem and community response to extreme weather events, natural disasters, and human influences.

These linked activities will further the broad objectives of the OAP and ORPPIS, supporting the continued development of integrated and sustained mapping, observations, visualization techniques forecast models, and decision-support tools. Resulting research and operational products will provide coastal resource managers, coastal zone planners, and emergency and public health officials with observations and short- and long-term forecasts of changing coastal conditions. This effort is strongly linked and depends on other Federal partners, including NOAA, EPA, U.S. Army Corps of Engineers (USACE), and the National Science Foundation (NSF). Activities will build off of the U.S. Group on Earth Observations (USGEO) and the NSTC Subcommittee for Disaster Reduction's (SDR) Improved Observations for Disaster Reduction Near-Term Opportunity Plan. In responding to the ORPPIS this initiative will focus on selected pilot regions with planning and implementation reflecting regional variability in capacity and priority needs as identified through engagement with regional alliances representing State, Local and broad Federal interests. Candidate regions for implementation, reflecting priorities of the USGEO and SDR plans, include the northern Gulf of Mexico, Southern California, and the Southeast/Mid-Atlantic. Initial efforts engaging multiple Federal agencies for at least three pilot regions would begin in FY 2008. Within a 5-year time frame for pilot studies, managers and officials will have enhanced tools and knowledge to ensure that decisions about land and resource use, management practices, and development in the coastal zone and adjacent watersheds can be evaluated with a complete understanding of the probable effects on public health, coastal ecosystems, and community hazard resilience. The leveraging of capabilities across all sectors and the development of regional relevant decision support tools will be clearly demonstrated in the pilot areas with lessons learned identified for broader national implementation.

The proposed activities are explicitly collaborative and the USGS will partner with other government and non-government partner institutions and contractors to identify resource management, public health and safety, and other issues and science data and information needed to resolve these issues. The USGS has a broad role to provide framework observations, mapping, and research to inform decision-making on public safety, resource use,

and natural resource restoration and preservation. Consequently, resources resulting from this request will be distributed to diverse USGS programs to ensure that integrated and multi-disciplinary efforts are responsive to needs identified. As required to ensure effective provision of capabilities and expertise funds may be provided, through grants, cooperative agreements or other mechanisms, to outside entities to meet program requirements. All USGS programs contributing to this initiative have scored moderately effective or better in the Administration's Program Assessment Rating Tool (PART) evaluation, and Program metrics will be used to measure performance. Initiative efforts will build upon the existing USGS knowledge base and expertise in conducting interdisciplinary studies to examine the impacts on coastal ecosystems of natural events and human and natural forces.

Coastal and Marine Geology

(+\$1,500,000 / +1 FTE)

Coastal ecosystems are subject to a variety of forcings, ranging from extreme events, human activities, and changing ocean and climatic conditions. Understanding the response of natural and constructed landscapes and ecosystems; forecasting the frequency, intensity, and impact of these forcings; and providing tools to develop policy and management responses is integral to constructing more resilient structures and communities and protecting the natural environment. Research, detailed seafloor and coastal mapping, and observations will focus on establishing the basis for short-term forecasts and long-term (probabilistic) assessments of coastal vulnerability to extreme events, persistent natural processes, and human influences across the coastal zone. This effort will enhance regional observing systems and models, integrating substantial existing observations and incorporating new observations to address critical regional data gaps. Results from this effort will, for example, inform hazard mitigation and response plans, provide forecasting data to support navigation safety, and assist regional resource managers and public health officials in sustaining ecosystem and public health and promoting hazard resilience.

This effort will conduct sea floor mapping studies and evaluate and help implement models to forecast responses to extreme weather events on the coast consistent with the Oceans Research and Priorities Plan. Working with regional alliances, State partners, and existing observing systems the USGS and other Federal agencies will identify critical observational needs, address observational gaps, develop new GIS tools and identify model development priorities that will lead to improved support for decision-making relevant to those issues of greatest concern to the management community. The USGS will build on established partnerships with NOAA and the USACE to provide and integrate monitoring and mapping data from existing and enhanced programs to ensure that the observational basis for forecasting is established. USGS leadership in water quality and hydrologic monitoring, ecosystem monitoring, and geologic and landscape mapping of coastal and submerged resources will be integrated with, for example, NOAA tide and water level monitoring and USACE coastal mapping to provide an observational framework for decision-support and modeling. Observational parameters collected by the Regional Coastal Ocean Observing Systems (RCOOS) will be important contributors to this effort. NOAA support for Integrated Ocean and coastal Observing System (IOOS) Regional Associations will contribute to stakeholder engagement and outreach efforts regarding observing needs and the integration of observations into decision support tools. Efforts will build on existing interagency collaborative efforts through the National Map to establish an integrated geospatial framework and the efforts of national and regional ocean observing systems, including the National Water Quality Monitoring Network, to monitor physical processes and ecological responses. Support will be provided, including for external community efforts, to develop inundation and ecosystem modeling to provide critical

Science on the Landscape — Regional and Crosscutting Activities

information for anticipating hazard vulnerability, contaminant and pathogen movement, and ecological and human impacts. The specific focus for model development will result from assessment of existing assets and capabilities and prioritization through engagement with regional partners and management entities.

In 2008 the effort will result, for each of the pilot regions, in an inventory of existing observational programs and an assessment of critical data gaps to be addressed by enhanced mapping and monitoring. For each pilot region a 5-year objective will be developed to provide at least one forecast tool each for future hazard vulnerability (for example, inundation susceptibility) and for ecosystem health (for example, water quality or pathogen tracking models) as well as broader assessments of ecological and public-safety vulnerability to specific aspects of coastal change.

The proposed increase (\$1,500,000 to Coastal and Marine Geology Program) will also support ongoing USGS Natural Hazard Initiative efforts on impacts of hurricanes, by building on current USGS activities to improve the science and information base for forecasting and responding to hurricane impacts to this most vulnerable of coastal settings.

Program Performance Change

	2004 Actual	2005 Actual	2006 Actual	2007 CR ¹	2008 Base Budget (2007 PB + Fixed Costs)	2008 Plan	Program Change Accruing in 2008	Program Change Accruing in Outyears
					A	B=A+C	C	D
# of formal workshops or training provided to customers (instances/issues/events) (CMG)	10	10	10	10	10	11	+1	0
Total Actual/Projected Cost (\$000)	\$250	\$250	\$250	\$250	\$250	\$300	\$50	
Actual/Projected Cost Per workshop (whole dollars)	\$25	\$25	\$25	\$25	\$25	\$27	\$50	

¹ The performance and cost data in the 2007 CR column is presented at the 2007 plan level, which is based upon a projection of 2007 likely enacted made during the first quarter of 2007. The 2008 plan builds on the 2007 plan. To the extent Congress enacts a 2007 appropriation that is different from the 2007 projection, the 2008 plan may require revision.

Note: Projected costs may not equal program change as these are full costs, which may include funds from other sources and (or) use averages.

Column A: The level of performance and costs expected in 2008 at the 2007 President's budget level plus funded fixed costs. Reflects the impact of prior year funding changes, management efficiencies, absorption of prior year fixed costs, and trend impacts, but does not reflect the proposed program change.

Column D: Outyear performance beyond 2008 addresses lagging performance — those changes occurring as a result of the program change (not total budget) requested in 2008. It does not include the impact of receiving the program change again in a subsequent outyear.

Program Overview

The Coastal and Marine Geology Program (CMGP) program maintains and applies geologic, oceanographic and geochemical expertise providing the observational, research, and modeling capabilities required to forecast coastal change in response to natural and human processes. The CMGP addresses a broad suite of national issues in the thematic areas of natural hazards, environmental quality and human health, and natural resources. The CMGP, through multi-year regional studies, provides the regional context for understanding and forecasting coastal change so that decisions on resource use, preservation, and restoration are made with comprehensive knowledge of the multiple drivers of future change, including the vulnerability of coastal communities to extreme events and ecosystem change. Interdisciplinary and integrated studies build on successful regional studies (e.g., Tampa Bay, Puget Sound, Southern California) and national programs to characterize coastal environments and the processes (coastal storms, sea-level rise) that shape them. Substantial ongoing program activities with respect to hurricane vulnerability and ecosystem and landscape change in the Northern Gulf of Mexico, Southern California, Puget Sound, and the Mid-Atlantic region provide a substantial basis for the collaborative work proposed here.

Broader USGS capabilities with respect to terrestrial mapping and geography, ecosystem and hydrologic monitoring and modeling, and the dynamics of earth systems will be integrated into this activity as required. USGS program objectives spanning the thematic components include:

- Characterization of geologic, hydrologic and ecological setting, processes, and change at regional or system scales as required to provide the framework understanding for management and policy in response to a broad range of issues.
- Development of regional and national hazard, resource and environmental assessments of coastal and marine condition, change and vulnerability to human and natural processes.
- Development of broadly applicable models of coastal and marine evolution and change.

The overall direction for USGS activities is provided by the USGS National Coastal Program Plan. This plan is consistent with the Ocean Research Priorities Plan and reflects internal and external inputs such as the USGS and Department's strategic plans and periodic reviews of the USGS programs and program elements by the National Academy of Sciences. The overall goals of the National Coastal Program Plan are to (1) provide the scientific information, knowledge, and tools required to ensure that land and resource use decision, management practices, and future development in the coastal zone and adjacent watersheds can be evaluated with a complete understanding of the effects on coastal ecosystems and communities and (2) provide a full assessment of the vulnerability of coastal and marine ecosystems and communities to natural and human-driven change.

Hydrologic Networks and Analysis

National Water Quality Monitoring Network

(+\$1,500,000 / +5 FTE)

The increase proposed for the Hydrologic Networks and Analysis program permits the initial implementation of the National Water Quality Monitoring Network ("the Network") called for in the OAP and defined through the efforts of some 40 Federal, State, and local agencies,

Science on the Landscape — Regional and Crosscutting Activities

monitoring associations, or professional organizations including the USGS, EPA, and NOAA and described in the plan entitled, "National Water Quality Monitoring Network for U.S. Coastal Waters and their Tributaries." This plan, approved by members of the Advisory Committee on Water Information (ACWI) and by the Council on Environmental Quality, National Science and Technology Council (CEQ/NSTC), provides for interagency pilot studies in FY 2007 to inventory existing monitoring assets, identify gaps between network design specifications and current data collection, refine the Network's observational and data sharing requirements, and identify next steps for Network implementation. FY 2008 activities supported by the proposed increase (\$1,500,000 to Hydrologic Networks and Analysis) will build upon pilot study results leading to demonstration projects designed to reveal the feasibility of the Network, refine observational parameters and temporal and geographic sampling frequencies and scales, and develop data sharing, summarization, and reporting methodologies. Roughly \$1,000,000 will be for related assessments to create the Network while the remaining \$500,000 will be for streamgages to advance the Network.

Program Performance Change

	2004 Actual	2005 Actual	2006 Actual	2007 CR ¹	2008 Base Budget (2007 PB + Fixed Costs)	2008 Plan	Program Change Accruing in 2008	Program Change Accruing In Outyears
					A	B=A+C	C	D
# real-time water-quality sites reporting in NWISWeb	1,062	1,125	1,102	887	887	See comments below.		
Comments	The most likely performance impact from the +\$1.5 million increase requested for the National Water Quality Monitoring Network is the addition of new water-quality monitoring sites. However, the number of sites will not be known until an evaluation and gap analysis of current regional water quality monitoring networks is completed, later in 2007 (for example, the analysis might indicate that rain gages are needed, rather than stream-based water-quality sampling sites). This approach to the Network design has been approved by CEQ/NSTC and the interagency ACWI, as noted above in the Justification of 2008 Program Changes section.							
<p>¹ The performance and cost data in the 2007 CR column is presented at the 2007 plan level, which is based upon a projection of 2007 likely enacted made during the first quarter of 2007. The 2008 plan builds on the 2007 plan. To the extent Congress enacts a 2007 appropriation that is different from the 2007 projection, the 2008 plan may require revision.</p> <p>Note: Projected costs may not equal program change as these are full costs, which may include funds from other sources and (or) use averages.</p> <p>Column A: The level of performance and costs expected in 2008 at the 2007 President's budget level plus funded fixed costs. Reflects the impact of prior year funding changes, management efficiencies, absorption of prior year fixed costs, and trend impacts, but does not reflect the proposed program change.</p> <p>Column D: Outyear performance beyond 2008 addresses lagging performance — those changes occurring as a result of the program change (not total budget) requested in 2008. It does <u>not</u> include the impact of receiving the program change again in a subsequent outyear.</p>								

Program Overview

Data on the quantity and quality of water in the Nation's streams, lakes, and aquifers, as well as analytical studies, are necessary for the wise planning, development, utilization, and protection of the Nation's water resources. The Federal funds appropriated through the Hydrologic Networks and Analysis (HNA) program support three distinct water-quality networks described

below, selected hydrologic analysis and modeling activities, and a small but vital portion of the overall information delivery activity of the USGS water resources programs.

The HNA program supports the Department's strategic plan, specifically the goal of improving the understanding of national ecosystems and resources through integrated interdisciplinary assessment, in conjunction with other USGS programs and an array of reimbursable projects funded by partner agencies.

2008 Program Performance

This initiative directly contributes to the Department's Resource Protection strategic goal to improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment. This initiative will contribute to GPRA output measures (# of systematic analyses and investigations delivered to customers) and intermediate outcome and program performance measures (% of regional and major topical studies for which interpretive and synthesis products are cited by identified partners and users within 3 years of study completion). The integrated activities supported, as part of a wider collaborative effort, will lead to more effective provision of science information and products that inform both short-term and long-term decisionmaking. As part of the ORPPIS, metrics will be developed to measure the effectiveness and impact of interagency efforts.

Regional and Crosscutting Activities

The USGS regional construct was developed to focus on issue-based, multidisciplinary science; align USGS work more closely with partners at the local and regional level; and enhance partnerships with Department of the Interior bureaus and other Federal, State, and local agencies. Closer proximity of the three USGS regions to Interior bureaus and other partners allows USGS scientists and managers to understand and address land and resource management issues at the local and regional levels; increases the opportunity for partnerships and leverages resources. Regional efforts enhance the connection of the world-renowned capabilities of USGS with the high-priority, real-time land management, urban planning, and heightened security needs of local, Federal, State, Tribal, and community managers.

Eastern Region — The Eastern Region (ER) has the longest urbanized coastline extending from the Gulf Coast of Mississippi to the Atlantic coastline of Maine, and along the Great Lakes from New York to Wisconsin; coastal issues represent an important focus for USGS science in response to coastal storms, erosion, and other hazards. The ER includes 60 percent of the U.S. population, or 177 million people. Nearly 50 percent of the growth in U.S. population since 1990 has occurred in the East, which contributes to the longest record of human-induced change in the Nation. The Eastern Region is characterized by numerous, high-density, urban population centers located along or in close proximity to shorelines, hardwood forests, and the Appalachian Mountains. Continued expansion of coastal and riverine urban centers into rural areas of the region will impact the Nation's ability to use and enjoy natural resources while increasing the number and difficulty of the challenges to protect the welfare of citizens from natural disasters and other health risks.

Central Region — Though largely rural, the USGS Central Region (CR) has some of the fastest growing population centers in the United States. Priority science issues of CR resource managers are agricultural practices, fire science, invasive species, water availability, and landscape management. Response to natural disasters is in the forefront of CR scientific

Science on the Landscape — Regional and Crosscutting Activities

activities. The USGS plays a key role in providing near-real-time data to NOAA tsunami warning centers and supports tsunami monitoring in the Pacific Rim. Seismic data from the Global Seismographic Network, supported jointly by the USGS and NSF, are used daily to determine the locations, depths, magnitudes, and other parameters of earthquakes worldwide. In the aftermath of Hurricanes Katrina and Rita, emergency preparedness procedures and protocols were enhanced and an inventory of resources available for use. An integrated science approach addresses agricultural practices issues at the Bureau of Reclamation by consolidated these data in the Digital Data Atlas—a geospatial tool for access, query, and studying the data in a comprehensive way and working with partners to interpret the impacts and evaluate alternative management strategies. Landscape change due to energy development is occurring in Wyoming's Green River basin, and USGS scientists have evaluated various mapping technologies to larger geographic areas and provided BLM managers with landscape-scale tools to assess wildlife habitat across large areas of Wyoming.

Western Region — With more than 75 percent of Interior lands in the Western Region (WR), USGS responsibilities to serve as the science and research arm for the public and all of Interior's bureaus are enormous, as BLM, NPS, FWS, and BOR are largely vested in the West. The WR is home to over 50 million people, including 8 of the Nation's top 10 fastest growing urban metropolises. WR is rich in both renewable and non-renewable natural resources; minerals, hydroelectric energy, geothermal energy, wind energy, oil and gas, water and forests. More than two-thirds of the 1,263 federally listed species occur in WR, and its many ecosystems (e.g., Klamath Basin, Colorado River, Great Basin, Puget Sound) provide frequent collisions over water availability, endangered species protection, urban growth, and increasing need for energy resources. Natural hazards are a major driver for WR science projects and planning with the longest coastline in the United States under which are huge and potentially catastrophic earthquake fault subduction zones. This is also the reason WR is home to numerous active volcanoes, with extensive volcanoes belts running the length of the Aleutian Islands and the adjacent Alaska Peninsula, also capping the Coast Range from Washington to California. Rangeland or forest wildfires have come with increasing frequency and severity bringing substantial impacts, including post-event landslide and debris flows that wreak additional havoc. USGS researchers are working constantly to provide first responder, policy partners, and the public the scientific information and tools to keep us informed, prepared, and safe.

Regional Planning, Performance, and Partnerships

Regional science planning is a collaborative effort between regional and programmatic managers to plan and implement the bureau's science goals, with an emphasis on work important to our many regional partners. Regional science outputs and outcomes directly address questions relating to the Department's strategic goals of Resource Protection, Resource Use, and Serving Communities and are reported in the programs' performance tables.

Planning and assessment of performance are conducted at various management levels in the Regions. Reviews are in-depth evaluations on the full range of activities under their purview; including scientific programs, products, management, and support services. Regional strategic reviews assess longer term strategic planning goals, their alignment with regional and bureau goals, and the impact of the scientific work on societal issues. Feedback is sought from partners who use and benefit from the products to identify their high priority science issues and specific science questions. Regional representatives meet with partners and USGS scientists to propose science projects to address these issues such as hazards, water use and availability, wildfire, landscape change, coastal and river processes, invasive species, human health and

others. The USGS partners with all the DOI bureaus, other Federal agencies such as EPA, FEMA, NASA, NOAA, USACE, DOE, and USDA, and other organizations such as State, local and tribal governments, universities, non-governmental and international organizations, and the private sector to conduct science and inform decisions for the future.

Workforce Planning

Workforce Plans are reviewed and amended routinely to better align with bureau science directions. Annual reviews of program activities include analyses of current workforce capabilities, costs, and fit with current and/or future program directions. Periodic review of staffing needs and workforce plan changes are a fundamental management practice. Several early retirement and voluntary separation (VERA/VSIP) requests have been approved by DOI, OPM, and OMB and were used to strategically align cost centers workforce with changing scientific directions and to better position them to respond to flat or reduced budgets. Following are highlights of selected regional workforce planning efforts.

- The Eastern Region (ER) manages programs in 26 States, the District of Columbia, the Commonwealth of Puerto Rico, and the U.S. Virgin Islands. Approximately 2,800 employees are distributed across 123 duty stations east of the Mississippi River. In FY 2006, the Eastern Region Workforce Plan efforts focused on the following goals and objectives: a comprehensive assessment of the status of current workforce plans; development of specific actions to be taken in FY 2006; further incorporating of workforce planning into annual and strategic reviews; and working with the Eastern Region Science Committee to develop linkages between the Eastern Region's Science Plan and Workforce Plan.

Two major workforce planning results in FY 2006 were the development and approval of a region wide VERA/VSIP request, and the development of a successful Most Efficient Organization (MEO) proposal in response to Competitive Sourcing goals established by the bureau. Under the A-76 competitive sourcing process, science technician functions within the Region's Minerals Information Team were restructured via the successful MEO bid, reducing the overall cost of the activity as well as total workforce (contractor and Federal employees) required to meet current needs, with minimal adverse impact to the Federal workforce.

- The USGS Central Region (CR) manages programs in 15 States between the Mississippi River and the western slope of the Rocky Mountains. Approximately 2,800 employees and 975 on-site contractors are distributed in 88 cities and 21 field offices across the region. The Fort Collins Science Center is requesting VSIP/VERA authority to restructure staff into a systems approach that orients the science staff to solve complex environmental issues. This restructure is an outcome of revising their strategic plan, which recognizes that the issues facing land and resource managers are complex and require an integrated systems approach to provide solutions and evaluate alternatives. If approved, this restructure will reduce the number of branches, realign scientific specialties, and add new expertise needed to complete this strategy.
- The Western Region (WR) manages programs in Alaska, Arizona, California, Hawaii, Idaho, Nevada, Oregon, Utah, Washington, Guam, and the Pacific Trust Territories. There are more than 2,400 employees distributed in 80 field offices across the region. As part of a

Science on the Landscape — Regional and Crosscutting Activities

long-term effort to gain control over escalating costs of facilities and salary and to reduce the excessive rate of turnover in science support positions in the San Francisco Bay area (Menlo Park office), the USGS WR utilized workforce planning to begin a long term transition of these positions to a lower cost area. As a result of this planning effort, the WR's Office of Western Regional Services (OWRS) have been reshaping the number and types of positions in the workforce through attrition and voluntary moves to Sacramento. This relocation plan also facilitated the implementation of the Long-term Integrated Science and Facility (LISF) plan, which called for the relocation of non-science functions currently performed at Menlo Park to lower cost areas in WR. OWRS is currently implementing a VERA/VISP, for which authority was provided during FY2006-2007, in order to accelerate the transition and now has over sixty percent of the regional support workforce located in Sacramento.

In WR, each Water Science Center manages workforce change based on the program opportunities they develop with partners and the science skills they have available or will need in the future—a necessary feature of a strongly reimbursable-dependent workforce. Water Science Centers annually examine the direction of likely future science program activities and fill vacancies vacated by retirements and transfers with younger scientists whose expertise matches future science activities and needs. This gradual transition process is evaluated as scientist positions become available.

Results of documented Workforce Plans have provided leadership with information to manage their limited resources (both personnel and financial), and to set and modify, as appropriate, science direction based upon customer need. Regions continue to use workforce planning tools in Annual, Strategic and Administrative reviews. The regions will continue refinement of existing workforce plans in response to evolving DOI goals as well as the continuing development of USGS future science directions. As several bureau competitive sourcing scoping activities and possible follow-on studies proceed in FY 2007 and FY 2008, related planning and implementation efforts will be guided by regional workforce plans.

Science on the DOI Landscape

The Eastern Region Director and Regional Executives are meeting with regional officials from the NPS, FWS, MMS, and BLM to discuss FY 2007 work and to establish projects for FY 2008. Research on Caribbean Marine Reserves, particularly coral ecosystem health in the Dry Tortugas and U.S. Virgin Islands, will continue into FY 2008. The USGS Eastern Region is in discussions with the BLM Eastern States Office about developing a decision analysis model to investigate scenario planning and options management involving the disposal of produced, subsurface water during the production of natural gas from coal beds on Federal lands within the Black Warrior Basin of Alabama and possibly Mississippi. Other areas of interest for Interior bureaus include ocean science and coastal issues, forest health, introduction of invasive species, impacts of wind power development, water availability for human and ecological needs, monitoring for avian influenza in the northeast, and Gulf Coast restoration.

USGS will partner with NPS, NOAA, and academic institutions to address issues relating to newly designated NPS marine reserves in the U.S. Virgin Islands and Florida's Dry Tortugas and to test whether these "no-take" areas improve the overall health of the coral reef communities, enhance their tolerance to natural and human impacts, and increase their ability to recover from storms, coral bleaching and disease, etc. This research directly supports the President's Ocean Action Plan and the related, national Ocean Resources Priority Plan, which

specifies marine protected areas and coral reefs as potential subjects of key near-term research.

The USGS, FWS, and NPS will organize a multi-agency workshop in FY 2007 in collaboration with the U.S. Forest Service and the Agricultural Research Service to exchange information on issues related to forest health in the Appalachians, identify key needs for scientific research, and identify and build partnerships focusing research on issues from a prioritized list of forest health research needs. The workshop will lead to an increase in collaboration and coordination among Federal and State agencies on issues related to forest health and serve to identify and prioritize forest health issues that would benefit from USGS research.

A new ground-water model of contaminant plumes in Biscayne National Park, to be completed in FY 2007, will be used to predict the effects of Everglades restoration on future freshwater inflows to the bay and to provide managers with insight into the causes of ecosystem degradation. In FY 2006, USGS scientists completed calibration of a ground-water model and started work on a new surface-water model. Final calibration will occur with the integration of the new surface-water model in FY 2007. Interim results of the modeling work were presented at the Greater Everglades Ecosystem Restoration (GEER) FY 2006 conference. A paper will be published in FY 2007 describing the work that USGS has done in Biscayne National Park and will present opportunities for future study that will improve natural resources management.

In FY 2007, Central Region is completing the DOI on the Landscape projects on Mancos Shale landscapes and coalbed methane development in the Powder River of Wyoming. Technical assistance to partners through our rapid response process will continue in FY 2007 and beyond. Also in FY 2007, two new DOI on the Landscape projects will be started. BLM, USFWS, and other partners are contending with management issues related to energy development in sagebrush ecosystems. The FY 2008 Healthy Lands Initiative will address their needs in a comprehensive way using an integrated science approach. To initiate this effort, in FY 2007, scientists in the Central Region are beginning a project to model at a landscape scale the relationships among sagebrush habitats and the obligate wildlife species located in this habitat. This project will provide the foundation to begin understanding the cumulative effects of intensive energy extraction activities and habitat loss on the viability of species such as sage-grouse. Data and information from this project will be incorporated into an information management system that will be available to managers and provide them with tools to evaluate management options.

In FY 2004, the USGS co-sponsored a meeting with the FWS and NPS to discuss and identify Ozarks resource issues and to commit to a cooperative interdisciplinary Ozarks research partnership. A key result of this partnership will be the start of a new project in FY 2007 to understand the karst features in the Ozarks. Working with partners, the objective of this project is to develop a probabilistic model for identifying the major factors that determine the occurrence of karst features in the Ozarks that can be used to better inform resource management decisionmaking in karst-dominated landscapes. Partners will use this information in evaluating management decisions and make the information available to other land use managers in the region to provide them with tools for a region-wide assessment of issues and management actions.

During FY 2007, the USGS Western Region leadership will meet with and hold briefings for partners from BLM, NPS, FWS, BOR, BIA, tribal officials and others, to discuss and identify science needs for resource management across the DOI landscape and to coordinate ongoing projects. These consultations and meetings at the Regional Director and Regional Executive

Science on the Landscape — Regional and Crosscutting Activities

level, and through relevant issue-focused workshops (water availability for ecosystems, Great Basin watershed management, etc.) will help to identify and develop projects on the DOI Landscape in FY 2008. Some key thematic areas of interest in WR include water availability for human and ecological needs, forest and rangeland health, impacts of energy development, invasive species, and monitoring for avian influenza throughout the Pacific migration routes.

The “Science on the DOI Landscape” funding is currently supporting five projects across WR. The Mojave project (FY 2004-07) now in its last year has developed an integrated, multi-disciplinary understanding of the Mojave desert ecosystem. A key new result is a predictive Desert Tortoise Habitat model tool that is proving useful for Federal resource managers’ efforts to optimize outcomes in a program to relocate tortoises to optimal habitats.

During FY 2007, WR launched a multi-disciplinary project on the Lower Colorado River designed to provide science for adaptive management in support of the BOR’s multi-species conservation plan. This project will continue in FY 2008, ultimately providing new data and analysis for an integrated biologic-geologic-hydrologic understanding to guide management of critical and threatened habitat along the river.

During FY 2007 seed funds were provided to start 3 project starts by focusing on resource management issues in critical environments: Terrestrial impacts to Coral Reefs in Hawaii; Sagesteppe ecosystems (sage hens and sage obligate species) and habitats in the Great Basin; and resource threatened species issues along the upper Columbia (Snake) River basin. These projects will continue in FY 2008. During FY 2007 several workshops on key issues will be held for Federal, State and tribal partners to further identify science gaps for future project starts in WR areas of land and resource management.

Priority Ecosystems Science (PES)

Through PES, the USGS provides integrated science support to better understand the interactive nature of resources and the environment. Land- and resource-management agencies require integrated scientific information and understanding to circumvent potential problems and implement needed improvements. USGS scientific information is provided within the adaptive management framework as improved scientific understanding can be incorporated into the planning and management of each area. Scientific information is used to ensure that future plans have realistic expectations for restoration, structures under construction are optimally managed, monitoring will yield the information desired, and managers have the tools to predict outcomes of possible restoration scenarios.

PES supports ongoing studies in the Greater Everglades, San Francisco Bay, Chesapeake Bay, the Mojave Desert, the Platte River and the Greater Yellowstone area. PES addresses the Department’s Resource Protection strategic goal of improving the understanding of natural ecosystems and resources through interdisciplinary assessment. Planned outputs include systematic analyses and investigations delivered to customers, formal workshops, and training that facilitate exchange and use of knowledge and long-term monitoring.

PES activities are budgeted through five USGS budget line items (Earth Surface Dynamics Program, Hydrologic Networks and Analysis Program, Toxic substances Hydrology Program, Geographic Analysis and Monitoring Program, and Biological Resources and Monitoring). The FY 2008 budget proposes a reduction of \$2,000,000 to PES activities through the Geographic Analysis and Monitoring Program line item.

Restoring the Nation's Greater Everglades and Coastal Ecosystems — Restoring the Nation's Greater Everglades and adjacent Florida Bay and Biscayne Bay coastal ecosystems in South Florida, over half of which is under the stewardship of the Department of the Interior, is the largest environmental restoration project ever attempted in the United States. The USGS continues to be a key partner in Greater Everglades restoration by providing fundamental and applied scientific information on ecosystem history, water quality and contaminants, surface and groundwater flows, and species response to hydroperiod dynamics. A major thrust of the USGS continues to be the development of new and improved models, including hydrologic models, ecological models, landscape models and water quality/contaminant models. These ecosystem models are being integrated into decision support tools to aid in restoration-related planning decisions by the FWS, NPS, USACE, Florida Department of Environmental Protection, EPA, and the South Florida Water Management District to predict the consequences of varied management alternatives, set ecological goals by providing yardsticks to measure the success of the restoration, and manage the natural resources of the system.

The first of goal of Greater Everglades restoration is “get the water right”, therefore USGS is continuing research on developing a thorough understanding of physical and chemical processes of surface and ground-water dynamics. USGS is refining and improving an integrated surface-water/ground-water hydrologic model for Everglades National Park, which is being used to set freshwater flow and salinity targets for the Park. In addition, USGS is expanding existing hydrologic models to the southeast to include Biscayne National Park and to the southwest to include the western part of Everglades National Park and Big Cypress National Preserve. USGS’s ecosystem history studies have provided a detailed understanding of recent history (last 150 years) of the Everglades and coastal system. This information is being used to help set restoration targets and evaluate restoration alternatives for Everglades National Park, Florida Bay, Biscayne National Park, and is providing information on restoration of these coastal systems relative to global change. USGS has developed comprehensive topographic surveys of the Greater Everglades using more than 50,000 survey points, and is expanding the survey into Lake Okeechobee and eastern Big Cypress National Preserve — this topographic information is critical for hydrologic modeling. In addition, USGS’s research is developing information on the dynamics of landscape change and integrating plant community dynamics with hydrology to develop a predictive landscape dynamics model linked to hydrologic and ecological models. USGS, in cooperation with NPS, FWS, and a number of university partners, is continuing its development and improvement of a suite of world class ecological models (called Across Trophic Level System Simulation (ATLSS) models) — ATLSS models are spatially explicit species index models and species population models linked to Everglades hydroperiod dynamics. Species models include: Alligators, Cape Sable Seaside Sparrow; Crocodiles, Manatees, Small/Large Marsh Fishes, Panther, Wading Birds, Snail Kites, Rosette Spoonbill/Coastal Fish, Oysters, Blue Crabs, and others. USGS is working closely with the NPS and FWS to develop PC-based ecological modeling decision support tools linking hydrodynamics to ecological response for use by restoration practitioners. Water quality, which is critical concern of DOI relevant to Greater Everglades restoration, is a major focus of USGS efforts with studies focusing on excess nutrients (especially phosphorus), conductivity and contaminants (specifically, mercury, sulfur and altered organic carbon). USGS is addressing water-quality-related changes (excess phosphorus, conductivity and contaminants) at Loxahatchee National Wildlife Refuge, Everglades National Park, and Florida Bay. Much of the USGS water quality and biogeochemistry research is being done in partnership with Florida Department of Environmental Protection (FDEP) and the South Florida Water Management District especially with regard to the interaction of sulfur and carbon on bioavailability of

mercury, and on evaluating restoration alternatives to minimize the impacts of sulfur and mercury.

Science Supports Restoration Efforts in San Francisco Bay — The USGS continues to be a key participant in the San Francisco Bay and Delta (SFBD) in support of the Bay-Delta Program CALFED, a 30-year plan to restore ecosystem function, improve water supply reliability, and sustain water quality and watershed habitat in the Bay. USGS provides leadership for CALFED's scientific program and contributes research to improve program decisions and expand the body of knowledge relevant to CALFED's proposed actions. USGS studies focus on the relations between proposed changes in the physical habitat of rehabilitated wetlands and the responses of biological resources to water flow, pesticide and metals concentrations, sediment concentrations and transport, and salinity distributions; and effects that these factors and their interrelations have on fish and avian populations in the Bay. USGS scientists began work on two 3-year jointly funded SFBD PES/CALFED studies. The first study is forecasting future ecological and hydrologic states of the Delta and estuarine ecosystem under prescribed scenarios of change using a series of linked climate, hydrologic, geomorphic and ecologic models. Findings will aid restoration, water quality goals, and decisions on infrastructure changes in the Delta. The second study is examining the reasons for the recent decline of fish (including the endangered Delta Smelt) in the system. PES activities will continue to support the South Bay Salt Pond Restoration Project, which covers 15,000 acres of former commercial salt ponds in South San Francisco Bay, which were purchased by State, and Federal agencies in March 2003. While, the FWS and conservation organizations have supported conversion of salt ponds and other bay lands to tidal wetlands to benefit species of concern, no guidelines, models, or management strategies for such conversions exist. This study provides the research to develop guidelines.

USGS Focuses Science on More Effective Restoration of the Chesapeake Bay Ecosystem — The restoration of the Chesapeake Bay, the Nation's largest estuary, is continually challenged by the population increase in its 64,000 square mile watershed. Since the mid-1980s, the Chesapeake Bay Program (CBP), a multi-agency partnership has worked to improve water quality, increase habitat, and restore living resources in the Bay. However, the lack of significant improvement in the Bay ecosystem and the discovery of “intersex” characteristics in fish within the Bay watershed illustrates that more effective implementation and assessment of ecosystem management actions are needed. To enhance restoration efforts, the CBP has asked the USGS to lead efforts to develop scientific approaches to more effectively target implementation of ecosystem management actions for greater water quality and ecological benefit. The USGS revised its science plan in consultation with the CBP, Interior, and academic partners to provide integrated science for effective ecosystem conservation and restoration. USGS studies for FY 2007 through FY 2011 are focused along four science themes: the impact of human activities on land use, the factors affecting water quality and quantity, the ability of habitat to support fish and water-bird populations, and synthesis to improve ecosystem assessment, conservation, and restoration. In FY 2007, the USGS is summarizing the available information that can be used to help better understand the spatial distribution of human activities and natural processes controlling nutrient and sediment transport and their changes over time. These findings, along with output from USGS models, are being used to develop improved decision-support tools to help resource managers better target water-quality management actions. Results from the USGS-lead CBP Nontidal Water-Quality Monitoring Network are being used to better assess the effectiveness of water-quality management strategies. Also in FY 2007, the USGS is beginning an assessment of the causes of intersex characteristics in fish and fish kills in the Chesapeake Bay watershed. In FY 2008-2010, the USGS is planning to conduct field investigations that are needed to better define the factors affecting the transport and change of nutrients and sediment in the watershed, and the

factors affecting fish health, to improve the approaches to more effectively implement and assess ecosystem management actions.

The Mojave Desert Ecosystem is a landscape of contrasts and challenges spread over southern Nevada, western Arizona, southwestern Utah, and a quarter of California. Encompassing six military bases, four national park units, and considerable Bureau of Land Management and other Federal lands, the Mojave Desert is home to a rapidly growing population of well over a million people. Human activities, such as animal grazing, off-road vehicle use, construction, mining, urban expansion, waste disposal, recreational uses, and water withdrawal, and natural processes influenced by man, such as fire and invasive species, have increased the vulnerability of the desert environment to soil erosion and ultimately habitat degradation. USGS is working closely with land management agencies and existing management groups in the Mojave Desert, including the Desert Managers Group to create a decision support system to (1) describe the vulnerability of the land to erosion, invasion by noxious weeds, climatic variability and other disturbances, (2) identify the mechanisms that determine resistance and resilience to disturbance; (3) determine the potential for recovery of degraded land so managers can better target management activities and (4) develop monitoring techniques. In FY 2007 and FY 2008, USGS will continue (1) detailed studies of how geomorphic surfaces affect the response of plants and fauna to water availability, (2) development of tools for analyzing these processes at a landscape and regional scale, (3) development of tortoise habitat models, and (4) assist managers in developing monitoring programs.

Platte River Ecosystem Resources and Management — The Central Platte River Valley provides habitat for the annual migration of over one-half million sandhill cranes, several million waterfowl, and for endangered species, including the whooping crane, piping plover, and least tern. Changes in water and land use have transformed the river channel, altered the structure of riparian habitats, and allowed for the introduction and spread of invasive species. In FY 2006, the Department of the Interior and the States of Colorado, Nebraska, and Wyoming all signed off on a proposed Platte River Recovery Implementation Program to improve habitat for the endangered species. The USGS has worked with State, Federal, and local partners to develop successful adaptive management strategies and USGS research is being used to guide the development of a new 5-year management plan for the crane population. In FY 2007 and FY 2008, the USGS will continue to operate hydrologic monitoring stations along the river, monitor cranes and migratory waterfowl, expand technological studies to better link surface and ground water levels, and investigate the effects of invasive species.

Greater Yellowstone Ecosystem: Snake River Project — The Snake River PES project is part of the Greater Yellowstone area which includes multiple States and mixed jurisdictions of Federal, State and private lands. The area is home to relatively intact species assemblages that represent world class wildlife, botanical, and geologic resources. The potential for controversy in this area is high as there are competing uses that include urbanization, mineral development, recreational use, and traditional land use such as grazing and timber harvest. The initiation of USGS research and the formation of the science advisory panel have prompted the BOR to examine modification of river flows to more closely mimic natural seasonal water flows thereby providing an opportunity to adaptively manage the system. Currently, 2 years of riparian vegetation research and 2 years of geomorphological research have been completed. We will continue the riparian and geomorphic studies while initiating the trout habitat studies in FY 2007. As part of the ongoing studies the project has produced maps of the distribution of floodplains and terraces of the Holocene valley to help with the geomorphic analysis, developed maps and figures detailing the flow inundation frequencies, reported on occurrence and spatial

Science on the Landscape — Regional and Crosscutting Activities

data on invasive and sensitive plant species, and developed spatially geo-referenced study plots for future monitoring as part of our riparian work. After a review of the current program, the PES steering committee concluded that the current focus of the program was too narrow and recommended that the Center take a broader look at the issues within the Greater Yellowstone Ecosystem and develop a more comprehensive ecosystem approach. The Center will meet with the PES program steering group and other interested parties in May to discuss the development of additional program thrusts to support this broader approach. Initial discussions have centered on the dynamics of large carnivore/herbivore interactions, influence of climate change on ecosystem dynamics, the role of invasive species in changing the GYE, and the increased use of water resources and the potential effects on aquatic ecosystems.

Department Crosscuts

As the Department's science bureau, USGS conducts research that is foundational to numerous intradepartmental and interagency crosscutting activities. These crosscutting activities range from environmental issues such as the Everglades restoration and coral reef protection in the Pacific Islands to resource management issues such as salmon recovery in the Pacific Northwest. The following are crosscutting activities in which the USGS plays a prominent role.

(Dollars in millions)

	2006 Enacted	2007 President's Budget	2008 President's Request
California Bay-Delta	\$5.2	\$4.1	\$3.8
Columbia River Basin Salmon Recovery	3.7	3.3	3.3
Coral Reef Protection	3.5	3.5	3.5
Global Change	26.6	26.6	26.6
Greater Everglades Ecosystem Restoration	7.8	7.8	7.8
Invasive Species	11.1	11.0	11.0
Klamath River Basin	1.7	2.0	2.0
Middle Rio Grande	1.6	1.5	1.5

California Bay-Delta — Activities in the San Francisco Bay and Delta focus on providing status and trend information on water quality in the San Joaquin River and Sacramento River watersheds, and unbiased and reliable scientific information and tools that explain the occurrence and effects of toxic substances in the Bay-Delta hydrologic environment. These activities are in support of or have related and overlapping objectives with the CALFED Bay-Delta Program. CALFED is a multi-agency, multi-billion dollar, 30-year plan to restore ecosystem functions, improve water supply reliability, and sustain water quality for California watersheds. The USGS provides leadership for the scientific aspects of the CALFED Program and specific studies that develop new knowledge to improve program decisions and expand the body of knowledge relevant to CALFED proposed actions. In FY 2007 and FY 2008, USGS will continue work on identifying the effects of the changing hydrology, infrastructure, and climate on the physical, chemical, and biological processes of the system; the interaction between and important processes of the marshes and adjacent bays, with a focus on the current decline of pelagic fish species and the restoration of salt ponds to ecosystems compatible with the needs of the San Francisco Bay and freshwater Delta.

Columbia River Basin Salmon Recovery — USGS collaborates with many partners including the Bonneville Power Administration, USACE, FWS, BLM, BOR, Department of Commerce, NOAA Fisheries, USDA, USFS, Washington and Oregon State government agencies, Grand

Ronde Tribe, Yakima Nation, and citizen advisory groups. In FY 2007, USGS will determine the survival of radio-tagged salmon to identify the impacts of water management and determine the efficacy of modifications to fish passage structures at dams on the Lower Snake and Columbia Rivers. In the Yakima Basin, the USGS will examine how proposed water storage can be used to influence spawning and rearing habitats of Pacific salmon. USGS work in the Wind River will involve life history research and monitoring to help recover steelhead trout from exceedingly low run levels of the 1990s. USGS work in the White Salmon River will evaluate the environmental consequences of the removal of Condit Dam scheduled for FY 2008. In FY 2008, the USGS will continue to evaluate recently installed fish passage structures and flow management to determine if the survival of juvenile salmon has been improved. The scheduled removal of Condit Dam in FY 2008 will provide an opportunity to learn about the ecological impacts and benefits of dam removal on salmonid species.

Coral Reef Protection — Coral reefs worldwide are in decline. The Department of the Interior alone has responsibility for more than 3.5 million acres of submerged habitat. In addition to shallow reef habitat, DOI also has responsibility for ocean areas where deep reef habitat exists. USGS is providing information to MMS on the value, diversity and extent of deep reefs under Department responsibility. Local Action Strategies have been developed in response to Coral Reef Task Force resolutions to address coral reef degradation in State and Federal waters (e.g., Hawaii, Florida, and the Caribbean). USGS research will provide information on reef health and status to resource managers and the scientific community to enable them to better manage the resource. Resource managers with the NPS, FWS, MMS, NOAA, and coastal States have called upon USGS to help them understand the processes involved in reef decline so that local-scale stressors can be mitigated or removed, and reef recovery encouraged. USGS products are being and will continue to be used by members of the Coral Reef Task Force as they implement the various Local Action Strategies.

In FY 2007 and FY 2008, USGS research on shallow and deep reefs will include understanding conditions needed for productive and healthy reef communities, understanding terrestrial impacts to reef health in support of U.S. Coral Reef Task Force resolutions, assessing impacts of disease on corals and the recovery trajectory to a healthy state, and evaluating how nature and human activities in marine parks and refuges and on the Outer Continental Shelf influence reef integrity and biodiversity.

Global Change — The USGS supports multidisciplinary studies of past environmental and climatic changes (climate history); process studies that explore the sensitivity of the Earth's surface, the hydrologic cycle, and ecosystems to climate variability and change; and forecasting of potential future changes and their effects on landscapes and ecosystems (particularly on public lands). USGS Global Change Research activities strive to achieve a whole-system understanding of the interrelationships among Earth surface processes, ecological systems, and human activities. Activities of this cross discipline science program focus on documenting, analyzing, and modeling the character of past and present environments and the geological, biological, hydrological, and geochemical processes involved in environmental change so that future environmental changes and impacts can be anticipated. To accomplish these goals, the USGS draws on its extensive land, water, and ecological monitoring networks, its remote sensing and mapping capabilities, and its basic process-oriented research. The integrated combination of these studies provides long-term perspectives needed by natural resource managers, communities, and policymakers to anticipate and adapt to climate change and variability within a science-based framework.

Science on the Landscape — Regional and Crosscutting Activities

In FY 2008, as part of its contributions to the U.S. Climate Change Science Program, the USGS will publish three synthesis and assessment products dealing with abrupt climate change, thresholds in ecological systems response, and climate change in the Arctic. The USGS will implement its global change research plan in collaboration with the other 12 agencies engaged.

Greater Everglades Ecosystem Restoration — The USGS continues to be a key partner in Greater Everglades restoration by providing fundamental and applied scientific information on ecosystem history, water quality and contaminants, surface and groundwater flows, and species response to hydropattern dynamics. A major thrust of the USGS continues to be the development of new and improved models, including hydrologic models, ecological models, landscape models and water quality/contaminant models. These ecosystem models are being integrated into decision support tools to aid in restoration-related planning decisions by the FWS, NPS, USACE, Florida Department of Environmental Protection, EPA, and the South Florida Water Management District to predict the consequences of varied management alternatives, set ecological goals by providing yardsticks to measure the success of the restoration, and manage the natural resources of the system.

Invasive Species — The USGS plays a significant role in implementing the national Invasive Species Management Plan, developed by the National Invasive Species Council, as called for in the Presidential Executive Order on invasive species. To meet the goals of the plan, the USGS Invasive Species program provides management-oriented research and delivers information needed to prevent, detect, control, and eradicate invasive species and to restore impaired ecosystems. USGS researchers are leading or cooperating in efforts to integrate the capabilities of the USGS and partners, including Federal and State resource agencies, to help provide the information, methods, technologies, and technical assistance needed for effective responses to terrestrial and aquatic invaders threatening the U.S. ecosystems and native species. Facilitating these efforts is the National Institute for Invasive Species Science (NIISS), a growing consortium of government and non-governmental organizations that is administratively housed in the USGS Fort Collins Science Center in Colorado. An important focus of NIISS is on developing models for predicting the probable spread and impacts of invaders, in cooperation with NASA Goddard Space Flight Center, the USGS EROS Data Center, and others.

Klamath River Basin — The Departments of the Interior, Commerce, and Agriculture are involved in a variety of activities throughout the Klamath River Basin in Oregon and California. USGS works closely with many Federal, State and local partners to address environmental, economic, and statutory issues in the basin. In addition, USGS is collaborating with NRCS to improve the accuracy of seasonal forecasts of inflows to the BOR Klamath Project to help with water allocations among all beneficial uses. Ongoing USGS ground-water and evapotranspiration studies are providing critical information to several partners for future resource allocation in the basin. In FY 2007 and FY 2008, USGS will continue work on determining the water-quantity and water-quality benefits that can be expected in Upper Klamath Lake and the Klamath River in response to various restoration activities. Further, USGS will investigate habitat used by juvenile suckers, population dynamics of adult suckers, survival of juvenile coho salmon, water quality, sediment, wetland, and watershed contributions to the ecological status of the Upper Klamath River basin and Upper Klamath Lake.

Middle Rio Grande — Basins of the Rio Grande in the southwestern United States encompass the main city areas of northern New Mexico (e.g., Santa Fe and Albuquerque) and are home of half the population and a similar part of the economy. The vitality of Middle Rio Grande basin communities and economies depends on satisfying the growing demands for water, including

drinking water, extracted from complex aquifers, yet knowledge of the aquifer systems and sustainability of the resource are poorly known. To address this need in the Albuquerque area, the USGS, in cooperation with the City of Albuquerque, New Mexico, Office of the State Engineer, and Bernalillo County, is monitoring ground-water-quality at multiple depths, researching the interaction between surface- and ground-water resources to help local water managers determine the impact of withdrawals both from the aquifer system and from the Rio Grande, and researching the rate at which the aquifer can recharge itself after water is withdrawn. Related USGS investigations include (1) studies of the geologic framework of the basin region, which will provide critical information on ground-water aquifers, hazards (seismic, subsidence, landslide), and resources and (2) studies in the San Luis Basin, which will improve ground water models used for management of the Rio Grande.

This page intentionally left blank.

Geographic Research, Investigations, and Remote Sensing

Subactivity	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Cooperative Topographic Mapping ¹	68,855	0	0	0	0	0
<i>FTE</i>	455	0	0	0	0	0
Land Remote Sensing	45,713	61,754	+527	-850	61,431	-323
<i>FTE</i>	77	99	0	0	99	0
Geographic Analysis and Monitoring	14,705	14,860	+664	-2,000	13,524	-1,336
<i>FTE</i>	93	76	0	-20	56	-20
Total Requirements (\$000)	129,273	76,614	+1,191	-2,850	74,955	-1,659
<i>FTE</i>	625	175	0	-20	155	-20
Impact of the CR		[-11,766]		[+11,766]	[0]	[+11,766]

¹The Cooperative Topographic Mapping Program was moved to the Enterprise Information Program in FY 2007

Impact of the CR (-\$11,766,000)

The 2008 budget restores the priorities of the 2007 President's budget by funding 2007 programmed fixed cost increases, eliminating unrequested 2006 congressional earmarks, and implementing the program enhancement and program reduction initiatives included in the 2007 President's budget. Notable for the Geography Program, if the program is required to operate at 2006 levels for the full year, the Landsat Data Continuity Mission is not funded and the established, multi-agency schedule may be delayed. The 2007 budget had included a \$16 million increase for this program. The increase was included in the House-passed 2007 appropriations bill and the bill that was adopted by the Senate appropriations committee.

Activity Summary

The 2008 budget request for the Geographic Research, Investigations, and Remote Sensing Activity is \$74,955,000 and 155 FTE, which is a net change of -\$1,659,000 and -20 FTE from the 2007 President's Request (Please note, the reduction of up to 20 FTE will be across the USGS disciplines. The decrease is being displayed in GAM since this is the program where the funds that are being cut are located.)

Geography is a multidisciplinary science that emphasizes space and place. It offers great potential to integrate important environmental and societal processes to facilitate our understanding of how human well-being and environmental quality can be improved and maintained. Moreover, it has the potential to identify spatial variation in these characteristics and qualities and to facilitate a more "place-specific" solution to environmental problems, including reduction of risk and options for greater adaptation to an uncertain future.

The ultimate goal of the USGS Geography Program is to "To improve people's ability to prosper by either affecting how the land will change (positive) or by becoming more adaptive to change (forecasting)."

USGS Geography research confronts some of the most pressing natural resource and environmental issues of our Nation. Observing the Earth with remote sensing satellites, USGS

Geographic Research, Investigations, and Remote Sensing

geographers monitor and analyze changes on the land, study connections between people and the land, and provide society with relevant science information to inform public decisions.

The surface of the Earth is changing rapidly, at local, regional, national, even global scales, with significant repercussions for people, the economy, and the environment. Some changes have natural causes, such as volcanic eruptions or drought, while other changes on the land, such as resource extraction, agricultural practices, and urban growth, are human-induced processes. There are other types of changes that are a combination of natural and human-induced factors; for example, landslides and floods are fundamentally natural processes that are often intensified or accelerated by human land use practices. Land cover on the Earth's surface—the pattern of natural vegetation, agriculture, and urban areas—is the product of both natural processes and human influences. Land cover represents an unbiased signature of environmental conditions. Improved understanding about the consequences of landscape change assists decision-makers in the fields of land use planning, land management, and natural resource conservation. The need for better information about land surface change is especially evident for changes brought about by wildfire, agricultural production, urbanization, forest logging, climate change and other factors operating at broad regional scales.

The Geography Discipline conducts its science through two programs: the Land Remote Sensing Program and the Geographic Analysis and Monitoring Program. Land Remote Sensing provides the Nation's portal to the largest archive of remotely sensed land data in the world; operates the Landsat satellites 5 and 7; and conducts research related to sensor technology and the scientific applications of remotely sensed data. The Geographic Analysis and Monitoring Program conducts research to understand the rates, causes, and consequences of landscape change over time and uses that understanding to model change processes for predicting future conditions.

During FY 2007, Geography's Land Cover Project completed the National Land Cover Database 2001 for the conterminous United States and is available through the internet (www.mrlc.gov). This multi agency project is an excellent example of effective Federal government collaboration. In addition, the USGS will be focusing efforts on the next generation Landsat mission to ensure that the ground data processing and flight operations systems are in place for NASA's spacecraft launch in 2011.

Use of Cost and Performance Information

This program makes better use of remotely sensed imagery by prioritizing federal agency requirements. Outreach on this effort included workshops on data applications; and conducting a survey that examined the market for moderate resolution satellite data.

The USGS Geography program confronts some of the most pressing natural resource and environmental issues of our Nation by observing and analyzing changes on the land. The surface of the Earth is changing rapidly, at local, regional, national, even global scales, with significant repercussions for people, the economy, and the environment. Some changes have natural causes, such as volcanic eruptions or drought, while other changes on the land, such as resource extraction, agricultural practices, and urban growth, are human-induced processes. There are other types of changes that are a combination of natural and human-induced factors; for example, landslides and floods are fundamentally natural processes that are often intensified or accelerated by human land use practices. Land cover on the Earth's surface—the pattern of natural vegetation, agriculture, and urban areas—is the product of both natural processes and human influences. Land cover represents an unbiased signature of environmental conditions. Improved understanding about the consequences of landscape change assists decisionmakers

in the fields of land use planning, land management, and natural resource conservation. The need for better information about land surface change is especially evident for changes brought about by wildfire, agricultural production, urbanization, forest logging, climate change, and other factors operating at broad regional scales.

By observing the Earth with remote sensing satellites, USGS geographers are able to monitor and analyze changes on the land, study the connections between people and those landscape changes, and provide society with relevant science information to inform public decisions. This is accomplished through the Land Remote Sensing (LRS) program and the Geographic Analysis and Monitoring (GAM) program.

Together, these programs directly support the President's Management Agenda and priorities of the Secretary of the Interior for (1) science-based decision-making, by making geospatial data available to scientists and the public and (2) Government, by simplifying and enhancing the delivery of geospatial data, information, and tools to citizens. The program activities are also aligned with the Department of the Interior's Resource Protection mission goal: to protect the Nation's natural, cultural and heritage resources. The Geography Program is using remote sensing satellites to monitor land surface change, conducting geographic research and analysis to understand the relationship between people and those changes, and providing land and resource managers with information necessary for managing the consequences of those changes.

Performance Assessment Rating Tool (PART) Evaluation

The USGS Geography Programs have received an "effective" rating when assessed with the Administrations Program Assessment and Rating Tool. The Geography discipline successfully achieved its milestones:

- Developed priorities for the geography science plan – The Geography Science Plan identified an ambitious set of goals exceeding the Program's available resources to achieve all simultaneously. These goals were prioritized to ensure that current funding is focused on the most important goals.;
- Prepared at the request of OMB a plan for transitioning the Multi-Resolution Land Cover (MRLC) consortium's national land-cover mapping effort to an operational program – The plan was coordinated through the MRLC partners and submitted to OMB in June 2006.
- Established USGS and NASA as co-chairs in NSTC-led effort to develop a long-term plan on future operational land imaging for the U.S. In April 2006, a presentation was given by the Future of Land Imaging Interagency Working Group (FLI-IWG) at the White House Conference Center, on the scope and status of the emerging plan for Future of Land Imaging in the U.S.

The ultimate goal of the USGS Geography Program is to *"To improve people's ability to prosper by either affecting how the land will change (positive) or by becoming more adaptive to change (forecasting)."* This will provide decision makers and the public a combination of data and readily available tools (e.g., web-based) to improve and sustain environmental quality and public safety in an ever-changing world. These data and tools will result in an unprecedented ability to design landscapes that are resilient and adaptive. Ultimately, the Geography Discipline will become a global leader in the science of:

Geographic Research, Investigations, and Remote Sensing

- Integrated vulnerability and risk assessment that incorporate the natural, social, and economic sciences
- Scenario-based, alternative futures tools to reduce environmental and hazard risks and to facilitate adaptation to an every-changing world at landscape scales.
- Land observations and monitoring via remote sensing

Activity: Geographic Research, Investigations, and Remote Sensing

Subactivity: Land Remote Sensing

	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Land Remote Sensing (\$000)	45,713	61,754	+527	-850	61,431	-323
<i>Total FTE</i>	<i>77</i>	<i>99</i>	<i>0</i>	<i>0</i>	<i>99</i>	<i>0</i>

Summary of FY 2008 Program Changes for Land Remote Sensing

Request Component	(\$000)	FTE
• Support for Commercial Remote Sensing Space Policy	-850	0
TOTAL Program Changes	-850	0

Justification of FY 2008 Program Changes

The 2008 request for the Land Remote Sensing (LRS) Program is \$61,431,000 and 99 FTE, a net program change of -\$850,000 and 0 FTE.

Commercial Remote Sensing Space Policy (CRSSP) Support — The USGS leads an interagency near-term (current to 5 year needs) remote sensing requirements process on behalf of the Federal civil community, by collecting and analyzing civil Federal agencies' remote sensing requirements and communicating these needs to government and industry to maximize use of data and technologies. The USGS allocates \$850,000 within the Land Remote Sensing Program for this function. To provide necessary resources for its higher-priority Landsat Program mission, the USGS proposes to step down from the responsibility to purchase, archive, and distribute commercial remote sensing data to other Federal agencies. The USGS will continue to maintain the highest levels of performance for Federal coordination of moderate-resolution remote sensing data requirements through its Landsat program.

Program Performance Change

No current Land Remote Sensing GPRA metrics are impacted by these proposed program changes.

Program Overview

The Nation's economic and environmental vitality rely on continual monitoring and analysis of Earth processes and their local, regional and global effects. Improving our ability to monitor, analyze and permanently record these changes promotes continued economic expansion,

Geographic Research, Investigations, and Remote Sensing

environmental awareness, and the advancement of scientific knowledge to support policy officials and decisionmakers in fulfilling their public service responsibilities. With the passage of the Land Remote Sensing Policy Act of 1992 (P.L. 102–555), Congress endorsed the need for continuous monitoring of the Earth and maintaining a readily available record of information displaying the status of its resources and environment. The USGS LRS Program (<http://remotesensing.usgs.gov/>) is responsible for implementing the provisions of the Act and for ensuring the continuous availability of moderate resolution and other remotely sensed imagery for the Nation.

The primary objectives of the LRS Program are to —

- Collect, process, archive, and distribute scientifically relevant global land and near-land observations acquired from aircraft or satellite,
- Ensure that these data are maintained and easily accessible and available to USGS partners, cooperators, stakeholders, and other customers,
- Conduct and sponsor research in land remote sensing data collection, accessibility, distribution, and application, and
- Investigate future remote sensing missions, sensors, and data relevant to the preceding objectives.

The LRS Program objectives are aligned with the Department of the Interior's Strategic Plan goal of Resource Protection, to protect the Nation's natural, cultural and heritage resources. The program supports USGS strategic objectives by making high-quality remotely sensed data widely and inexpensively available without restrictions to a global community of international, Federal civil, defense, NGO, State, local, academic, commercial, and individual users in both operational and research environments.

The U.S. National Space Policy (NSPD 49), newly authorized on August 31, 2006, provides further guidance to the LRS Program: "The Secretary of the Interior, through the Director of the U.S. Geological Survey, shall collect, archive, process, and distribute land surface data to the United States Government and other users and determine operational requirements for land surface data."

In addition, the National Satellite Land Remote Sensing Data Archive (NSLRSDA) required the Department of the Interior to establish a permanent Government archive containing satellite remote sensing data of the Earth's land surface -- and to make these data easily accessible and readily available for study.

In accordance with these directives, the LRS Program has the following components:

- Remote Sensing Missions and Data Acquisitions;
- Long-Term Data Preservation and Access;
- National Civil Applications Program; and
- Remote Sensing Research and Applications.

For FY 2007, the USGS has assumed the Chair of the Committee on Earth Observation Satellites (CEOS). CEOS is recognized as the major international forum for the coordination of civil Earth observation satellite programs, and for interaction of these programs with users of

satellite data worldwide. The three primary objectives of CEOS are (1) to optimize benefits of spaceborne Earth observations through cooperation in mission planning, and development of compatible data products, formats, services, applications, and policies, (2) to serve as a focal point for international coordination of space-related Earth observation activities, and (3) to exchange policy and technical information to encourage complementarity and compatibility of observation and data exchange systems.

CEOS has been recognized as the space segment provider for the international, ministerial-level Group on Earth Observations (GEO). GEO was organized to develop and institute a worldwide "system of systems" approach to *in situ* and space-based observations, which will provide coordinated, comprehensive, and sustained Earth observations and information to national and international decision-makers. Such a comprehensive approach is needed to enhance human health, safety and welfare, alleviate human suffering including poverty, protect the global environment, reduce disaster losses, and achieve sustainable development. The USGS participates in the related U.S. Interagency Working Group on Earth Observations (IWGEO), which was formed to develop a 10-year plan for implementing the U.S. components of an integrated Earth Observation System.

In support of GEO and user community objectives, CEOS agencies are embarking on a near-term effort to better coordinate and implement satellite observations to support climate research. CEOS has developed nearly 60 actions to address the needs articulated in the "satellite supplement" to the Global Climate Observing System (GCOS) Implementation Plan, and CEOS members will be working diligently on these actions in the coming year. CEOS has also endorsed the concept of standards-based satellite constellations, an innovative process whereby disparate types of Earth observing programs funded by CEOS member agencies can contribute to GEO observational requirements. This approach seeks synergies among national and regional satellite programs for land surface imaging, ocean surface topography, atmospheric composition, and precipitation measurements. Additional information can be found at: <http://www.ceos.org/pages/overview.html>.

2008 Program Performance

The 2008 budget request for the Land Remote Sensing Program is \$61,431,000 and 99 FTE. The LRS Program falls under the Resource Protection strategic goal in 2008.

Remote Sensing Missions and Data Acquisitions

(Estimates for FY 2006, \$24 million; FY 2007, \$40 million; FY 2008, \$40.1 million)

The LRS Program acquires remotely sensed data to support Department of the Interior and other U.S. operational responsibilities and the global Earth science community. This is accomplished by operating the Landsat missions, leveraging the USGS infrastructure to receive data from other satellites (e.g., EO-1, Terra and Aqua), coordinating Federal purchases of commercial data, and acquiring data through international partnerships.

Landsat

Landsat represents the world's longest continuously acquired collection of space-based land remote sensing data. It is a joint initiative of the USGS and the National Aeronautics and Space

Geographic Research, Investigations, and Remote Sensing

Administration (NASA) designed to gather Earth resource data from space. NASA developed and launched the spacecrafts, while the USGS handles the operations, maintenance, and management of all ground data reception, processing, archiving, product generation, and distribution.

Landsat satellites have been collecting images of the Earth's surface for more than thirty years. Landsat's global survey mission is to repeatedly capture images of the Earth's landmasses, coastal boundaries, and coral reefs, and to ensure that sufficient data are acquired to support the observation of changes on the Earth's land surface and surrounding environment. NASA launched the first Landsat satellite in 1972, and the current Landsat 7, in 1999. Landsats 5 and 7 continue to capture hundreds of images of the Earth's surface each day.

Landsat data are used by government, commercial, industrial, civilian, military, and educational communities throughout the United States and worldwide. The data support a wide range of applications in such areas as global change research, agriculture, forestry, geology, resource management, geography, mapping, water quality, and oceanography. The consistency of Landsat data over three decades of acquisition offers opportunities to compare land cover changes over time. Landsat images are also invaluable for emergency response and disaster relief. Advances made in data reception and processing permit rapid access to imagery in times of natural or human-made disaster. Within hours of data acquisition, the USGS Center for Earth Resources Observation and Science (EROS) in Sioux Falls, South Dakota, provides relief organizations worldwide with satellite images for disaster response, as well as image-derived products that incorporate information on population density, elevation, and other relevant topics.

Landsat Data Help Save Millions of Taxpayer Dollars, in Fighting Crop Insurance Fraud

Dr. John Brown, an agricultural private investigator, estimates Landsat data save the Federal Government approx. \$100 million annually by assisting the USDA field investigators who verify suspect claims to the Federal Crop Insurance Program. Over the past three years, USDA's Risk Management Agency have used about 600 Landsat scenes annually (covering 7.6 million acres) to confirm fraudulent activity of insured farmers. Only a small percentage (0.18%) of farmers submit suspect claims but the cost savings to taxpayers by using Landsat data can be substantial.

In FY 2007 and FY 2008 the USGS will continue operations and maintenance for Landsats 5 and 7. The mission for both satellites is expected to end in 2010 as their fuel will be depleted. At that time a decommissioning process will be initiated and over approximately one year the satellites will be maneuvered into an orbit that will eventually safely deorbit them.

Did You Know?

- Landsat Island, off the ice northeastern coast of Labrador, Canada, got its name from its "discoverer," Landsat 1. Landsat satellites have charted previously unknown lakes, islands and ocean reefs. In his book, *Mapping the Next Millennium*, Stephen S. Hall states, "[b]y seeing in electromagnetic increments beyond the normal range of human vision, Landsat revealed whole new worlds hidden within the folds of a familiar world we thought we knew so well."
- Through the joint National Burn Severity Mapping Project, the USGS and National Park Service (NPS) are using Landsat imagery to determine fire's long-term effects over large, often remote regions such as fire-threatened regions of Montana, Wyoming, Colorado, and New Mexico. The project is focused on NPS and adjacent lands; scientists analyze pre- and post-fire datasets to determine the extent of landscape change. The analyses provide a landscape perspective for Park officials and local communities in their efforts to determine ecological burn severity and recovery efforts.
- The Landsat image archive is essential for researchers at the National Cancer Institute and Colorado State University in their efforts to predicting effects of long-term exposure to agricultural chemical exposure in nearby human populations (including possible resultant illnesses such as cancer and neurological and reproductive disorders). Study regions include the Platte River Valley (Colorado and Nebraska) and Iowa.
- Google Earth™ uses Landsat 7 image mosaics, giving customers a bird's-eye view of almost any place on Earth. With this free, online system, the public at large can explore the Earth's landmasses, picking out continents and learning about changes in land use over vast regions of the planet.
- Landsat data are important to the USDA's Natural Resources Conservation Service (NRCS) to fulfill their charge of completing initial soil surveys on private lands by 2011. The total acreage scheduled for elevation and land use analysis is more than 20 million acres.
- Landsat data are used by USDA's Rangeland Resources Research Unit for research projects whose goal is to help Wyoming ranchers better manage their lands.

Extending the Legacy of Global Land Observation

The **Landsat Data Continuity Mission (LDCM)** is the future of Landsat. It will continue to obtain valuable data and imagery to be used in agriculture, education, business, science, and government.

In a December 23, 2005 memorandum from the White House, NASA was directed to move LDCM from a partnership with the NOAA and the National Polar-orbiting Operational Environmental Satellite System (NPOESS) to a free-flyer mission. The free-flyer spacecraft will deliver data to the DOI through the USGS. The USGS will be responsible for the operations of the mission, along with collecting, archiving, processing and distributing the data to U.S. Government and other users. LDCM, the next-generation Landsat satellite, is a 5-year mission scheduled for launch in 2011. This mission will ensure the continued acquisition and availability of Landsat-like data beyond the current Landsat missions.

In FY 2007, the USGS, in cooperation with NASA, announced the selection of the Landsat Science Team. This team consists of scientists and engineers reflecting USGS leadership, USGS and NASA scientists, and a group of external scientists and satellite data applications specialists. The team's main focus will be to advise the USGS and NASA on issues critical to the success of the LDCM. They will recommend strategies for the effective use of archived data from Landsat sensors and investigate the requirements for future sensors to meet the needs of Landsat users, including the needs of policy makers at all levels of government. In addition, the team will cooperate with other Earth observing missions, both nationally and internationally.

During FY 2007, the USGS will complete the requirements analysis and began preliminary design of all ground system components, working closely with NASA to ensure integration of components with the spacecraft and on-board sensor. The success of this mission is dependent on the coordination of all activities between USGS and NASA. The USGS participated in NASA's acquisition strategy (drafting the request for proposals (RFP), holding an industry day, and writing the final RFP) for the operational land imaging sensor that will acquire images of the Earth. In addition, the USGS will complete two essential reviews for the mission, the system concept review and ground system requirements review. These reviews assure that the operations concepts and requirements that define the ground system's functions will support the preliminary design activities commencing in late FY 2007.

In FY 2008, the USGS will continue ground system design activities for the data processing and archiving segment, which will capture, archive, process, and distribute LDCM data and the flight operations segment, which will operate the spacecraft and provide the communications network to support spacecraft operations and receive LDCM image data. Formal preliminary design reviews for all mission components will be performed to insure system designs are maturing on schedule. Also, the USGS will work closely with NASA in preparing and awarding contracts for the procurement of the LDCM spacecraft and the mission operations systems that will be used to control spacecraft and on-board sensor operations.

Following a 2011 launch, LDCM will have a 5-year mission life with 10-year expendable provisions. Once on-orbit acceptance has been achieved, NASA will transfer ownership of the system to the USGS, which will operate the spacecraft and manage the data. Additional information on Landsat satellites (LDCM) can be found at: <http://ldcm.usgs.gov/>.

Future of Land Imaging (FLI) — On December 23, 2005, the President's Science Advisor issued a memorandum directing the National Science and Technology Council (NSTC) to develop a plan to ensure the long-term continuity of operational land imaging in the U.S. in coordination with the Department of the Interior, NASA, and other Federal Agencies. The Future of Land Imaging Interagency Working Group (FLI IWG) was formed and conducted a

Landsat Data Gap Study

The Landsat Data Continuity Mission (LDCM), that will be the successor mission to Landsat 7, is slated for launch sometime in 2011. The orbit-positioning fuel onboard Landsat 7 may be used up by 2010, which would cause a gap in global Landsat data acquisitions for the USGS-managed National Satellite Land Remote Sensing Data Archive. Also, since Landsat 7 surpassed its design life in April 2004, there is an increasing risk of equipment failure that could introduce a data gap well before 2010. While there is no current or planned satellite system in the world that could replicate the data characteristics and global coverage frequency of Landsat 7, a multi-agency team, chaired by representatives from the USGS and NASA, has been investigating alternative data sources to mitigate a Landsat data gap. Extensive work has been completed on identifying the most Landsat-like data sources that could be exploited during a data gap, and a data-gap implementation plan was completed in FY 2007.

year-long fact-finding process, which included consultation with government, science and other non-profit organizations, and commercial experts. These efforts included a public workshop convened in July 2006 at which public speakers emphasized the importance of land imaging to the U.S., with special emphasis on its importance to State, local and tribal governments.

The FLI IWG completed its report and recommendations for future operational land imaging in December 2006. The group proposed that a National Land Imaging Program be established within the Department of the Interior to ensure continuity of civil land imaging for the United States and access to, availability of, and ability to use land imaging data for all U.S. public and private purposes. This program would have the authority to acquire future operational land imaging space systems for civil purposes and to acquire land imaging data from U.S. commercial and foreign sources. These new authorities complement the Department's long-standing responsibility to acquire, archive, and manage U.S. land imaging data holdings and new authorities assigned to the Department under the recent National Space Policy to gather and develop all U.S. requirements for land surface data.

The final report documenting these national needs and proposing this new national program is planned for release in February 2007. Additional information on FLI can be found at: <http://www.landimaging.gov/process.html>.

Long-Term Data Preservation and Access

(Estimates for FY 2006, \$9 million; FY 2007, \$9 million; FY 2008, \$9.2 million)

"The farther backward you can look, the farther forward you are likely to see."

Winston Churchill

The Earth is changing in ways that are not fully understood. It will never be possible to comprehend the meaning of these changes without a clear and consistent record of observable surface phenomena. The LRS Program has the responsibility to preserve, provide access to, and distribute products from the long-term archive of aerial and satellite data sets. The archives at the USGS Center for EROS provide a comprehensive, permanent, and impartial record of the Earth's land surface.

In the Land Remote Sensing Policy Act of 1992 the Congress directed the Department of the Interior to establish a permanent government archive containing satellite remote sensing data of the Earth's land surface, and to make them available for study. The USGS, as a world leader for archiving remotely sensed data, is responsible for making these data available and easily accessible to users at minimal costs. Currently, the archive consists of over 107,000 rolls of aerial and satellite imagery containing in excess of 13 million frames. It also includes a digital inventory of various aerial and satellite Earth science data sets, totaling over 4,700 terabytes, stored in multiple robotic mass storage systems.

"When the entire world is paying attention to the global change, it is crucial that we have access to remote sensing data in time series for free or with limited cost."

I-Kuai Hung, Ph.D.
Stephen F. Austin State University
Nacogdoches, Texas
September 6, 2006

The archive holdings are used for environmental research, homeland security, land management, natural hazard analysis, and natural resource management and development,

with applications that extend beyond America's borders. The worldwide community of users includes personnel in Federal, State, and local governments, researchers at academic institutions, and private enterprise.

The USGS projects an exponential growth in archival volume of satellite data (see Figure 1). The core satellite data holdings include: Multispectral Scanner (MSS) and Thematic Mapper (TM) image data (1972 to present) from Landsats 1-5 and Landsat 7 satellites; Advanced Very High Resolution Radiometer (AVHRR) data (1986 to present) over the Earth's land surface from NOAA weather satellites; and more than 880,000 declassified intelligence satellite photographs (1960 -1972).

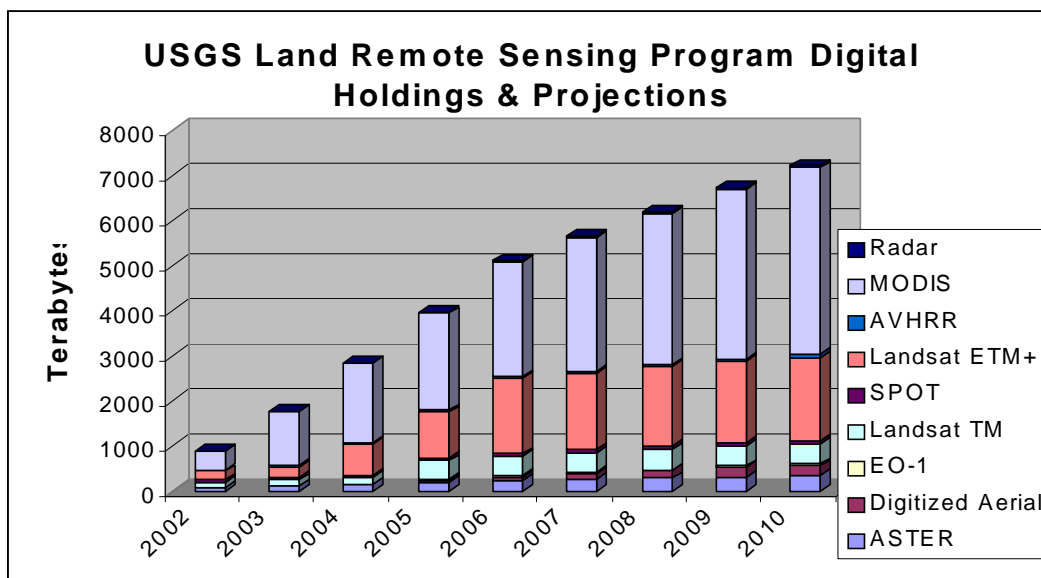


Figure 1. The projected exponential growth of satellite data in the USGS archive.

In FY 2007 and FY 2008 the project will continue to maintain, preserve and provide ready access to historical remote sensing film and digital databases and archives. Planned activities include data organization, ingest, metadata generation, data set appraisals and assessments, dispositions including transfer to the National Archive and Records Administration (NARA) and preservation activities such as data set transcriptions and media migrations for collections in the Long-Term Archive.

Activities for the Long-Term Archive include —

- Continue to operate and maintain systems that acquire, process, and ingest satellite imagery into the archive,

Mid-decadal Global Land Survey

NASA and the USGS formed a partnership in FY 2007 to produce a mid-decadal global, ortho-rectified satellite-image data set derived primarily from Landsat images. The model data set for this project is the widely used Landsat 2000 data set produced from Landsat 7 data under a similar arrangement between NASA and the USGS. Landsats 5 and 7 are both projected for decommissioning before the end of 2010, and either or both could fail well before that time. Since creating a "Landsat 2010" data set is not feasible, both agencies agreed that producing a mid-decadal global land survey (MDGLS) data set would have significant value for global land cover and land use change detection when used in conjunction with the previous Landsat global surveys. The MDGLS data set is projected for completion by the end of FY 2008.

- Support initiatives to partner with NARA to become an affiliated NARA archive,
- Continue to manage, operate, and maintain photographic and digital archives and ensure long-term preservation of archival holdings,
- Appraise and dispose of the historical collections; add new collections in the archive that are aligned to program objectives and the USGS mission,
- Improve easier, faster public access to archive holdings through continued digitizing of USGS historical film collections; create and place browse images online and create single-frame coordinate metadata (to better assist customers in acquiring data and imagery tailored to their needs),
- Web enable historical data sets for no charge electronic distribution over the Internet,
- Advance Earth Explorer and GloVis capabilities to enhance public access to the historical archive,
- Provide for effective and efficient user and customer service, data sales activities, and dissemination of products, and
- Provide certified reproductions of archived film sources to the public.

These archival data form a baseline chronology of environmental change on the Earth, both natural and human-induced and an invaluable tool for scientific assessment and prediction. Through access to archive holdings, stakeholders can learn from the past to benefit the future.

Remote Sensing Research and Applications

(Estimate for FY 2006, \$13.7 million; FY 2007, \$12.6 million; FY 2008, \$11.8 million)

The LRS Program provides National leadership in ensuring that remotely sensed data are available and contribute to the understanding of how human-environmental systems respond to change. The LRS Program is conducting fundamental research on satellite sensor properties that focuses on improved data analysis and the use of remotely sensed data to achieve practical solutions of societal, physical, and biological science problems. The research of sensors and their application is vital to the scientific community for identifying, analyzing, assessing, monitoring, and predicting land surface features and long (e.g., climate change) and short term (e.g. hurricane) events. The current science and application projects in the LRS Program cover a wide range of subject areas and have durations lasting from one to five years (e.g., 2006-2010). This currently includes: hazards analysis and prediction, such as high resolution imagery and digital elevation models to better assess and potentially predict the effects of earthquakes, volcanism, and landslides; support of national land surface change programs such as the National Land Cover Database and LANDFIRE; support for global change studies (global land cover change and carbon emission); and supplying data for disaster response, such Hurricane Katrina and the Indonesia Tsunami. Additional information on LRS research projects can be found at: (<http://remotesensing.usgs.gov/researchapps.html>).

Examples of ongoing activities for FY 2007 and FY 2008:

Using Remote Sensing to Monitor and Model Landscape Vulnerability to Water Erosion in Hawaii — In many landscapes the potential vulnerability to water erosion is important, with vegetation sheltering of the soils being a critical component that influences the level of vulnerability. In Hawaii, water erosion and sediment runoff onto coral reefs are major concerns

and methods to detect, map, and monitor both temporal and spatial vegetation dynamics within a landscape are critical for mapping and monitoring the degree of erosion vulnerability. The relationship between changes in annual vegetation/perennial grasses and seasonal conditions are critical to the landscape erosion. Remotely sensed data collected under conditions of high and low rainfall show that sediment runoff on the island of Molokai is affected by the amount of vegetation cover within the watersheds, with the highest amount of vegetation dynamics occurring within the lower half of the watersheds being studied. This information is available to decision-makers for resource planning and management.

Landslide Delineation — Landslides are a significant hazard in the United States, causing over \$1 billion in damages and as many as 50 deaths annually. Although typically associated with mountainous terrain, landslides also occur in lower elevations due to excavation failures, river/stream bank failures, mine waste collapse, excessive rains that weaken hillsides, etc. Using RADAR imagery, USGS research scientists characterize critical slope formations in order to better predict slope failure potential. This knowledge will inform local planners and emergency responders of potential hazards to their communities.

Biomass Extraction for Urban Land Management — The rapid growth of our Nation's urban areas is negatively impacting natural resource areas needed for aquifer recharge, air quality and species habitat. Currently, urban areas hold over sixty percent of the U.S. population. The City of Seattle has experienced tremendous population growth over the last decade resulting in the loss of urban forests and biomass. This has been amplified by impervious surfaces reducing the permeability of the urban landscape and increasing storm water runoff. Urban vegetation and forests are integral for air and water quality for sustainability of human and biological functions. The USGS is using Light Detection and Ranging (LIDAR) data to identify the vegetation structure in urban areas. Modeling urban biomass will provide a tool for local decision makers and urban water quality studies at a local and regional scale for local decision makers to use effectively.

Detection and Monitoring of Changes in Arctic Lakes — Recent studies have indicated that high-latitude lakes have been undergoing very rapid changes. These changes are believed to be a harbinger of climate warming as several key factors that affect lake abundance and surface water area are believed to be changing as a result of local, regional, or global fluctuations in climate. However, the changes that have been documented have not followed the same trajectory throughout the high latitude regions; some studies have reported lake expansion, whereas, some studies have reported lake shrinkage, drainage, and/or drying. USGS scientists are utilizing Landsat satellite imagery for three time periods, circa-1970s, circa-1980/early 90s, and circa-2000 to determine the extent, type, and rate of lake changes occurring in Alaska. The use of three time periods will enable analysis of potential trends in geographically distinct eco-regions that span the entire state of Alaska, a land area that is one-fifth the size of the conterminous United States (see Figure 2).

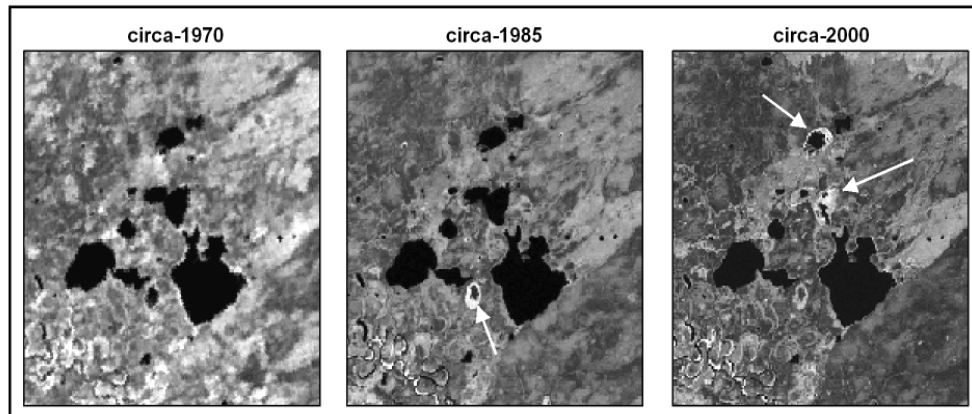


Figure 2. Time series of Landsat imagery showing lakes that are drying up through time.

Advancements in LIDAR Research — With the proliferation of LIDAR systems and technologies in the past few years, more and more LIDAR data have become available to researchers, scientists, and managers alike. While the primary purpose for most commercial LIDAR collections is still only creating very accurate high-resolution bare earth elevation data sets, much more information can be extracted than a bare earth digital elevation model (DEM). LIDAR data can provide elevation information for features such as vegetation and man-made structures. Using LIDAR can help visualize "virtual cities" and "virtual forests". Current off-the-shelf software allows for precision feature extraction. The automated feature extraction tools have shown success in extracting building footprints and individual trees from raw LIDAR data. When merged with other types of remotely sensed data, such as high resolution satellite imagery or digital aerial photography, LIDAR allows for the 3-D modeling of wildland and urban landscapes. The availability of the LIDAR data provides scientists with more precise modeling capabilities than previously possible. The USGS is using LIDAR in every discipline and every region, primarily for generation of high-resolution DEMs, but also for estimating vegetation information, such as carbon and biomass, as well as automated feature extraction of buildings. LIDAR technology has become an accepted method for collecting highly accurate high-resolution elevational information. The increased acceptance and use of this technology is changing how people in the USGS use three-dimensional information in their science and applications.

U.S. Commercial Remote Sensing Space Policy

The 2003 U.S. Commercial Remote Sensing Space Policy (CRSSP) and underscored by the 2006 U.S. National Space Policy directs Federal agencies to rely to the maximum practical extent on U.S. commercial remote sensing space capabilities for filling the imagery and geospatial needs of military, intelligence, foreign policy, homeland security and civil users (<http://crssp.usgs.gov>). The USGS, NGA and NOAA are working in partnership in implementing the President's CRSSP (see Figure 3). The USGS leads the near-term (current to 5 year needs) remote sensing requirements process on behalf of the Federal civil community. The USGS collects and analyzes civil Federal agencies' remote sensing requirements, communicating these needs to government and industry to maximize use of data and technologies. This effort provides for efficient, collaborative civil use of remotely sensed data to

address national priorities in environmental monitoring, economic growth, and in mitigating the impacts of natural disasters.

Civil/NGA Shared Execution of CRSSP

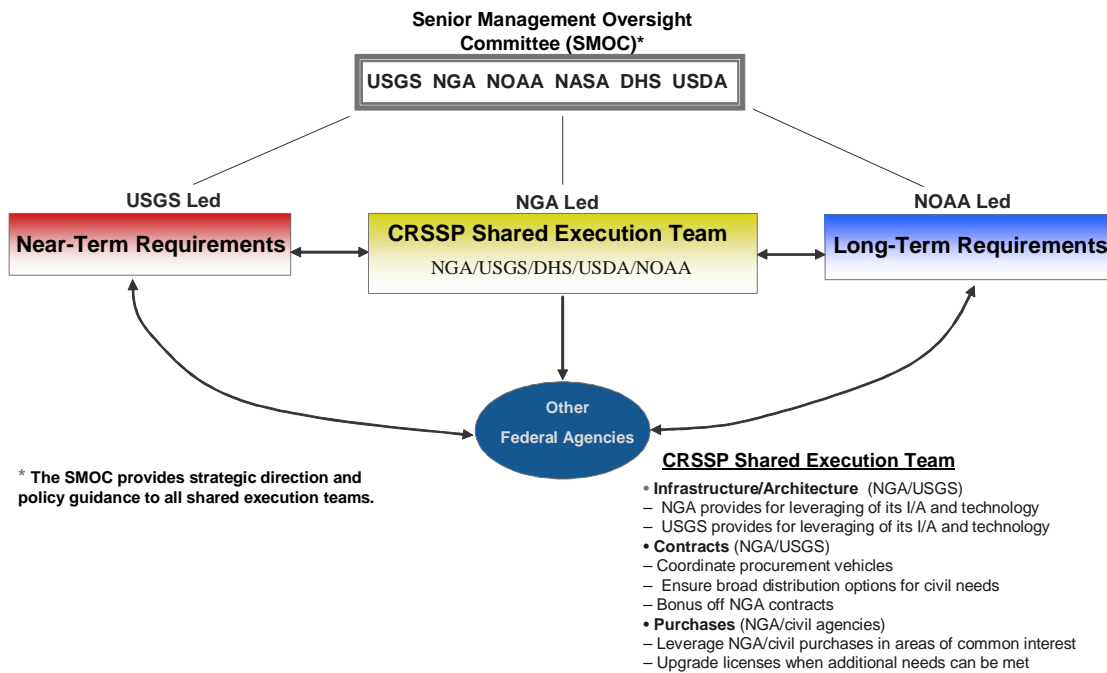


Figure 3. Government partnership implementing CRSSP.

National Civil Applications Program (NCAP)

The USGS has fulfilled the lead Federal government responsibility for the civil application of classified data since the 1960's. NCAP serves the Federal civil agencies by providing for the acquisition, dissemination, and exploitation of classified remote sensing systems and data to address land and resource management, environmental, socioeconomic, hazards, disasters, and other geospatial scientific analysis and policy issues. NCAP provides critical support to the continuity of operations and continuity of Government. In addition, the NCAP activities also support the Civil Applications Committee (CAC), a Presidential-chartered interagency committee that provides coordination and oversight of Federal civil use of classified collections.

USGS NCAP currently funds two secure facilities, in Reston and Denver, which support the complex infrastructure of security precautions and information technology (hardware, software, networks, etc.) necessary to enable the dual use of classified systems and capabilities. The NCAP activity serves as a key point of entry for the civil community to gain access to the significant resources the Intelligence Community has dedicated in areas such as: technology transfer and awareness of advanced image processing and analysis techniques, sensor research, and applications research.

The NCAP plays a proactive and relevant role in addressing geospatial requirements associated with Federal lands management and hazards planning and response activities, including hurricane response. Through NCAP, the USGS provides decision-makers with the best available, scientifically sound information based on the awareness, utilization and synthesis of all classified, commercial, open source, and governmental remotely sensed data.

Performance Overview

The following table highlights important performance measures for the Geographic Research, Investigations, and Remote Sensing Activity; the decrease to support commercial remote sensing funds does not impact current Geography metrics:

Geographic Research, Investigations, and Remote Sensing

Program Performance Overview									
End Outcome Goal 1.4: Resource Protection: Improving the understanding of national ecosystems and resources through integrated interdisciplinary assessment									
End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
GPRA End Outcome Measures									
% of targeted science products that are used by partners for land or resource management decision making (SP)	UNK	UNK	UNK	UNK	≥90%	≥90%	≥90%	0	≥90%
Intermediate Outcome Measures and Bureau and PART Outcome Measures									
Ensure availability of long-term environmental and natural resource information, data and systematic analyses needed by land and resource managers for informed decision making									
% of US surface area with contemporary land cover data needed for major environmental monitoring and assessment programs (SP)	45%	65%	75	75	95% (286/3)	95% (286/3)	100% (300/3)	+5%	60% (180/3)
Comment:	Reflects modification of previous performance measure for the number of mapping units completed (66 mapping units across the country). The National Land Cover Database (NLCD) is made available via the internet for the US, including a all 50 states and Puerto Rico. NLCD is conducted on a cyclical basis.								
% of surface area with temporal and spatial monitoring, research, and assessment/data coverage to meet land use planning and monitoring requirements (SP Geography) (PART) (Number of completed eco-region assessments out of a total of 84 eco-regions)	31%	37%	48%	48%	53%	60% (50/84)	69 (58/84)	+9%	Plan completion FY2010
Comment:	FY07 Plan assumes funding at the FY07 PB level. During FY07 USGS will conduct a review of the landscape status and trends project to focus geographic research in the high priority areas: landscape status & trends; causes & consequences of landscape change; vulnerability & risk analysis; and vulnerability & risk reduction. The Status and Trends project will be completed in 2010 providing an assessment of land use and land cover change for the US (84 ecoregion areas). Research will then focus on consequences of these changes.								
<i>Content and expanse of knowledge base:</i> X% of data accessible: X% of satellite data available from archive within 24 hours of capture (PART Geography)	90%	97.2%	90%	98.7%	90%	95%	95%	0	95%
Total Actual/Projected Cost (\$000)	40,140	43,725		40,159	40,962	40,962	41,781	+819	

Land Remote Sensing

Program Performance Overview									
End Outcome Goal 1.4: Resource Protection: Improving the understanding of national ecosystems and resources through integrated interdisciplinary assessment									
End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
Actual/Projected Cost per Unit (whole dollars)	14.64	14.64		14.64	14.64	14.64	14.64	0	
Intermediate Outcome Measures and Bureau and PART Outcome Measures									
Ensure the quality and relevance of science information and data to support decision making									
% of studies validated through appropriate peer review or independent review (SP)	100%	100% (83/83)	100% (77/77)	100% (75/75)	100% (49/49)	100% (49/49)	100% (58/58)	0	100% (61/61)
% satisfaction with scientific and technical products and assistance for environment and natural resource decision making (SP)	UNK	UNK	UNK	UNK	≥90%	≥90%	≥90%	0	≥90%
PART Efficiency and Other Output Measures									
# of annual terabytes collected (Geography)	527.2	438.8	534.0	537.9	534.0	534.0	658.0	+124	658.0
Total Actual/Projected Cost (\$000)	30,442	31,063		31,684	32,318	32,318	32,964	+646	
Actual/Projected Cost per Unit (whole dollars)	57.75	70.79		59.33	60.52	60.52	55.96	-4.56	
# of cumulative terabytes managed (Geography)	2,448.3	2,887.4	3,509.8	3,425.3	4,043.8	4,043.8	4,701.8	+658	7,388.8
# of systematic analyses and investigations delivered to customers	UNK	83	77	79	49	75	71	-4	71
Total Actual/Projected Cost for analysis' (\$000)	UNK	25,655		23,801	15,037	15,037	17,200	+2,163	
Actual/Projected Cost per analysis (whole dollars)	UNK	309		313	307	307	307	0	

Geographic Research, Investigations, and Remote Sensing

Program Performance Overview									
End Outcome Goal 1.4: Resource Protection: Improving the understanding of national ecosystems and resources through integrated interdisciplinary assessment									
End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
# of formal workshops or training provided to customers (instances/issues/events)	23	17	14	10	11	9	8	-1	8
Total Actual/Projected Cost for analysis' (\$000)	500	510		330	330	330	510	+180	
Actual/Projected Cost per analysis (whole dollars)	25	30		33	30	37	64	+37	
LDCM: X% of ground system designed, built, and tested (Geography)	UNK	UNK	28%	8% (reflects planning stage only)	44%	44% (reflects planning stage only)	85% (reflects planning stage only)	+41%	5% (100%-Mission complete at launch in 2011. Begin planning for next)
Comment:	LDCM project has been modified to reflect a free-flyer satellite. NASA is responsible for development of the spacecraft and USGS development of the ground data processing and flight operations systems. It is imperative that all aspects of this satellite mission are coordinated and accomplished in tandem between USGS and NASA for the planning, design and development of spacecraft, instrument, ground systems and flight operations system for a successful mission. Current performance reflects only planning and developing of the system requirements. Much of the design will be complete in FY08 and development of system will begin, depending on FY07 funding. EVM may eventually be used to measure performance.								
Note: The 2007 plan is the performance level based upon a projection of 2007 likely enacted made during the first quarter of 2007. The 2008 plan and 2012 long-term targets build on the 2007 plan. To the extent Congress enacts a 2007 appropriation that is different from the 2007 projection, the 2008 plan and 2012 targets may require revision.									

Activity: Geographic Research, Investigations, and Remote Sensing

Subactivity: Geographic Analysis and Monitoring

	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Geographic Analysis and Monitoring (\$000)	14,705	14,860	+664	-2,000	13,524	-1,336
<i>Total FTE</i>	93	76	0	-20	56	-20

Note: The proposed decrease of \$2 million to the USGS Priority Ecosystems Program will result in a reduction of up to 20 FTE across the USGS disciplines. The decrease is being displayed here since this is the program were the funds that are being cut are located.

Summary of FY 2008 Program Changes for Geographic Analysis and Monitoring

Request Component	(\$000)	FTE
• USGS Priority Ecosystems	-2,000	-20
TOTAL Program Changes	-2,000	-20

Justification of FY 2008 Program Changes

The 2008 budget request for the Geographic Analysis and Monitoring (GAM) Subactivity is \$13,524,000 and 56 FTE, a net program change of -\$2,000,000 and -20 FTE from the 2007 President's Budget.

USGS Priority Ecosystems Science — The 2008 budget proposes a reduction of \$2,000,000 in Priority Ecosystem Science (PES) activities. This reduction in PES will facilitate the funding of higher priority activities within the GAM Program. PES activities will continue in the six study unit area (Greater Everglades, San Francisco Bay, Chesapeake Bay, Mojave Desert, Platte River, and the Greater Yellowstone area) but at a reduced rate, potentially impacting ongoing modeling and monitoring activities.

The funding for Priority Ecosystems Science (PES) activities is \$10.7 million from across the four science disciplines (Biology, Geography, Geology, Water). PES is managed by a National Coordinator and a National Coordination Council that includes representatives from the Regions and Bureau Program Coordinators. This reduction represents Geography's full contribution to PES activities. GAM research in support of PES is aimed at improving the understanding of the rates, causes, and consequences of natural and human-induced processes that shape and change the landscape over time and to provide comprehensive information needed to understand the environmental, resource, and economic consequences of landscape change. GAM contributions for PES have included maps of urban growth trends throughout the Chesapeake Bay watershed that are being used by state resource agencies and land conservation organizations to target land preservation efforts and develop urban growth

Geographic Research, Investigations, and Remote Sensing

forecasts that consider the potential impacts on stream and estuary water quality. Additionally, GAM contributions are being used in the Greater Everglades to develop and apply technologically advanced elevation measurement systems that provide the foundation for research, management, and restoration of critical ecosystems.

More specifics on PES activities can be found under the Science on the Landscape section, which begins on page F - 1.

Program Performance Change

Organizationally, PES performance is included within the Biology Discipline. The table below reflects GAM performance excluding PEWS activities.

	2004 Actual	2005 Actual	2006 Actual	2007 CR ¹	2008 Base Budget (2007 PB + Fixed Costs)	2008 Plan	Program Change Accruing in 2008	Program Change Accruing in Outyears
					A	B=A+C	C	D
Resource Protection: # of formal workshops or training provided to customers (PES)	UNK	14	10	12	12	10	-2	0
Total Projected Cost (\$000)	UNK	\$350	\$250	\$300	\$300	\$250	-\$50	0
Projected Cost per unit (whole dollars)	UNK	\$25	\$25	\$25	\$25	\$25	0	0
Comments	To avoid double counting, performance for integrated science for priority ecosystems is consolidated in Biological Research and is not reflected in Geography Program totals.							
Resource Protection: # of systematic analyses and investigations delivered to customers (PES)	NA	31	26	30	30	26	-4	4
Total Projected Cost (\$000)	NA	UNK	UNK	\$10,400	\$10,400	\$8,450	\$1,950	\$10,400
Projected Cost per unit (whole dollars)	NA	UNK	UNK	\$347	\$347	\$325	\$487	\$347
Comments	To avoid double counting, performance for integrated science for priority ecosystems is consolidated in Biological Research and is not reflected in Geography Program totals.							

	2004 Actual	2005 Actual	2006 Actual	2007 CR ¹	2008 Base Budget (2007 PB + Fixed Costs)	2008 Plan	Program Change Accruing in 2008	Program Change Accruing in Outyears
					A	B=A+C	C	D
<p>1 The performance and cost data in the 2007 CR column is presented at the 2007 plan level, which is based upon a projection of 2007 likely enacted made during the first quarter of 2007. The 2008 plan builds on the 2007 plan. To the extent Congress enacts a 2007 appropriation that is different from the 2007 projection, the 2008 plan may require revision.</p> <p>Note: Projected costs may not equal program change as these are full costs, which may include funds from other sources and (or) use averages.</p> <p>Column A: The level of performance and costs expected in 2008 at the 2007 President's Budget level plus funded fixed costs. Reflects the impact of prior year funding changes, management efficiencies, absorption of prior year fixed costs, and trend impacts, but does not reflect the proposed program change.</p> <p>Column D: Outyear performance beyond 2008 addresses lagging performance — those changes occurring as a result of the program change (not total budget) requested in 2008. It does <u>not</u> include the impact of receiving the program change again in a subsequent outyear.</p>								

Program Overview

The Earth's surface is rapidly changing, at local, regional, national, and global scales, with significant repercussions for citizens, the economy, and the environment. Some of these changes are due to natural causes, such as volcanic eruptions, earthquakes, or drought, while other changes on the land, such as resource extraction, agricultural practices, and urban growth, are human-induced processes. In addition, there are changes that are a combination of natural and human-induced factors, for instance, landslides and floods are fundamentally natural processes that are often intensified and/or accelerated by human land use practices. An example of the combination of natural and human-induced factors in landscape change is the canalization of the Mississippi River and the degradation of coastal wetlands – factors that amplified the devastating fury of Hurricane Katrina.

The USGS GAM Program conducts geographic research in support of the following goals:

1. Characterizes and quantifies land surface status and trends, providing a framework for understanding change patterns and processes from local to global scales.
2. Understands past, present, and future environmental consequences of land change and its impacts on the people, environment, economy, and resources of the nation.
3. Improves the scientific basis for vulnerability and risk assessments, as well as disaster mitigation, response, and recovery activities.
4. Develops credible and accessible geographic research, tools, and methods supporting resource allocation and decision-making.

These goals have been identified and described in the Geography Discipline's research plan: *Geography for a Changing World, A Science Strategy for the Geographic research of the United States Geological Survey, 2005 – 2015.*

The GAM researchers use earth observation data supplied by remote sensing platforms, scientific data gathered in the field, and socio-economic data to quantify the rates of landscape change, identify key driving forces, and forecast future trends of landscape change. Results are utilized by resource managers to plan future activities and responses to events that may result in loss of life, economic value, or degrade environmental resources. Studies are conducted

Geographic Research, Investigations, and Remote Sensing

within a geographic context at a range of spatial and temporal scales, in order to provide a comprehensive, interdisciplinary perspective. This perspective is necessary to understand the threats impacting our nation's quality of life, such as climate change, natural disasters, infectious diseases, and suburban sprawl.

Geographic Analysis & Monitoring Program Funding by Component (Dollars in millions)

Goal	Components	FY 2006	FY 2007	FY 2008
1	Landscape Surface Status and Trends	6.8	8.6	8.6
2	Environmental Consequences	3.8	2.9	3.2
3	Hazards and Risk Assessment	1.3	0.6	0.9
4	Resource Decision-Making	0.8	0.8	0.8
	Priority Ecosystems	2.0	2.0	0.0
	Total	\$14.7	\$14.9	\$13.5

The first goal of the GAM Program is to characterize and quantify land surface status and trends to provide a framework for understanding change patterns and processes from local to global scales. This goal receives the bulk of the Program's funding and is used to support two large important projects:

- **Landscape Status and Trends** — which involves identifying the characteristics of the land surface and understanding the forces shaping the land. Land change studies attempt to explain (1) where change is occurring, (2) what land cover types are changing, (3) the types of transformation occurring, (4) the rates or amounts of land change, and (5) the driving forces and proximate causes of change. The ultimate reasons for studying these change characteristics are to understand land change trends, evaluate and manage the consequences of change, and define future scenarios of change. Recently released through the internet (<http://eros.usgs.gov/LT/coverpage.html>) is the "Status and Trends of Eastern United States Land Cover." This comprehensive report summarizes aggregate change in the Eastern United States and specific characteristics of change occurring in each of 20 Eastern U.S. ecoregions.
- **National Land Cover Database (NLCD)** — The NLCD project is compiling land cover information across all 50 States and Puerto Rico, using a partnership of eight Federal agencies and private outsourcing, with the USGS lead the effort. This database captures the type of land cover, the proportion of urban development, and the proportion of tree canopies for every 1-acre patch across the United States. The NLCD is the basis for many regional and national environmental assessments, including the Heinz Center's

State of the Nation's; Ecosystems and EPA's Report on the Environment. In 2007, the database will be completed for the conterminous states, and the majority of the work in Alaska, Hawaii and Puerto Rico will be conducted. In addition, the accuracy assessment of the conterminous U.S. portions of the database will be initiated.

The second goal is to understand the past, present, and future environmental consequences of land change and its impacts on the people, environment, economy, and resources of the nation. Two major GAM efforts focus on quantifying changes in the carbon cycle and the causes and consequences of wildfires.

- **Carbon Cycle Research** — Carbon plays a fundamental role in regulating the climate of the Earth system. GAM researchers are applying their expertise in satellite remote sensing, biogeochemical modeling, analysis of large spatial data sets, and geographic information systems applications to develop a quantitative understanding of the terrestrial carbon cycle. This understanding will be the basis for tools to help policy makers and resource managers evaluate the carbon consequences of land management options, including implications for climate change mitigation strategies. Specific goals include determining the spatial distribution of carbon in the terrestrial environment, and developing estimates of gross primary productivity, respiration, and net ecosystem exchange.
- **Wildfire Research** — Fire is an integral part of ecosystem functioning and processing. Spatial information on fire history, prevalence and severity is required to monitor fire conditions, manage forests and grasslands and plan fire-fighting operations. Land management agencies, scientific communities, and citizenry affected by wildland fires benefit from research and development of consistent and accurate geospatial fire data, maps, and assessments produced at various scales. Specific research projects include mapping fuel loads, periodic monitoring and forecasting of fire danger and analyzing the impacts of current and past fires.

The third goal of the GAM program is to improve the scientific basis for vulnerability and risk assessment, mitigation, response and recovery related to the human and environmental dynamics of land change. Two major foci of GAM research are to investigate the effects of land-cover change on creating hazards and increasing vulnerability and understanding the influences of societal perceptions, policies and laws on societal vulnerability and resilience.

- **Hazards and Risk Assessment** — With the recent disasters in the Indian Ocean and in the U.S. Gulf Coast, reducing potential losses from natural hazards in coastal communities is one of the critical issues of the 21st century. To reduce potential losses, public and private decision makers must understand the hazards in their communities and their vulnerability to these hazards. The GAM Program is helping local and state practitioners by augmenting its traditional expertise in natural hazards with improved capacity to assess vulnerability, defined here as the exposure, sensitivity, and resilience of a community.
- **Assessing and Communicating Vulnerability** — Natural hazards threaten public safety and economic health nationwide. As people increasingly move to locations that are vulnerable to natural hazards, financial losses from natural hazard events will continue to rise. Community decision-makers and leaders face the challenge of how to plan for and allocate scarce resources to invest in protecting their communities. In

response, the GAM program has developed the Land Use Portfolio Model (LUPM), a tool for modeling, mapping, and communicating risk. It is designed to help public agencies and communities understand and reduce their vulnerability to, and risk of, natural hazards. The LUPM is adapted from financial-portfolio theory, a method for evaluating alternative, regional-scale investment possibilities on the basis of their estimated distributions of risk and return.

The fourth and final goal of the GAM Program is to develop credible and accessible geographic research, tools, and methods to support decision-making related to the human and environmental consequences of land change. A major focus of GAM's efforts are developing a set of metrics, indicators, models and decision-support systems that characterize the environmental, social and economic consequences of land change.

- **Global Data Toolset** — The GAM Program has been developing the Global Data Toolset (GDT) to support global-scale monitoring of critical landscape variables and providing an ecoregion-based data framework for global land cover trends analysis, planning and management. It contains a wide-variety of global data including protected areas, ecoregions, amphibian habitats, important bird areas, biodiversity hotspots, hydrography, landcover, elevation and population. These data were collected from various organizations including Birdlife International, the International Union for the Conservation of Nature and Natural Resources, Conservation International, World Wildlife Fund and the World Conservation Monitoring Center.

In addition, the Program contributes to bureau-wide initiatives regarding priority ecosystems and integrated monitoring of critical landscapes. The Program is active in international efforts to monitor the global environment, such as the U.S. Group on Earth Observation (GEO) and the Global Earth Observation Systems of Systems (GEOSS) through the Global Integrated Trends Analysis Network (GITAN). This Network is a multi-disciplinary, interagency, and international collaboration focused on understanding the types, causes and consequences of landscape change around the world.

Scientists funded by the GAM Program are regularly called upon to provide expertise on issues of land management, hazards mitigation and environmental change at the national and international levels to DOI, other Bureaus within the department, as well as local, state and other federal agencies. GAM research is formally presented at national and international conferences and workshops, including the Association of American Geographers, American Geophysical Union and the American Society of Photogrammetry and Remote Sensing, and is published in both internal and external reports, as well as in peer-reviewed publications.

Priority Ecosystems Science

Through PES, the USGS provides integrated science support to better understand the interactive nature of resources and the environment. Land- and resource-management agencies require integrated scientific information and understanding to circumvent potential problems and implement needed improvements. USGS scientific information is provided within the adaptive management framework as improved scientific understanding can be incorporated into the planning and management of each area. Scientific information is used to ensure that future plans have realistic expectations for restoration, structures under construction are optimally managed, monitoring will yield the information desired, and managers have the tools to predict outcomes of possible restoration scenarios.

PES supports ongoing studies in the Greater Everglades, San Francisco Bay, Chesapeake Bay, the Mojave Desert, the Platte River and the Greater Yellowstone area. PES addresses the Department's Serving Communities mission area of "advancing knowledge through scientific leadership and informing decisions through the application of science" by improving stakeholder access to needed science information through databases and methodologies. Additionally, PES activities expand the scientific base by providing temporal and spatial monitoring, research, and assessment/data coverage to meet land-use planning and monitoring requirements, as well as support the Department mission area of Resource Protection by providing information, assessments and technical assistance for decision making. Planned outputs include systematic analyses and investigations delivered to customers, formal workshops, and training that facilitate exchange and use of knowledge and long-term monitoring.

PES activities are budgeted through five USGS budget line items (Earth Surface Dynamics Program, Hydrologic Networks and Analysis Program, Toxic substances Hydrology Program, Geographic Analysis and Monitoring Program, and Biological Resources and Monitoring). The 2008 budget proposes a reduction of \$2,000,000 to PES activities through the Geographic Analysis and Monitoring Program line item. The proposed reduction will potentially result in the curtailment or elimination of modeling and monitoring activities in any or all six ecosystem areas. The reduction may impact the science needs for resource managers and other decision-makers in implementing restoration strategies. Additionally, the reduction may impact the ability to leverage PES funds with State, local, and other Federal partners. A transition strategy has been developed to help prioritize potential reductions to specific activities that aim to lessen the impacts on ongoing activities while maintaining critical science needs.

Restoring the Nation's Greater Everglades and Coastal Ecosystems — The USGS continues to be a key partner in Greater Everglades restoration by providing fundamental and applied scientific information on ecosystem history, water quality and contaminants, surface and groundwater flows, and species response to hydrodynamic dynamics. A major thrust of the USGS continues to be the development of new and improved models, including hydrologic models, ecological models, landscape models and water quality/contaminant models. These ecosystem models are being integrated into decision support tools to aid in restoration-related planning decisions by the FWS, NPS, USACE, Florida Department of Environmental Protection, EPA, and the South Florida Water Management District to predict the consequences of varied management alternatives, set ecological goals by providing yardsticks to measure the success of the restoration, and manage the natural resources of the system.

USGS is continuing research to understand physical and chemical processes of surface and ground-water dynamics. USGS is refining and improving an integrated surface-water/ground-water hydrologic model for Everglades National Park, which is being used to set freshwater flow and salinity targets for the Park. In addition, USGS is expanding existing hydrologic models to include Biscayne National Park and to include the western part of Everglades National Park and Big Cypress National Preserve. The information from these models will be used to help set restoration targets and evaluate restoration alternatives for Everglades National Park, Florida Bay, Biscayne National Park, and is providing information on restoration of these coastal systems relative to global change. USGS has developed comprehensive topographic surveys of the Greater Everglades and is expanding the survey into Lake Okeechobee and eastern Big Cypress National Preserve. In addition, USGS's research is developing information on landscape change and integrating plant community dynamics in a model linked to hydrologic and ecological models. USGS, in cooperation with NPS, FWS, and a number of university partners, is continuing its development and improvement of ecological models called Across

Trophic Level System Simulation (ATLSS) models. ATLSS models are species models linked to Everglades hydrodynamic dynamics. These species models include: alligators, crocodiles, manatees, fish, panther, birds, oysters, blue crabs, and others. USGS is working closely with the NPS and FWS to develop decision support tools linking hydrodynamics to ecological response for use by restoration practitioners. Water quality is a major focus of USGS efforts with studies focusing on excess nutrients (especially phosphorus), conductivity and contaminants (specifically, mercury, sulfur and altered organic carbon). USGS is also addressing water-quality-related changes (excess phosphorus, conductivity and contaminants) at Loxahatchee National Wildlife Refuge, Everglades National Park, and Florida Bay. Much of the USGS water quality and biogeochemistry research is being done in partnership with Florida Department of Environmental Protection (FDEP) and the South Florida Water Management District

Science Supports Restoration Efforts in San Francisco Bay — The USGS continues to be a key participant in the San Francisco Bay and Delta (SFBD) in support of the Bay-Delta Program CALFED, a 30-year plan to restore ecosystem function, improve water supply reliability, and sustain water quality and watershed habitat in the Bay. USGS provides leadership for CALFED's scientific program and contributes research to improve program decisions and expand the body of knowledge relevant to CALFED's proposed actions. USGS studies focus on the relations between proposed changes in the physical habitat of rehabilitated wetlands and the responses of biological resources to water flow, pesticide and metals concentrations, sediment concentrations and transport, and salinity distributions; and effects that these factors and their interrelations have on fish and avian populations in the Bay. USGS scientists began work on two 3-year jointly funded SFBD PES/CALFED studies. The first study is forecasting future ecological and hydrologic states of the Delta and estuarine ecosystem under prescribed scenarios of change using a series of linked climate, hydrologic, geomorphic and ecologic models. Findings will aid restoration, water quality goals, and decisions on infrastructure changes in the Delta. The second study is examining the reasons for the recent decline of fish (including the endangered Delta Smelt) in the system. PES activities will continue to support the South Bay Salt Pond Restoration Project, which covers 15,000 acres of former commercial salt ponds in South San Francisco Bay, which were purchased by State, and Federal agencies in March 2003. While, the FWS and conservation organizations have supported conversion of salt ponds and other bay lands to tidal wetlands to benefit species of concern, no guidelines, models, or management strategies for such conversions exist. This study provides the research to develop guidelines.

USGS Focuses Science on More Effective Restoration of the Chesapeake Bay Ecosystem — The restoration of the Chesapeake Bay, the Nation's largest estuary, is continually challenged by the population increase in its 64,000 square mile watershed. Since the mid-1980s, the Chesapeake Bay Program (CBP), a multi-agency partnership has worked to improve water quality, increase habitat, and restore living resources in the Bay. However, the lack of significant improvement in the Bay ecosystem and the discovery of "intersex" characteristics in fish within the Bay watershed illustrates that more effective implementation and assessment of ecosystem management actions are needed. To enhance restoration efforts, the CBP has asked the USGS to lead efforts to develop scientific approaches to more effectively target implementation of ecosystem management actions for greater water quality and ecological benefit. The USGS revised its science plan in consultation with the CBP, Interior, and academic partners to provide integrated science for effective ecosystem conservation and restoration. USGS studies for FY 2007 through FY 2011 are focused along four science themes: the impact of human activities on land use, the factors affecting water quality and quantity, the ability of habitat to support fish and water-bird populations, and synthesis to improve ecosystem assessment, conservation, and restoration. In FY 2007, the

USGS is summarizing the available information that can be used to help better understand the spatial distribution of human activities and natural processes controlling nutrient and sediment transport and their changes over time. These findings, along with output from USGS models, are being used to develop improved decision-support tools to help resource managers better target water-quality management actions. Results from the USGS-lead CBP Nontidal Water-Quality Monitoring Network are being used to better assess the effectiveness of water-quality management strategies. Also in FY 2007, the USGS is beginning an assessment of the causes of intersex characteristics in fish and fish kills in the Chesapeake Bay watershed. In FY 2008-2010, the USGS is planning to conduct field investigations that are needed to better define the factors affecting the transport and change of nutrients and sediment in the watershed, and the factors affecting fish health, to improve the approaches to more effectively implement and assess ecosystem management actions. These investigations may be limited or deleted in FY 2008 due to proposed reductions in the USGS budget for Priority Ecosystem Science under the Geographic discipline.

The Mojave Desert Ecosystem — is a landscape of contrasts and challenges spread over southern Nevada, western Arizona, southwestern Utah, and a quarter of California. Encompassing six military bases, four national park units, and considerable Bureau of Land Management and other Federal lands, the Mojave Desert is home to a rapidly growing population of well over a million people. Human activities, such as animal grazing, off-road vehicle use, construction, mining, urban expansion, waste disposal, recreational uses, and water withdrawal, and natural processes influenced by man, such as fire and invasive species, have increased the vulnerability of the desert environment to soil erosion and ultimately habitat degradation. USGS is working closely with land management agencies and existing management groups in the Mojave Desert, including the Desert Managers Group to create a decision support system to (1) describe the vulnerability of the land to erosion, invasion by noxious weeds, climatic variability and other disturbances, (2) identify the mechanisms that determine resistance and resilience to disturbance, (3) determine the potential for recovery of degraded land so managers can better target management activities, and (4) develop monitoring techniques. In FY 2007 and FY 2008, USGS will continue (1) detailed studies of how geomorphic surfaces affect the response of plants and fauna to water availability, (2) development of tools for analyzing these processes at a landscape and regional scale, (3) development of tortoise habitat models, and (4) assist managers in developing monitoring programs.

Platte River Ecosystem Resources and Management — The Central Platte River Valley provides habitat for the annual migration of over one-half million sandhill cranes, several million waterfowl, and for endangered species, including the whooping crane, piping plover, and least tern. Changes in water and land use have transformed the river channel, altered the structure of riparian habitats, and allowed for the introduction and spread of invasive species. In FY 2006, the Department of the Interior and the States of Colorado, Nebraska, and Wyoming all signed off on a proposed Platte River Recovery Implementation Program to improve habitat for the endangered species. The USGS has worked with State, Federal, and local partners to develop successful adaptive management strategies and USGS research is being used to guide the development of a new 5-year management plan for the crane population. In FY 2007 and FY 2008, the USGS will continue to operate hydrologic monitoring stations along the river, monitor cranes and migratory waterfowl, expand technological studies to better link surface and ground water levels, and investigate the effects of invasive species.

Greater Yellowstone Ecosystem: Snake River Project — The Snake River PES project is part of the Greater Yellowstone area which includes multiple States and mixed jurisdictions of

Federal, State and private lands. The area is home to relatively intact species assemblages that represent world class wildlife, botanical, and geologic resources. The potential for controversy in this area is high as there are competing uses that include urbanization, mineral development, recreational use, and traditional land use such as grazing and timber harvest. The initiation of USGS research and the formation of the science advisory panel have prompted the BOR to examine modification of river flows to more closely mimic natural seasonal water flows thereby providing an opportunity to adaptively manage the system. Currently, 2 years of riparian vegetation research and 2 years of geomorphological research have been completed. Riparian and geomorphic studies will be continued. As part of the ongoing studies the project has produced maps of the distribution of floodplains and terraces of the Holocene valley to help with the geomorphic analysis, developed maps and figures detailing the flow inundation frequencies, reported on occurrence and spatial data on invasive and sensitive plant species, and developed spatially geo-referenced study plots for future monitoring as part of our riparian work.

2008 Program Performance

The GAM Program's 2008 planned activities will build on previous research studies and will be aligned with the four goals previously described.

Goal 1 — Characterize and quantify land surface status and trends to provide a framework for understanding change patterns and processes from local to global scales

- Land Cover Status and Trends: The GAM program is planning on completing 9 ecoregion based assessments of contemporary land use and land cover change. This will result in the completion of 58 ecoregions, or 69 percent of the country.
- NLCD: The NLCD 2001 data set will be completed with data for Alaska, Hawaii and Puerto Rico will be finalized. In addition, research will be conducted for initiating the next iteration land cover dataset.

Goal 2 — Understand the past, present, and future environmental consequences of land change and its impacts on the people, environment, economy, and resources of the nation.

- Carbon Cycle: GAM research will continue to focus on mapping quantifying carbon stocks, especially in the high latitudes. Assessments will first be conducted in the Yukon River Basin to assess the impact of melting permafrost on soil carbon storage.
- Phenological Monitoring: Research will be conducted to develop a database of vegetation condition and linking remotely sensed images with in situ vegetation data, as well as developing methods of characterizing phenology that are appropriate for different ecosystems. Assessments will be conducted on the impact of land use change and climate variability on land surface phenology and related energy and water fluxes.
- Wildfire Research: GAM research will focus on studies that lead to a better understanding of vegetation conditions such as moisture content, percent green vegetation, and the impact of climate and weather variability, both spatially and temporally, on fire risks.

- **Water Quality Monitoring:** Research will focus on incorporating the results of land cover change models in assessing future water quality conditions. Results will be used to assess the effectiveness of storm water management systems and Best Management Practices (BMPs) in removing nitrogen and phosphorus from our nation's waterways.

Goal 3 — Improve the scientific basis for vulnerability and risk assessment, mitigation, response and recovery related to the human and environmental dynamics of land change.

- **Multi-Hazards Demonstration Project:** GAM research will focus on the consequences of natural hazards and improve community responses to the range of natural hazards potentially facing communities. The Program will also focus on improved communication as it merges information about different high-risk hazards into integrated products to support local community efforts in land-use planning, hazards mitigation, and emergency response.
- **Gulf Coast Hazards:** GAM researchers will develop a model that integrates natural hazards and societal vulnerability knowledge to assess societal impacts of hurricane storm-surge inundation in the Gulf of Mexico. Assessments will be conducted in areas most susceptible to hurricane-related storm-surge and coastal change to demonstrate the utility of societal vulnerability information for risk-management practitioners to identify and visualize the impacts to at-risk communities.

Goal 4 — Develop credible and accessible geographic research, tools, and methods to support decision-making related to the human and environmental consequences of land change.

- **Ecosystem Portfolio Model (EPM):** GAM researchers will evaluate strategies protecting the biological resources of South Florida's parks and refuges. The EPM will integrate natural science, land use, and economic information to assist with land use scenario evaluation, land use planning, and ecological assessments related to land use.

Performance Overview

The following table highlights important performance measures for the Geographic Analysis and Monitoring Program. As shown in an earlier table, the decrease of PES funds potentially impacts metrics in the Biology Discipline as all PES performance is counted there.

Geographic Research, Investigations, and Remote Sensing

Program Performance Overview									
End Outcome Goal 1.4: Resource Protection: Improving the understanding of national ecosystems and resources through integrated interdisciplinary assessment									
End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
GPRA End Outcome Measures									
% of targeted science products that are used by partners for land or resource management decision making (SP)	UNK	UNK	UNK	UNK	≥90%	≥90%	≥90%	0	≥90%
Intermediate Outcome Measures and Bureau and PART Outcome Measures									
Ensure availability of long-term environmental and natural resource information, data and systematic analyses needed by land and resource managers for informed decision making									
% of US surface area with contemporary land cover data needed for major environmental monitoring and assessment programs (SP)	45%	65%	75	75	95% (286/3)	95% (286/3)	100% (300/3)	+5%	60% (180/3)
Comment:	Reflects modification of previous performance measure for the number of mapping units completed (66 mapping units across the country). The National Land Cover Database (NLCD) is made available via the internet for the US, including a all 50 states and Puerto Rico. NLCD is conducted on a cyclical basis.								
% of surface area with temporal and spatial monitoring, research, and assessment/data coverage to meet land use planning and monitoring requirements (SP Geography) (PART) (Number of completed eco-region assessments out of a total of 84 eco-regions)	31%	37%	48%	48%	53%	60% (50/84)	69 (58/84)	+9%	Plan completion FY2010
Comment:	FY07 Plan assumes funding at the FY07 PB level. During FY07 USGS will conduct a review of the landscape status and trends project to focus geographic research in the high priority areas: landscape status & trends; causes & consequences of landscape change; vulnerability & risk analysis; and vulnerability & risk reduction. The Status and Trends project will be completed in 2010 providing an assessment of land use and land cover change for the US (84 ecoregion areas). Research will then focus on consequences of these changes.								
<i>Content and expanse of knowledge base:</i> X% of data accessible: X% of satellite data available from archive within 24 hours of capture (PART Geography)	90%	97.2%	90%	98.7%	90%	95%	95%	0	95%
Total Actual/Projected Cost (\$000)	40,140	43,725		40,159	40,962	40,962	41,781	+819	

Geographic Analysis and Monitoring

Program Performance Overview									
End Outcome Goal 1.4: Resource Protection: Improving the understanding of national ecosystems and resources through integrated interdisciplinary assessment									
End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
Actual/Projected Cost per Unit (whole dollars)	14.64	14.64		14.64	14.64	14.64	14.64	0	
Intermediate Outcome Measures and Bureau and PART Outcome Measures									
Ensure the quality and relevance of science information and data to support decision making									
% of studies validated through appropriate peer review or independent review (SP)	100%	100% (83/83)	100% (77/77)	100% (75/75)	100% (49/49)	100% (49/49)	100% (58/58)	0	100% (61/61)
% satisfaction with scientific and technical products and assistance for environment and natural resource decision making (SP)	UNK	UNK	UNK	UNK	≥90%	≥90%	≥90%	0	≥90%
PART Efficiency and Other Output Measures									
# of annual terabytes collected (Geography)	527.2	438.8	534.0	537.9	534.0	534.0	658.0	+124	658.0
Total Actual/Projected Cost (\$000)	30,442	31,063		31,684	32,318	32,318	32,964	+646	
Actual/Projected Cost per Unit (whole dollars)	57.75	70.79		59.33	60.52	60.52	55.96	-4.56	
# of cumulative terabytes managed (Geography)	2,448.3	2,887.4	3,509.8	3,425.3	4,043.8	4,043.8	4,701.8	+658	7,388.8
# of systematic analyses and investigations delivered to customers	UNK	83	77	79	49	75	71	-4	71
Total Actual/Projected Cost for analysis' (\$000)	UNK	25,655		23,801	15,037	15,037	17,200	+2,163	
Actual/Projected Cost per analysis (whole dollars)	UNK	309		313	307	307	307	0	

Geographic Research, Investigations, and Remote Sensing

Program Performance Overview									
End Outcome Goal 1.4: Resource Protection: Improving the understanding of national ecosystems and resources through integrated interdisciplinary assessment									
End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
# of formal workshops or training provided to customers (instances/issues/events)	23	17	14	10	11	9	8	-1	8
Total Actual/Projected Cost for analysis' (\$000)	500	510		330	330	330	510	+180	
Actual/Projected Cost per analysis (whole dollars)	25	30		33	30	37	64	+37	
LDCM: X% of ground system designed, built, and tested (Geography)	UNK	UNK	28%	8% (reflects planning stage only)	44%	44% (reflects planning stage only)	85% (reflects planning stage only)	+41%	5% (100%-Mission complete at launch in 2011. Begin planning for next)
Comment:	LDCM project has been modified to reflect a free-flyer satellite. NASA is responsible for development of the spacecraft and USGS development of the ground data processing and flight operations systems. It is imperative that all aspects of this satellite mission are coordinated and accomplished in tandem between USGS and NASA for the planning, design and development of spacecraft, instrument, ground systems and flight operations system for a successful mission. Current performance reflects only planning and developing of the system requirements. Much of the design will be complete in FY08 and development of system will begin, depending on FY07 funding. EVM may eventually be used to measure performance.								
Note: The 2007 plan is the performance level based upon a projection of 2007 likely enacted made during the first quarter of 2007. The 2008 plan and 2012 long-term targets build on the 2007 plan. To the extent Congress enacts a 2007 appropriation that is different from the 2007 projection, the 2008 plan and 2012 targets may require revision.									

Geologic Hazards, Resources, and Processes

Subactivity	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Geologic Hazard Assessments	81,000	82,396	+1,612	0	84,008	+1,612
<i>FTE</i>	385	386	0	0	386	0
Geologic Landscape and Coastal Assessments	77,752	78,106	+1,785	+1,500	81,391	+3,285
<i>FTE</i>	428	428	0	+1	429	+1
Geologic Resource Assessments	76,534	56,916	+2,384	-2,614	56,686	-230
<i>FTE</i>	533	353	0	-30	323	-30
Total Requirements (\$000)	235,286	217,418	5,781	-1,114	222,085	+4,667
<i>FTE</i>	1,346	1,167	0	-29	1,138	-29
Impact of the CR		[18,067]		[-18,067]		[-18,067]

Impact of the CR

(-\$18,067,000)

The 2008 budget restores the priorities of the 2007 President's budget by funding 2007 programmed fixed cost increases, eliminating unrequested 2006 congressional earmarks, and implementing the program enhancement and program reduction initiatives included in the 2007 President's budget. Notable increases requested in the 2007 President's budget that were not included in the current Continuing Resolution include \$3,700,000 for the Hazards Assessment and Mitigation Initiative, and \$750,000 for additional Energy Policy Act requirements.

Activity Summary

The 2008 budget request for the Geologic Hazards, Resources, and Processes Activity is \$222,085,000 and 1,138 FTE, a net program change of +\$4,667,000 and -29 FTE from the 2007 President's Budget. This funding level includes a proposed increase of \$1.5 million in the Coastal and Marine Geology Program that would support USGS development of an Oceans Research Priorities Plan. The plan is a collaborative effort across the Federal sector that would establish the basis for both short-term forecasts and long-term, probabilistic assessments of coastal vulnerability to extreme events, persistent natural processes, and human influences across the coastal zone.

The budget request includes \$29.9 million for the Mineral Resources program, a decrease of \$2.6 million below the 2007 level. In 2008, USGS would continue selected minerals surveys and studies relevant to ongoing land management by the Department of the Interior. Additional information on program changes is provided in each subactivity of this document.

The Geologic Discipline provides earth science information needs for a wide variety of partners and customers, including Federal, State, and local agencies, non-government organizations, industry, and academia. This information is used by the USGS and its partners, cooperators, and customers in evaluating resource potential, defining and mitigating risks associated with natural hazards, and characterizing the potential impact of natural geologic processes on human activity, health, the economy, and the environment.

Geologic Hazards, Resources, and Processes

The mission of the USGS Geology Discipline contributes to the achievement of the Department's FY 2007-2012 Strategic Plan goals of providing for responsible resource protection and use and serving communities by providing information to improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment; to improve the understanding of energy and mineral resources to promote responsible use and sustain the Nation's dynamic economy, and to improve understanding, prediction, and monitoring of natural hazards to inform decisions by civil authorities and the public to plan for, manage, and mitigate the effects of hazard events on people and property. All Geology programs have a 5-year plan that supports the science strategy and are reviewed every five years.

Program Assessment Rating Tool (PART) Evaluation

The Administration has reviewed Geology Discipline programs within all three subactivity levels using the PART. The reviews concluded that all programs reviewed have a clear purpose, do a good job at leveraging resources, work with a wide array of partners, and were rated "moderately effective."

Recommendations for improvement include —

- Improve earthquake risk estimates by integrating seismic monitoring information with FEMA hazard loss estimation capabilities,
- Work with other Federal agencies to evaluate linked measures for geologic hazard reduction,
- Evaluate efforts to coordinate hazard investments across programs,
- Conduct regular, independent reviews of the geologic map program,
- Increase integration of geologic information to facilitate analysis and decision making,
- Set standards for data collection preservation and exchange,
- Establish USGS-wide performance measures for priority coastal activities along with program partners.
- Establish and implement procedures for engagement of federal resource management agencies in planning of program activities, design of products, and setting of joint priorities,
- Increase coordination and provision of coastal and ocean mapping activities and information across federal/non-federal agencies.
- Target funding to activities that support long-term land use and economic policy decisions and improve accessibility and application of minerals information,
- Continue to make energy reports and data more accessible and user friendly.

Use of Cost and Performance Information

USGS has ABC data for FY 2004 and FY 2005, but these two years of data demonstrate that more detail is required for decisionmaking. Beginning in FY 2006, data was collected for each task within a project. After several years of collecting at this level, USGS will be better able to track and analyze trends in program funding and expenditures, as well as links to the Department's goals and priorities. Use of ABC has been incorporated into new 5-Year Program Plans.

Using PART, ABC, and other performance information, the USGS will continue to meet the Department's needs for geologic hazard assessments, landscape and coastal assessments, and resource assessments.

Action Plans have been developed to carry out PART recommendations, with milestones being met on schedule.

Workforce Planning

In 2005, the Geology Discipline implemented a workforce planning strategy aligned with USGS science goals and tied to GPRA goals. The plan identifies areas in which the USGS needs to build internal capacity, contract with the private sector, and partner with other organizations; forecast future critical skill needs and identify mechanisms for recruiting, developing, and retaining a diverse workforce with those critical skills; align individual employee performance and rewards with organizational performance; and make effective use of technology.

Efforts are underway to rebalance and renew the skill mix to gain functional and position flexibilities identified through an extensive workforce planning effort. Employees with updated skills are needed to meet current science and business program requirements, changing program goals, new science priorities, and advances in technology. Positions will be redesigned in future years to strengthen hazard and resource assessments, engineering, seismology, geodesy, geomagnetism, information technology, new technological skills in modeling and statistics, and monitoring and analysis, mapping, oceanography, physics, sedimentation, biogeochemistry, and toxicology.

Subactivity Overview

Geology Discipline comprises three subactivities:

Geologic Hazard Assessment programs conduct basic and applied research, gather long-term data, operate monitoring networks, perform assessments and modeling, and disseminate findings to the public, enabling the Nation's emergency response capabilities to warn of impending disasters, better define risk associated with natural hazards, encourage appropriate response, and mitigate damage and loss. These programs produce information and understanding that will lead to a reduced impact of natural hazards and disasters on human life and the economy. The United States is subject to a variety of inevitable and uncontrollable natural hazards (earthquakes, volcanic eruptions, landslides, coastal erosion, tsunamis, floods and magnetic storms) that can result in considerable human suffering and billions of dollars in property and business losses. Damage and loss of life can be reduced through preventative planning; social, economic, and engineering adaptations; provision of real-time warning capabilities; understanding vulnerability, and more effective post-event emergency response. Central to this preplanning are accurate, scientifically based geologic hazards assessments and real-time monitoring systems that define the nature and degree of risk or potential damage. The more precisely risks can be defined, the greater the likelihood that appropriate mitigation strategies will be adopted (e.g., building codes for new construction and retrofitting, and land-use plans). The sooner information reaches emergency response centers, the sooner warnings can be issued to protect lives and teams can be dispatched to resolve urgent medical, utility, or other infrastructure problems.

Geologic Landscape and Coastal Assessments programs focus on understanding geologic processes at or near the Earth's surface through research, monitoring, and assessment of the landscape. Information and modeling derived from these geologic process studies allow scientists to distinguish the effects of human activities from natural changes and enable more effective, adaptive, and efficient resource and environmental management decisions. The USGS provides the geologic framework for the Nation and scientific data to understand issues such as coastal erosion and pollution, sea-level rise, loss of wetlands and marine habitats, the geologic processes controlling the invasion of cheat grass, and the role of dust in desert ecosystem health. Armed with this knowledge, decisionmakers can respond better to both

Geologic Hazards, Resources, and Processes

natural and human-induced changes. Extreme changes in the environment are less costly if their likely effects can be mapped, quantified, and anticipated. Resources can be more efficiently used if the impacts of their extraction can be predicted and mitigated. Damaged or endangered ecosystems can be repaired more effectively if the natural processes that form and maintain them are accounted for in remediation and restoration plans. Strategies for conserving and using the Nation's lands and resources are improved when the natural processes at work are incorporated into predictive models and management plans in an adaptive manner. Work under these programs also supports the U.S. Climate Change Science Program and the President's Ocean Action Plan.

Geologic Resource Assessment programs assess the availability and quality of the Nation's mineral and energy resources, including the economic and environmental effects of resource extraction and use. The Mineral Resources Program is the sole Federal provider of scientific information for objective resource assessments and unbiased research results on mineral potential, production, consumption, and environmental effects, and also provides comprehensive baseline data in the fields of geochemistry, geophysics, and mineral deposits. The Energy Resources Program conducts research to understand the processes that lead to the accumulation of energy resources (oil, natural gas, coal, gas hydrates, and others such as geothermal) and the environmental and human health effects of energy resource usage. USGS conveys results from these studies to land and resource managers and policymakers in support of the Department's strategic goal of managing resources to enhance public benefit, promote responsible use, and ensure optimal value.

Activity: Geologic Hazards, Resources and Processes

Subactivity: Geologic Hazard Assessments
Program Component: Earthquake Hazards

	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Earthquake Hazards (\$000)	50,583	51,461	+1,042	0	52,503	+1,042
<i>Total FTE</i>	220	220	0	0	220	0

Program Overview

The 2008 budget request for the Earthquake Hazards Program is \$52,503,000 and 220 FTE. The USGS proposes no program changes for this program.

The USGS Earthquake Hazards Program (EHP) provides the scientific information and knowledge necessary to reduce deaths, injuries, and economic losses from earthquakes and earthquake-induced tsunamis, landslides and liquefaction. Products of this program include timely notifications of earthquake locations, size, and potential damage; regional and national assessments of earthquake hazards; and public outreach to communicate advances in understanding earthquakes, their effects, and the degree to which they can be predicted.

Of all natural hazards facing the United States, earthquakes have the greatest potential for inflicting catastrophic casualties, damage, economic loss, and disruption. Although damaging earthquakes are infrequent, their consequences can be immense. According to recent studies, a major earthquake in an urbanized region of the United States could cause several thousand deaths and a quarter trillion dollars in losses, impacting the national economy. Although the risk from earthquakes is famously high in California, many other parts of the country are also at risk, including the Mississippi River valley, Pacific Northwest, Intermountain West, Alaska, Hawaii, and parts of the eastern seaboard. Over 75 million people, including 46 million outside California, live in metropolitan areas with significant earthquake risk. Through the Advanced National Seismic System (ANSS), USGS and its State and university partners provide seismic monitoring coverage for the Nation with a national ANSS Backbone network, National Earthquake Information Center (NEIC), National Strong Motion Project, and 15 regional networks in areas of moderate-to-high seismic activity.

For coastal communities, the seismic risk is compounded by the potential for damaging tsunamis generated by large earthquakes. Increasing the safety of coastal communities requires a broad program of monitoring, warning system development and public education, accompanied by research into earthquake and tsunami sources and processes. The Indian Ocean tsunami starkly illustrated the potential dangers of earthquake-generated tsunamis, and highlights opportunities for increasing the Nation's ability to (1) rapidly determine the location, size and depth of large earthquakes, (2) discriminate those likely to have caused a tsunami, and (3) work with Federal, local and foreign partners to ensure timely warnings can be issued. For

Geologic Hazard Assessments

example, tsunami warnings issued by the National Oceanic and Atmospheric Administration (NOAA) Pacific and Alaska Tsunami Warning Centers rely on seismic data transmitted from the USGS NEIC). With support received from the President's Tsunami Warning Initiative in fiscal years 2005 and 2006, the USGS accelerated upgrades to its NEIC and implemented 24 x 7 staffing at the Center, greatly improving the speed and reliability of information provided immediately following damaging earthquakes.

Worldwide, nearly 7,000 deaths resulted from earthquake activity in 2006. Most of the approximately 5,750 fatalities for the year occurred when a magnitude 6.3 earthquake struck Java, Indonesia on May 26. The total number of fatalities falls far short of the death tolls for 2004 and 2005, which were 284,010 and 89,354, respectively. Staff at the USGS NEIC locates close to 70 earthquakes each day – or nearly 26,000 a year. On average, there are 17 magnitude 7.0 to 7.9 earthquakes and one magnitude 8.0 or greater earthquake each year worldwide.

The EHP is the applied earth science component of the multi-agency National Earthquake Hazard Reduction Program (NEHRP), most recently re-authorized by the Earthquake Hazards Reduction Authorization Act of 2004, P.L. 108–360 enacted on October 25, 2004. The National Institute of Standards and Technology (NIST) is the lead agency, and it coordinates the activities with USGS and the two other NEHRP agencies: the National Science Foundation (NSF), and Federal Emergency Management Agency (FEMA).

This program supports the Department's Serving Communities strategic goal to improve understanding, prediction, and monitoring of natural hazards to inform decisions by civil authorities and the public to plan for, manage, and mitigate the effects of hazard events on people and property. As described in the Administration's Program Assessment Rating Tool (PART) review, the EHP role is clearly defined and unique from other Federal, State, local, or private entities. The USGS programs in Earthquake Hazards, Volcano Hazards, Landslide Hazards, Global Seismographic Network and Geomagnetism were reviewed as a group in FY 2003 for the FY 2005 Budget using the PART, and were found to be working effectively with partners and fulfilling the USGS mission. As a result, they received a collective score of 82. An example of responding to a PART recommendation, the EHP has worked with the other USGS geologic hazards programs to link performance measures to measures in other agencies such as FEMA and NOAA that use USGS information to reduce loss of life and property.

Partnerships are crucial to the program's success. Approximately 25 percent of the total EHP budget is directed toward research grants and cooperative agreements with universities, State agencies, and private technical firms to support research and monitoring activities. This external funding is highly leveraged by funds from other Federal agencies, States, and the private sector.

Overall direction for the EHP is established by a 5-Year Plan that results from internal and external inputs such as the USGS and Interior strategic plans, results of periodic reviews by the Scientific Earthquake Studies Advisory Committee, workshops with stakeholders on specific topics, and the advice of senior scientists both within and outside the USGS. The appropriateness of the specific directions being taken by the EHP to meet the goals of the plan is assured by requiring both management and scientific review of project concepts and of final project proposals when submitted for initial funding. Additionally, periodic reviews are conducted on progress of multiyear projects and peer review of reported project results when completed.

The section below on 2008 Program Performance describes activities under the following three program components:

Assessment and Characterization of Earthquake Hazards — The USGS contributes to earthquake hazard mitigation strategies by (1) estimating and describing the likelihood of and potential effects of moderate-to-large earthquakes in high-risk regions of the United States, such as southern California and the Pacific Northwest, and (2) making this knowledge available to others so that it can be used to reduce the impact of potentially damaging earthquakes. Federal, State, and local government agencies, architects and engineers, insurance companies and other private businesses, land-use planners, emergency response officials, and the general public rely on the USGS for earthquake hazard information to refine building codes, develop land-use strategies, safeguard lifelines and critical facilities, develop emergency response plans, and take other precautionary actions to reduce losses from future earthquakes.

Monitoring and Reporting Earthquake Activity and Crustal Deformation — As required under the Disaster Relief Act of 1974 (P.L. 92–288), the USGS has the assigned Federal responsibility for monitoring and notification of seismic activity in the United States. The USGS is the only U.S. agency that routinely and continuously reports on current domestic and worldwide earthquake activity. Reports of potentially damaging earthquakes are provided to the National Command Center; the White House; the Departments of Defense, Homeland Security (including FEMA), Transportation, Energy, and the Interior; State offices of disaster services; numerous public and private infrastructure management centers (e.g., railroads and pipelines); the news media, and the public. Rapid earthquake notifications delivered by e-mail, pager, fax, and through USGS Web sites. USGS also provides near-real-time data to NOAA's tsunami warning centers, supporting tsunami monitoring in the Pacific Rim and disaster alerting in Alaska, Hawaii, Washington, California, and U.S. territories in the western Pacific.

Use of Cost and Performance Information

The EHP annual and 5-year planning procedures have been organized to respond to PART recommended actions and the Department's performance and cost-efficiency metrics. As an example of responding to a PART recommendation, the program has worked with the other USGS geologic hazards programs to link performance measures to measures in other agencies such as FEMA and NOAA that use USGS information to reduce loss of life and property.

To track cost, budget, and schedule for the implementation of ANSS, the Program employs the Earned Value Management System (EVMS) and reports quarterly EVMS results to the Department and Office of Management and Budget (OMB).

Gathering ABC information at the task level began in FY 2006. After several years of tracking this valuable detailed information, EHP will be better placed to track and analyze important trends in program funding and expenditures, as well as scientific emphases within each program and links to Departmental goals and priorities. A preliminary and broad breakdown of activities and estimated costs linked to ABC codes are:

Activity	Estimated Funding (\$ million)		
	ABC Code	FY 2007	% of funds
Hazard Assessments	N8	16.7	33
Earthquake Monitoring	J7	20.2	39
Earthquake Research	N7	9.7	19
Response, assistance, training	Z3	3.3	7
Program Planning	04	1.4	3

Conducting Research into Earthquake Causes and Effects — The USGS conducts research on the causes, characteristics, and effects of earthquakes. This research has direct application in increasing the accuracy and precision of the agency's earthquake hazards assessments, earthquake forecasts, and earthquake mitigation practices.

Geologic Hazard Assessments

Priority goals for each component are outlined in the 5-Year Plan for 2004–08. The new plan also includes a fourth component—*Earthquake Safety Policy*—that features activities embedded in each of the other program components and reflects the overall NEHRP mission to translate improvements in understanding into loss-reduction results.

2008 Program Performance

At the 2008 funding level, EHP accomplishments will include the following:

Assessment and Characterization of Earthquake Hazards

National Seismic Hazard Maps — USGS national-scale seismic hazard maps are used to develop new, unified building codes for the United States. These digital maps integrate a wide range of geological and geophysical information to provide estimates of the maximum severity of ground shaking that a given location is expected to experience during the next 50, 100, and 250 years. Periodic review and updating of the seismic hazard maps to incorporate new information are among the highest priorities for the EHP. The USGS works closely with earthquake researchers, engineers, and State and local government representatives across the Nation to ensure that the maps represent the most current and accurate information available. Release of these maps responds to the program's PART output measure for "number of systematic analyses & investigations delivered to customers."

The latest generation of maps is being prepared for delivery near the end of 2007, following an extensive review process, replacing those from 2002. During 2008, USGS will produce engineering design maps, derived from new hazard maps using specifications from the Building Seismic Safety Council; these design maps will be used for 2008 NEHRP Recommended Provisions, in the 2010 construction engineering standards of the American Council on Seismic Engineering, and in the 2012 International Building Code. In addition, USGS will produce a variety of other products derived from the seismic hazard map, for use by engineers, city planners and other end-users; these include uniform hazard spectra at shaking frequencies ranging from 0.5 – 10 Hz, maps that portray the degree of certainty and resolution of seismic hazard estimates nationwide, and disaggregations that associate seismic hazard with the earthquakes most likely to cause strong shaking at a given site of interest. USGS will also collect data and begin calculations required to update the seismic hazard map for Hawaii, scheduled for release in 2009.

Hazard Maps for Urban Areas — The scale of the national earthquake hazard maps precludes taking into account local variations in the size and duration of seismic shaking caused by small-scale geologic structures and soil conditions. For high-to-moderate risk urban areas, the USGS is generating more detailed products that make it possible for local officials to make informed zoning and building code decisions. Modeling of ground motion is provided for engineering applications. In conjunction with release of these targeted products, the USGS conducts workshops to assure the proper transfer of knowledge and to help design effective mitigation strategies. During 2008, the USGS will focus efforts on collaborative urban seismic hazard mapping projects in the high-risk St. Louis urban area and the Tri-State (Evansville) area of Indiana, Kentucky, and Illinois. In both these efforts, USGS serves primarily as a coordinator, with most of the technical work being done by local partners. Partners in the St. Louis project include the University of Missouri at Rolla, Missouri Department of Natural Resources, and the Missouri State Geological Survey. Those for the Tri-State (Evansville) project include the state geological surveys of Indiana, Kentucky, and Illinois, the Southwest Indiana Disaster Resistant

Community Corporation, Association of Central United States Earthquake Consortium (CUSEC) State Geological Surveys, and Purdue University. As part of the Multi-Hazard Demonstration Project in Southern California, USGS will continue a systematic investigation of the earthquake history of the southern San Andreas Fault in partnership with the Southern California Earthquake Center (SCEC). This analysis will contribute to an urban hazard assessment for the Los Angeles region to be completed in 2009.

Monitoring and Reporting Earthquake Activity and Crustal Deformation

The Advanced National Seismic System (ANSS) — The ANSS initiative is focused on expanding and improving the performance and integration of national, regional, and urban seismic monitoring networks in the United States. Begun in 2000, ANSS implementation efforts have focused primarily on the installation of new urban recording stations in five high-risk metropolitan areas: Los Angeles, CA; Salt Lake City, UT; San Francisco, CA; Seattle, WA; and Anchorage, AK. Increasing seismic monitoring capability in urban regions has two major benefits: (1) provide rapid assessments of the distribution and severity of strong ground shaking just after an earthquake—information used by emergency response officials to determine the scope and scale of the crisis they face, and (2) provide detailed and accurate data on the shaking of the ground and structures during a damaging earthquake. These data can be used in the recovery and rebuilding phase for more earthquake-resistant design and construction in the future.

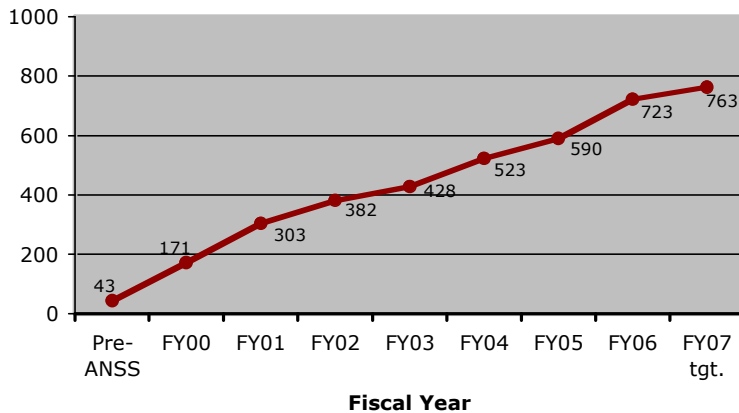
ANSS-Directed Funding within EHP

FY	Amount (\$M)
2000	\$1.6
2001	\$3.6
2002	\$3.9
2003	\$3.9
2004	\$4.4
2005	\$8.866*
2006	\$8.0
2007 (continuing resolution)	\$8.0
2008 (proposed)	\$8.0

*2005 amount includes supplemental funding received as part of the President's Tsunami Initiative.

By the end of 2007, USGS and partners will have installed 763 ANSS earthquake monitoring stations (see chart). This includes the completion of the national ANSS Backbone seismic network in the contiguous United States, thanks to a partner contribution by the NSF in 2004–06. The ANSS network is now capable of detecting almost all felt earthquakes in the United States except remote areas of Alaska.

Growth of ANSS Stations Since Inception



Geologic Hazard Assessments

In 2008 under the proposed budget, ANSS-directed resources will almost entirely be devoted to operating and maintaining the installed system. Sensor installations funded in 2008 will add approximately 17 new equivalent stations to the system, increasing the total number of ANSS stations to 780. Most of these new sensors will be installed on buildings and bridges, capturing earthquake motions that can be used to improve engineering designs.

Regional Earthquake Monitoring — As part of ANSS, the USGS and cooperating universities operate regional seismic networks in areas of high seismicity. Data from all U.S. seismic networks are used to monitor active faults and ground shaking, in much greater detail than is possible with the national-scale network. Each region has appropriate local data processing capabilities; regional data are contributed to a national ANSS catalog of earthquakes. ANSS regional networks serve as state or local distribution points for information about earthquakes to the public, local and State agencies, and other regional interests. The regional data centers also relay earthquake data in real time to the NEIC, as well as to other regional networks. They also provide information about regional earthquake hazards, risks, and accepted mitigation practices, and those centers located at universities provide training and research facilities for students. To support partner activities in regional earthquake monitoring, approximately \$5.9 million will be provided in 2007 through cooperative agreements, \$3.4 million of which comes from base program funds and \$2.5 million of which comes from funds targeted for development and maintenance of the ANSS. In 2008, an equal amount will be directed toward ensuring robust regional network operations and maintenance, both by implementing standardized earthquake processing software in the regional networks and by targeting a larger proportion of the funding for network staffing.

Earthquake Early Warning — Since 2006, USGS has funded external research to investigate the feasibility of earthquake early warning. This research is designed to test early-warning methods using actual data streams from ANSS sensors in California urban areas. Early warning systems have been deployed in Japan, Taiwan, Mexico, and Turkey to provide up to tens of seconds warning before strong shaking begins. Such systems can be used by utilities to rebalance electricity distribution and shut off gas lines, hospitals to initiate auxiliary power systems, and for other targeted uses. Evaluation of this test will take place in 2008 to determine whether it is successful enough to warrant the substantial network upgrades that would be required for an operational system.

Monitoring Changes in the Shape of the Earth's Surface — Geodetic networks provide essential information about the massive, slow deformation (strain) of the land surface near faults and the forces that cause earthquakes. The USGS is working with universities, local agencies, and the Plate Boundary Observatory component of the NSF's Earth Scope program to conduct geodetic investigations using Global Positioning System (GPS), laser-ranging surveys and sensitive borehole instruments. To address the problem of hazards in the urban Los Angeles region and its environs, the USGS operates and distributes data from state-of-the-art, continuously operating GPS stations installed in cooperation with the National Aeronautical and Space Administration (NASA) Jet Propulsion Laboratory, the Scripps Institution of Oceanography, and the SCEC. These and similar stations in other regions measure changes in the shape of the Earth's surface that help reveal the way stress accumulates on earthquake faults in the region, and how those faults are moving at depth. In addition, the USGS is employing a new satellite technology, Interferometric Synthetic Aperture Radar (InSAR), to quickly and accurately produce large aerial maps of pre- and post-earthquake land deformation. The USGS continues to develop computational tools necessary to efficiently analyze, interpret, and model InSAR data.

Regional Earthquake Monitoring Supported by the USGS

In 2008, the USGS expects to continue to support 16 regional seismic networks, operated by the following colleges and universities:

Boston College, Weston Geophysical Observatory	University of California, Los Angeles
California Institute of Technology	University of California, San Diego
Columbia University, Lamont-Doherty Earth Observatory	University of Kentucky
Montana Tech of the University of Montana	University of Memphis
Saint Louis University	University of Oregon
University Nevada at Reno	University of South Carolina
University of Alaska Fairbanks	University of Utah
University of California, Berkeley	University of Washington

Conducting Research into Earthquake Causes and Effects

Internal Research Activities — A major focus of USGS earthquake research is to understand earthquake occurrence in space and time. Ongoing USGS investigations seek to understand the physical conditions for earthquake initiation and growth; processes of earthquake triggering; how individual faults in the same region interact; why some faults slip slowly without generating earthquakes while others generate earthquakes; and the factors that control variations in recurrence intervals of earthquakes along the same fault. USGS research efforts are also directed at improving the understanding of earthquake-induced strong ground shaking and its effects. Specifically, USGS researchers are investigating how complexities in the earthquake source, Earth’s crust, and near-surface soils and deposits influence seismic wave propagation and strong ground motion. Improving current techniques for forecasting the effects of strong ground motion will greatly improve seismic hazard maps for urban regions. These efforts are thus critical for cost-effective earthquake hazard mitigation. Another research priority is the identification and understanding of behavior of weak soils that liquefy and fail when subjected to earthquake shaking. Research on ground failure, carried out in collaboration with structural and geotechnical engineers, will lead to improved design of earthquake-resistant infrastructure and lifelines, such as bridges and airports, commonly built on fill or weak soil.

Supporting External Research Partnerships — EHP provides competitive, peer-reviewed, external research support through cooperative agreements and grants that enlist the talents and expertise of State and local government, the academic community, and the private sector. Investigations and activities supported through the external awards are closely coordinated with and complement the internal USGS program goals. Many of the external projects are co-funded with other agencies and sources, leveraging the effect of USGS support. External program activities include (1) mapping seismic hazards in urban areas, (2) developing credible earthquake planning scenarios including loss estimates, (3) defining the prehistoric record of large earthquakes, (4) investigating the origins of earthquakes, (5) improving methods for predicting earthquake effects, and (6) testing the feasibility and seismic network requirements for an earthquake early warning system. By involving the external community, the USGS program increases its geographical and institutional impact, promotes earthquake awareness across the Nation, encourages the application of new hazards assessment techniques by State and local governments and the private sector, and increases the level of technical knowledge within State and local government agencies. To support external work, \$4.9 million is requested in the 2008 for competitively awarded earthquake research grants, \$0.5 million for cooperative agreements with state and local partners for work in support of urban seismic hazard mapping, \$0.5 million through cooperative agreements for the operation and maintenance of regional geodetic networks and other long-term research efforts, and \$1.1 million to the SCEC, a

Geologic Hazard Assessments

40-institution research consortium that USGS funds in partnership with the NSF. The 2008 request maintains the same level of funding and effort as FY 2007. In both 2007 and 2008, EHP will continue to support targeted research to improve algorithms used to rapidly and accurately determine the magnitude and shaking of large earthquakes. Implementation of such algorithms into NEIC analysis operations shortens the time needed to report on potentially damaging or tsunamigenic earthquakes.

USGS FY 2007 Cooperative Agreements for Earthquake Research and Seismic and Geodetic Networks	
Applied Technology Council	University of California - Berkeley (3 agreements)
Boston College	University of California – Los Angeles
Brigham Young University	University of California - San Diego (2 agreements)
California Institute of Technology	University of Colorado
California Geological Survey	University of Kentucky
Central U.S. Earthquake Consortium	University of Memphis
Central Washington University	University of Nevada, Reno
Columbia University	University of Oregon
Commonwealth Scientific & Industrial Research Org.	University of South Carolina
Lamont Doherty Earth Observatory	University of Southern California
Montana Bureau of Mines and Geology	University of Utah (2 agreements)
Oregon DOGAMI	University of Washington
Saint Louis University	University of Wyoming
San Francisco State University	Utah Geological Survey
Southern California Earthquake Center (SCEC)	Virginia Polytechnic Institute
University of Alaska	
USGS FY 2007 Grants Earthquake Research and Hazards Assessments	
AIR Worldwide Corp.	State University of New York - Buffalo
Arizona State University	University of Alaska – Anchorage
Boise State University	University of Arizona
Boston College	University of Arkansas – Little Rock
Brigham Young University	University of California - Berkeley (3 grants)
Brown University	University of California – Irvine
California Geological Survey (2 grants)	University of California – Los Angeles
California Institute of Technology (5 grants)	University of California – Riverside
Central U.S. Earthquake Consortium	University of California - San Diego (4 grants)
Clemson University	University of California - Santa Barbara (3 grants)
Colorado Geological Survey	University of Cincinnati
Cotton Shires & Assoc., Inc.	University of Memphis (2 grants)
Duke University	University of Missouri – Rolla (3 grants)
Harvard University (2 grants)	University of Nevada – Reno (7 grants)
Independent (2 grants)	University of Oregon (2 grants)
Indiana University (2 grants)	University of Southern California (3 grants)
Lamont-Doherty Earth Observatory (3 grants)	University of Texas - Austin
NORSAR	University of Texas – El Paso (2 grants)
North Carolina State University	University of Utah (2 grants)
Northwestern University	University of Virginia
Oregon DOGAMI	University of Washington
Oregon State University (2 grants)	University of Wisconsin – Madison (2 grants)
Pennsylvania State University	URS Corporation (5 grants)
Purdue University (2 grants)	Utah Geological Survey
San Diego State University (3 grants)	Utah State University
SPA Risk	Virginia Polytechnic Institute (2 grants)
Stanford University (2 grants)	William Lettis and Associates (5 grants)

Geologic Hazard Assessments

Program Performance Overview

The table below summarizes the performance measures that either relate exclusively to the EHP or are shared among the USGS programs in Volcano Hazards, Landslide Hazards, Global Seismographic Network, and Geomagnetism.

End Outcome Goal: 4.2: Serving Communities: Improve understanding, prediction, and monitoring of natural hazards to inform decisions by civil authorities and the public to plan for, manage, and mitigate the effects of hazard events on people and property									
End Outcome Goal End Outcome Measure / Intermediate or PART Measure / PART Efficiency or other Outcome Measure	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
Intermediate Outcome Measures and Bureau and PART Outcome Measures									
Provide information to assist communities in managing risks from natural hazards									
# of areas for which detailed hazard assessments are completed (SP)	UNK	UNK	UNK	3	3	3	4	+1	7
# of urban areas for which detailed hazard maps are completed (PART) (EHP)	2	3	3	3	3	3	4	+1	7
# of metropolitan regions where Shakemap is incorporated into emergency procedures (SP) (PART)	5	5	5	5	5	5	5	0	5
Comments:	Assumption of level funding through 2012. Exhibit 300, prepared earlier, reflects target of 10 in 2012.								
<i>Use Rate: Earthquakes: X% of communities/tribes using DOI science on hazard mitigation, preparedness and avoidance for each hazard management activity (07 Plan baseline is 885 at risk counties)</i>	62.7%	63.4%	63.9%	63.9%	64.0%	62.8%	62.8%	0	62.8%
	559/891	565/891	569/891	569/891	570/891	556/885	556/885		556/885
Comments:	The revision of the Strategic Plan added Tribal communities to the metric on % of communities. Rebaselined # counties to 885 in 2007 Plan; EHP using a new counties database.								
PART Efficiency and Other Output Measures									
Ensure the quality and relevance of science information and data to support decision making.									
# of systematic analyses/investigations delivered to customers (systematic analyses/investigations) (EHP)	0	4	2	2	2	160	155	-5	137

Earthquake Hazards

End Outcome Goal: 4.2: Serving Communities: Improve understanding, prediction, and monitoring of natural hazards to inform decisions by civil authorities and the public to plan for, manage, and mitigate the effects of hazard events on people and property									
End Outcome Goal End Outcome Measure / Intermediate or PART Measure / PART Efficiency or other Outcome Measure	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
Comments:	2007 Plan, new baseline number of systematic analyses. EHP systematic analyses are scientific publications that are typically produced after years of data collection and analysis, and the rate of release is highly variable from year to year. The slight decline in publications in 2008 is due to the increasing priority in recent years to improving earthquake monitoring systems.								
# of real-time ANSS earthquake sensors (cumulative) (PART) (EHP)	95 (cum 523)	40 (cum 563)	106 (cum 669)	27 (cum 723)	40 (cum 763)	40 (cum 763)	17 (cum 780)	+17	0 (cum 780)
Comments:	Sensors were rebaselined in FY 2006 to earned-value management accounting.								
# of formal workshops or training provided to customers (instances/issues/events) EHP		11	7	7	6	6	6	0	6
Comments:	Assumption of level funding through 2012.								
# of communities/tribes using DOI science on hazard mitigation, preparedness and avoidance of each hazard management activity (EHP) (PART) (07 Plan baseline is 885 at risk counties)	559	565	569	569	570	556	556	0	556
Comments:	The revision of the Strategic Plan added Tribal communities to the metric on % of communities. Rebaselined # counties to 885 in 2007 Plan; EHP using a new counties database.								
Note: The 2007 plan is the performance level based upon a projection of 2007 likely enacted made during the first quarter of 2007. The 2008 plan and 2012 long-term targets build on the 2007 plan. To the extent Congress enacts a 2007 appropriation that is different from the 2007 projection, the 2008 plan and 2012 targets may require revision.									

This page intentionally left blank.

Activity: Geologic Hazards, Resources, and Processes

Subactivity: Geologic Hazard Assessments
Program Component: Volcano Hazards

	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Volcano Hazards Program (\$000)	21,466	21,672	+370	0	22,042	+370
<i>Total FTE</i>	<i>127</i>	<i>127</i>	<i>0</i>	<i>0</i>	<i>127</i>	<i>0</i>

Program Overview

The 2008 budget request for the Volcano Hazards Program is \$22,042,000 and 127 FTE. The USGS proposes no program changes for this program.

Under the Stafford Act (P.L. 93–288), the Department of Interior has the responsibility to issue timely warnings of potential geologic disasters to the affected populace and civil authorities. Accordingly, the mission of the Volcano Hazards Program (VHP) is to provide the Earth science data and information, analyses, and research needed to reduce the loss of life, property, and economic impact of hazards related to volcanoes.

Within the last 10,000 years, 169 volcanic centers within the United States have erupted or exhibited sufficient hydrothermal activity or seismic unrest to indicate that they are capable of erupting in the future. To reduce societal exposure to the threats posed by these volcanoes, the VHP conducts a range of on-going activities that may be broadly divided into volcano-hazard-assessment and volcano-monitoring components. Process-oriented research is conducted under both components to steadily improve accuracy of hazard assessments and accuracy of interpretations and forecasts of volcanic activity. Both components provide training and technical assistance to inform decision-makers on managing risk from natural hazards.

Volcano hazard assessments are research efforts conducted to inform decisions on management of risk from natural hazards. Each assessment requires a geologic map and involves field work, laboratory analysis, and data analysis by research scientists, and typically requires 3 to 5 years to complete. The long-term goals are to provide hazard assessments for all dangerous volcanoes and to establish response plans for all communities that they threaten. These goals are tracked by performance measures for (1) number of counties or comparable jurisdictions that have adopted emergency response plans, (2) percent of completed hazard assessments for 70 targeted volcanoes, (3) number of formal workshops or training provided to customers, and (4) number of systematic analyses and investigations (risk/hazard assessments) delivered to customers. Process-oriented research conducted in support of the hazard assessment includes studies on controls of explosive volcanism and dynamics of volcanic debris flows.

Geologic Hazard Assessments

Monitoring volcanoes involves (1) collection, scientific interpretation, management, and distribution of data to inform decision-makers on managing risk from natural hazards, and (2) technical assistance to decision-makers on managing risk from natural hazards. Volcano monitoring is a continuing activity that includes detection of earthquakes and explosions, ground deformation, temperature change, and volcanic gas emissions. Sophisticated instruments are required, including arrays of sensitive seismometers, geodetic instruments and microphones, ground-based and airborne gas and thermal sensors, and satellite-based sensors. Monitoring activities include maintenance of the existing networks, expansion of the networks to include previously unmonitored volcanoes, improvements in the monitoring of under-monitored volcanoes, and response to volcanic unrest and eruptions. Volcano monitoring network is maintained and operated by 5 volcano observatories (Alaska Volcano Observatory (AVO); Cascade Volcano Observatory (CVO), Hawaiian Volcano Observatory (HVO), Long Valley Observatory (LVO), and Yellowstone Volcano Observatory (YVO) and their partners, the Universities of Alaska, Washington, Utah, and Hawaii, and the Alaska Division of Geophysical and Geological Surveys. Collaboration with National Oceanic and Atmospheric Administration (NOAA), FAA, and the Air Force Weather Agency provides early warning and situational awareness of volcanic ash threats to jet aircraft, and through a partnership with U.S. Agency for International Development (USAID), the VHP provides emergency response support and training to developing nations faced with volcanic hazards. The long-term goal of the monitoring component is tracked by performance measures for: (1) percent of 70 potentially active volcanoes monitored; (2) number of volcanoes for which information supports public safety decisions; and (3) number of sites (mobile or fixed) monitored for ground deformation to identify volcanic activity. Process-oriented research conducted in support of monitoring includes studies on the origin of long-period earthquakes and tremor associated with volcanic activity, on the contribution of hydrothermal fluids to ground deformation in calderas, on the causes and precursors of hydrothermal explosions at Yellowstone caldera, and on the dimensions and characteristics of the magmatic plumbing system of volcanoes.

Use of Cost and Performance Information

The VHP is implementing a unified and integrated strategy for monitoring the Nation's volcanoes described in the NVEWS report (National Volcano Early Warning System). The reconfiguration in 2006 of project proposals at the task level on the basis of ABC codes will provide both the uniformity in financial reporting and the ability to focus resources necessary to accomplish this broad change in program direction. The Program will track identical classes of expenditures across all observatories and use the information to identify potential savings and improvements in efficiency, and these observations will allow the program to refine financial planning for the NVEWS.

The VHP has made steady annual progress on both monitoring and hazard-assessment efforts. Utilizing supplemental funds provided by the FAA, the volcano monitoring network has been expanded, on average, each year to include two previously unmonitored volcanoes. At the end of FY 2006, 51 volcanoes were monitored by the VHP. On average, one to two hazard assessments have been released to customers each year, and there has been steady progress on development of community response plans in the Cascades. The VHP estimates that 256 counties or comparable jurisdictions are threatened by volcano hazards. At the end of FY 2006, 190 had adopted or were served by emergency management organizations that had adopted response plans based on USGS volcano hazard assessments.

A need for improved monitoring of the Nation's volcanoes to improve disaster warnings has been identified by the Office of Science and Technology Policy in "Grand Challenges for Disaster Reduction (2005)," (<http://www.sdr.gov/>), and by the United States Group on Earth Observations (USGEO), a standing subcommittee of the National Science and Technology Council Committee on Environment and Natural Resources, in its "Strategic Plan for the

U.S. Integrated Earth Observation System" (http://usgeo.gov/docs/EOCStrategic_Plan.pdf). Also, USGEO states in "Improved Observations for Disaster Reduction: Near-Term Opportunity Plan" (http://usgeo.gov/docs/nto/Disaster_Observations_NTO_2006-0925.pdf) that existing volcano monitoring is lacking or suboptimal for many volcanoes and that monitoring networks are not fully integrated at the national level.

Development of a National Volcano Early Warning System (NVEWS) is now a major goal of the USGS Volcano Hazards Program following an assessment of volcanic threat and monitoring capabilities for all 169 of the Nation's active volcanoes (USGS Open-File Report 2005-1164; <http://pubs.usgs.gov/of/2005/1164/>). The report concludes that most dangerous U.S. volcanoes are under monitored. At present, volcano observatories function autonomously, analyzing data from volcanoes for which they are responsible, and the distribution and age of monitoring equipment reflects a reactive approach to volcanic unrest and activity over the last 25 years so that many volcanoes are under-monitored or unmonitored, and much of the monitoring equipment is out of date. Fully implemented, NVEWS will move the Volcano Hazards Program from this regionally-based, loosely affiliated collection of monitoring networks that provide adequate monitoring for only a few volcanoes to a nationally integrated system that provides modern monitoring at levels commensurate with the threats posed, and that provides 24 x 7 situational awareness and data for all potentially hazardous U.S. volcanoes. This goal is consistent with the Department of the Interior's Serving-Communities strategic goal to improve understanding, prediction, and monitoring of natural hazards to inform decisions by civil authorities and the public to plan for, manage, and mitigate the effects of hazard events on people and property. At present, the highest priority NVEWS targets for improvement are —

- Volcanoes that currently are erupting (Mount St. Helens in Washington and Kilauea in Hawaii) or exhibiting precursory unrest (Mauna Loa in Hawaii, Fourpeaked in Alaska).
- 13 very-high-threat volcanoes with inadequate monitoring (9 in the Cascade Range and 4 in Alaska).
- 19 volcanoes in Alaska and the Mariana Islands that pose threats to aviation but have no real-time ground-based monitoring to detect precursory unrest or eruption onset.

An additional 21 under-monitored volcanoes in Washington, Oregon, California, Hawaii, Alaska, the Commonwealth of the Northern Marianas (CNMI), and Wyoming are lower priority NVEWS targets. GPRA/PART performance metrics that will track progress on the development of NVEWS are (1) measures of percentages of volcanoes monitored, (2) sites monitored for ground deformation, (3) number volcanoes for which information supports public safety decisions, and (4) percentage of full monitoring achieved.

2008 Program Performance

At the 2008 funding level, VHP accomplishments will include the following:

Response to Eruption and Unrest — In 2008, VHP will direct resources as necessary toward response to volcanoes that are erupting or exhibited unrest (earthquakes, deformation, or gas emissions) that may be precursory to an eruption. Although it is impossible to predict with certainty which volcanoes will be erupting or showing unrest in 2008, the following volcanoes are likely to require attention and resources. The persistent eruptions of Mount St. Helens in

Geologic Hazard Assessments

Washington State and Kilauea volcano in Hawaii show no signs of ending and will almost certainly require additional close attention in 2008. Also likely to require extra attention and resources are Mauna Loa in Hawaii, which has erupted about every five years in historical times and which has been deforming since 2002 as a result of magma filling a magma chamber beneath the summit, and Fourpeaked volcano in Alaska, which continues to exhibit elevated thermal activity and emission of volcanic gas since a swarm of earthquakes indicated the onset of unrest in October, 2006.

Monitoring Improvements in Support of NVEWS — The VHP will direct resources toward improvement of existing monitoring networks in the Cascades. Plans include monitoring improvements in Washington at Mount Rainier, which requires currently has only one Global Positioning System (GPS) receiver for deformation monitoring and which requires improved seismic monitoring. In Oregon, monitoring improvements will be made at Crater Lake, which has no seismometers within 30 miles of the volcano. In addition, the permitting process will be initiated to allow improved monitoring at Mount Shasta in California, and at Newberry Caldera in Oregon. In Alaska, the VHP will focus efforts on improving the reliability of existing volcano monitoring networks and systems for data acquisition and analysis. In addition, the VHP will collaborate with the Washington State University on a research and development effort to develop smart networks to improve deployment speed, resilience and data capturing capacity of future volcano monitoring networks.

Volcanic Hazard Assessments and Systematic Analyses — The VHP will continue to make progress on production of volcanic hazard assessments to guide development of community response plans and interpretation of volcanic unrest. The hazard assessment of Medicine Lake volcanic field in northern California will be completed, and progress will be made toward completion of the hazard assessment for Mount Lassen in California and geologic maps for Mount Hood in Oregon and Glacier Peak in Washington. Geologic investigations will continue at Cook Inlet volcanoes in Alaska, which can directly impact over half the population of the state, to better understand their eruptive history and the volcanic processes that drive eruptions. The VHP will continue to publish the results of research on volcanic processes, aiming at a total of 75 systematic analyses (including reports, including maps and hazard assessments) delivered to the public in 2008.

Eruption Response Plans — A national volcanic-ash operations plan in support of aviation safety and the Internal Civil Aviation Organization's volcano watch will be implemented in collaboration with NOAA, FAA and the Air Force Weather Agency to provide early warning and situation awareness of volcanic ash threats to aircraft, and significant progress will be made toward completion of community response plans for Mount Adams in Washington.

This program supports the Department's Serving Communities strategic goal to improve understanding, prediction, and monitoring of natural hazards to inform decisions by civil authorities and the public to plan for, manage, and mitigate the effects of hazard events on people and property. As described in the Administration's Program Assessment Rating Tool (PART) review, the VHP role is clearly defined and unique from other Federal, State, local, or private entities. The USGS programs in Earthquake Hazards, Landslide Hazards, Global Seismographic Network and Geomagnetism were reviewed as a group in 2003 for the 2005 Budget using the PART, and were found to be working effectively with partners and fulfilling the USGS mission. As a result, they received a collective score of 82. The VHP 5-Year Plan has been reviewed, approved by the Bureau, and was released in 2006.

Program Performance Overview

The table below summarizes the performance measures that either relate exclusively to the VHP or are shared among the USGS programs in Earthquake Hazards, Landslide Hazards, Global Seismographic Network, and Geomagnetism

End Outcome Goal: 4.2: Serving Communities: Improve understanding, prediction, and monitoring of natural hazards to inform decisions by civil authorities and the public to plan for, manage, and mitigate the effects of hazard events on people and property									
End Outcome Goal End Outcome Measure / Intermediate or PART Measure / PART Efficiency or other Outcome Measure	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
GPRA End Outcome Measures									
Intermediate Outcome Measures and Bureau and PART Outcome Measures									
Provide information to assist communities in managing risks from natural hazards									
# of areas for which detailed hazard assessments are completed (SP)	UNK	UNK	UNK	45	46	46	47	+1	50
Use Rate: Volcanoes: X% of communities/tribes using DOI science on hazard mitigation, preparedness and avoidance for each hazard management activity (Baseline is 256 at risk counties)	63.3%	66.4% 170/256	74.2% 190/256	74.2% 190/256	83.6% 214/256	83.6% 214/256	85.9% 220/256	+2.3%	85.9% 220/256
Comments:	The revision of the Strategic Plan added Tribal communities to the metric on % of communities; however, baseline of 256 counties remains unchanged as Tribes were already incorporated into the count.								
PART Efficiency and Other Output Measures									
# of systematic analyses/ investigations delivered to customers (systematic analyses/investigations) (VHP)	2	1	3	1	1	75	67	-8	45
Total Actual/Planned Investigation Cost (\$000)		500	1,500		2,000 (est)		TBD	TBD	
Actual/Projected Costs Investigation Delivered (whole dollars)		500	500		1,430		TBD	TBD	
Comments:	2007 Plan, new baseline number of systematic analyses. VHP systematic analyses are scientific publications that are typically produced after years of data collection and analysis, and the rate of release is highly variable from year to year. The estimates for 2007 and 2008 are based on the average rate of release for the last 5 years. The decline in publications in 2008 is due to the level of response to hazardous events necessitated in recent years by the eruption of Mount St. Helens and Augustine.								
# of formal workshops or training provided to customers (instances/issues/events)	4	5	4	4	4	4	4	0	4
Total Actual/Planned Workshop Cost (\$000)		120	120	120	120	120	120	0	120
Actual/Projected Costs Investigation Delivered (whole dollars)		30	30	30	30	30	30	0	30
# of sites (mobile or fixed) monitored for ground deformation to identify volcanic activity (VHP) *metrics impacted by the eruption of Augustine in 2006	85	88	98*	94	125*	125	128	+3	140

Geologic Hazard Assessments

End Outcome Goal: 4.2: Serving Communities: Improve understanding, prediction, and monitoring of natural hazards to inform decisions by civil authorities and the public to plan for, manage, and mitigate the effects of hazard events on people and property									
End Outcome Goal End Outcome Measure / Intermediate or PART Measure / PART Efficiency or other Outcome Measure	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
GPRA End Outcome Measures									
Total Actual/Planned # sites (\$000)		90	300		480	480	93	-387	
Actual/Projected Costs per new site monitored (whole dollars)		30	30		30 (est)				
# of volcanoes for which information supports public safety decisions (PART) (VHP)	Cum 49	+2 (cum 51)	0 (cum 51)	0 (cum 51)	+1 (cum 52)	+1 (cum 52)	+0 (cum 52)	0	1 (cum 53)
Total Actual/Planned # volcanoes (\$000)		2,000	0		500 (est)	500 (est)	0		500 (est)
Actual/Projected Costs per new site monitored (whole dollars)		1,000			500 (est)	500 (est)	0		500 (est)
X% of potentially active volcanoes monitored (x number of 70) (PART) (VHP)	67%	72.9% (51/70)	72.9% (51/70)	72.9% (51/70)	74.3% (52/70)	74.3% (52/70)	74.3% (52/70)	0%	75.7% (53/70)
% of potentially hazardous volcanoes with published hazard assessments (SP) (PART)	61.4%	62.8% (44/70)	64.3% (45/70)	64.3% (45/70)	65.7% (46/70)	65.7% (46/70)	67.1% (47/70)	+4.3%	71.4% (50/70)
# of communities/tribes using DOI science on hazard mitigation, preparedness and avoidance of each hazard management activity (VHP) (PART) (Baseline # is 256 at risk counties)	162	170	190	190	214	214	220	+6	220
Comments:	The revision of the Strategic Plan added Tribal communities to the metric on % of communities. Baseline of 256 counties remains unchanged as Tribes were already incorporated into the count.								
Volcano Monitoring Improvements: X% of full monitoring achieved (BUR)	UNK	48.9% (227/ 464)	48.7% (226/ 464)		49.4% (229/ 464)	49.4% (229/ 464)	50.0% (232/ 464)	+0.6%	53.0% (246/ 464)
Note: The 2007 plan is the performance level based upon a projection of 2007 likely enacted made during the first quarter of 2007. The 2008 plan and 2012 long-term targets build on the 2007 plan. To the extent Congress enacts a 2007 appropriation that is different from the 2007 projection, the 2008 plan and 2012 targets may require revision.									

Activity: Geologic Hazards, Resources and Processes

Subactivity: Geologic Hazard Assessments
Program Component: Landslide Hazards

	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Landslide Hazards Program (\$000)	3,042	3,284	+76	0	3,360	+76
<i>Total FTE</i>	<i>19</i>	<i>20</i>	<i>0</i>	<i>0</i>	<i>20</i>	<i>0</i>

Program Overview

The 2008 budget request for the Landslide Hazards Program is \$3,360,000 and 20 FTE. The USGS proposes no program changes for this program.

The Landslide Hazards Program (LHP) gathers information, conducts research, responds to landslide disasters, and produces scientific reports and other products that can be used by a broadly based user community, including Federal, State, and local governments and the private sector. LHP investigations focus on research to better understand, assess, and monitor the causes and mechanisms of ground failure. Its main goal is to reduce losses from landslides through improved understanding of landslide hazards and application of new strategies for hazard mitigation.

This program supports the Department's Serving Communities strategic goal to improve understanding, prediction, and monitoring of natural hazards to inform decisions by civil authorities and the public to plan for, manage, and mitigate the effects of hazard events on people and property. Two intermediate outcome measures in support of the intermediate outcome of providing information to assist communities in managing risks from natural hazards—the use rate of products, and the response to inquiries—are tracked. Output measures for which targets are established in support of achieving the intermediate outcome goal include the delivery of systematic analyses (risk assessments) to customers and the presentation of formal workshops or training to customers.

Landslide-hazard assessments provide the scientific basis for land-use, emergency management, and loss reduction measures. For example, studies of landslide susceptibility and hazards are providing much needed information to reduce landslide losses in parts of the country that have significant landslide problems including, but not limited to: California, the Pacific Northwest, and the Blue Ridge of the Eastern United States. The USGS cooperates with local partners in California, Colorado, Oregon, and Washington, as well as Federal agencies such as the National Park Service (NPS) and the Forest Service.

Landslide hazard research concentrates on understanding landslide processes, developing and deploying instruments that monitor threatening landslides, and forecasting the onset of

Geologic Hazard Assessments

catastrophic movement of future landslides. Research into processes and forecasting methodologies is conducted on the types of landslides that produce losses in the United States such as landslides related to steep slopes, heavy rains, and vegetation loss due to wildfires.

The USGS deploys near-real-time monitoring systems at sites in California, near Yosemite National Park and in Oregon in Portland and near Newport. These sites provide continuous rainfall and soil-moisture and pore-pressure data needed to understand the mechanisms of landslide occurrence. Such understanding can form the scientific underpinnings for early warning of conditions that may trigger landslides. A landslide early-warning system based on such information will be useful in reducing hazards in landslide-prone areas.

USGS scientists respond to landslide emergencies and disasters nationwide. Federal, State, and local agencies are assisted through landslide site evaluations and recommendations of strategies for reducing on-going and future damages from landslides. When there is sufficient information or knowledge of a particular area, such as in Southern California, LHP provides information on potential hazards. Specifically, if rainfall intensity-duration thresholds for landslide activity have been developed for an area or if landslide-hazard maps have been produced, LHP can issue an advisory. LHP works in conjunction with the National Weather Service (NWS) to issue advisories and press releases regarding the potential for landslide activity. These advisories are provided relatively infrequently.

For foreign disasters, the USGS works with the Agency for International Development's Office of Foreign Disaster Assistance (USAID/OFDA) in responding to appeals for technical assistance from affected countries.

The USGS provides timely information through the National Landslide Information Center (NLIC). The Center communicates with the public and media about on-going emergency responses and provides information to the external user-community through fact sheets, books, reports, and press releases, consistent with the Department's Serving Communities strategic goal to protect lives, resources, and property by providing information to assist communities in managing risks from natural hazards. The NLIC maintains several databases: the Landslide Bibliography (more than 15,000 entries), the International Landslide Experts Roster of about 2,000 entries, and Major Landslide Events of the United States (part of the USGS National Atlas). The NLIC also has real-time measurements from on-going landslide monitoring projects available for viewing via the Internet. These measurements are used to forecast landslide movement or changes in an individual landslide's behavior.

Monitoring can detect early indications of rapid catastrophic movement. Up-to-the-minute or real-time monitoring provides immediate notification of landslide activity, potentially saving lives and property. Continuous information from real-time monitoring also provides a better understanding of landslide behavior for scientists,

Use of Cost and Performance Information

Gathering ABC information at the task level is still under development. After several years of tracking this valuable detailed information, LHP will be better placed to track and analyze important trends in program funding and expenditures, as well as scientific emphases within each program and links to the Department's goals and priorities.

engineers, and public officials. The USGS conducts these efforts in cooperation with other Federal, State, and local agencies, including NPS; Bureau of Land Management (BLM); Federal Highway Administration; California, Washington, Oregon, and Colorado State Departments of Transportation; Colorado Geological Survey; Colorado School of Mines; Oregon Department of Geology and Mineral Industries, and private companies.

As described in the Administration's Program Assessment Rating Tool (PART) review, the Geologic Hazard Assessments Subactivity role is clearly defined and unique from other Federal, State, local, or private entities. The LHP was reviewed in 2003 as part of the Geologic Hazard Assessments Program for the 2005 Budget using the PART, was found to be "moderately effective."

2008 Program Performance

At the 2008 funding level, LHP accomplishments will include the following:

Landslide-Hazard Assessment Activities:

Risk/Hazard Assessments Delivered to Customers — LHP plans to deliver hazard/risk assessments for areas burned by fires in Southern California and neighborhoods in the Portland Metropolitan area. The burned areas in Southern California are highly susceptible to landslides during the winter rainy season, and even small amounts of rain can have disastrous consequences.

Counties or Comparable Jurisdictions that have Adopted Improved Land-Use Plans, Emergency Response Plans or Other Hazard Mitigations Measures — LHP provided susceptibility maps, hazard assessments or emergency warnings to National Forests in southern California and Rocky Mountains, in several National Parks in California and South Dakota, a county in Kentucky, several cities and counties in Oregon, and for burned areas in a multi-county area in southern California. All of these jurisdictions used these products to mitigate against the effects of landslides and debris flows through land-use planning, response planning, and warning systems.

Landslide Monitoring Activities:

Areas for which Models Exist that are Used to Interpret Monitoring Data — LHP will continue to develop rainfall thresholds for Western Oregon in 2008 and areas burned in Southern California.

Landslide Hazards Emergency Response — LHP will continue to respond to landslide emergencies in the United States and internationally and monitor these landslides where necessary. Landslide emergencies will continue to be posted through the Department's Common Alert Protocol to reach the largest audience of land and emergency managers.

Landslide Information Dissemination Activities:

National Landslide Information Center — LHP will continue to respond to inquiries from the public, educators, and public officials on hazard mitigation, preparedness and avoidance strategies for landslide hazards.

Publications for Users of Hazard Information — LHP will continue to educate land-use planners and planning officials using the USGS/American Planning report, "Landslide Hazards and Planning." The USGS will also publish a handbook for non-scientists on landslide hazards through the auspices of the International Landslide Consortium.

Geologic Hazard Assessments

Program Performance Overview

The table below summarizes the performance measures that either relate exclusively to the Landslide Hazards Program or are shared among the USGS programs in Earthquake Hazards, Volcano Hazards, Global Seismographic Network, and Geomagnetism.

End Outcome Goal: 4.2: Serving Communities: Improve understanding, prediction, and monitoring of natural hazards to inform decisions by civil authorities and the public to plan for, manage, and mitigate the effects of hazard events on people and property.									
End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
GPRA End Outcome Measures									
Intermediate Outcome Measures and Bureau and PART Outcome Measures									
Provide information to assist communities in managing risks from natural hazards									
# of areas for which detailed hazard assessments are completed (SP)	UNK	UNK	UNK	1	2	2	2	0	6
<i>Use Rate: Landslides: X% of communities/tribes using DOI science on hazard mitigation, preparedness and avoidance for each hazard management activity (Baseline is 1,800 at risk counties)</i>	3.7%	3.9%	4.4%	4.4%	4.9%	4.9%	5.4%	+0.5%	7.4%
	70/1800	71/1800	80/1800	80/1800	89/1800	89/1800	98/1800		134/1800
Comments:	The revision of the Strategic Plan added Tribal communities to the metric on % of communities; however, baseline of 1,800 counties remains unchanged as Tribes were already incorporated into the count.								
<i>Use Rate: Landslide Hazards: # of responses to inquiries from the public, educators, and public officials to the National Landslide Information Center on hazard mitigation, preparedness and avoidance strategies for landslide hazards (BUR)</i>	1,600	5,200	1,600	1,600	1,600	1,600	1,600	0	1,600
# of systematic analyses/ investigations delivered to customers (LHP)	1	1	1	1	1	15	15	0	13
Comments:	Systematic analyses rebaselined in the 2007 Plan.								
# of formal workshops or training provided to customers (instances/issues/events) (LHP)	3	3	1	2	1	1	1	0	TBD
# of areas or locations for which geophysical models exist that are used to interpret monitoring data (PART) (LHP)	4	4 1/3	4 2/3	4 2/3	5	5	5 1/3	+1/3	6 2/3

End Outcome Goal: 4.2: Serving Communities: Improve understanding, prediction, and monitoring of natural hazards to inform decisions by civil authorities and the public to plan for, manage, and mitigate the effects of hazard events on people and property.									
End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
GPRA End Outcome Measures									
# of communities/tribes using DOI science on hazard mitigation, preparedness and avoidance of each hazard management activity (LHP) (PART) (Baseline is 1,800 counties and parks with moderate to high landslide susceptibility in the U.S. (99-03, 60 adopted measure))	70	71	80	80	89	89	98	+9	134
Comments:	The revision of the Strategic Plan added Tribal communities to the metric on % of communities. Baseline of 1,800 counties remains unchanged as Tribes were already incorporated into the count.								
Note: The 2007 plan is the performance level based upon a projection of 2007 likely enacted made during the first quarter of 2007. The 2008 plan and 2012 long-term targets build on the 2007 plan. To the extent Congress enacts a 2007 appropriation that is different from the 2007 projection, the 2008 plan and 2012 targets may require revision.									

This page intentionally left blank.

Activity: Geologic Hazards, Resources and Processes

Subactivity: Geologic Hazard Assessments
Program Component: Global Seismographic Network

	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Global Seismographic Network (\$000)	3,914	3,949	+62	0	4,011	+62
<i>Total FTE</i>	5	5	0	0	5	0

Program Overview

The 2008 budget request for the Global Seismographic Network Program is \$4,011,000 and 5 FTE. The USGS proposes no program changes for this program.

The Global Seismographic Network (GSN) Program is a global monitoring network providing high-quality seismic data to support earthquake disaster management, hazards assessments, national security (through nuclear test treaty monitoring), loss reduction, and research on earthquake sources and the structure and dynamics of the Earth. The GSN is a joint program between the USGS and the National Science Foundation (NSF), implemented by USGS, the Institute for Geophysics and Planetary Physics (IGPP) of the University of California, and the Incorporated Research Institutions for Seismology (IRIS), a consortium of universities.

Initiated in 1986, the GSN currently consists of 143 stations, installed over two decades by USGS and IGPP. Funds for the purchase and installation of new sites are provided by NSF to IRIS. The USGS is responsible for maintenance and operation, data collection, and quality control of two-thirds of the GSN stations, and IRIS supports the University of California to operate and maintain the other one third. Maintenance is accomplished in cooperation with many international partners who, in most cases, provide facilities to shelter the instruments and personnel to oversee the security and operation of each station. USGS tasks include training station operators; troubleshooting problems; providing major repairs; conducting routine service visits to network stations; providing direct financial aid in support of station operations at those sites lacking a host organization, and ensuring data quality and completeness.

As part of GSN activities, the USGS and IRIS also evaluate, develop, and advance new technologies in sensors, instrument installation, data acquisition, and management. To improve performance, stations with unusually high background noise are relocated to quieter sites or configurations (e.g., burying sensors in boreholes) so that smaller events (earthquakes or explosions) or signals of interest may be detected. The planned lifetime of the completed network is 30 years. However, with proper maintenance and upgrades of data system platform, the GSN can produce data indefinitely, with expanded capabilities.

Geologic Hazard Assessments

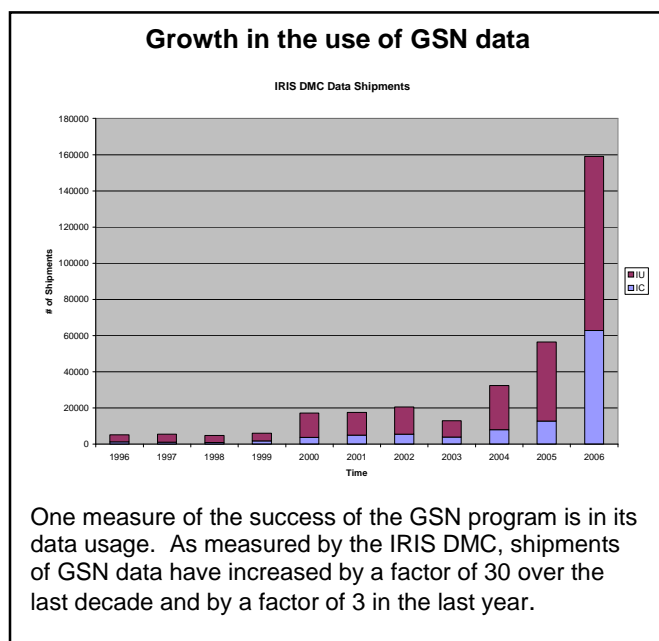
Under a Memorandum of Understanding between the USGS and NSF, the GSN Program is overseen by a "Standing Committee" consisting of external stakeholders and one USGS representative. The GSN Standing Committee typically meets twice a year.

As described in Administration's Program Assessment Rating Tool (PART) review, the USGS role is clearly defined and unique from other Federal, State, local, or private entities. The GSN Program was reviewed in 2003 as part of the Geologic Hazard Programs for the 2005 Budget using the PART. It was found to be "moderately effective." GSN-specific performance measures were established as part of that process.

Data and products derived from this program have multiple and diverse uses. First, this program supports the Department's Serving Communities strategic goal to improve understanding, prediction, and monitoring of natural hazards to inform decisions by civil authorities and the public to plan for, manage, and mitigate the effects of hazard events on people and property. The information provided to end users supports the intermediate outcome goal of providing information to assist communities in managing risks from natural hazards.

GSN real-time data are transmitted continuously to the USGS National Earthquake Information Center (NEIC) in Golden, Colorado, where they are used, with other data, to rapidly determine the locations, depths, magnitudes, and other parameters of earthquakes worldwide. The high quality of GSN data allows them to be used for the rapid determination of the geometric orientation of the fault that caused the earthquake, and provide an estimate of the length of the fault that ruptured during the earthquake.

The rapid availability of earthquake information is critical for first responders and government officials responsible for assessing an earthquake disaster. In the case of significant domestic earthquakes, the USGS and partners provide information to Federal and State emergency management and public safety agencies, operators of transportation facilities, public utilities, and national news media. In the case of potentially damaging events outside of the United States, information from the NEIC is immediately sent to the Department of State, embassies and consulates in the affected region, the Office of Foreign Disaster Assistance, the Red Cross, and the United Nations, as well as national and international news media.



GSN stations provide critical, near-real-time data to NOAA's tsunami warning centers, supporting tsunami monitoring in the Pacific Rim and disaster alerting in all US coastal states and the U.S. territories in the Pacific and Caribbean. In 2006, tsunami alerts were generated from the processing of data from GSN stations for tsunami-generating earthquakes off the coasts of Indonesia (May 17) and Russia's Kuril Islands (November 15). These alerts were transmitted to response agencies by NOAA's Pacific Tsunami Warning Center within minutes of these quakes. For the Pacific Ocean, and now also for the Caribbean Sea and Atlantic and Indian Oceans, NOAA relies on GSN real-time data to trigger analysis of the ocean-bottom sensors that detect tsunami waves.

All GSN data are freely and openly available to anyone via the Internet. Copies of all the data from USGS GSN stations are sent to the IRIS Data Management Center (DMC) in Seattle, Washington, which provides the data to the scientific community. As the distribution point for GSN data to users (such as scientists, engineers, and government agencies) worldwide, the DMC responded to over 150,000 requests for GSN data in 2006. In addition, data from most GSN stations are currently available within hours of large earthquakes to the worldwide user community via the USGS *Live Internet Seismic Server*.

Data from the GSN are also used extensively in basic and applied research on earthquakes, Earth structure, and other geophysical problems. Consequently, GSN data are extensively used in studies conducted and supported by USGS and other agencies like NSF, the U.S. Department of Energy, and the U.S. Air Force. Some of this research and data support national security through the seismic monitoring of nuclear explosions and the improved calibration of nuclear explosion monitoring networks.

Many GSN sites have evolved into geophysical observatories. An extended suite of geophysical instrumentation can make use of GSN logistical and telemetry infrastructure, including GPS, gravimeters, magnetometers, microbarographs, and meteorological sensors. Microbarographs

Expanding Global Communications: In response to the President's Tsunami Warning Initiative, the USGS worked closely with local station operators, Institute for Geophysics and Planetary Physics, NOAA, and the Comprehensive Test Ban Treaty Organization (CTBTO) to enhance the communications capabilities of the GSN. As a result, real-time communication links were established or upgraded at 35 of the total 143 station network during 2005 and 2006. This effort included 21 sites that contribute to the CTBTO, 8 sites with new communication links, and 3 sites with new satellite communication links that provide data directly to NOAA's Pacific Tsunami Warning Center (PTWC).

For example, the installation of a NOAA VSAT (foreground) at Afimalu, Samoa, allows data from the GSN station to flow directly to PTWC. The CTBTO VSAT (background) provides data directly to its facilities but also serves as a redundant backup.



Geologic Hazard Assessments

were installed this year at GSN stations in Peru, Azores, in the southwest Pacific at Western Samoa and Tuvalu, and at the South Pole. The 45 microbarographs installed globally at GSN sites are the largest open data source of its kind. The GSN continues its close cooperation with the GPS community with co-located instrumentation at 43 sites, and shared telemetry infrastructure in Africa, Siberia, and at Easter Island in the Pacific.

Given the high rate of significant earthquakes around the world, the GSN is an important tool in earthquake-related education and outreach. The USGS has worked with IRIS to develop educational museum displays based on data from the GSN. These displays explain the basic concepts of seismology and earthquake occurrence and have proven to be quite popular with the public. Displays are in place at the Smithsonian Institution in Washington, D.C., the American Museum of Natural History in New York, the Carnegie Museum in Pittsburgh, USGS Headquarters, the New Mexico Museum of Natural History in Albuquerque, and the Franklin Institute's traveling "Powers of Nature" exhibit.

2008 Program Performance Estimates

In 2008, the USGS will continue to strive to maintain the GSN at high reliability and low cost. The USGS portion of the GSN has grown from 72 to 85 stations since 1998, soon to be 90 stations. Through the President's Tsunami Warning Initiative, USGS has added GSN-affiliated stations in the Caribbean and increased the number of stations with real-time telemetry over the past two years, providing new capabilities for the network but also increasing operations and maintenance costs, which must be absorbed at fixed funding levels.

Specific goals for 2008 include (1) improve station reliability through more timely maintenance, an expanded inventory of spare parts, replacement of obsolete technologies and standardization of equipment, (2) further the incorporation of the GSN into the Global Earth Observation System of Systems effort and cooperate with IRIS, NSF, and other agencies in continuing to use the GSN as a platform for global geophysical observations, (3) enhance network performance by relocating noisy stations to quieter sites and by the use of new seismometer and installation technologies, and (4) enhance data quality-control operations.

USGS will also participate with partners in the development and testing of new sensor technology. The existing STS-1 seismometers, which are no longer produced, are aging and beginning to fail. A replacement for this seismometer is necessary to support network performance.

GSN Station at Kanton



A much-anticipated highlight for FY07 will be the installation of the GSN station on the atoll of Kanton, Kiribati. This is one of four stations to be installed, but Kanton stands out for its remote location. It is the only inhabited island in the Phoenix Islands, with a 2005 population of 41. Some speculate that Kanton is where Amelia Earhart disappeared in 1937.

There is no electricity or running water and the island is not served by any regular transport. The GSN station and satellite communications equipment will be solar-powered and provided with 100% spares in order to minimize the need for return visits.

The GSN program will continue in 2008 to undertake regular internal and external reviews of its activities. Reviews follow the bureau policy on program review and the requirements for achieving and reporting on bureau performance measures developed in accordance with the Government Performance and Results Act as well as measures identified during the PART process.

In terms of specific metrics, three factors will lead to an expected decrease in the performance of the network in 2008:

- Because of expected increases in fixed costs (mostly due to a Federally negotiated increase in the main GSN support contracts), we anticipate a decrease in contractor support that will, in turn, result in less frequent visits to stations for scheduled and unscheduled maintenance.
- It is expected that aging equipment will also degrade station performance at some sites. Because of the increased fixed costs noted above, limited funds are available to increase stocks of replacements sensors and other critical parts.

Both of these factors will result in an expected lower performance on the metric for data availability. Program managers are seeking ways of reducing dependence on contract-supported station maintenance, but we do not predict significant changes by the 2008 budget year.

Geologic Hazard Assessments

Program Performance Overview

The table below summarizes the performance measures that either relate exclusively to the GSN or are shared among the USGS programs in Earthquake Hazards, Volcano Hazards, Landslide Hazards, and Geomagnetism.

End Outcome Goal: 4.2: Serving Communities: Improve understanding, prediction, and monitoring of natural hazards to inform decisions by civil authorities and the public to plan for, manage, and mitigate the effects of hazard events on people and property.									
End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
GPRA End Outcome Measures									
Intermediate Outcome Measures and Bureau and PART Outcome Measures									
Ensure the quality and relevance of science information and data to support decision making.									
PART Efficiency and Other Output Measures									
% of earthquake monitoring global seismic network stations that have telemetry (increase reporting speed from one hour to 20 minutes)	80%	86%	89%	89%	93%	93%	93%	0	95%
X% data availability for real-time data from the GSN (PART)	90.5	89%	90%	88%	87%	87%	86%	-1%	95%
Data processing and notification costs per unit volume of input data from sensors in monitoring networks (in cost per gigabyte) (PART Eff. Measure)	0.90 \$/k/GB (-1%)	0.79 \$/k/GB	1.42 \$/k/GB	1.30 \$/k/GB	1.33 \$/k/GB	1.33 \$/k/GB	1.33 \$/k/GB	0	TBD
Note: The 2007 plan is the performance level based upon a projection of 2007 likely enacted made during the first quarter of 2007. The 2008 plan and 2012 long-term targets build on the 2007 plan. To the extent Congress enacts a 2007 appropriation that is different from the 2007 projection, the 2008 plan and 2012 targets may require revision.									

Activity: Geologic Hazards, Resources, and Processes

Subactivity: Geologic Hazard Assessments
Program Component: Geomagnetism

	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Geomagnetism Program (\$000)	1,995	2,030	+62	0	2,092	+62
<i>Total FTE</i>	14	14	0	0	14	0

Program Overview

The 2008 budget request for the Geomagnetism Program is \$2,092,000 and 14 FTE. The USGS proposes no program changes for this program.

The mission of the USGS Geomagnetism Program is to monitor the Earth's magnetic field through an array of ground-based magnetic observatories; to provide high temporal resolution records of magnetic field variations covering long timescales; to disseminate magnetic data to various governmental, academic, and private institutions; and to conduct research into the nature of geomagnetic variations for purposes of scientific understanding and hazard mitigation. The program consists of three main elements: (1) Geomagnetic Observatory Operations, (2) Data Transportation, Management, Processing and Dissemination, and (3) Scientific Research. Short-term variations, in particular those occurring during geomagnetic storms, are hazardous to satellites and electrical power distribution systems and make radio communications, navigation, and geophysical surveys difficult. During magnetic storms, astronauts and high-flying aircraft pilots can be exposed to dangerous levels of radiation. The program's magnetometer data are used for diagnosis of near-Earth space-weather conditions by both the National Oceanic and Atmospheric Administration (NOAA) Space Environment Center and the U.S. Air Force, and the program is an integral part of the National Space Weather Program as detailed in its strategic plan.

It is estimated that the annual economic impact of magnetic storms runs into the hundreds of millions of dollars, not to mention the potential impact upon national security. Long-term, secular variation of the field is caused by convection in the Earth's core, resulting in a slow drift in the global-scale structure of the magnetic field. Because many navigational systems use the magnetic field direction as a means of orientation, it is essential to track these long-term changes. Moreover, drilling programs undertaken within the oil industry rely on magnetic orientation, and these can be degraded during magnetic storms, particularly at high latitude. Finally, many historical property boundaries are based on magnetic orientation, and knowledge of the magnetic field is needed to reconstruct or re-establish these boundaries.

This program supports the Department's Serving Communities strategic goal to improve understanding, prediction, and monitoring of natural hazards to inform decisions by civil

Geologic Hazard Assessments

authorities and the public to plan for, manage, and mitigate the effects of hazard events on people and property. Output measures for which targets are established in support of achieving the intermediate outcome goal include the presentation of formal workshops or training to customers and systematic analyses/ investigations delivered to customers.

The program activities support the USGS Geology Strategic Plan (2001–10) goals of conducting geologic hazards assessments for mitigation planning and providing short-term prediction of geologic disasters and rapidly characterizing their effects.

Geomagnetic Observatory Operations — The USGS Geomagnetism Program operates a network of 14 geomagnetic observatories, distributed across the United States and its territories. Data are collected continuously from each observatory by a variety of instruments housed in buildings designed to provide environmental stability and to ensure long-term baseline stability. Each site is visited regularly by either program staff or contract employees to conduct calibrations of the instruments. Data are transmitted in real time to program headquarters in Golden, CO, via a set of satellite linkages. The program is currently working improve the basic infrastructure at each observatory and to improve the temporal resolution of the measurements, by increasing the sampling frequency from 1 minute to 1 second, and to improve data access by installing Internet links to each observatory. By necessity, the network and everything associated with handling the data are technologically elaborate. It consists of many finely tuned components, each of which need to be operated in careful synchronization.

Use of Cost and Performance Information

Cost/performance data are used to prioritize maintenance activities across the 14-observatory geomagnetic monitoring network. In FY 2006, program managers also analyzed operational costs, facility needs, and customer data requirements across the observatory network, identifying cost efficiencies to free funds for other critical program needs.

The Geomagnetism Program partners with the Air Force (AFWA) to ensure adequate monitoring of the geomagnetic field.

All real-time data are used continuously by both NOAA and the US Air Force. Real-time data from Barrow, College, Honolulu, and San Juan are used by Kyoto University, Kyoto World Data Center, and the Japanese National Institute of Information and Communication Technology. Real-time data from Fredericksburg and Sitka are used by the GeoForschungsZentrum of Germany.

Data Processing, Management, and Dissemination — Once the data from the observatories are received in Golden, CO, they are subjected to an initial processing. They are then organized for immediate transmission to both NOAA's Space Environment Center in Boulder, CO, and the U.S. Air Force Weather Agency in Omaha, NE. For longer-term studies, the magnetic data are adjusted using the periodic calibration measurements made at each observatory, making them useful for statistical studies of rapid magnetic field variations and for the purpose of mapping the field on a global scale. These fully calibrated or "definitive" data are published yearly on a CD-ROM in cooperation with foreign national geomagnetism programs working with *Intermagnet* (<http://www.intermagnet.org>). The USGS Geomagnetism Program also distributes data and maps and models of the magnetic field through its Web site (<http://geomag.usgs.gov>), which receives several hundred to a thousand visits from the public per day.

Scientific and Applications Research — USGS Geomagnetism Program staff conduct geomagnetic research to achieve a better understanding of basic geomagnetic processes and their effects on physical and social environments. Recent projects have included the development of a statistical framework for characterizing the long-term secular variation of the magnetic field and studies of the dynamo generating the field within the Earth's core. The

program has recently begun an analysis of the statistics of rapid magnetic field variations with the goal of characterizing them both spatially and temporally so that geomagnetic hazards can be mapped and so that risks can be quantified.

2008 Program Performance

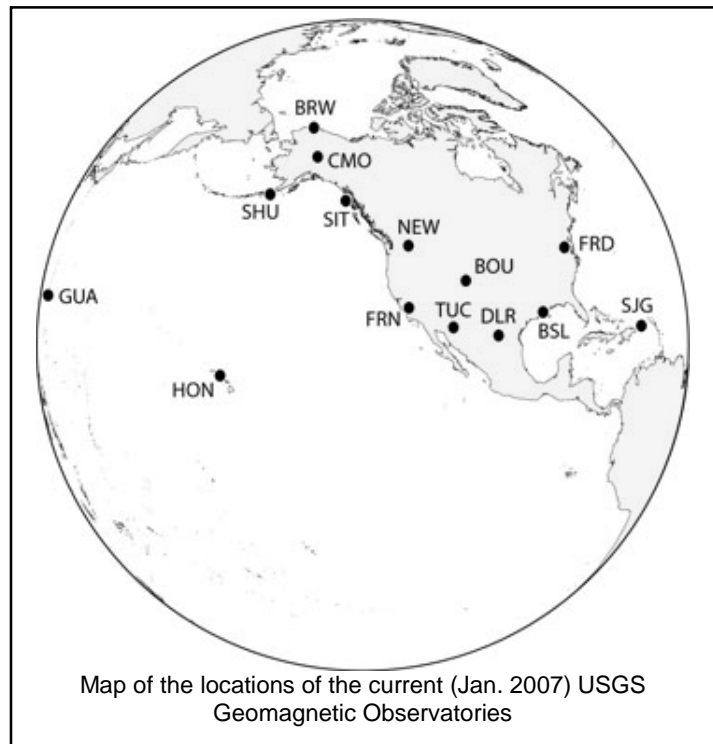
At the 2008 funding level, the Geomagnetism Program accomplishments will include the following:

IAGA Observatory Workshop — The USGS Geomagnetism Program will host the 2008 International Association of Geomagnetism and Aeronomy (IAGA) instrument and observatory operations workshop. This will be the first time the USGS has hosted this important workshop. The workshop is divided into two parts, the first of which is concerned with hands-on, side-by-side instrument comparisons that are important for checking system accuracy and reliability. The second part of the workshop is concerned with data analysis and scientific applications, which are important for ensuring high data quality and promoting a relationship with the data user community. All of this will benefit the Geomagnetism Program by helping to improve operations and increase the profile of the Program. Geomagnetism Program staff are currently working to improve the Boulder observatory so guests can make needed measurements, and possible co-sponsors are being approached as well.

Geomagnetic Observatory Operations — In 2008, the new 1-second acquisition system will be tested, with the aim of preparing for fully operational 1-second acquisition at selected observatories in 2008. Program staff will concentrate on major upgrades at the Barrow Observatory, including repair or replacement of the primary sensor building, installation of the data-acquisition system, and installing Internet links. Work will continue in developing calibration systems at Boulder.

2008 should see the benefit of these efforts, primarily through improved data quality and reduced operational expenses. With the installation of the new data acquisition system at all observatories by the end of 2007, continuous operations and software upgrades should make the network easier to manage. Work on the program's Web site should make dissemination of magnetometer data easier and result in improved profile for the program.

Based on an operational analysis of the costs, facility needs, and user requirements for data from USGS geomagnetic observatories completed in 2006, USGS has decided to close the



Geologic Hazard Assessments

observatory at Del Rio, Texas, in order to make resources available for other observatories and program needs.

Data Processing, Management, and Dissemination — Capacities for managing and disseminating 1-second data should be complete in 2007 and made operational in 2008. Management of magnetotelluric and South Pole data will commence.

Scientific and Applications Research — Work will continue on developing a geomagnetic hazard map in 2008, primarily through statistical analysis of observatory data and through development of a magnetic disturbance index (Dst) service. Simple but operationally useful measures of magnetic activity will be developed for display on the program Web site.

As described in the Administration's Program Assessment Rating Tool (PART) review, the Geomagnetism Program role is clearly defined and unique from other Federal, State, local, or private entities. The Geomagnetism Program was reviewed in 2003 as part of the Geologic Hazard Programs for the 2005 Budget using the PART. These programs were found to be moderately effective.

Program Performance Overview

End Outcome Goal: 4.2: Serving Communities: Improve understanding, prediction, and monitoring of natural hazards to inform decisions by civil authorities and the public to plan for, manage, and mitigate the effects of hazard events on people and property										
End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012	
<i>GPRA End Outcome Measures</i>										
<i>Intermediate Outcome Measures and Bureau and PART Outcome Measures</i>										
Ensure the quality and relevance of science information and data to support decision making.										
PART Efficiency and Other Output Measures										
# of systematic analyses/ investigations delivered to customers (GeoMag) (new measure begins in 2007)	NA	NA	NA	NA	2	2	2	0	2/yr	
# of formal workshops or training provided to customers (instances/issues/events) (GeoMag)	NA	NA	1	1	1	1	1	0	1/yr	
Note: The 2007 plan is the performance level based upon a projection of 2007 likely enacted made during the first quarter of 2007. The 2008 plan and 2012 long-term targets build on the 2007 plan. To the extent Congress enacts a 2007 appropriation that is different from the 2007 projection, the 2008 plan and 2012 targets may require revision.										

This page intentionally left blank.

Activity: Geologic Hazards, Resources and Processes

Subactivity: Geologic Landscape and Coastal Assessments
Program Component: Earth Surface Dynamics

	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Earth Surface Dynamics Program (\$000)	13,354	13,266	+287	0	13,553	+287
<i>Total FTE</i>	<i>78</i>	<i>78</i>	<i>0</i>	<i>0</i>	<i>78</i>	<i>0</i>

Program Overview

The 2008 budget request for the Earth Surface Dynamics Program is \$13,553,000 and 78 FTE. The USGS proposes no program changes for this program.

This program supports the Department's Resource Protection strategic goal to improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment. The goal of the Earth Surface Dynamics Program (ESDP) is to be the primary provider of scientific information on past, present, and future climates and their effects on Earth and human systems to fulfill the mission of the USGS. Understanding of Earth surface processes and climate change impacts is used to provide perspectives for policymakers and support for land and resource managers.

Use of Cost and Performance Information

Gathering ABC information at the task level is still under development for 2008. After several years of tracking this valuable detailed information, ESDP will be better placed to track and analyze important trends in program funding and expenditures, as well as scientific emphases within each program and links to the Department's goals and priorities.

Program goals are achieved through a series of projects in the following main groups that —

- Document the nature of climatic and environmental change and variability, including the distinguishing of human vs. natural change, on timescales ranging from years to millennia,
- Develop a fundamental understanding of interactions between climate, Earth surface processes, and marine and terrestrial ecosystems on timescales ranging from years to millennia,
- Seek to understand impacts of climate change and variability on landscapes and marine and terrestrial systems,
- Model and anticipate the effects of climate change and variability on natural and human systems,

Geologic Landscape and Coastal Assessments

- Provide information on the relative sensitivity, adaptability, and vulnerability of ecosystems, resources, and regions to climatic change and variability to support land and resource management and policy decisions, and
- Enhance the quality and relevance of program activities through collaboration with national and international scientific entities.

ESDP-funded projects support the goals of the U.S. Climate Change Science Program (CCSP) to (1) improve knowledge of the Earth's past and present climate and environment, including its natural variability, (2) improve quantification of the forces bringing about changes in the Earth's climate and related systems, (3) reduce uncertainty in projections of how the Earth's climate and environmental systems may change in the future, (4) understand the sensitivity and adaptability of different natural and managed ecosystems and human systems to climate and related global changes, and (5) explore the uses and identify the limits of evolving knowledge to manage risks and opportunities related to climate variability and change.

Results of scientific activities supported by ESDP are communicated to customers in academia, resource management agencies, and the general public through project reports and peer-reviewed scientific papers, Web sites, databases, and meetings with stakeholders. Metrics of program success include the number of reports and publications, number of people accessing Web sites, and the frequency of meetings with stakeholders.

The ESDP supports research in three principal Earth processes study areas: Global Change and impacts of climate change and variability, Great Lakes geologic mapping, and Priority Ecosystems Studies.

Global Change — (Estimates for FY 2006, \$10.5 million; FY 2007, \$10.5 million; FY 2008, \$10.5 million). The ESDP supports multidisciplinary studies of past environmental and climatic changes (climate and environmental history), process studies that explore the sensitivity of the Earth-surface and associated ecosystems to climate change and variability, and forecasting of potential future changes and their effects on landscapes, land use, and ecosystems (particularly on public lands). The combination of these studies provides integrated long-term perspectives on the effects of climatic changes and variability and on the interactions through time among climatic, geologic, biologic, and human systems on regional and landscape scales. These studies provide information to allow policymakers and land and resource managers to gauge the relative sensitivity of particular ecosystems, resources, and regions to climatic change and variability. Understanding the nature and magnitude of past climate and environmental changes is necessary to provide a baseline against which to identify the effects of humans as agents of environmental change and to provide a long-term perspective on climate variability that can be used in developing plans for ecosystem restoration.

Central Great Lakes Geologic Mapping Coalition Project — (Estimates for FY 2006, \$0.5 million; FY 2007, \$0.5 million; FY 2008, \$0.5 million). This project contributes to ESDP goals of understanding the interrelationships among Earth surface processes, ecological systems, and human activities by documenting, analyzing, and modeling geological and hydrological processes involved in environmental change; as well as providing information on the nature and extent of past climate changes (especially the extent of Pleistocene ice advances in the Midwest).

Priority Ecosystems Studies (PES) — (Estimates for FY 2006, \$2.5 million; FY 2007, \$2.5 million; FY 2008, \$2.5 million). Through PES, ESDP supports interdisciplinary studies of

ecosystems, including studies of the Everglades, San Francisco Bay Delta, Chesapeake Bay, Platte River, and the Mojave Desert to evaluate land-use changes, ecosystem histories, indexes of ecosystem sensitivity to change, and vulnerability to potential stressors in order to devise restoration and adaptive management strategies for land use managers.

Outputs for which targets are set relate to number of gigabytes, number of systematic analyses and investigations, and number of formal workshops or training. These outputs support the intermediate outcome goal of ensuring availability of long-term environmental and natural resource information, data, and systematic analyses needed by land and resource managers for informed decision making.

2008 Program Performance

The program accomplishments described below are examples that demonstrate the utility of scientific publications, reports, and other products that are counted under the output measures "systematic analyses and investigations delivered to customers" and "number of long-term data collections maintained."

Satellite Image Atlas of the World — The ESDP plans to complete the 11 volumes of the Satellite Image Atlas of the World (USGS Professional Paper 1386). This is the culmination of a long-term international project to use Landsat Multispectral Scanner (MSS) images acquired in the mid-1970s to establish a baseline for the areal distribution of the Earth's glaciers. More than 70 U.S. and foreign scientists, from 25 countries, representing 45 different institutions, have collaborated in the preparation of 10 geographic-area chapters and an introductory chapter on State of the Earth's Cryosphere at the Beginning of the 21st Century: Glaciers, Snow Cover, Floating Ice, and Permafrost, the latter with a 1:50,000,000-scale map of the Earth's Dynamic Cryosphere.

Long-term Data Collection Efforts — The ESDP will continue to measure active layer and deep borehole temperatures to monitor changes in Alaskan permafrost and collect and analyze meteorological and wind erosion data from USGS monitoring stations in the Southwest. The program also supports long term paleoenvironmental data sets including the Packrat Midden database on past vegetation composition.

Formal Workshops or Training Provided to Customers — The ESDP will provide at least 6 workshops or training sessions to customers, three of which include —

- **Abrupt Climate Change:** A workshop on climate change priorities and their coordination between ESDP, the Department, and other Federal partners as part of our leadership in the development of 21 Climate Change Science Program (CCSP) Synthesis and Assessment Products, mandated by Congress as part of the U.S. Global Change Research Act. This meeting will be held in Reston, VA, in January 2007.
- **Arctic Paleoclimate:** A workshop focused on developing a better scientific understanding of past, present, and future climate change in the climate sensitive Arctic region. This workshop, supported by ESDP, is being conducted in concert with the Department of the Interior, other Federal partners, and academia as part of our leadership in the development of 21 Climate Change Science Program (CCSP) Synthesis and Assessment Products, mandated by Congress as part of the U.S. Global Change Research Act. This meeting will be held in Denver, CO, some time in the winter of 2007.

Geologic Landscape and Coastal Assessments

- Yukon Basin science workshop: A workshop coordinating the efforts of a Yukon Basin initiative is planned for September, 2007. This collaborative effort will link air, water, and soil and forest information across the Yukon River Basin. A consortium of scientists and stakeholders from USGS, U.S. Fish and Wildlife Service (FWS), National Park Service (NPS), U.S. Forest Service (USFS), and the State of Alaska are expected to participate. Outcomes include a strategy for a new budget initiative for joint activities of the partners for consideration in the 2009 budget cycle.

Systematic Analyses and Investigations Delivered to Customers — The ESDP will deliver 6 systematic analyses focused on achieving the goals of the CCSP. These analyses will include —

- Two (2) Professional papers on glacier change to be included in the *Glacier Atlas of the World* volume.
- A published report on the Climate History of the Arctic as the conclusion of USGS' obligation to CCSP and The Congress for development of the Synthesis and Assessment Product 1.2.
- A published report on Abrupt Climate Change as the conclusion of USGS' obligation to CCSP and The Congress for development of the Synthesis and Assessment Product 3.4.
- A professional paper on the relationship between climate change and plant communities' biodiversity. To be published as the fourth, and final chapter of *Atlas of Relations Between Climatic Parameters and Distributions of Important Trees and Shrubs in North America*.

Databases Maintained (gigabytes annual and cumulative) — The ESDP will accumulate 2.8 gigabytes for a cumulative total of 19.4 gigabytes.

The ESDP completed a new 5-Year Plan covering the period FY 2006–11 in 2006. This plan will be revised to reflect comments received during in the external review of the program to be conducted by the American Association for the Advancement of Science (AAAS) in 2007 with outcomes and actions to be implemented in 2008.

Additional program accomplishments planned include —

- Enhancement of cryospheric monitoring in Alaska's North Slope that will help determine the impacts of climate change on current and near-term permafrost stability, and potential impacts to global warming and loss of infrastructure to communities, Defense, and energy exploration. This work is conducted in cooperation with the Bureau of Land Management (BLM).
- Development of science related to the role of climate change in influencing the carbon budget, hydrologic cycle, and related ecological response within the Yukon Basin of Alaska and adjacent parts of Canada. This work will benefit resource management decisionmakers in the NPS, FWS, BLM, USFS, the Canadian Government, the State of Alaska, and native Alaskan consortiums.
- Investigation of the geohistorical record in the arid southwest, Pacific Northwest, and intermountain regions of Colorado, Utah, and California will help facilitate better

understand long term climate change and variability and its influence on long-term drought throughout the region. This work is highly coordinated with land and resource managers from across the States and Federal government agencies in order to provide them with a concise understanding of past, present, and future drivers of landscape and resource changes so that they may develop more efficient and cost-effective resource management plans, including forest resource plans, reservoir operation plans, and enhanced conjunctive water-use strategies.

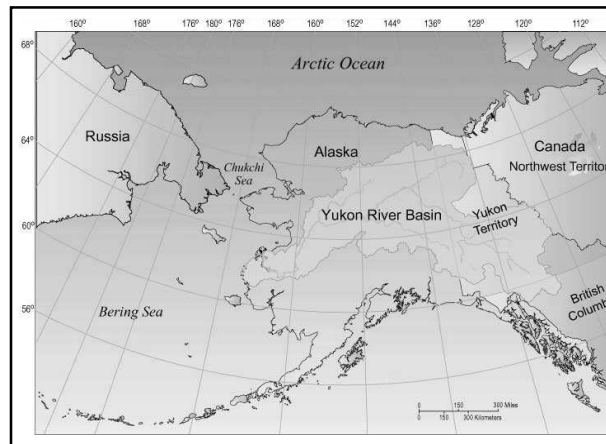
- Study of abrupt climate change events, their mechanisms, and their impact on the Earth and its inhabitants. This work will ultimately provide significant knowledge to managers responsible for developing mitigation and adaptation strategies aimed at coping with climate-related natural hazards, such as abrupt temperature increases ($> 10^{\circ}\text{C}/\text{century}$), floods, strong storms (including Category 5 hurricanes), drought, and sea-level rise.
- Completion of three state-of-the-science Synthesis and Assessment Products, Abrupt Climate Change, Arctic Paleoclimate, and Ecological Thresholds as part of USGS' and the Department's Congressionally mandated obligation for the Climate change Science Program. These products provide an overview of the current knowledge base regarding specific components of global climate change science, and are targeted towards a public and Congressional audience.

Terrestrial and Freshwater Interactions with a Changing Climate in the Yukon River Basin — Climate change is a global phenomenon, but the magnitude of change and the significance of the effects on Federal systems will vary across the globe. Arctic and sub-arctic regions are considered to be particularly sensitive to the effects of climate warming.

Permafrost thawing, and the resulting enhancement of both water infiltration and the decomposition of large stores of frozen organic material, will radically affect northern ecosystems of the Arctic region and the rate at which carbon is exported from those landscapes to the atmosphere, rivers, and the Arctic Ocean.

In particular, this potential permafrost could significantly increase the rate of warming globally. These conditions make arctic and sub arctic ecosystems important areas for deciphering the potential effects of global warming on natural resources. The USGS and the USFS are leading a developing consortium of U.S. and Canadian Federal agencies, university scientists, and tribal organizations in implementing a prototype environmental monitoring and research strategy in the Yukon River Basin. The collaboration will link air, water, soil, and forest information across the Yukon River Basin to track and understand regional changes in carbon flux and storage. International collaboration with Canadian partners in the Yukon River headwaters will be critical to the success of the project. ESDP plans to continue allocation of \$600,000 to the development of a Yukon Basin pilot study for the second year of a 2-year proof-of-concept study.

Climate Change — In 2008, climate change activities will focus on the terrestrial and freshwater interactions with a changing climate in the Yukon River Basin. The USGS and the USFS are leading a consortium of U.S. and Canadian Federal agencies, university scientists,



Geologic Landscape and Coastal Assessments

and Tribal organizations in implementing a prototype environmental monitoring and research strategy in the Yukon River Basin. The collaboration will link air, water, soil, and forest information across the basin to track and understand regional changes in carbon flux and storage.

Great Lakes — In 2008 the USGS and the State geological surveys of Illinois, Indiana, Michigan, and Ohio, will continue a partnership to produce three-dimensional geologic maps of the extensive glacial deposits that blanket the upper Midwest. These maps provide a foundation for making economic and environmental decisions related to ground water balances, land, and other natural resources in the Great Lakes. By pooling their expertise and resources, the five geological surveys can address these issues more effectively than could any one survey working alone.

Priority Ecosystems Studies — In 2008, the ESDP will continue to provide support for PES studies which are described in more detail in the Science on the Landscape section (see the Science on the Landscape section beginning on page F–1). Through PES, ESDP supports interdisciplinary studies of ecosystems, including studies of the Everglades, San Francisco Bay Delta, Chesapeake Bay, Platte River, Yellowstone, and the Mojave Desert to evaluate land-use changes, ecosystem histories, indexes of ecosystem sensitivity to change, and vulnerability to potential climate stressors in order to devise restoration and adaptive management strategies for land use managers.

Program Performance Overview

End Outcome Goal: 1.4: Resource Protection: Improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment									
End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
<i>PART Efficiency and Other Output Measures</i>									
# of annual gigabytes collected (ESD)		2.8	2.8	2.8	2.8	2.8	2.8	0	2.8
# of cumulative gigabytes managed (ESD)		11	13.8	13.8	16.6	16.6	19.4	+2.8	30.6
# of systematic analyses and investigations delivered to customers (ESD)		6	6	6	6	6	6	0	6
# of formal workshops or training provided to customers (instances/issues/events) ESD		6	6	6	6	6	6	0	6
Note: The 2007 plan is the performance level based upon a projection of 2007 likely enacted made during the first quarter of 2007. The 2008 plan and 2012 long-term targets build on the 2007 plan. To the extent Congress enacts a 2007 appropriation that is different from the 2007 projection, the 2008 plan and 2012 targets may require revision.									

This page intentionally left blank.

Activity: Geologic Hazards, Resources and Processes

Subactivity: Geologic Landscape and Coastal Assessments
Program Component: National Cooperative Geologic Mapping Program

	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
National Cooperative Geologic Mapping Program (\$000)	25,113	25,447	+601	0	26,048	+601
<i>Total FTE</i>	<i>133</i>	<i>133</i>	<i>0</i>	<i>0</i>	<i>133</i>	<i>0</i>

Program Overview

The 2008 budget request for the National Cooperative Geologic Mapping Program is \$26,048,000 and 133 FTE. The USGS proposes no program changes for this program.

The National Cooperative Geologic Mapping Program (NCGMP) was created following the passage of the National Geologic Mapping Act of 1992, which was reauthorized in 1997 and 1999 (Public Laws 105–36 and 106–148). In 2007, Congress is due to reauthorize the Act for the third time. The NCGMP is the primary source of multiple-purpose geologic maps that depict the distribution of the Nation's sediment and rocks and the resources they provide. Geologic maps are vital for exploring, developing, and preserving mineral, energy, and water resources; evaluating and planning for land management and environmental protection; reducing losses from natural hazards, including earthquakes, volcanoes, landslides, and other ground failures; mitigating effects of coastal and stream erosion; siting of critical facilities; and planning for basic Earth science research. The NCGMP represents more than a decade of successful cooperation among Federal, State, and university partners in delivering state-of-the-art digital geologic maps to the Nation in a cost-effective, timely manner. Each of these partners has a unique role, yet all work cooperatively to leverage financial resources and to determine the areas of highest priority for new geologic mapping.

This program supports the Department of Interior's Resource Protection strategic goal to improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment.

The mission of the NCGMP is to provide accurate geologic maps and three-dimensional frameworks that contribute to sustaining and improving the quality of life and economic vitality of the Nation and mitigating geologic hazardous events and conditions.

Program priorities are outlined in the National Geologic Mapping Reauthorization Act of 1999 (P.L. 106-148) and in the program's 5-Year Plan for 2006-2010. The NCGMP 5-Year Plan has three goals:

Geologic Landscape and Coastal Assessments

- Goal 1 — Produce high-quality, multi-purpose digital geologic maps and accompanying databases and reports to solve diverse land-use problems in high-priority areas. Develop three-dimensional geologic frameworks that extend into the subsurface for use in a variety of predictive models, such as ground-water flow, seismic shaking, landslide probabilities, landscape change, and ecosystem health. Measures under this goal deal with increasing regional geologic map coverage of the United States, promoting use of geologic maps by the National Park Service (NPS), water resource managers, and in the mitigation of natural hazards, as well as documenting the Systematic Analyses and Investigations delivered to customers.
- Goal 2 — Make geologic map information more accessible to the public by providing geologic maps, reports, and databases in a variety of digital formats. Preserve and make accessible the extensive USGS paleontologic collections and accompanying databases. Measures under this goal document the maps/reports that are made accessible on the internet through the National Geologic Map Database (<http://ngmdb.usgs.gov>), and the information provided to our customers through formal workshops and training.
- Goal 3 — Ensure that the NCGMP will have the capabilities/work force to meet the future needs of the Nation. Measures include documenting how students trained through the EDMAP component of the program use their mapping experience to further their geoscience education and careers.

Use of Cost and Performance Information

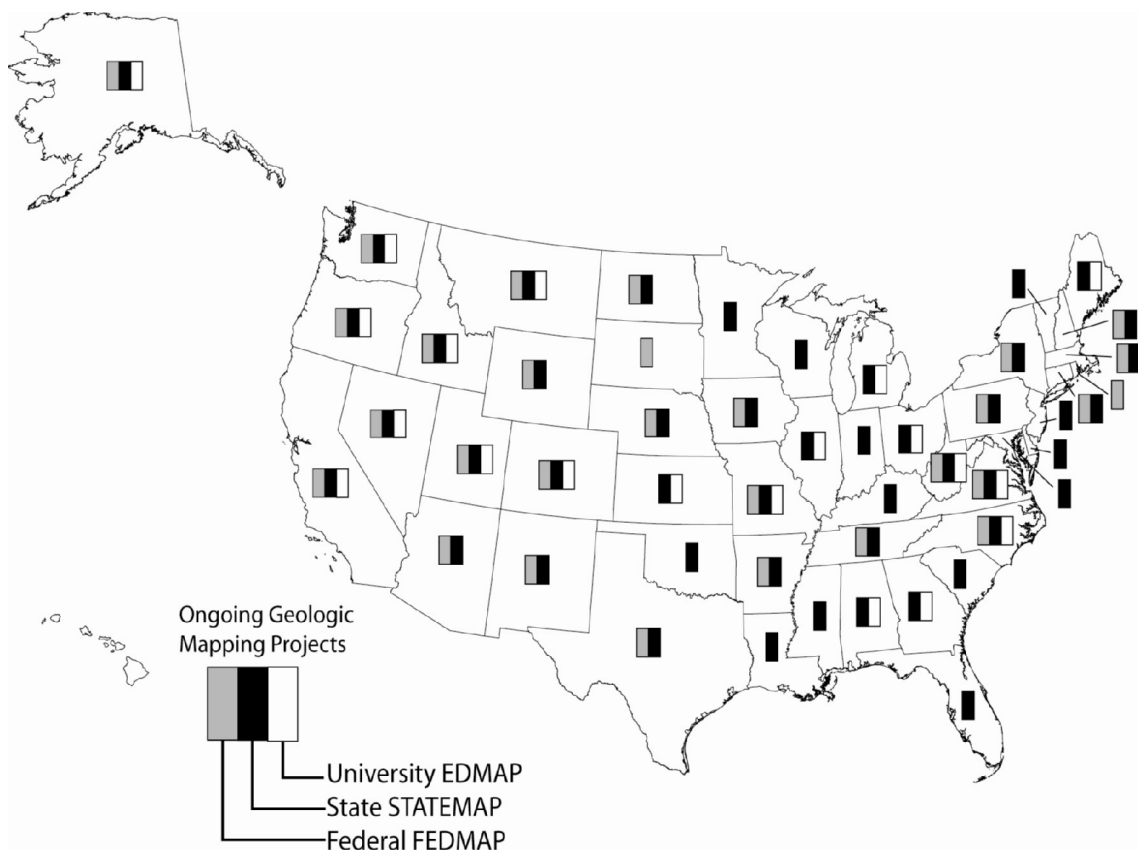
Gathering ABC information at the task level is still under development in the NCGMP. After several years of tracking this valuable detailed information, NCGMP will be better placed to track and analyze important trends in program funding and expenditures, as well as scientific emphases within each program and links to the Department's goals and priorities.

Over the past few years, geologists within the NCGMP have been working to advance and improve the production of geologic maps through the use of new field mapping techniques that streamline the process from data collection to map production. NCGMP has established ambitious targets to make the process even more efficient and will continue to collect quantitative data on the success of these improvements.

The NCGMP priorities are reviewed annually by a congressionally mandated Federal Advisory Committee, which includes representatives from the U.S. Department of Energy (DOE), U.S. Department of Agriculture (USDA), the Office of Science and Technology Policy (OSTP), U.S. Environmental Protection Agency (EPA), State geological surveys, academia, and the private sector. In addition, State Mapping Advisory Committees in 47 States meet each year to prioritize local geologic mapping needs and assist USGS managers in modifying and prioritizing long-range plans. These priorities are based upon customer needs for the maps. In 1987, geologic maps had five primary applications: oil and gas, metals, industrial minerals, ground water, and coal, listed in decreasing order. By 2005, the number of justifications has increased and broadened dramatically, as can be seen in the accompanying figure. Progress and status reports on the NCGMP are prepared for the Secretary of the Interior to deliver to the Committee on Resources of the House of Representatives and the Committee on Energy and Natural Resources of the Senate.

The NCGMP carries out the Mapping Act through three main program components: FEDMAP, STATEMAP, and EDMAP. Each year, panels that include scientists from Federal and State

governments and academia critically review all work plans that are submitted to the three components.



FEDMAP

(Estimates for FY 2006, \$17.55 million; FY 2007, \$17.56 million; FY 2008, \$17.93 million)

The FEDMAP component currently supports, totally or in part, 32 regional geologic mapping and synthesis projects that cross jurisdictional boundaries and (or) involve work on Federal lands. These projects are located primarily within three regional teams of the USGS: Western Earth Surface Processes Team, Central Earth Surface Processes Team, and Eastern Earth Surface Processes Team. However, NCGMP also funds interdisciplinary projects with the Mineral Resources Program, Earthquake Hazards Program, Landslide Hazards Program, and the Ground Water Resources Program. Most of these projects have a lifespan of approximately 5 years. In 2007, studies are being undertaken in 38 States. The program also partially supports a number of geochronology and other common-use laboratories in the Geologic Discipline and the National Geologic Map Database Project (NGMDP), which represents a major cooperative effort with the Association of American State Geologists to serve information about all geologic maps produced in the United States. New and ongoing geologic mapping work plans are evaluated annually by a FEDMAP Review Panel, which includes representatives from State geological surveys, NPS, Fish and Wildlife Service (FWS), USGS Water Resources Discipline (WRD), and USGS scientists with diverse scientific backgrounds.

Geologic Landscape and Coastal Assessments

The NGMDP is an ongoing effort with State geological surveys, universities, the Canadian Geological Survey, and the Consejo de Recursos Minerales, Mexico, to present all geologic mapping data from North America on one Web site and with a common set of map standards. Additionally, users can access information on current geologic mapping activities and the proper use of geologic names. The project's Web site serves more than 40,000 users per month. In 2006, thousands of new bibliographic map records were added to the map catalog, and there was an increased effort to obtain information from State geological surveys.

Through a Science in the Parks effort, the NCGMP is the principal USGS partner coordinating and prioritizing geologic mapping studies with the NPS. This decade-long effort is now an integral component of the FEDMAP program, and the NCGMP is committed to working with NPS well into the future. Projects are developed and selected jointly by the NPS and the USGS to merge the Earth science information needs of individual parks with the geologic mapping mission of the USGS. The resulting geologic data is made available in digital, as well as standard, formats that are needed for NPS land-use management, educational outreach, inventory, and monitoring of natural resources. NCGMP-funded projects also work with other Federal land management agencies (e.g., FWS, Bureau of Land Management (BLM), and the U.S. Forest Service).

STATEMAP

(Estimates for FY 2006, \$7.25 million; FY 2007, \$7.32 million; FY 2008, \$7.52 million)

The STATEMAP component supports geologic mapping studies by 47 State geological surveys through a competitive grant program that matches every Federal dollar with a State dollar. Mapping priorities are determined with the help of State Mapping Advisory Committees in each State, which include representatives from all levels of government, the private sector, academia, and industry. Currently, more than 500 individuals offer their time on these committees to prioritize geologic mapping needs.

EDMAP

(Estimates for FY 2006, \$0.56 million; FY 2007, \$0.57 million; FY 2008, \$0.60 million)

The EDMAP component supports the training of a new generation of geologic mappers in universities and colleges through a competitive matching-fund grant program. Since EDMAP's inception in 1996, more than \$4.8 million from the NCGMP have supported geologic mapping efforts of more than 600 students working with more than 190 professors at 136 universities in 44 states, the District of Columbia, and Puerto Rico. Funds for graduate projects are limited to \$15,000 with undergraduate project funds limited to \$7,500. These funds are used to cover field expenses and map production, but not faculty salaries. The college or university matches the EDMAP funding.

In 2006, the NCGMP continued a career study of EDMAP students that was begun in 2004. Students are sent a questionnaire three years after completion of their EDMAP experience. The results clearly demonstrate that EDMAP students: (1) fall well above the national average for pursuing advanced academic degrees in the geoscience field, (2) easily obtain geoscience positions due to the knowledge gained through the EDMAP experience, and (3) frequently use the geologic mapping skills gained through the EDMAP. In fact, several of our past EDMAP students, now teachers/professors, are applying for EDMAP grants for their students.

The NCGMP was reviewed by the PART in 2005 for the 2007 budget and received a score of 81, "moderately effective." In response to the PART findings for the NCGMP to conduct

"regular, independent reviews of the program," in 2006, the American Association for the Advancement of Science conducted an independent review of NCGMP. In 2007, the program will begin implementation of recommendations from the review.

2008 Program Performance

Important projects that will be completed in 2008, and whose accomplishments will satisfy program GPRA requirements, include (1) regional surficial geologic mapping in the western plains states and the Rocky Mountains, (2) investigation of the ground-water implications of the Chesapeake Bay Impact Crater, (3) comprehensive geologic mapping in the central Colorado urban corridor, (4) understanding how geology influences ground-water availability, movement, and contamination in the western United States, (5) understanding how glacial deposits influence ground-water and aggregate-resource availability, and (6) determining how geology has influenced the topography, water, soils, and plant and animal communities of the Appalachian Blue Ridge Mountains. NCGMP anticipates that approximately 47 State geologic surveys and 40 universities will receive financial support from the program through our grant programs. These projects will produce over 400 new geologic maps and train approximately 60 students.

Geologic Landscape and Coastal Assessments

Program Performance Overview

End Outcome Goal: 1.4: Resource Protection: Improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment									
End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
GPRA End Outcome Measures									
% of targeted science products that are used by partners for land or resource management decision making (SP)	UNK	UNK	UNK	UNK	UNK	≥90%	≥90%	0	≥90%
Intermediate Outcome Measures and Bureau and PART Outcome Measures									
Ensure availability of long-term environmental and natural resource information, data and systematic analyses needed by land and resource managers for informed decision making									
<i>Content and expanse of knowledge base: X% of surface area with temporal and spatial monitoring, research, and assessment/data coverage to meet land use planning and monitoring requirements (X% of U.S. with regional geologic map coverage that is available to customers through the NGMDB (PART)</i>	50.25%	53%	55%	55%	57.5%	57.5%	60.0%	+2.5%	69.0%
Total Projected Square Mile Cost (\$000)					\$18,660,090		\$23,460,090		\$28,260,090
Projected Cost per Square Mile (whole dollars)					\$1,750		\$1,750		\$1,750
X% of geologic investigations in National Park Service (NPS) units that are cited for use by the NPS within three years of delivery (NCGM PART)	UNK	80%	80%	80%	80%	80%	80%	0	80%
X% of EDMAP students that work on subsequent geoscience degrees or obtain a job in a geoscience field (NCGM PART)	95%	94%	95%	95%	95%	95%	95%	0	95%
X% of U.S. with geologic maps that are being integrated into ground-water availability status and trends to support resource management decisions (NCGM PART)	3%	5%	6%	6%	8%	8%	10%	+2%	10%
Comments:	2008 Request reflects program growth. Baselines for new PART measures that link to work done with major program partners, primarily NPS, Ground Water Resources Program and communities that are trying to mitigate against natural hazards.								

National Cooperative Geologic Mapping

End Outcome Goal: 1.4: Resource Protection: Improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment									
End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
GPRA End Outcome Measures									
# of counties or comparable jurisdictions that have adopted hazard mitigation measures based in part on geologic mapping and research (NCGM PART)	UNK	10	12	12	14	14	14	0	19
PART Efficiency and Other Output Measures									
# of annual gigabytes collected (NCGM)	405	110	200	200	200	200	200	0	200
# of cumulative gigabytes managed (NCGM)	840	950	1,150	1,150	1,350	1,350	1,550	+200	2,350
# of systematic analyses and investigations delivered to customers (NCGM)		5	9	9	9	100	98	-2	90
# of formal workshops or training provided to customers (instances/issues/events)	10	10	10	10	10	10	10	0	10
# of hours for fieldwork, compilation, and publication of a typical geologic map (NCGM PART Eff. Measure)	3,160	3,070	2,980	2,980	2,890	2,890	2,810	-90	2,700
# of State Geological Surveys that add geologic map information to the NGMDB (NCGM PART)	47	48	49	49	50	50	51	This measure ends at 51	Measure ended
# of EDMAP students trained each year (NCGM PART)	60	62	60	66	60	60	60	0	60
Total actual/projected cost per student (\$000)			\$7,300		\$7,300	\$7,300	\$7,300		\$7,300
Actual/projected cost per student (whole dollars)			\$473,000		\$473,000	\$473,000	\$473,000		\$473,000
Note: The 2007 plan is the performance level based upon a projection of 2007 likely enacted made during the first quarter of 2007. The 2008 plan and 2012 long-term targets build on the 2007 plan. To the extent Congress enacts a 2007 appropriation that is different from the 2007 projection, the 2008 plan and 2012 targets may require revision.									

This page intentionally left blank.

Activity: Geologic Hazards, Resources and Processes

Subactivity: Geologic Landscape and Coastal Assessments
Program Component: Coastal and Marine Geology

	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Coastal and Marine Geology (\$000)	39,285	39,393	+897	+1,500	41,790	+2,397
<i>Total FTE</i>	217	217	0	+1	218	+1

Summary of 2008 Program Changes for Coastal and Marine Geology Program

Request Component	(\$000)	FTE
• Program Change		
• Ocean Action Plan	+1,500,000	+1
TOTAL Program Changes	+1,500,000	+1

Justification of 2008 Program Changes

The 2008 budget request for the Coastal and Marine Geology Program is \$41,790,000 and 218 FTE, a program change of +\$1,500,000 and + 1 FTE from the 2007 President's Budget.

Ocean Action Plan (+\$1,500,000 and +1 FTE) — Coastal ecosystems are subject to a variety of changes, ranging from extreme events, human activities, and changing ocean and climatic conditions. Understanding the response of natural and constructed landscapes and ecosystems; forecasting the frequency, intensity, and impact of these changes; and providing tools to develop policy and management responses is integral to constructing more resilient structures and communities and protecting the natural environment. Research, detailed seafloor and coastal mapping, and observations will focus on establishing the basis for short-term forecasts and long-term (probabilistic) assessments of coastal vulnerability to extreme events, persistent natural processes, and human influences across the coastal zone. This effort will enhance regional observing systems and models, integrating substantial existing observations and incorporating new observations to address critical regional data gaps. Results from this effort will, for example, inform hazard mitigation and response plans, provide forecasting data to support navigation safety, and assist regional resource managers and public health officials in sustaining ecosystem and public health and promoting hazard resilience.

This effort will conduct sea floor mapping studies and evaluate models to forecast responses to extreme weather events on the coast consistent with the Ocean Research and Priorities Plan. Working with regional alliances, State partners, and existing observing systems the USGS and other Federal agencies will identify critical observational needs, address observational gaps,

Landscape and Coastal Assessments

develop new Geographic Information System (GIS) tools, and identify model development priorities that will lead to improved support for decision-making relevant to those issues of greatest concern to the management community. The USGS will build on established partnerships with National Oceanic and Atmospheric Administration (NOAA) and the U.S. Army Corps of Engineers (USACE) to provide and integrate monitoring and mapping data from existing and enhanced programs to ensure that the observational basis for forecasting is established. USGS leadership in water quality and hydrologic monitoring, ecosystem monitoring, and geologic and landscape mapping of coastal and submerged resources will be integrated with, for example, NOAA tide and water level monitoring and USACE coastal mapping to provide an observational framework for decision-support and modeling. Observational parameters collected by the Regional Coastal Ocean Observing Systems (RCOOS) will be important contributors to this effort. NOAA support for Integrated Ocean and coastal Observing System (IOOS) Regional Associations will contribute to stakeholder engagement and outreach efforts regarding observing needs and the integration of observations into decision support tools. Efforts will build on existing interagency collaborative efforts through the National Map to establish an integrated geospatial framework and the efforts of national and regional ocean observing systems, including the National Water Quality Monitoring Network, to monitor physical processes and ecological responses. Support will be provided, including for external community efforts, to develop inundation and ecosystem modeling to provide critical information for anticipating hazard vulnerability, contaminant and pathogen movement, and ecological and human impacts. The specific focus for model development will result from assessment of existing assets and capabilities and prioritization through engagement with regional partners and management entities.

In 2008 the effort will result, for each of the pilot regions, in an inventory of existing observational programs and an assessment of critical data gaps to be addressed by enhanced mapping and monitoring. For each pilot region a 5-year objective will be developed to provide at least one forecast tool each for future hazard vulnerability (for example, inundation susceptibility) and for ecosystem health (for example, water quality or pathogen tracking models) as well as broader assessments of ecological and public-safety vulnerability to specific aspects of coastal change. The proposed increase (\$1,500,000 to Coastal and Marine Geology Program) will also support ongoing USGS Natural Hazard Initiative efforts on impacts of hurricanes, by building on current USGS activities to improve the science and information base for forecasting and responding to hurricane impacts to this most vulnerable of coastal settings.

Program Performance Change

	2004 Actual	2005 Actual	2006 Actual	2007 CR ¹	2008 Base Budget (2007 PB + Fixed Costs)	2008 Plan	Program Change Accruing in 2008	Program Change Accruing in Outyears
					A	B=A+C	C	D
# of formal workshops or training provided to customers (instances/issues/events) (CMG)	10	10	10	10	10	11	+1	0
Total Actual/Projected Cost (\$000)	\$250	\$250	\$250	\$250	\$250	\$300	+\$50	0

	2004 Actual	2005 Actual	2006 Actual	2007 CR ¹	2008 Base Budget (2007 PB + Fixed Costs)	2008 Plan	Program Change Accruing in 2008	Program Change Accruing in Outyears
					A	B=A+C	C	D
Actual/Projected Cost Per workshop (whole dollars)	\$25	\$25	\$25	\$25	\$25	\$27	\$50	0
<p>¹ The performance and cost data in the 2007 CR column is presented at the 2007 plan level, which is based upon a projection of 2007 likely enacted made during the first quarter of 2007. The 2008 plan builds on the 2007 plan. To the extent Congress enacts a 2007 appropriation that is different from the 2007 projection, the 2008 plan may require revision.</p> <p>Note: Projected costs may not equal program change as these are full costs, which may include funds from other sources and (or) use averages.</p> <p>Column A: The level of performance and costs expected in 2008 at the 2007 President's budget level plus funded fixed costs. Reflects the impact of prior year funding changes, management efficiencies, absorption of prior year fixed costs, and trend impacts, but does not reflect the proposed program change.</p> <p>Column D: Outyear performance beyond 2008 addresses lagging performance — those changes occurring as a result of the program change (not total budget) requested in 2008. It does <u>not</u> include the impact of receiving the program change again in a subsequent outyear.</p>								

Program Overview

The Coastal and Marine Geology Program (CMGP) maintains and applies capabilities in marine geology, geophysics, geochemistry and oceanography to provide information and research products on geologic conditions and processes critical to the management of the Nation's coastal and marine environments. The CMGP addresses a broad suite of national issues in the thematic areas of natural hazards, environmental quality and human health, and natural resources requiring credible and objective scientific data, information, and understanding. As the primary Federal marine geologic research, information, and knowledge provider, the CMGP develops, maintains, and delivers information, technologies, and products that provide Federal, State, and local agencies and the public the authoritative, scientific basis for regulating, managing, and protecting the Nation's coastal and marine resources and communities.

Program objectives spanning the thematic program components include —

- Characterization of geological setting, processes, and change at regional or system scales as required to provide the framework understanding for management and policy in response to a broad range of issues — Framework development and synthesis of geologic information and understanding is the foundation for USGS research activities to understand and model the physical processes that control the status, function, and evolution of coastal and marine systems and the resulting environmental, hazard, and resource implications for human and environmental health, economic growth, public safety, and resource use, protection, and management.
- Development of regional and national hazard, resource and environmental assessments of coastal and marine condition, change and vulnerability to human and natural processes — Regional geological framework development and topical research on geological processes provides the foundation for development of assessment products.
- Development of broadly applicable models of coastal and marine evolution and change — Geologic framework development and process understanding provides the

Landscape and Coastal Assessments

basis for development and evaluation of hindcast and forecast models. Model application to specific issues and settings, expanding the range of relevant applications, is supported by regional information development and targeted process studies.

Overall direction of CMGP activities is established by a 5-Year Plan. The plan reflects internal and external inputs such as the USGS and Department's strategic plans and periodic reviews of the program and program elements by the National Academy of Sciences (NAS). The CMGP is also broadly directed by the objectives of the National Coastal Program Plan (2003) submitted to Congress by the USGS. The overall goals of this program are to (1) provide the scientific information, knowledge, and tools required to ensure that land and resource use decisions, management practices, and future development in the coastal zone and adjacent watersheds can be evaluated with a complete understanding of the effects on coastal ecosystems and communities and (2) provide a full assessment of the vulnerability of coastal and marine ecosystems and communities to natural and human-driven changes.

The CMGP supports the Department's Resource Protection strategic goal to improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment. GPRA goals for project and program outputs, including analyses, models, information resources, and workshops to transfer information and capabilities are established as part of the program planning process and performance is evaluated quarterly and annually.

In pursuit of these goals the CMGP develops and implements national, regional, and topical studies that advance knowledge relevant to national issues. Program activities are developed in response to long-term program objectives, partner needs, and potential to leverage USGS resources with partner resources to effectively meet shared objectives. Leveraging or cost-sharing provides partners access to unique USGS capabilities while enhancing the cost-effectiveness of USGS mission activities.

Historically partners provide 7 to 10 percent of funding for program activities, with significant in-kind contributions additionally provided through collaborative studies developed to respond to critical needs identified by stakeholders. This practice ensures that study products have immediate application while advancing long-term program objectives.

Regional studies are designed to provide essential framework information to Federal, State, and local managers with respect to specific issues/topics as well as providing broadly applicable information products. Topical studies, often implemented within regional efforts, are designed to develop fundamental information that has broad applicability. Synthesis of regional and topical studies provides the basis for national assessments and products. Project work plans submitted to the CMGP are reviewed annually by internal and external scientists and managers knowledgeable in the relevant area of proposed and ongoing work. Reviewers provide guidance that informs program and project directions and implementation.

Use of Cost and Performance Information

Gathering ABC information at the task level is still under development in the Coastal and Marine Geology Program for 2007. After several years of tracking this valuable detailed information, USGS will be better placed to track and analyze important trends in Program funding and expenditures, as well as scientific emphasis within each Program and links to Department's goals and priorities.

The CMGP supports research projects implemented primarily by the Coastal and Marine Geology centers in Woods Hole, MA, St. Petersburg, FL, and Menlo Park and Santa Cruz, CA. Additional resources are provided to other USGS science centers and external cooperators (academic, State) to ensure needed capabilities are effectively provided.

The CMGP was reviewed using the Administration's Program Assessment Rating Tool (PART) process in 2006 and received an initial rating of "moderately effective." Program performance measures were established as part of that process, including output, outcome, and efficiency measures.

The CMGP reports output measures that represent both specific individual technical products (maps, technical reports) and substantial bodies of information and research results under thematic areas of national importance. In 2006 the CMGP met annual output performance targets to provide substantial enhancements to the available scientific knowledge base in the areas of —

- Tsunami and Earthquake Hazards
- Sea-floor and Fisheries Habitats
- Offshore Mineral Resources
- National and Regional Coastal Change Hazards
- Gas Hydrates

These scientific products form the basis for outcome measures which evaluate the use, application, and impact of CMGP products. In 2006 the program assessed external stakeholder valuation of products resulting from major long-term program efforts including —

- Earthquake hazards in Southern California
- Contaminants in New York/New Jersey coastal and marine sediments
- Characterization of Atlantic sea-floor habitats
- Sedimentation and contaminant inputs to Lake Mead and Lake Mojave
- Gas Hydrates research and assessment

For 80 percent of these major program elements stakeholders identified specific applications of CMGP products that informed and improved their decision-making.

Recommendations in 2007 for improvement and follow up action plans address —

- Establishing USGS-wide performance measures for priority coastal activities along with program partners,
- Establishing mechanisms and implementing procedures for engagement of Federal resource management agencies in planning of program activities leading to joint product identification and development supporting program and end-user priorities, and
- Increasing integration of coastal and ocean mapping activities with other agencies and enhancing provision of Federal and Federally-supported coastal and ocean mapping information across Federal and non-Federal agencies

2008 Program Performance

At the 2008 request level, program performance will be maintained at established levels. The topical balance of the program will be largely unchanged. As planned projects end the regional focus of program activities will shift in response to national priorities, stakeholder input and opportunities for partnerships. For example, in 2008, the Tampa Bay Integrated Science Study will be completed and resources will support enhancement of integrated studies of coastal ecosystem change in the Northern Gulf of Mexico begun in 2007. This shift, along with

Landscape and Coastal Assessments

continuing program emphasis on hazard and environmental studies in the mid-Atlantic and Southern California regions, provides a substantial base to initiate the proposed program changes. Program changes (Ocean Action Plan, +\$1,500,000) will have a modest impact on 2008 performance; increasing the number of stakeholder workshops supported. The proposed increase will conduct sea floor mapping studies, evaluate and implement models to forecast responses to extreme weather events on the coast consistent with the Ocean Research and Priorities Plan. Additionally, the program build on the topical and regional elements of the CMGP and will, with the completion of the collaborative 5-year effort proposed, substantially enhance program performance in terms of both outputs and outcomes. The proposed increase, by facilitating engagement in interagency efforts will allow the CMGP to maintain regional diversity in program activities that has been otherwise declining with level base funding.

Program Performance Overview

End Outcome Goal: 1.4: Resource Protection: Improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment									
End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
GPRA End Outcome Measures									
Intermediate Outcome Measures and Bureau and PART Outcome Measures									
Ensure availability of long-term environmental and natural resource information, data and systematic analyses needed by land and resource managers for informed decision making									
% of NPS units for which environmental characterization based on airborne remote sensing is provided as digital GIS products and for which products are cited or use by NPS within 2 years (C&M PART)	UNK	50%	50%	50%	60%	60%	75%	+15%	75%
% of regional and major topical studies for which interpretive and synthesis products are cited by identified partners and users within 3 years of study completion (C&M PART)	60%	80%	80%	80%	80%	80%	80%	0	80%
PART Efficiency and Other Output Measures									
# of annual gigabytes collected CMG			8.0	16.0	8.0	8.0	8.0	0	8.0
# of cumulative gigabytes managed CMG		55.0	63.0	71.0	71.0	79.0	87.0	+8.0	111.0
# of systematic analyses and investigations delivered to customers (C&M)		8	8	8	9	9	9	0	9
# of formal workshops or training provided to customers (instances/issues/events) (CMG)		10	10	10	10	10	11	+1 Ocean Action Plan	10
# of conceptual or numerical models developed (Puget Sound GD)	2	0	0	0	0	0	1	+1	1
# of digital geographic information products for priority National Park Service units that provide environmental characterization based on airborne remote sensing (C&M PART)	3	10	8	8	9	9	10	+1	10

Landscape and Coastal Assessments

End Outcome Goal: 1.4: Resource Protection: Improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment									
End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
GPRA End Outcome Measures									
Fraction of significant landfalling hurricanes (coterminous U.S.) for which post-storm assessments of impact are developed (C&M PART)	4/5	3/3	>=3/4	>=3/4	>=3/4	>=3/4	>=3/4	0	>=3/4
% of open Ocean and Great-Lakes shoreline of coterminous US for which up-to-date characterization of the shoreline is provided (C&M PART)	62%	62%	80%	80%	90%	90%	90%	0	90%
Cost of collection and processing of airborne remote sensing data for coastal characterization and impact assessments (C&M PART Eff Measure)	0.58	0.56	0.55	0.55	0.47	0.47	0.35	-0.12	0.35
# of environmental products in marine protected and managed areas provided for resource management and restoration planning (C&M PART)	40	54	63	63	72	72	75	+3	75
Note: The 2007 plan is the performance level based upon a projection of 2007 likely enacted made during the first quarter of 2007. The 2008 plan and 2012 long-term targets build on the 2007 plan. To the extent Congress enacts a 2007 appropriation that is different from the 2007 projection, the 2008 plan and 2012 targets may require revision.									

Activity: Geologic Hazards, Resources, and Processes

Subactivity: Geologic Resource Assessments
Program Component: Mineral Resources

	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Mineral Resources (\$000)	52,774	30,785	+1,716	-2,614	29,887	-898
<i>Total FTE</i>	<i>384</i>	<i>204</i>	<i>0</i>	<i>-30</i>	<i>174</i>	<i>-30</i>

Summary of 2008 Program Changes for Mineral Resources

Request Component	(\$000)	FTE
• Program Changes		
• Mineral Resources Program	-2,614	-30
TOTAL Program Changes	-2,614	-30

Justification of 2008 Program Changes

The 2008 budget request for the Mineral Resources Program is \$29,887,000 and 174 FTE, a program change of -\$2,614,000 and -30 FTE from the FY 2007 President's Budget.

Mineral Resources (-\$2,614 and -30 FTE) — In the FY 2008 budget, a program change of -\$2,614,000 and -30 FTE (along with an offsetting fixed cost change of +\$1,716,000) is proposed. This proposal is made to provide funding resources for higher priority activities in USGS and the Department of the Interior.

The proposed reduction to the budget for MRP will result in a scaled-back program in 2008 that will complete one site-specific mineral resource project for Federal land management agencies in the lower 48 States, provide regional-scale geologic data and mineral resource assessments in Alaska, collect data on domestic and international production and utilization of 70-80 essential mineral commodities, and manage four national-scale long term databases. The proposed reduction will be addressed in 2008 by:

- Discontinuing research on environmental consequences of mined and unmined mineral deposits,
- Discontinuing research required in preparation for updating the 1995 national assessment of potential for undiscovered mineral deposits in the United States,
- Reducing funding available for managing MRP's digital databases, and

Geologic Resource Assessments

- Reducing the number of mineral commodity reports available for decisions.

The proposed decrease would require that USGS eliminate 30 occupied scientific and technical positions, from nine locations across the United States (Denver, CO; Flagstaff, AZ; Menlo Park, CA; Mounds View, MN; Reno, NV; Reston, VA; Spokane, WA; Seattle, WA; and Tucson, AZ).

The proposed decrease will eliminate one systematic analysis scheduled to be delivered to customers in 2008, and nine more that are underway and scheduled through 2012. Three systematic analyses that are scheduled for delivery in 2009 will be delayed until at least 2011. Starting in 2008, MRP will be able to produce 1-2 systematic analysis per year.

MRP will provide formal two formal workshops or training for customers in 2008 and beyond. The number of mineral commodity and related reports (including materials flow studies) produced annually will be reduced from 700 in 2007 to 650 in 2008 and beyond; the remaining reports will focus on a limited group of commodities for which data are most essential to other Federal agencies, industry, and the public.

Program Performance Change

	2004 Actual	2005 Actual	2006 Actual	2007 President's Budget	2008 Base Budget (2007 + Fixed Costs)	2008 Plan	Program Change Accruing in 2008	Program Change Accruing In Outyears
					A	B=A+C	C	D
# of systematic analyses & investigations delivered to customers (PART)	4	3	6	1	3	2	-1	-9 in the period 2008-2011
Total Actual/Projected Cost (\$000)	17,224	12,000	25,665	12,399*	19,378	18,078**	-1,300	
Actual/Projected Cost Per Analysis (unit in whole dollars)	4,305,909	3,999,663 ‡	4,277,478	12,398,811	6,459,263	9,038,894	***	
Comments	*includes sunk costs of five systematic analyses that would be terminated by proposed FY 2007 program change; **includes sunk costs of one systematic analysis terminated by proposed FY 2008 program change; ***no rational calculation possible here; ‡ the FY 2005 performance tables show this value as \$4.18M, which is the average cost for FY 2004 and FY 2005.							
# of cumulative gigabytes managed	15.420	16.131	16.221	16.3	16.3	16.3	0	0
Total Actual/Projected Cost (\$000)				5,200	5,200	4,486	-714	
Actual/Projected Cost Per Gigabyte (unit in whole dollars)				320,000	320,000	275,215	-44,785	

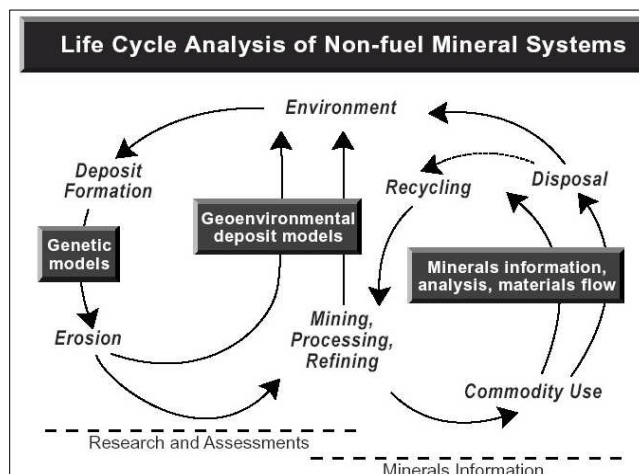
Mineral Resources

	2004 Actual	2005 Actual	2006 Actual	2007 President's Budget	2008 Base Budget (2007 + Fixed Costs)	2008 Plan	Program Change Accruing in 2008	Program Change Accruing In Outyears
					A	B=A+C	C	D
Comments	Decrease required by proposed 2008 program change; although the calculation seems to demonstrate savings (fewer \$ per gigabyte), it actually demonstrates understaffing and deferral of maintenance and other future costs; the number of gigabytes of data MRP makes available to the Nation does not fluctuate to accommodate proposed budget reductions							
# formal workshops or training provided to customers (PART)	8	8	8	3	3	2	-1	
Comments	No cost data are available for this measure.							
# of mineral commodity reports available for decisions	733	746	690	700	720	650	-70	
Total Actual/Projected Cost Per Report (\$000)				9,324	9,324	8,724	-600	
Actual/Projected Cost Per Report (unit in whole dollars)				13,320	13,320	13,422	+102	
Comments:	FY 2006 target was 720.							
% of non-fuel mineral commodities for which up-to-date deposit models are available to support decision making	UNK	UNK	UNK					
Comments	New measure beginning in 2007 (new DOI Strategic Plan). Baseline for measure to be derived in 2007. Neither costs nor goals can be shown because the work was cut in the 2007 President's budget.							
<p>1 The performance and cost data in the 2007 CR column is presented at the 2007 plan level, which is based upon a projection of 2007 likely enacted made during the first quarter of 2007. The 2008 plan builds on the 2007 plan. To the extent Congress enacts a 2007 appropriation that is different from the 2007 projection, the 2008 plan may require revision.</p> <p>Note: Projected costs may not equal program change as these are full costs, which may include funds from other sources and (or) use averages.</p> <p>Column A: The level of performance and costs expected in 2008 at the 2007 President's budget level plus funded fixed costs. Reflects the impact of prior year funding changes, management efficiencies, absorption of prior year fixed costs, and trend impacts, but does not reflect the proposed program change.</p> <p>Column D: Outyear performance beyond 2008 addresses lagging performance — those changes occurring as a result of the program change (not total budget) requested in 2008. It does <u>not</u> include the impact of receiving the program change again in a subsequent outyear.</p>								

Program Overview

Non-Fuel Minerals in U.S. Economy

- The United States is the world's largest user of mineral commodities.
- Processed materials of mineral origin accounted for more than \$542 billion in the U.S. economy in 2006, an increase of 14 percent over 2005.
- U.S. manufacturers and consumers of mineral products depended on other countries for 100 percent of 17 mineral commodities and for more than 50 percent of 45 mineral commodities that are critical to the U.S. economy.
- Current and reliable information about both domestic and international mineral resources and the consequences of their development informs decisions about supply and development of mineral commodities.



Major Program Components

- MRP is the sole Federal provider of scientific information for objective resource assessments and unbiased research results on mineral potential, production, consumption, and environmental effects.
- Life cycle analysis of non-fuel mineral systems (see figure, above) demonstrates the connections between various natural and anthropogenic processes through which minerals are made available to sustain developed societies.
- In its most recent review of the MRP (2003), the National Research Council identified four Federal roles in mineral science and engineering:
 - an unbiased national source of science and information,
 - basic research on mineral resources,
 - advisory, and
 - international (undertaking or supporting international activities that are in the national interest).
- MRP addresses these four roles through work in two functions:
 - a **research and assessment function** that provides information for land planners and decisionmakers about where mineral commodities are known and suspected in the Earth's crust, and
 - a **minerals information function** that collects, analyzes, and disseminates data that describe current production and consumption of about 100 mineral commodities, both domestically and internationally for approximately 180 countries.

- Each function meets the needs of different parts of the community of mineral resource information users, including
 - Federal, State, and local land managers;
 - Federal, State, and international departments and agencies concerned with materials availability, defense, security, the economy, trade, environmental management, human health and safety;
 - private sector companies concerned with materials availability, defense, security, the economy, trade, environmental management, human health and safety; academic institutions;
 - policymakers in the U.S. Congress, and State and local governments; and
 - the general public.
- Together these activities provide information ranging from that required for land planning decisions on specific management units to that required for national and international economic decisions.

Performance, Goals, Outcomes

- MRP is the only USGS program addressing the **non-energy minerals** aspects of the Department's Resource Use strategic goal.
- MRP funds basic and applied research, within USGS and outside, that provides world-class earth science research and data used by policy and decisionmakers, land managers, other Federal and State agencies, the mineral resources industries, foreign governments, nongovernmental organizations, academia, other scientists, and the public. Results of MRP-funded projects completed 2002-2006 are available at <http://minerals.usgs.gov/about/history.html> (USGS projects) and <http://minerals.usgs.gov/mrerp/reports.html> (projects conducted outside USGS, funded by the Mineral Resources External Research Program)
- To clearly measure USGS progress in providing information in the Department's strategic plan for 2003-2008, three outcome measures (average square miles of the United States with non-energy mineral information available to support management decisions; customer satisfaction with information provided to support decisions in non-energy minerals; and percent of studies validated through appropriate peer review or independent review) were identified in partnership with Department and OMB and designed to roll up into the

Use of Cost and Performance Information

MRP was reviewed in 2003 for the 2005 budget using PART and was found to be moderately effective. The most recent PART summary of MRP says that the program has achieved performance targets and made its information products and databases easier to use. MRP continues to focus program activities to support long term land use and policy decisions and to make reports and data more accessible and user friendly.

USGS has ABC data for FY 2004-2006, but only 2006 data provide details required for decision processes because beginning in 2006, data are collected for each task within a project. After several years of collecting at this level, MRP will be able to analyze trends in program funding and expenditures, as well as links to the Department's goals and priorities.

ABC data for 2004-2006 demonstrate that over 88 percent of funds appropriated to MRP are allocated to project work that satisfies key performance measures: average United States square miles with non-energy minerals information, number of systematic analyses delivered to customers, and number of gigabytes of data managed.

Using PART, ABC, and other performance information, such as customer surveys and reviews by the National Research Council, the MRP continues to evolve towards a research- and information-based program that assists others in using the results of USGS research and data collection to meet the needs of land management agencies and a broad spectrum of professional and general users.

Geologic Resource Assessments

intermediate goal of ensuring availability of energy and mineral resource information and systematic analyses needed by land and resource managers for informed decision making.

- In the DOI Strategic Plan for 2007-2012, MRP works toward two measures, still within the Resource Use goal. Together with the Energy Resources Program, MRP addresses the end outcome goal "Improve the understanding of energy and mineral resources to promote responsible use and sustain the Nation's dynamic economy."
- In addition to assessments of the potential for undiscovered mineral deposits, the MRP provides long-term national and regional data on mineral production, use, and recycling to land-management agencies, regulatory agencies, industry, academia, and the public (<http://minerals.usgs.gov/>). MRP statistics and information on the global supply of, demand for, and flow of minerals and materials essential to the U.S. economy, national security, and environmental protection are available on the Web (<http://minerals.usgs.gov/minerals/>).
- Customer satisfaction surveys of use of data from the national mineral resource assessment, minerals databases, and geochemical data sets indicate a total satisfaction score of 86 percent.

Means and Strategies

- Program funding is allocated for projects whose products support goals outlined in the current 5-Year Plan (<http://minerals.usgs.gov/plan/mrp-plan-2006-2010.pdf>); both project activities and funding are adjusted annually as required to accommodate increases or decreases in staffing, fixed costs, and overall availability of funds.
- Prioritization of specific projects is based on five characteristics. Projects that have been retained address these criteria:
 - Deposit types that have highest likelihood of occurring on U.S. Federal lands,
 - Commodities for which current and future supplies are not secure,
 - Commodities for which increased demand is anticipated,
 - Deposit types that have largest economic or environmental impact, and
 - Work on lands where access is not an issue and cooperation from land owners or managers has been secured.
- The Federal Land Policy and Management Act of 1976 requires USGS to "conduct mineral surveys of public lands to support the designation of Wilderness Areas . . . Prior to BLM making any recommendation for the designation of any area as wilderness, the Secretary of Interior shall cause minerals surveys to be conducted by USGS."
- In addition, USGS has significant responsibilities deriving from the Minerals Policy Act of 1970 and the National Materials and Minerals Policy, Research, and Development Act of 1980. The MRP responds to these and other economic and public policy needs of the Nation with both the research and information functions of the program.

2008 Program Performance

Overview

- The 2008 budget request for the Mineral Resources Program is \$29,887,000 and 202 FTE, a program change of -\$2,614,000 and -30 FTE from the 2007 President's Budget.
- All activities funded in 2008 address the key PART finding, requiring MRP to "Target program funds on activities that support long-term land use and economic policy decisions and improve accessibility and application of MRP information."

Research and Assessments Function

- The 2008 budget request for MRP's Research and Assessments function is \$18,576,000, a net change of -\$2,014,000 and -25 FTE from 2007 President's Budget.
- With funds proposed for 2008, this function will conduct the following activities addressing the Department's Resource Use goal for non-energy minerals, meeting performance targets listed in the performance overview:
 - Complete and deliver one systematic analysis on Federal lands in Colorado,
 - Conduct regional-scale geologic data and mineral resource assessments in two areas of Alaska, delivering one systematic analysis to customers,
 - Continue one of three research and development projects, begun in 2007, designed to provide tools required for the scheduled update of the 1995 National Mineral Resource assessment,
 - Manage three national-scale long term databases (geochemistry, geophysics, and mineral deposits), contributing to the increased number of gigabytes of data managed,
 - Provide three formal workshops or training to customers on topics such as understanding the utility of geoscience data for land planning.

MRP will deliver the results of a collaborative effort begun in 2003 in national forests in north-central Colorado, addressing the land manager's need for specific information about potential for discovery of new deposits on or near Federal lands (necessary for planning, particularly in areas affected by urban-wildland interface issues, such as north-central Colorado). This work builds on studies in Idaho and Montana completed in 2004 in collaboration with Forest Service and others, as well as on work to be completed in 2007 (funded by the 2007 Continuing Resolution) in Big Bend National Park, Texas, and on U.S. Bureau of Land Management (BLM) lands in western Colorado.

MRP-funded project work in Alaska meets the needs of a variety of State, Federal, and private sector partners for fundamental geologic, geochemical, geophysical, and mineral resource information for our largest and least-well explored State. Areas studied are selected through public processes involving all stakeholders and results are published as soon as data are verified and peer reviewed. Project work to be completed in the Tintina gold belt of east-central Alaska in 2007 (funded by the 2007 Continuing Resolution) addresses stakeholder needs for basic geologic, geochemical, and geophysical data as well as understandings of the processes by which metals are transported in Arctic environments. Work to be completed in 2008 is in southwestern Alaska; the next study area will be determined through consultation during 2008.

Beginning in 2008, as a part of the Department's new Strategic Plan, MRP has a new performance measure, designed to demonstrate progress towards updating the 1995 National Mineral Resource assessment. This update is currently scheduled to begin in 2011, at the beginning of the next MRP five-year plan, and relies on national-scale geologic, geochemical, geophysical, and mineral deposits data for which a ten-year update project will be completed in 2007. The proposed budget reduction in 2008 will postpone beginning the update of the National Mineral Resource assessment until at least 2014, because limited funding is available for preparation. In 2007 (based on Continuing Resolution) MRP is funding three research and development projects providing data and methods required for this update; the budget reduction proposed for 2008 will require eliminating two of the three after 2007. When the single remaining project supporting this goal is completed (2010), resources can be made available to fund the next block of required research. As projects on other high priority topics are completed in 2009 and 2010, limited resources will become available to meet the remaining research and development need. Current estimates suggest that with the budget remaining for MRP beginning in 2008, all required research and development might be completed by 2014 rather than 2011 at current (2007 CR) funding levels. During 2007 and 2008 MRP will monitor progress and provide baseline data for the new performance measure. This measure is the next step in addressing the PART finding requiring focus of MRP funds on long term land use and economic policy decisions.

Another Agency's view of MRP

In April 2005, USGS received a letter from Max Dodson, Assistant Regional Administrator for EPA Region 8. His letter included this description:

"The USGS Minerals Division has not only been an invaluable source of expert technical support, but has in many cases been the only source for their specific types of expertise. Their value to EPA goes beyond their expertise, however; it is especially enhanced given that USGS maintains an agency goal to remain independent of policy decisions. This allows EPA to tap into nationally and internationally recognized experts that do not hold any agenda beyond that of excellence in science. EPA has found this source of expertise to be extremely rare, not available through any other sources, including universities and/or many contractors..."

It is my hope that EPA may continue its invaluable and indispensable relationship with the USGS Minerals Department in matters at the Libby Asbestos Site and in future projects."

Developing and upgrading of national databases, as well as converting those databases to standard formats, is an ongoing effort and will continue in 2008. Evolving online data delivery tools provide information in digital format to any customer with Internet access; this has been of particular interest to land-management agencies and regional-planning groups. Features of this unique online system include sophisticated data set search options, user viewing of data tables, and downloading of page-sized maps with user control of map data layers, legend, title, and other parameters. The system is available at <http://mrdata.usgs.gov/>.

Data and conclusions from USGS minerals research will continue to be available to users in easily accessible, accurate, and timely products in 2008. Information is disseminated through traditional paper products, in digital form, on the Internet (<http://minerals.usgs.gov/>), through interagency collaborations, and in technical and non-technical public presentations. Other methods through which MRP projects provide timely results for all customers include development of new geophysical and geochemical techniques for mineral-resource studies and the application of mineral-resource expertise and techniques to other societally relevant issues such as mapping earthquake and volcanic hazards, location and evaluation of energy resources, characterization of hydrology, or location of buried ordnance.

The Mineral Resources Data System (MRDS) is a worldwide database of metallic and industrial mineral sites with related geologic, commodity, and deposit information. It currently contains information describing about 115,000 locations; new records are continually being added and existing records updated or upgraded. In 2008 and beyond no new records will be added; work will be limited to updating and upgrading existing records. About 200 data fields are available for each location, permitting storage of such disparate information as location, geology, description of deposit, exploration and development, description of workings, commodities present, production, reserves and resources, and published and unpublished references. The data can be searched and sorted using any of these fields. The data are available on CD-ROM and as part of the MRP's data delivery Web site (see above).

Minerals Information Function

- The 2008 budget request for MRP's Minerals Information function is \$11,282,000, a net change of -\$600,000 and -5 FTE from 2007 President's Budget.
- With funds proposed for 2008, this function will conduct the following activities addressing the Department's Resource Use goal for non-energy minerals, meeting performance targets listed in the performance overview:
 - Collect, analyze, and disseminate timely information and data on domestic supply and availability for 70-80 mineral commodities, in the United States and 180 other countries,
 - Conduct specialized studies of materials flows and recycling, and
 - Deliver about 650 mineral commodity and related reports.

Mineral materials are essential to the U.S. economy and national security. USGS information and data cover the extraction, production, and refining of mineral commodities and some of their products. The Departments of Interior, Defense, and State, Central Intelligence Agency, the Federal Reserve, and private sector companies utilize USGS mineral-related policy analysis in their regional and global analyses. Information on strategic minerals is also provided to the Department of Defense for managing the National Defense Stockpile. Materials flow and recycling analyses are utilized by Federal agencies for domestic and international analyses, as well as by industry, academia, and the public.

USGS mineral commodity specialists provide production and capacity data for the U.S. nonfuel minerals industry to the Federal Reserve Board (FRB). The FRB uses data in USGS minerals information reports to calculate the indexes of industrial production, capacity, and capacity utilization, which are among the most widely followed monthly indicators of the U.S. economy. These capacity indexes and the rates of capacity utilization based upon them are published monthly in FRB's G.17 release, Industrial Production and Capacity Utilization. USGS scientists also provide assistance to FRB economists and policymakers in analyzing mineral industry indicators and trends.

Geologic Resource Assessments

Program Performance Overview									
End Outcome Goal 2.4 Resource Use: Improve the understanding of energy and mineral resources to promote responsible use and sustain the nation's dynamic economy Resource Protection:									
End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
GPRA End Outcome Measures									
% of targeted science products that are used by partners and customers for land or resource management decision making (SP)	UNK	UNK	UNK	UNK	UNK	≥80%	≥80%	0	≥80%
Intermediate Outcome Measures and Bureau and PART Outcome Measures									
Ensure availability of energy and mineral resource information and systematic analyses needed by land and resource managers for informed decision making									
% of targeted non-fuel mineral commodities for which up-to-date deposit models are available to support decision making (SP)	UNK	UNK	UNK	UNK	UNK	Baseline	5%		50%%
<i>Baseline Information:</i> Average square miles of the United States with non-energy mineral information available to support management decisions (PART)	2,401,329	3,097,647	3,332,038	3,318,208	3,346,737	3,346,737	3,346,737	0	3,346,737
Intermediate Outcome Measures and Bureau and PART Outcome Measures									
Ensure the quality and relevance of science information and data to support decision making									
% of studies validated through appropriate peer review or independent review (SP) MRP	100%	100%	100%	100%	100%	100%	100%	0	100%
	(5/5)	(3/3)	(6/6)	(6/6)	(1/1)	(6/6)	(3/3)		(5/5)
% satisfaction with scientific and technical products and assistance for natural resource decision making (SP)	UNK	UNK	UNK	UNK	UNK	≥80%	≥80%	0	≥80%
PART Efficiency and Other Output Measures									
# of systematic analyses & investigations delivered to customers (assessments) (PART)	5	3	6	6	1	6	2	-4	1-2
# of cumulative gigabytes managed	15.420	16.131	16.221	16.221	16.3	16.3	16.3	0	16.3
# of formal workshops or training provided to customers (instances/issues/events) (PART)	8	8	8	8	3	7	2	-5	3
# of mineral commodity reports available for decisions (BUR)	733	746	720	690	700	720	650	-70	600
X% of expected responses for which canvass forms have been converted to electronic format	58%	81%	88%	88%	100%	100%	100%	0	100%

Program Performance Overview									
End Outcome Goal 2.4 Resource Use: Improve the understanding of energy and mineral resources to promote responsible use and sustain the nation's dynamic economy Resource Protection:									
End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
X% of targeted analyses delivered which are cited by identified partners within 3 years after analysis delivered (PART)	80%	87%	≥80%	93%	≥80%	≥80%	≥80%	0	≥80%
Average cost of a systematic analysis or investigation (PART Eff. Measure)	\$4.31M	\$4.18M	\$4.4M	\$4.3M	\$12.4M	\$3.8M	\$9.0M	+\$5.2M	\$6M
Note: The 2007 plan is the performance level based upon a projection of 2007 likely enacted made during the first quarter of 2007. The 2008 plan and 2012 long-term targets build on the 2007 plan. To the extent Congress enacts a 2007 appropriation that is different from the 2007 projection, the 2008 plan and 2012 targets may require revision.									

This page intentionally left blank

Activity: Geologic Hazards, Resources, and Processes

Subactivity: Geologic Resource Assessments
Program Component: Energy Resources

	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Energy Resources (\$000)	23,760	26,131	+668	0	26,799	+668
<i>Total FTE</i>	<i>149</i>	<i>149</i>	<i>0</i>	<i>0</i>	<i>149</i>	<i>0</i>

Program Overview

The 2008 Budget Request for the Energy Resources Program is \$26,799,000 and 149 FTE. The USGS proposes no Program changes for this Program.

The Nation faces simultaneous challenges from an increasing need for energy resources, a growing dependence on imported oil resources, and growing demands to minimize environmental effects associated with energy resource development and utilization. The USGS Energy Resources Program (ERP) addresses these challenges by conducting research to better understand the fundamental processes that lead to the formation and accumulation of energy resources (oil, natural gas, coal, and others such as geothermal) and the environmental and human health effects of energy resource usage. ERP scientists use the results of these geoscientific studies to evaluate energy resource accumulation and distribution and to assess the energy resource potential of the Nation and the world (exclusive of U.S. Federal offshore waters). The ERP conveys results from these studies to land and resource managers and policymakers in support of the Department's strategic goal of managing resources to enhance public benefit, promote responsible use, and ensure optimal value. Collectively, this information is used to plan for a secure energy future and to allow for the strategic use and evaluation of resources. Major consumers of ERP products are the Department's land and resource management bureaus, other land management agencies such as the U.S. Forest Service (USFS), Federal environmental and national security agencies, policymakers and other Congressional offices, State geological surveys, the energy industry, the environmental community, the international energy community, academia, and the public.

As described in the Administration's Program Assessment Rating Tool (PART) review, the ERP role is clearly defined and unique from other Federal, State, local, or private entities. The ERP was reviewed in FY 2003 as an independent, stand-alone program, and received a PART score of 84. The PART findings indicate that the ERP generates and provides objective, science-based energy information essential for: shaping policies regarding domestic and foreign energy resources, making sound decisions regarding Federal land and resource use, and maintaining a healthy domestic energy industry. The information ERP produces can be used to determine both current and future resource options.

To clearly measure progress in providing information essential to its customers, ERP tracks four intermediate outcome measures associated with producing baseline information about oil and gas assessments for targeted basins, and the quality, content, and satisfaction with the data provided. Outputs associated with these intermediate outcome measures include the delivery of systematic investigations and analyses to customers, the maintenance and growth of 3 long-term data collections, and the provision of formal workshops or training to customers. The number of ERP long-term data collections currently maintained remains the same and consists of (1) the National Coal Resources Data System, (2) the National Energy Research Seismic Library, and (3) the Organic Geochemical Database. ERP now counts the number of gigabytes in these databases as a measure of growth. The number of gigabytes is not comparable among databases, as they contain very different types of data. However, the number of gigabytes in each is expected to grow as the databases grow in their utility. In 2006, the ERP developed a framework to expand the Organic Geochemical Database, enabling the incorporation of analytical results from the Energy Analytical Laboratory (EAL). The EAL is responsible for the analyses of major, minor and trace elements in coal, overburden, water, and related samples from all the coal regions in the United States and major coal provinces around the world. In 2007, this framework will be implemented, enabling the integration of inorganic analyses from the EAL with organic geochemical data to provide customers, stakeholders, and the general public with ready access to a unique and comprehensive suite of geochemical data, and further extend the utility of this long-term data collection. As part of a continuing effort to demonstrate government accountability and improve performance, the ERP will continue in 2007 an external audit and review process of the Organic Geochemical Laboratory.

In addition, as indicated in the PART review, the ERP will gather information regarding the customer citation of select ERP products within a 3-year time period following product delivery, and will expand the number of ERP products released in digital format to the public. In 2006, for the first time in the Energy Program's history, a single, unified, and integrated website representing the broad range of Energy Program research activities, products, and capabilities was made available to the Public. The site has a consistent look and feel across the diverse research areas, simplified navigation, and increased functionality to discover, access, and download science information by geography (region), product type, or commodity. Further, the ERP continues to follow up on recommended actions from the ERP PART. The ERP 2007 PART Improvement Plan consists of these follow-up actions and associated milestones:

- Implementation of redesigned Energy resources Web site to ensure it meets user needs: measure the anticipated increased usage of the ERP Web site (primarily by an increase in page visits); solicit user satisfaction by using a variety of passive and active methods including gathering information submitted by users to an online feedback form and a questionnaire directed to ERP Web site newsletter subscribers; and, expand Web site content including information, services, data and publication access by 20 percent during the 2007.
- Monitoring of actual performance against performance measures and goals in the new 5-year plan, focusing on goals 3 (gas hydrates) and 7 (partnerships): work with Minerals Management Service (MMS) to develop a methodology for in-place gas hydrate resources in the Outer Continental Shelf; and, work with MMS to develop a methodology for technically recoverable gas hydrate resources in the Outer Continental Shelf.

Energy Policy Act of 2005 Implementation — The Energy Policy Act of 2005 calls for several major activities for which USGS science is a critical component. The Act focuses on the use of

all energy sources, with an emphasis on assessment of geothermal resources and alternative energy sources such as gas hydrates and oil shale. Further, the Act calls for creation of the Preservation of Geological and Geophysical Data Program to rescue, curate, and preserve materials and data related to energy and minerals. The Act also reauthorizes the Energy Policy and Conservation Act Amendments of 2000 (EPCA), in which the USGS assesses the oil and gas resources underlying Federal lands in the United States. Detailed descriptions of these activities are given in the following sections. All of these activities support the Department of Interior's End Outcome Goal to Manage or Influence resource use to enhance public benefit, promote responsible use, and ensure optimal value – Energy and is responsive to the Secretary's priorities to support increased production that is environmentally responsible.

National Oil and Gas Resources

(Estimates for FY 2006, \$12.8 million; FY 2007, \$14.0 million; FY 2008, \$14.0 million)

The 1995 USGS National Oil and Gas Assessment concluded that there was a low probability that many more large oil accumulations would be discovered in the onshore areas and State waters of the United States. Instead, the Nation's future energy supplies will come from a mix of domestic natural gas deposits, existing domestic oil and gas fields, and from imports. The combination of the 1990 Clean Air Act Amendments, concern about greenhouse gas emissions to the atmosphere, and the re-enactment of the Energy Policy and Conservation Act (EPCA) Amendments of 2000 have collectively introduced a sense of urgency in the effort to identify the Nation's remaining deposits of natural gas. This need was re-emphasized with the passage of the Energy Policy Act of 2005. Research started in 2000 is continuing to focus on regions of the Nation that have high potential for future natural gas production, including coalbed gas; those areas that have oil and gas resources under public lands; and on the scientific challenge of improving the accuracy of natural gas resource assessments.

Use of Cost and Performance Information

Gathering ABC information at the task level is still under development for 2007 and 2008. After several years of tracking this valuable detailed information, USGS will be better placed to track and analyze important trends in Program funding and expenditures, as well as scientific emphases within each Program and links to the Department's goals and priorities.

The USGS ERP is estimating the volume of oil and gas resources that underlie Federal lands. This scientific inventory of oil and gas resources on Federal lands is mandated by the EPCA Amendments of 2000 (P.L. 106-469 §604) and forms the basis for the periodic report to Congress required by the Act. The EPCA legislation was reauthorized with the passage of the Energy Policy Act of 2005, Public Law 109-58. In 2006, ERP contributed the following basins to the EPCA inventory: Wind River Basin, Hanna, Laramie, Shirley Basins, and the Eastern Oregon and Washington province. The second phase of the Energy Policy and Conservation Act Amendments of 2000 (EPCA) inventory, "Scientific Inventory of Onshore Federal Lands' Oil and Gas Resources and Reserves and the Extent and Nature of Restrictions or Impediments to their Development," was delivered to Congress and released to the public in November 2006 (FY 2007). This document presented a comprehensive review of Federal oil and gas resources in eleven basins in the United States and constraints on their development.

The USGS will continue to update its oil and gas resource assessments for the United States and the world using a consistent, peer-reviewed methodology as authorized in the Energy Policy Act of 2005 (P.L. 109-58 §364).

During 2007, the following oil and gas resource assessments will be completed: the Sacramento Basin, Illinois Basin, and Gulf Coast Tertiary section. In 2007, work will begin on the following

Geologic Resource Assessments

assessment provinces: Williston Basin (including the Bakken Formation), Arkoma Basin, the Cook Inlet, and research into unconventional petroleum systems will continue.

In 2008, the USGS will complete assessments of the Permian Basin, Big Horn Basin, Bakken Formation of the Williston Basin, Southern Afghanistan, and West Greenland.

Alaska — The North Slope of Alaska is thought to have the greatest remaining petroleum resource potential of any onshore area in the United States. The USGS is conducting an intensive examination of Alaska's geology and petroleum potential with current research focused on: synthesizing conventional oil and gas resources information for the entire North Slope of Alaska, including the National Petroleum Reserve, Alaska (NPRA), Arctic National Wildlife Refuge (ANWR)-1002 area, and the central portion of the North Slope; and, gathering the geologic information necessary to assess the nonconventional and unconventional resources of the North Slope, including heavy oil, coalbed methane, and gas hydrates. Unconventional resources on the North Slope probably occur in great abundance, but relatively little is known about them. For example, coalbed gas now accounts for approximately 10 percent of the natural gas production in the United States, yet much remains to be studied about this important energy source. In 2006, USGS scientists completed an assessment of undiscovered coalbed gas resources on the North Slope of Alaska. This study represents the first detailed assessment by the USGS of undiscovered coalbed gas resources beneath the North Slope.

During 2007, aggregation of assessment results from ANWR, NPRA, and Central North Slope, and the area west of NPRA will be completed and estimates of undiscovered, technically recoverable petroleum resources for the entire northern Alaska province will be released.

The USGS ERP continues to support preservation of irreplaceable legacy digital and hardcopy data from the North Slope of Alaska and to provide government, industry, academic, and public institutions the ability to query and download NPRA data directly from the Internet. Similar efforts continue on a national scale to archive approximately 80,000 miles of seismic data and other data sets that currently reside on 9-track and 21-track magnetic tape. These data will be indexed in a geographic information system to allow ease of access and retrieval.

Gas Hydrates — Gas hydrate is a crystalline solid formed of water and natural gas (usually methane) and is potentially one of the most important energy resources for the future. Gas hydrate looks much like ice, but contains abundant amounts of methane in a solid form. Gas hydrates are known to exist in huge quantities in marine sediments several hundred meters below the sea floor and are also found in association with permafrost in the Arctic. However, the precise magnitude and producibility of an accumulation at a given site remains very much in question. Future contributions from gas hydrate to world energy supplies depend on these issues pertaining to the availability, producibility, and cost of extracting methane from the hydrate phase. To date, few surveys dedicated to producing hydrate deposits have been conducted, and better methods to identify and survey gas hydrates, especially the high-concentration zones, need to be developed. The USGS has state-of-the-art laboratories studying the nature of gas hydrates and has made important strides in improving the general knowledge of gas hydrates.

The USGS ERP participates in several international consortia composed of research, industry, and academic institutions. One of these is the Mallik Research Consortium. This group drilled three test wells in the Mackenzie Delta in 2002, the results of which were published in 2005. This work demonstrated that gas hydrates are a producible energy source, but further research

must be undertaken to translate these results into technically recoverable resource estimates for gas hydrates. Results from the Mallik test well support ERP cooperative research efforts on gas hydrate recoverability on the North Slope of Alaska and in other international consortia efforts. ERP also works closely with the Indian Directorate General of Hydrocarbons (DGH) in an effort to study, characterize, and explore for hydrates off the coast of India. During the summer of 2006, the USGS provided scientific and technical expertise and training to key U.S. and international research collaborators and stakeholders, and led a scientific effort funded by the DGH to explore for and drill gas hydrate occurrences at 21 sites in offshore India. An unprecedented number of pressurized hydrate cores and other subsurface data were obtained from this effort. In 2007 and 2008, characterization of these data, as well as examination of 3-D seismic data, will be conducted for future, more detailed study of offshore gas hydrates. The ultimate goal, depending on the results of the current studies, will be a gas hydrate production test in Indian waters.

In 2007 and 2008, efforts will continue to assess the recoverability and production characteristics of permafrost-associated natural gas hydrates and associated free-gas accumulations in the Prudhoe Bay-Kuparuk River area on the North Slope of Alaska. The objective is to examine the resource potential of two known gas hydrate/free-gas accumulations (Eileen and Tarn) in the Prudhoe Bay-Kuparuk River area; and drill and test a viable gas-hydrate/free-gas prospect. This effort is a cost-shared study between the Department of Energy (DOE) and the USGS. Technical support and data access are being supplied by industry and academic cooperators on the North Slope.

In addition, the USGS ERP is assessing the recoverability, resource potential, environmental effects, and production characteristics of Alaskan permafrost-associated natural gas hydrates in cooperation with Bureau of Land Management (BLM) and the State of Alaska. The primary goal of the research effort is to lay the groundwork for an assessment of the recoverability and potential production characteristics of onshore natural gas hydrates and associated free-gas accumulations on the Alaska North Slope. This work builds on the efforts (described above) addressing the known gas hydrate accumulations overlying the Prudhoe Bay and Kuparuk River oil fields, and provides the basis from which to assess the occurrence of gas hydrate accumulations on unexplored State and Federal managed lands. USGS cooperators (BLM and Alaska DGGS) in this effort are responsible for oil and gas development that takes place on Alaskan and Federal public lands, as well as for most pipeline right-of-ways. The basic and applied research that the USGS produces through this cooperative study will provide the BLM and the Alaska DNR with the knowledge of where potential gas hydrate development may take place. In 2008, the USGS will produce the estimate of technically recoverable resources of the North Slope of Alaska. This work builds on cooperative efforts between USGS and MMS in creating a methodology to assess the in-place and technically recoverable resources of gas hydrates in the Outer Continental Shelf of the United States.

Gulf Coast Region — The Gulf Coast region is one of the major hydrocarbon-producing areas of the world. As such, the USGS ERP is conducting investigations—using seismic, well, and geochemical data—into the geologic framework of this region. This effort will provide the geologic, geophysical, and geochemical framework studies necessary to evaluate the oil-, gas-, and coal-bearing rocks of Texas, Louisiana, Mississippi, and Alabama that have the greatest potential for future oil, gas, and coalbed methane production. A better understanding of the stratigraphic, structural, and biostratigraphic framework and petroleum systems will enable USGS scientists to: (1) better assess the potential for undiscovered petroleum resources; and, (2) define potential onshore extensions of plays identified by the MMS for offshore Federal resources. Current cooperative efforts with industry, the State Geological Surveys and the

Geologic Resource Assessments

MMS will continue to improve data quality and availability. During 2007, project staff will assess the undiscovered resource estimates of the Tertiary formations and Cretaceous coal bed gas.

Coalbed Methane — USGS geologists are investigating the potential coalbed methane (CBM) resources around the country, including southernmost Texas and north-central Louisiana, the PRB, Alaska, and other areas.

The USGS and the BLM have an ongoing cooperative agreement in the PRB under which the USGS, in the course of its national geologic studies, produces coal reservoir maps, stratigraphic cross sections, reservoir gas drainage maps, charts of coal reservoir characteristics, graphs of chemical and isotope composition of co-produced water, gas content charts, and estimates of CBM resources. Maps and data are conveyed in digital format; other products include interpretive reports and oral presentations. These data and interpretations are used directly by BLM land managers, as well as gas operators and pipeline companies who are exploring and developing CBM resources. This information also enables land managers to moderate disputes between coal miners and gas operators. These data are also used by BLM, the Bureau of Indian Affairs (BIA), and several tribes for land use management plans to forecast both the minimum number of wells necessary to produce a given volume of gas, and the anticipated effect of water extraction during field development on the surficial environment. The information helps BLM, BIA, and Native groups identify areas on Federal and Native land leases where the gas resource is being drained by wells on State or private lands, consistent with the DOI strategic goal to manage resources to enhance public benefit, promote responsible use, and ensure optimal value.

Origin and Controls on Microbial Gas Accumulations — Natural gas generated from microbial activity involving organic deposits (coal, black shale, petroleum) represents an increasingly important natural resource. Until recently, producers tended to ignore microbially derived natural gas deposits because they were considered too small to be economic; however the development in the PRB changed that perception. It is estimated that natural gas from microbial activity (methanogenesis) accounts for about 20 percent of the world's natural gas resource. Since this gas is biologically produced, it also represents a possible renewable resource. Examples of microbially produced natural gas deposits include the organic-rich Antrim shale deposits in northern Michigan and large portions of the PRB coal in Wyoming.

Although a considerable body of research exists on the biology of methanogenesis, there is much less known about the microbially mediated conversion of materials such as coal to methane. Preliminary studies by USGS and others have shown that coal gas in many parts of the United States is generated from microbial methanogenesis. In 2008, the USGS will continue to conduct field and laboratory studies to better define the processes and organisms involved in microbial production of methane from these materials, focusing especially on samples from the Powder River Basin (PRB).

Continuous Resources — Continuous gas accumulations generally consist of large, single fields having spatial dimensions equal to or exceeding those of conventional plays, and, in contrast to conventional gas fields, cannot be represented in terms of discrete units delineated by downdip hydrocarbon-water contacts. Estimates show that the largest remaining undiscovered domestic resource occurs in what USGS scientists term "continuous" gas accumulations, e.g., coalbed methane and basin-centered gas from low-permeability geologic units such as 'tight gas sands' and shale-gas reservoirs. (Note: Others use the term 'unconventional' when referring to these resources; however, because these resources can be developed with currently available technology and practices, the USGS employs a narrower

definition for unconventional resources, e.g., referring to truly frontier energy resources such as gas hydrates.) Understanding continuous gas resources – the fastest growing resource produced in the United States – is therefore critical, both in terms of the responsible use of this energy resource as well as the sustainability of the domestic energy supply. This work focuses on the identification of the controls on continuous-unconventional gas accumulations, the role of gas-generation processes, and the characteristics of petroleum and associated water in these basins. The goal is to develop a sound understanding of the evolution of present-day hydrocarbon accumulations, many of which are currently being produced, but with difficulty, because little is understood about these resources.

Reserve Growth — The USGS ERP has an important role in understanding and assessing petroleum resources, both domestically and internationally. Potential additions to reserves from these resources are from the discovery of new accumulations and reserve growth of discovered fields. Approximately half of the world's potential additions to reserves are estimated to come from reserve growth. Because of the significant volumes of petroleum resources involved, the estimation of reserve growth is an integral part of USGS assessments. Because of the importance of reserve growth in accurately estimating resources, the ERP has a research activity focused on reserve growth to establish procedures to assess reserve growth by modifying new and existing methods and developing a strategy for assessing reserve growth that is peer reviewed before implemented. In 2006, all reserve growth methods were evaluated and full feedback from the peer review is expected in 2007. Activities in 2007 and 2008 will focus on finalizing a reserve growth methodology, publishing that methodology, and providing estimates of reserve growth for selected geologic and geographic regions.

Oil Shale Resources

(Estimates for FY 2006, \$ 0.0 million; FY 2007, \$0.0 million [\$500,000, see below]; FY 2008 \$0.0 million)

Published assessments are nearly 20 years old and need to be updated in order to understand the potential of oil shales to contribute to the U.S. energy mix. In addition, previous studies did not include an evaluation of the presence or absence of minerals such as halite, nahcolite, or trona. Halite, in some cases occurring in significant quantities in oil shale, may require special handling. Nahcolite and trona are valuable resources presently being mined on their own, but the presence of these minerals in oil shale can affect the extraction of oil from oil shale, as these minerals decompose when heated. Within this new ERP effort, new methods to assay oil shale will be examined. The Fischer assay method, which has been used to assess oil shale for more than 50 years, is no longer endorsed by the American Chemical Society. Concerns over this methodology include the fact that not all gases generated in the process are measured, and these gases can be valuable byproducts, and the Fischer assay method may not indicate the maximum amount of oil that can be produced by a given oil shale. Start of this effort is dependent upon a 2007 budget enactment of the 2007 Presidents budget, House mark and Senate mark for \$500,000. The plan is to have an assessment of the Greater Green River oil shale resources completed two years after receipt of funding.

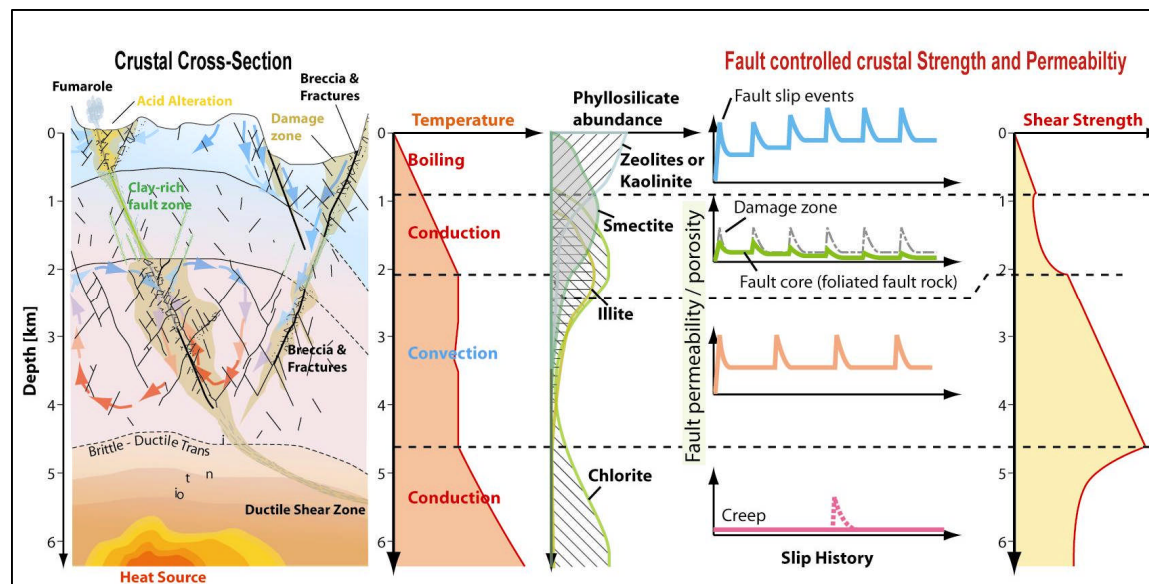


Figure 1. Revised conceptual model depicting a geothermal system and relationship to associated geologic properties, such as fault permeability and rock strength.

Geothermal Resources

(Estimates for FY 2006, \$0.5 million; FY 2007, \$0.5 million; FY 2008, \$0.5 million)

Geothermal Resources — The last national geothermal resource assessment was published in 1979, and advances in the field of geothermal energy and technology indicate that much of that information, as well as the geologic models for geothermal resources, contained in the earlier assessment are outdated. In 2006, in support of the Energy Policy Act of 2005 (P.L. 109-58 §226), the USGS began a 3-year project to produce a new national assessment of geothermal resources capable of producing electric power, with a focus on the western United States, including Alaska and Hawaii. The methodology for identified geothermal systems will be completed, reviewed, and published during 2007. This methodology is critical to the national geothermal resource assessment effort underway within the program. This work will continue to update and improve our understanding of geothermal systems (Figure 1), and culminate in FY 2008 with a completed assessment. This assessment effort, in partnership with the DOE, BLM, National Laboratories, universities, State agencies, and a consortium of the geothermal industry, will highlight geothermal energy resources located on public lands. The assessment will include a detailed estimate of electrical power generation potential and an evaluation of the major technological challenges and environmental effects of increased geothermal development. Support products will include online geospatial databases of regional and system-specific geological, geophysical, geochemical, and hydrological information relevant to geothermal resources as well as research publications.

National Coal Resources

(Estimates for FY 2006, \$2.1 million; FY 2007, \$2.4 million; FY 2008, \$2.4 million)

Previous USGS ERP coal resource assessments evaluated the total in-ground coal resource. The USGS ERP has recently revised the USGS assessment methodology to determine the subset of U.S. coal resources that is both available for mining and technically recoverable (i.e., the coal reserve base). In 2006, ERP started to systematically evaluate the PRB, the single largest producing coal basin in the United States. In 2007, ERP will finalize the revised assessment for the PRB. In 2008, other basins will be looked at using this new approach, most

likely basins from the Colorado Plateau. These new studies will illustrate how much resource is actually available and technically recoverable.

Federal and State land managers can use these results to support land-use decisions; environmental regulators use the information to evaluate compliance with regulations stemming from the 1990 Amendments to the Clean Air Act; and economists use the results to forecast economic trends at regional and national scales. Electric utilities, coal producers, and coal consumers also use these results and products for evaluating the availability and quality of coal feedstock to electricity generating power plants and to achieve compliance with emission standards and other environmental regulations. These studies form the basis for addressing the challenge of future changes in the energy mix as the Nation responds to increasing demands for cleaner-burning coal. The ERP is working closely with counterparts at other organizations (BLM, the Energy Information Administration, the Securities and Exchange Commission, and the Office of Surface Mining) to ensure that the revised products address a variety of needs.

With the conclusion of this first digital compilation of coal resource and coal quality data, the USGS will begin to determine how to integrate this new digital resource information with national coal quality inventories. The resulting integrated data will enable the USGS to provide critical information to land and resource managers who must contend with the Nation's ever-increasing need for energy while protecting the environment and human health.

World Oil and Gas Resources

(Estimates for FY 2006, \$2.6 million; FY 2007, \$2.6 million; FY 2008, \$2.6 million)

Energy is critical to the health and vitality of United States and world societies. Credible scientific information on the abundance and geologic distribution of energy is critically needed. The USGS World Petroleum Assessment Project conducts geologic studies that improve the understanding of the quantity, quality, and geologic distribution of world oil and gas resources.

In 2006, the USGS continued research in this arena by completing an assessment of undiscovered oil and gas resources in the Northern Afghanistan, and the Mackenzie Delta Province, and continued to develop its approach to assessment of undiscovered resources of the Arctic. The USGS assessment of the petroleum resources of northern Afghanistan, done in cooperation with Afghan Ministry of Mines and Industry, and funded by the U.S. Trade and Development Agency, determined that the petroleum resource of northern Afghanistan is significantly greater than previously understood. Results of the assessment can be found at: <http://pubs.usgs.gov/fs/2006/3031/>. These results are the first publicly available estimates of undiscovered, technically recoverable oil and gas resources for Afghanistan, follow standard USGS methodology and protocol, and provide the basis for lease block designation and information required to attract the interest of oil and gas exploration companies.

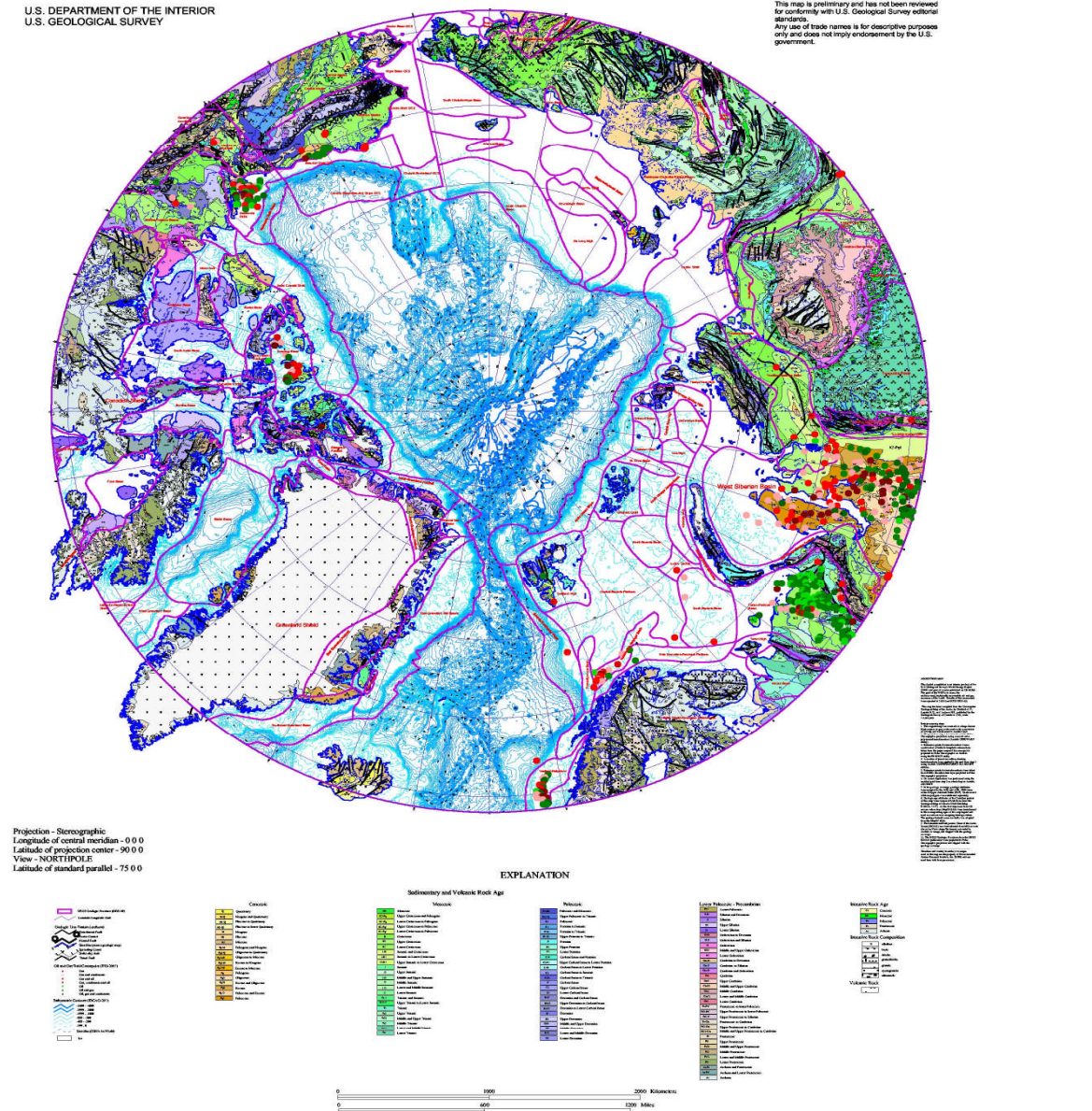
Work on assessing the undiscovered petroleum resources in 2007 will result in completed assessments for the Northeast Greenland area. In 2008, the USGS ERP will continue to assess those oil and gas provinces of the world that were not targeted in previous assessments. The highest priority task is the Arctic Assessment (Figure 2), which will assess targeted Arctic provinces in Canada, United States, Russia, Norway, Greenland, and other circum-Arctic countries. These provinces most likely contain significant petroleum hydrocarbon resources. Thus, ERP undertook a focused approach to evaluate the Arctic, because these additional provinces will be critical for understanding not only the full resource potential of the Arctic, but also the world. This task is strongly supported by the DOE, the national security community, a

Geologic Resource Assessments

consortium of companies, and most especially by the foreign governments and academic institutions of the assessed countries.

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

This map is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards. Any use of trade names is for descriptive purposes only and does not imply endorsement by the U.S. government.



Circumpolar Geologic Map of the Arctic (onshore)

Digitally compiled by Folks M. Persits and Gregory F. Ulmishok

Figure 2. Circumpolar Geologic Map of the Arctic, produced for the Arctic assessment task of the World Petroleum project in the Energy Resources Program (http://pubs.usgs.gov/of/1997/ofr-97-470/OF97-470J/Plot/arc_bath.pdf)

Energy Information and the Environment

(Estimates for FY 2006, \$6.0 million; FY 2007, \$6.9 million; FY 2008, \$6.9 million)

The production and use of all energy sources generates some type of environmental impact. For example, oil and gas production is attended by water production that must be disposed of in some way and coal combustion sometimes produces a wide range of potentially hazardous substances.

ERP scientific studies focused on environmental and human health challenges include characterization of waters co-produced with oil, gas, and coalbed methane, in order to determine best disposal practices, coastal subsidence associated with oil and gas production, and human health impacts of energy resource occurrence and use.

Coal Quality and Human Health — The USGS ERP conducts research to understand the natural variability of coal quality, and the ramifications of such variability on environmental quality and human health. For example, in many parts of the country and the world, coal deposits may act as natural aquifers and convey large amounts of potable water. Balkan Endemic Nephropathy (BEN), a disease thought to develop from long-term exposure of susceptible individuals to low levels of toxic organic compounds derived from coal in drinking water in many parts of the Balkans, has been extensively studied by the USGS in conjunction with the human health care sector and international doctors. The ERP continues to build on the expertise developed during the BEN study by evaluating linkages in the United States and other countries where the confluence of specific human diseases and toxic organic compounds from coal may occur. In the United States, the water obtained from low-rank coal beds, either by drinking water wells or by coalbed methane production wells, may have leached toxic organic compounds from coal. The ERP is characterizing water quality in these settings. ERP researchers have been contacted by a number of foreign scientists who have noted BEN-like symptoms within their own countries. A number of cooperative efforts have formed from these contacts, leading to an increased understanding of this disease.

Because more than half of the Nation's electricity demand is met through burning coal, and that demand will continue to increase in the future, an understanding of the connections among coal quality, environmental quality, and human health during aspects of coal resource utilization is essential to resource managers and policymakers alike. The USGS ERP will continue to work with representatives from the human health care sector Center for Disease Control (CDC), National Institutes of Health (NIH), National Institute of Environmental Health Sciences, and other domestic and international groups of doctors, epidemiologists, and health care providers) to investigate health effects that may be associated with energy resource use. In one such project, continuing into 2008, the USGS will collaborate with the Navajo Nation to study the relationship of indoor and ambient air quality to respiratory diseases in the Navajo Nation. This work will study the possible linkages between indoor coal burning and human respiratory ailments. This research provides objective scientific information to guide private industry, Federal and State policymakers, foreign government officials, and health care workers.

The ERP will also present a short class (at the 2007 Clearwater Conference) which will detail the results to date of ERP studies on coal quality and coal combustion. Products will consist of short classes, lectures, exhibit displays, and journal articles dealing with all aspects of the coal combustion process. Chlorine plays an important role in the speciation of mercury in coal-fired power plants. The role of chlorine in coal-fired combustion processes is not well understood. In 2007, USGS efforts to study chlorine in coal will result in a published deliverable. The USGS ERP will finalize the compilation of coal quality data on coals from around the world as part of

Geologic Resource Assessments

the World Coal Quality Inventory. Emphasis in 2007 will focus on finalizing the associated database.

The National Coal Resources Data System (NCRDS) (Estimates for FY 2006, \$0.7 million; FY 2007, \$0.7 million; FY 2008, \$0.7 million) — NCRDS provides the world's largest, most comprehensive, publicly available, electronic coal quality and quantity databases. Started more than 25 years ago, the USGS databases contain information on the location, quantity, attributes, stratigraphy, and chemical components of U.S. coal deposits, including quality analyses of more than 14,000 coal samples and some 200,000 stratigraphic records. At least 136 coal-quality parameters are determined, including detailed location information and a wide range of physical and chemical properties. The NCRDS stratigraphic database contains more than 30 parameters describing the geologic section measured from drill holes and surface exposures including specific geo-referenced information. These data are accessible through USGS-constructed interfaces to perform several analytical capabilities and produce a robust suite of products addressing several coal resource assessment issues, including: locating coal deposits having desirable characteristics for various uses; assessing environmental impacts of coal use; evaluating coal resources; and describing technological properties of coal from specific areas and beds. A long-term partnership of the USGS and approximately 22 State geological surveys, both contributors to and users of the databases, has formed the basis of this sustained effort to collect, correlate, and analyze the basic data, build and verify the databases, and digitally utilize these USGS-maintained data sets. Portions of the coal resource and geochemical databases can be found on the USGS Energy Web site (<http://energy.usgs.gov>), or interested parties may request selected data in several formats.

2008 Program Performance

The planned accomplishments and outcomes listed below demonstrate the utility of USGS activities that are counted for GPRA and PART measures, including: "number of targeted basins with resource assessments available to support management decisions," "percent of formal USGS studies validated through appropriate or independent review," "number of systematic analyses and investigations," "long-term data collections," and "training and workshops."

The number of long-term data collections maintained remains the same and consists of (1) the National Coal Resources Data System, (2) the National Energy Research Seismic Library, and (3) the Organic Geochemical Database. ERP now counts the number of gigabytes in these databases as a measure of growth. The number of gigabytes is not comparable among databases, as they contain very different types of data. However, the number of gigabytes in each is expected to grow as the databases grow in their utility.

Also in 2008, the ERP will provide 8 formal workshops or training to customers. ERP training consists of courses that are requested by customers, cooperators, and colleagues, and are therefore not always predictable. Workshops are usually set up by ERP scientists to further a common scientific or research need, to seek outside ideas or validation of ERP work, or to share our expertise with counterparts in other countries. Examples of ERP training include (1) human health courses outlining the relationships between coal usage and human health and (2) coalbed methane courses providing instruction about coalbed methane genesis, occurrence, migration, assessment, testing, development, and (3) training on the basics of oil and gas assessments for foreign scientists (e.g., previous training has included delegations from Afghanistan and Colombia). ERP workshops include gatherings of experts to talk about specific

oil and gas or coal issues such as reserve growth and resource assessment methodology – two issues that many groups (academic, other government, and industry consortia) struggle with as these issues evolve along with technology and our understanding of geology.

In support of the number of targeted basins with energy resource assessments available to support management decisions, the USGS will complete assessments of the Permian Basin, Big Horn Basin, Bakken Formation of the Williston Basin, Southern Afghanistan, and West Greenland in 2008.

Geologic Resource Assessments

Program Performance Overview

The Energy Resources Program addresses the Department of the Interior Resource Use strategic goal to improve the understanding of energy and mineral resources to promote responsible use and sustain the nation's dynamic economy. The following table highlights important performance measures for the Energy Resources Program

End Outcome Goal: 2.4: Resource Use: Improve the understanding of energy and mineral resources to promote responsible use and sustain the nation's dynamic economy									
End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
Intermediate Outcome Measures and Bureau and PART Outcome Measures									
Ensure availability of energy and mineral resource information and systematic analyses needed by land and resource managers for informed decision making									
# of targeted basins/areas with energy resource assessments available to support management decisions (SP) (PART)	5	7	6	6	6	5	5	0	2
% of targeted non-fuel mineral commodities for which up-to-date deposit models are available to support decision making (SP)	UNK	UNK	UNK	UNK	UNK	Baseline	10%	NA	100%
<i>Baseline Information:</i> Average square miles of the United States with non-energy mineral information available to support management decisions (PART)	2,401,329	3,097,647	3,332,038	3,318,208	3,346,737	3,346,737	3,346,737	0	3,346,737
Intermediate Outcome Measures and Bureau and PART Outcome Measures									
Ensure the quality and relevance of science information and data to support decision making									
% of studies validated through appropriate peer review or independent review (SP) (Total) (ERP)	100% (5/5)	100% (7/7)	100% (5/5)	100% (5/5)	100% (5/5)	100% (5/5)	100% (7/7)	0	100% (7/7)
% satisfaction with scientific and technical products and assistance for natural resource decision making (SP)	UNK	UNK	UNK	UNK	UNK	≥80%	≥80%	0	≥80%
PART Efficiency and Other Output Measures									
# of systematic analyses & investigations delivered to customers (assessments)	5	7	5	5	5	5	7	+2	7

Energy Resources

End Outcome Goal: 2.4: Resource Use: Improve the understanding of energy and mineral resources to promote responsible use and sustain the nation's dynamic economy									
End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
# of formal workshops or training provided to customers (instances/issues/events)	8	8	7	7	8	8	8	0	8
Total actual/projected cost (\$000)	\$120,000	\$120,000	\$105,000		\$120,000	\$120,000	\$120,000	0	
Actual/projected cost per acre (whole dollars)	\$15,000	\$15,000	\$15,000		\$15,000	\$15,000	\$15,000	0	
X% of targeted analyses/investigations delivered which are cited by identified partners within 3 years of delivery (PART)	80%	86%	≥80%	82%	≥80%	≥80%	≥80%	0	≥80%
Average cost of a systematic analysis or investigation (PART Eff. Measure)	\$2.2M	\$2.73M	\$2.75M	\$1.98M	\$2.75M	\$2.75M	\$2.75M	0	\$2.75M
# of annual gigabytes collected	0.745	97.793	20.038	158.048	20.038	20.038	20.038	0	TBD
# of cumulative gigabytes managed	211.458	351.289	371.327	509.338	391.365	524.826	544.864	+20.038	TBD
Note: The 2007 plan is the performance level based upon a projection of 2007 likely enacted made during the first quarter of 2007. The 2008 plan and 2012 long-term targets build on the 2007 plan. To the extent Congress enacts a 2007 appropriation that is different from the 2007 projection, the 2008 plan and 2012 targets may require revision.									

This page intentionally left blank.

Water Resources Investigations

Subactivity	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Hydrologic Monitoring, Assessments, and Research	142,527	141,876	+5,047	+3,150	150,073	+8,197
<i>FTE</i>	<i>1,023</i>	<i>1,005</i>	<i>0</i>	<i>+5</i>	<i>1,010</i>	<i>+5</i>
Cooperative Water Program	62,833	62,171	+2,410	-2,200	62,381	+210
<i>FTE</i>	<i>716</i>	<i>694</i>	<i>0</i>	<i>-18</i>	<i>676</i>	<i>-18</i>
Water Resources Research Act Program	6,404	0	0	0	0	0
<i>FTE</i>	<i>2</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Total Requirements (\$000)	211,764	204,047	+7,457	+950	212,454	+8,407
Total FTE	1,741	1,699	0	-13	1,686	-13
Impact of the CR		[+7,839]		[-7,839]		[-7,839]

Impact of the CR

(-\$7,839,000)

The 2008 budget restores the priorities of the 2007 President's budget by funding 2007 programmed fixed cost increases, eliminating unrequested 2006 congressional earmarks, and implementing the program enhancement and program reduction initiatives included in the 2007 President's budget.

Activity Summary

The 2008 budget request for the Water Resources Investigations Activity is \$212,454,000 and 1,686 FTE, which is a net change of +\$8,407,000 and -13 FTE from the 2007 President's budget. Additional information on program changes is provided in each program element section of this document.

Since 1879, the USGS has been involved in issues related to water availability, water quality, and flood hazards. This work, conducted by more than 3,500 hydrologists, technicians, and support staff located in every State, includes collection, management, and dissemination of hydrologic data; analysis of hydrologic systems through modeling or statistical methods; and research and development leading to new methods and new understanding.

The mission of the USGS water programs supports the Department's Strategic Plan, in particular End Outcome Goal 1.4: "Resource Protection: Improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment." This is accomplished through activities that contribute to two Intermediate Outcomes — "Ensure availability of long-term environmental and natural resource information, data and systematic analyses needed by land and resource managers for informed decisionmaking" and "Ensure the quality and relevance of science information and data to support decisionmaking" — and to a number of GPRA and PART program performance measures that are shown in the performance tables for the individual water programs.

Program Assessment Rating Tool (PART) Evaluation

In FY 2004, the majority of the Water Resources Investigations program underwent PART evaluation. In keeping with the President's Business Reference Model, rather than conducting the PART for eight individual programs, the USGS was evaluated in (1) research and (2) data collection and dissemination categories and was rated "moderately effective." The PART evaluations found that the programs have a clear purpose, do a good job at leveraging resources, work with a wide array of partners, and maintain an effective Web site for distributing and visualizing water information. The evaluations also concluded that the USGS has effectively used the FACA Advisory Committee on Water Information and the National Water Quality Monitoring Council for feedback to improve programs and coordinate activities.

The USGS worked with the OMB to develop an Improvement Plan for carrying out the PART recommendations. Performance measures resulting from the PART are shown in the performance tables for the Water programs, and the USGS has submitted a new PART Improvement Plan for 2007. As a result of PART recommendations and associated performance measures, the USGS is —

- moving toward quicker finalization of hydrologic data,
- making significant progress in efforts to develop an integrated water information portal with the EPA,
- investigating the feasibility of contracting out USGS streamgaging activities,
- working with the EPA and other Federal and State agencies through the Advisory Committee on Water Information and the National Water Quality Monitoring Council to develop shared water monitoring plans as were developed for the Chesapeake Bay watershed, and
- working with the National Academy of Sciences National Research Council (NRC) to obtain an independent review of the entire USGS Water Discipline, as described below.

Other Program Reviews

In 2006, the NRC formed a Committee on River Science of the USGS. The Committee looked at a wide variety of work along rivers, ranging from monitoring streamflow and water-quality parameters to integrated, watershed-based research and national synthesis. The report recommends a potential future set of activities that the USGS should undertake related to River Science. The report is also available online at: <http://newton.nap.edu/catalog/11773.html>.

Based on PART recommendations, the USGS has asked the NRC's Water Science and Technology Board to conduct an in-depth review of the entire USGS Water Discipline. The purpose of the review is to assess the water program and recommend how USGS can best address the Nation's priority water issues. Such reviews in the past have yielded a strong endorsement of the USGS mission and provided useful insights to guide future program development. In recent years, the NRC has conducted detailed reviews of NSIP, NAWQA, the Water Use Program, Watershed Research, and River Science, among other topics. The last comprehensive review of the Water Discipline as a whole was completed in 1991.

The review of the entire Water Discipline will be conducted during FY 2007 and 2008, with a final report anticipated in October 2008. The NRC has assembled a highly qualified panel of water resources experts from government, academia, and nongovernmental organizations. The Committee held its first meeting in October 2006 and anticipates meeting 3–4 more times, including at least 2–3 meetings at USGS Water Science Centers. The intention of the Committee is to meet with a wide range of USGS managers, scientists, and customers to obtain a full range of insights into our current program.

Workforce Planning

The USGS is working hard to change skill sets to keep pace with changing customer needs, anticipated level budgets, and reduced reimbursable income. The bureau is using creative solutions for rapid changes in technology and workforce flexibility through the use of contractors and term appointments. In some cases, funding freed from salary load will be used to invest in partnerships through grants. However, in some cases the nature of the work requires the use of government employees. Thus, the USGS has initiated a VSIP/VERA process for a number of Water Science Centers and the National Research Program (NRP). Some of the positions vacated through the VSIP/VERA process will be filled with new employees who possess the requisite skills.

In 2007, the USGS will implement a VSIP/VERA for the NRP, which is funded largely by the Hydrologic Research and Development program and encompasses research units at three major centers: Reston, Denver, and Menlo Park. This action is the result of an extensive workforce/staff planning effort that identified and quantified workforce requirements in the NRP. Changing program goals and priorities require a different balance of workforce skills to implement new strategic opportunities and directions. Also, restructuring and reduction of programmatic activities as a result of years of level funding, coupled with rising salary and other fixed costs, have reduced funds available for operational expenses. Programmatic restructuring will occur within the current organizational structure. Positions were identified for VSIP and VERA offers through analyses of workforce needs and funding projections for programs managed by the NRP.

Subactivity Overview

Water Resources Investigations comprises three subactivities that operate with three distinctly different funding mechanisms:

The **Hydrologic Monitoring, Assessments, and Research subactivity** includes six programs funded directly from Federal appropriations and conduct work primarily inhouse, using the expertise of scientists on the Federal payroll. The programs in this subactivity include: Ground-Water Resources, National Water-Quality Assessment (NAWQA), Toxic Substances Hydrology, Hydrologic Research and Development, National Streamflow Information Program (NSIP), and Hydrologic Networks and Analysis (HNA). These programs are primarily research oriented, with the exception of NSIP and portions of HNA, which focus on long-term data collection, and NAWQA, which provides status and trends information on water-quality conditions across the Nation.

The **Cooperative Water Program subactivity** provides information needed to understand the Nation's water resources through a program of shared efforts and funding with 1,400 State,

Water Resources Investigations

tribal, and local partner agencies. Authorizing legislation requires that States and localities pay at least half the cost of the work that the USGS performs under this subactivity, so program resources are leveraged and program priorities are determined in concert with partners. About half the funding supports basic data collection, including approximately 65 percent of the USGS streamgaging network, and the remaining half supports interpretive investigations, with the goal of seeking solutions to water-resources issues of national and local concern.

Through the **Water Resources Research Act subactivity**, the USGS administers grants for 54 State research institutes designated by the Water Resources Research Act. The program supports academic research to aid in the resolution of State and regional water problems, promotes technology transfer, and provides for the training of scientists and engineers. Grant monies under this program must be matched by the receiving universities.

Activity: Water Resources Investigations

Subactivity: Hydrologic Monitoring, Assessments, and Research
Program Component: Ground-Water Resources Program

	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Ground-Water Resources Program (\$000)	8,027	7,422	+206	0	7,628	+206
<i>Total FTE</i>	<i>66</i>	<i>66</i>	<i>0</i>	<i>0</i>	<i>66</i>	<i>0</i>

Program Overview

Ground water is one of the Nation's most important natural resources and is becoming increasingly important to all our lives. Ground water serves as the primary source of drinking water to approximately half the Nation's population, provides about 40 percent of the irrigation water essential for the Nation's agriculture, sustains the flow of most streams and rivers, and helps maintain a variety of aquatic ecosystems. The continued availability of ground water is essential for current and future populations and the health of the economy in all 50 States.

The goals of the GWRP are to —

- Identify, describe, and make available fundamental information regarding ground-water availability in the Nation's major aquifer systems, and evaluate this information over time,
- Characterize the natural and human factors that control recharge, storage, and discharge in the Nation's major aquifer systems, and to improve understanding of these processes,
- Develop and test new tools and field methods for analyzing ground-water flow systems and their interactions with surface water, and
- Provide scientific leadership across all USGS programs on matters pertaining to the Nation's ground-water resources, including research directions, quality control, technology transfer, and information storage and delivery.

2008 Program Performance

The 2008 budget request for the GWRP is \$7,628,000 and 66 FTE.

The GWRP includes the following activities:

- Regional ground-water investigations (Estimates for FY 2006, \$4.9 million; FY 2007, \$4.0 million; FY 2008, \$4.2 million)

Hydrologic Monitoring, Assessments, and Research

- Field methods and model development (Estimates for FY 2006, \$1.0 million; FY 2007, \$1.2 million; FY 2008, \$1.2 million)
- Fundamental data and ground-water level monitoring (Estimates for FY 2006, \$0.5 million; FY 2007, \$0.5 million; FY 2008, \$0.5 million)
- Technical support (Estimates for FY 2006, \$1.6 million; FY 2007, \$1.7 million; FY 2008, \$1.7 million)

To address the goals listed above, the GWRP is planning the following activities for FY 2008:

Regional Ground-Water Evaluations — Regional ground-water evaluations consist of multiple large-scale study areas or aquifers that collectively make up a national assessment. Individual studies form the building blocks that can be used to develop a comprehensive regional and national perspective. In FY 2008, regional ground-water availability studies will continue in the Mississippi Embayment (AR, MS, TN, and LA), the Basin and Range carbonate-rock aquifers (UT & NV), and a yet to be selected regional ground-water system.

This program component also includes the Water Availability and Use pilot effort that began in FY 2005. Long-term monitoring and assessment of water resources by the USGS provides the science needed by the public and decision makers to assess water availability and use, to understand drought and its impact on water supply, and to manage and use our water resources responsibly. The National Water Availability and Use Program is intended to provide citizens, communities, and natural-resource managers with a clearer knowledge of the status of the Nation's water resources (how much water we have now), trends over recent decades in water availability and use (how water availability is changing), and an improved ability to forecast the availability of water for future economic and environmental uses.

This pilot includes a study in the Great Lakes Basin (\$1,200,000) and the Lower Colorado River Basin (\$400,000). The pilot is helping determine the best ways to evaluate the resource and how to deliver the information in a manner that is most helpful to planners and policymakers working at local, regional, and national levels. The program is based on concepts presented in the report, *Concepts for National Assessment of Water Availability and Use* (<http://water.usgs.gov/pubs/circ/circ1223/>), which was produced at the request of the House Appropriations Committee.

Field Methods and Model Development — The GWRP is continuously searching for more efficient methods of evaluating ground-water resources at a variety of different scales. The USGS has been at the forefront of devising new analytical techniques to solve practical problems in the study of ground-water resources. Geophysical methods and application research, along with ground-water model development are specialized activities that support and benefit all USGS projects in accomplishing organizational goals. In FY 2008, the Branch of Geophysics will continue to explore new

USGS collaborates with Colorado Water Conservation Board to Develop Denver Basin Ground-Water Flow Model

The USGS is developing a computer model of ground-water flow in the Denver Basin aquifer system in coordination with the Colorado Water Conservation Board (CWCB) and Colorado Division of Water Resources. State of Colorado agencies are building comprehensive data sets for the Denver Basin aquifers as part of the South Platte Decision Support System project. The USGS is assisting in quality assurance of the data sets and using the data as input to the USGS Denver Basin model.

The USGS Denver Basin ground-water flow model is being used by both the USGS and CWCB to assess effects of pumping on water levels, aquifer storage, and stream flow; to make predictions of future system behavior; and to evaluate and guide further data collection efforts.

technologies and their implementation in the field to help solve real world problems like the mapping and quantification of ground-water discharge into streams, lakes, and estuaries using a fiber-optic distributed temperature sensor. Furthermore, efforts will continue to enhance the capability and utility of predictive models to supply critical information needed for informed decision making related to a wide range of complex and emerging issues such as, the modeling of saltwater intrusion, aquifer storage and recovery, and deep-well injection.

Fundamental Data and Ground-Water Level Monitoring — Collection of fundamental ground-water information is critical to the ability to assess and assure the availability of the Nation's ground-water resources. Measurement of ground-water levels is used to monitor changes in conditions (water levels and storage) due to climate and withdrawals. The development of the Ground-Water Climate Response Network seeks to assess changes in ground-water conditions due to climate stresses. The ground-water climate response network (<http://groundwaterwatch.usgs.gov/>), although still small, continues to grow as the public, water managers, and scientist better understand the connection between climatic variations and shallow ground-water aquifers. Additionally, periodic evaluation of water levels on a regional scale is necessary to properly inventory ground-water reserves in areas experiencing intense development, such as the High Plains aquifer.

Technical Support — This support provides quality control to assure the technical excellence of the ground-water field programs and provides a structured way of transferring new technology to activities that are conducted at USGS Water Science Centers in each State. This program component also provides a formal way of establishing research priorities and making ground-water information available to other agencies, the scientific community, and the public.

The GWRP 5-Year Plan is in the final stages of being updated and reviewed to conform to new agency guidelines. The goal is for completion in early 2007.

The goals of the GWRP support the Department's strategic plan, specifically the goal of improving the understanding of national ecosystems and resources through integrated interdisciplinary assessment. In conjunction with the Cooperative Water Program and an array of reimbursable projects, the GWRP contributes to the outcome measures and PART program performance measures shown in the Program Performance Overview table.

Hydrologic Monitoring, Assessments, and Research

Program Performance Overview

There are no performance measures that can be tied exclusively to the GWRP, except for "systematic analyses and investigations delivered to customers." However, in conjunction with the Cooperative Water Program, Hydrologic Networks and Analysis, and an array of reimbursable projects, the GWRP contributes to all the measures listed below.

End Outcome Goal 1.4: Resource Protection: Improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment.									
End Outcome Goal End Outcome Measure / Intermediate or PART Measure / PART Efficiency or other Outcome Measure	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
GPRA End Outcome Measures									
% targeted science products that are used by partners for land or resource management decisionmaking (SP)	UNK	UNK	UNK	UNK	UNK	≥90%	≥90%	0	≥90%
Intermediate Outcome Measures and Bureau and PART Outcome Measures									
Ensure availability of long-term environmental and natural resource information, data, and systematic analyses needed by land and resource managers for informed decisionmaking									
% of the Nation's 65 principal aquifers with monitoring wells used to measure responses of water levels to drought and climatic variations to provide information needed for water-supply decisionmaking (PART) (denominator = 65 principal aquifers)	60% (39)	61% (40)	62% (40)	61% (40)	60% (39)	60% (39)	58% (38)	-2% (-1)	66% (43)
Comments:	Changes in 2007 and 2008 are due to decreases proposed for the Cooperative Water Program.								
Contributing Programs:	GWRP, HNA, Coop Water Program (USGS and State/local contributions), and reimbursements from other Federal agencies.								
% of ground-water stations that have real-time reporting capability in the ground water climate response network (PART) (denominator = 347 sites in climate network)	57%	67% (233)	67% (233)	47%	63% (220)	63% (220)	60% (209)	-3% (-11)	70% (244)
Comments:	During 2006, although the network grew by 55%, the number of wells reporting real-time grew only 10%. As a result, the relative proportion of the network that is reporting real-time declined. Real-time measurement continues to grow in the USGS-funded portion of the network. Change in 2007 is due to impact of inflation, and not to budget decrease. Change in 2008 is due to the decrease proposed for the Cooperative Water Program (see page I - 51).								
Contributing Programs:	GWRP, HNA, Cooperative Water Program (USGS and State/local contributions), and reimbursements from other Federal agencies.								

Ground-Water Resources Program

End Outcome Goal 1.4: Resource Protection: Improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment.									
End Outcome Goal End Outcome Measure / Intermediate or PART Measure / PART Efficiency or other Outcome Measure	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
% of U.S. with ground-water availability status and trends information to support resource management decisions (PART) (denominator = 65 principal aquifers)	5% (3.5)	7% (4.5)	8% (5.5)	8% (5.5)	7% (4.5)	9% (6)	6% (4)	-3% (-2)	9%
Total Projected Cost (\$000)	\$1,575		\$1,925		\$1,575	\$2,100	\$1,500	-\$600	
Projected Cost per regional ground-water availability project (national average) (whole dollars)	\$350,000		\$350,000		\$350,000	\$350,000	\$375,000	\$375,000	
Comments:	Change in 2008 results from decrease proposed for the Cooperative Water Program (see page I - 51). Measure indicates the number of regional ground-water evaluation projects (status and trends in ground-water availability) that coincide with total number of the Nation's 65 principal aquifers, as designated in the National Atlas. Average cost per project is \$350,000–\$375,000, though actual costs range from <\$100,000 to >\$500,000 per project, depending on the scope and location of the study. Project costs include salaries, travel, training, vehicles, supplies, report production, and printing.								
Contributing Programs:	Cooperative Water Program, Ground-Water Resources Program								
Intermediate Outcome Measures and Bureau and PART Outcome Measures									
Ensure the quality and relevance of science information and data to support decisionmaking									
% of studies validated through appropriate peer review or independent review (SP)	100%	100% (16)	100% (18)	100% (18)	100% (17)	100% (18)	100% (17)	0 (-1)	100% (15)
PART Efficiency and Other Output Measures									
# systematic analyses & investigations delivered to customers	UNK	16	18	15	17	18	17	-1	100% (15)
Total actual/projected cost (\$000)	\$4,800		\$4,500		\$5,100	\$5,400	\$5,100	-\$300	
Actual/projected cost per scientific report or other product (whole dollars)	\$300,000		\$300,000		\$300,000	\$300,000	\$300,000	-\$300,000	
Comments:	Difference between 2007 Plan and 2008 Plan is due to a difference in funding between the 2007 President's Budget and the 2007 CR that eliminates funding for unrequested earmarked studies. Further decrease in the long-term 2012 target reflects elimination of these same earmarked studies. Difference between 2006 plan and 2006 enacted is due to the lag time at year's end in entering data in the reports tracking system, which shows how many scientific publications have been distributed to customers. Since year-end reporting is required before the end of September, publications distributed in the last few days of the month were missing from the year-end report. A later check of the reports tracking system showed that the year-end target was met and exceeded. (Additional publications that caused USGS to ultimately exceed targets included 34 products from the water programs that were provided to reimbursable customers as a result of work that was not factored into performance targets because the receipt of reimbursable funds occurred after performance targets were set.								

Hydrologic Monitoring, Assessments, and Research

End Outcome Goal 1.4: Resource Protection: Improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment.									
End Outcome Goal End Outcome Measure / Intermediate or PART Measure / PART Efficiency or other Outcome Measure	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
# real-time ground-water sites reporting in NWISWeb	799	796	692	917	685	685	689	+4	689
Comments:	Target exceeded in 2006 due to receipt of additional reimbursements from partner agencies. Change in 2007 is due to budget increase for the Healthy Lands Initiative, for which the funds reside in the Biological Research and Monitoring Subactivity.								
Contributing Programs:	GWRP, HNA, Coop Water Program (USGS and State/local contributions), and reimbursements from other Federal agencies. In addition, the Biological Research and Monitoring Subactivity houses the funds for the Healthy Lands Initiative, which will add new sites to the network in 2008.								
Note: The 2007 plan is the performance level based upon a projection of 2007 likely enacted made during the first quarter of 2007. The 2008 plan and 2012 long-term targets build on the 2007 plan. To the extent Congress enacts a 2007 appropriation that is different from the 2007 projection, the 2008 plan and 2012 targets may require revision.									

Activity: Water Resources Investigations

Subactivity: Hydrologic Monitoring, Assessments, and Research
Program Component: National Water-Quality Assessment Program

	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
National Water-Quality Assessment (\$000)	62,203	62,571	+2,354	0	64,925	+2,354
<i>Total FTE</i>	<i>381</i>	<i>372</i>	<i>0</i>	<i>0</i>	<i>372</i>	<i>0</i>

Program Overview

The National Water-Quality Assessment (NAWQA) program addresses three long-term goals:

- Describe the status and trends in the quality of a large, representative part of the Nation's surface-water and ground-water resources,
- Provide an improved understanding of the primary natural factors and human activities affecting these conditions, and
- Provide information that supports development and evaluation of management, regulatory, policy, and monitoring decisions by other Federal, State, and local agencies.

The full scale NAWQA program began in 1991. During its first decade, the Program conducted interdisciplinary assessments and established a baseline understanding of water-quality conditions in 51 of the Nation's river basins and aquifers, referred to as Study Units. New studies were initiated in 2001 to be completed in the Program's second decade in 42 of the 51 Study Units. The NAWQA 5-Year Plan is undergoing internal and external review and is expected to be completed during 2007.

The goals of the NAWQA program support the Department's strategic plan, specifically the goal of improving the understanding of national ecosystems and resources through integrated interdisciplinary assessment. In conjunction with other USGS programs and an array of reimbursable projects funded by partner agencies, NAWQA contributes to the outcome measures and PART program performance measures shown in the table at the end of this section.

2008 Program Performance

The 2008 budget request for the NAWQA program is \$64,925,000 and 372 FTE. At the proposed level, the program would continue national synthesis of selected topics; regional and national assessments of status and trends in streams and ground water; studies of source-water quality associated with large community water systems; and five topical studies (see text box

Hydrologic Monitoring, Assessments, and Research

below). Long-term stream monitoring would continue at 113 sites; monitoring for ground water would continue in 20 principal aquifers; and ecological sampling would continue at 58 stream sites.

The USGS approaches the program goals listed in the Program Overview using six major program elements, newly organized from previous years, for which 2008 activities are described below:

- **National Synthesis of Key Findings Related to Important Water-Quality Topics** — National synthesis topics cover pesticides, nutrients, and aquatic ecology, and to a lesser extent, volatile organic compounds and trace elements. Findings contribute to a comprehensive national-scale perspective on water-quality conditions and trends and key factors (such as land use, hydrology, geology, and soils) that govern water quality. (Estimates for FY 2006, \$7.4 million; FY 2007, \$7.5 million; FY 2008, \$7.6 million)
- **Regional and Study Unit Assessments of Status and Trends** — Status and trend assessments focus on surface-water-quality in the 42 Study Units grouped within 8 major river basins in the United States, and ground-water-quality in about one-third of the Nation's 62 principal aquifers. These broad-scale assessments integrate modeling with monitoring to help extend water-quality understanding to unmonitored, yet comparable areas. They also involve collaboration and inclusion of data from other USGS programs, such as the National Stream Quality Accounting Network, and other Federal agencies, and regional, State, Tribal, and local organizations to maximize the use of stream-monitoring information for broad water-resource understanding. Source-water-quality assessments are conducted to characterize water in selected drinking-water supply wells, stream intakes, and in finished drinking water associated with large community water systems. The source-water assessments complement drinking-water monitoring required by other Federal, State, and local programs, which focus primarily on post-treatment compliance monitoring. (Estimates for FY 2006, \$24.1 million; FY 2007, \$24.4 million; FY 2008, \$25.3 million)
- **Topical Studies of National Priority** — Topical studies address five national priority topics that establish links between sources and transport of contaminants, and the potential effects of contaminants on humans and aquatic ecosystems. The five topical studies are conducted in selected Study Units most affected by the issues. NAWQA relies on fundamental research accomplished in other water programs like the National Research Program and the Toxic Substances Hydrology program. For example, NAWQA collaborates with other USGS scientists on sampling and analytical techniques to understand key chemical and biological processes affecting water quality, such as mercury bioaccumulation in fish, stream metabolism, and contaminant degradation. (Estimates for FY 2006, \$12.0 million; FY 2007, \$12.4 million; FY 2008, \$12.6 million)
- **Supporting Research and Methods** — To ensure NAWQA data collection and analyses are relevant to emerging issues, about 10 percent of program resources is devoted to developing state-of-the-art methods of sample collection and analysis and to innovative research techniques, such as those involving age-dating, dye tracer tests,

Topical Studies of National Priority

Effects of nutrient enrichment on stream ecosystems

Sources, transport, and fate of agricultural chemicals

Transport of contaminants to public-supply wells

Effects of urbanization on stream ecosystems

Bioaccumulation of mercury in stream ecosystems

and isotope analysis. (Estimates for FY 2006, \$6.0 million; FY 2007, \$6.4 million; FY 2008, \$6.5 million)

- **Coordination at Local, State, Regional, and National Levels** — NAWQA continues to provide direct service to the EPA Office of Pesticide Programs; Office of Wetlands, Oceans, and Watersheds; Office of Ground Water and Drinking Water; and Office of Science and Technology, assisting in the timely and relevant application of NAWQA data and predictive models to those offices' decisionmaking processes. Partnerships and liaisons with environmental and natural resources managers, regulators, planners, and policy makers, from national to local, have involved over 1,500 organizations and individuals. (Estimates for FY 2006, \$2.6 million; FY 2007, \$2.7 million; FY 2008, \$2.7 million)
- **Technical Support of USGS Water-quality Activities** — The USGS has a long tradition of providing national technical support and training for its geographically distributed water-quality studies. This support provides quality control to assure the technical excellence of water-quality field programs and provides a structured way of transferring new technology to investigative and data activities that are primarily conducted in USGS Water Science Centers in each State. Technical support also includes a formal way of establishing priorities for water-quality research by the USGS and provides a mechanism to make water-quality information available to other agencies, the scientific community, and the public. (Estimates for FY 2006, \$10.1 million; FY 2007, \$9.2 million; FY 2008, \$10.2 million)

The NAWQA Program implements and supports outreach and liaison activities at local, State, regional, and national scales. NAWQA's Web site (<http://water.usgs.gov/nawqa/>) provides rapid access to NAWQA data, products, and methods documents, and includes an up-to-date listing of current developments that allows interested parties to get new information in a timely fashion. In 2006, the program made public more than 11 million records of data on water quality, ecology, and hydrology, providing one of the largest nationally consistent on-line collections of water-quality data and associated information. Data include 8,000 stream sites, 8,000 wells, concentrations in water, sediment, and aquatic tissues for 2,000 chemicals, and biological community data for about 16,000 algae, fish, and aquatic insects.

To share program knowledge and to solicit external input on program direction, NAWQA managers coordinate extensively with Federal agencies such as the EPA, USDA, State and local agencies, non-governmental organizations, and the private sector. For example —

- NAWQA staff share office space in selected EPA offices to ensure that technical information and resources are shared, so that duplication can be avoided and Federal dollars can be saved.
- The Program continues coordination with their National Liaison Committee, consisting of about 100 representatives with water-resources responsibilities or interests from Federal, State, and regional organizations, academia, public interest groups, professional and trade associations, and the private industry.
- The NAWQA Program continues its extensive working relationship with the H. John Heinz III Center for Science, Economics, and the Environment (Heinz Center) and the EPA Office of Information to develop national indicators on nutrients (phosphorus and nitrogen) and contaminants (including pesticides) in streams and ground water. This information is used in the development of the Heinz Center *State of the Nation's*

Hydrologic Monitoring, Assessments, and Research

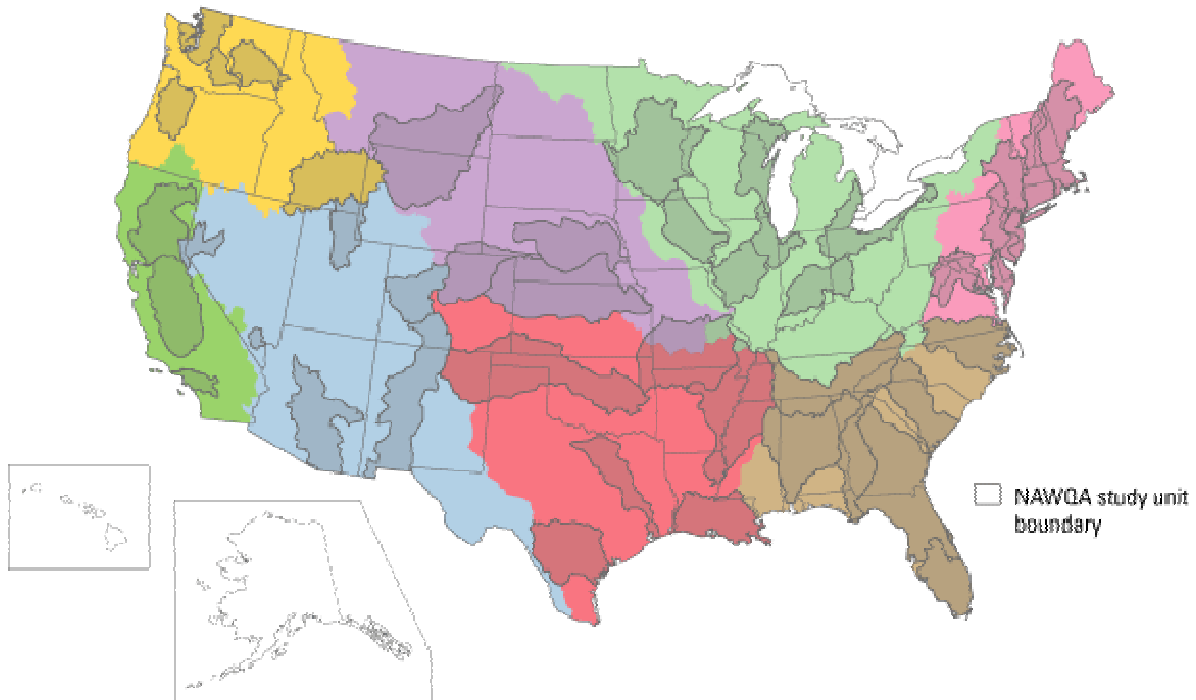
Ecosystems and EPA *State of the Environment Report*, produced every 3–5 years and anticipated in 2007 and 2012.

- The NAWQA Program continues collaboration and support for the National Water-Quality Monitoring Council (composed of more than 50 representatives from other Federal, State, Tribal, and local agencies, non-governmental organizations, industry, and academia) in their effort to develop consistent methodology and national water monitoring networks.
- The Program hosts public congressional briefings on key findings relevant to water-issues of national concern. Since 1998, the Program has co-hosted or participated in 19 congressional briefings, in large part supported by the Water Environment Federation.

Five major products are anticipated in 2008, including —

- National reports on source-water-quality, focusing on the occurrence and distribution of about 270 compounds, including pharmaceuticals and personal care products, in selected drinking-water supply wells, stream intakes, and in finished drinking water associated with large community water systems,
- National report on the occurrence of 220 compounds in over 2,700 domestic wells,
- Professional paper on the quality of water in the High Plains aquifer spanning areas in Colorado, Kansas, Nebraska, Oklahoma, Texas, and Wyoming,
- Enhanced user-friendly mapping with the USGS National Map, graphical displays, and data retrievals on the NAWQA Data Warehouse Web site, and
- Enhanced aquatic ecological data system for all USGS water program data, based on the existing NAWQA Data Warehouse system.

NAWQA Surface-Water Regions

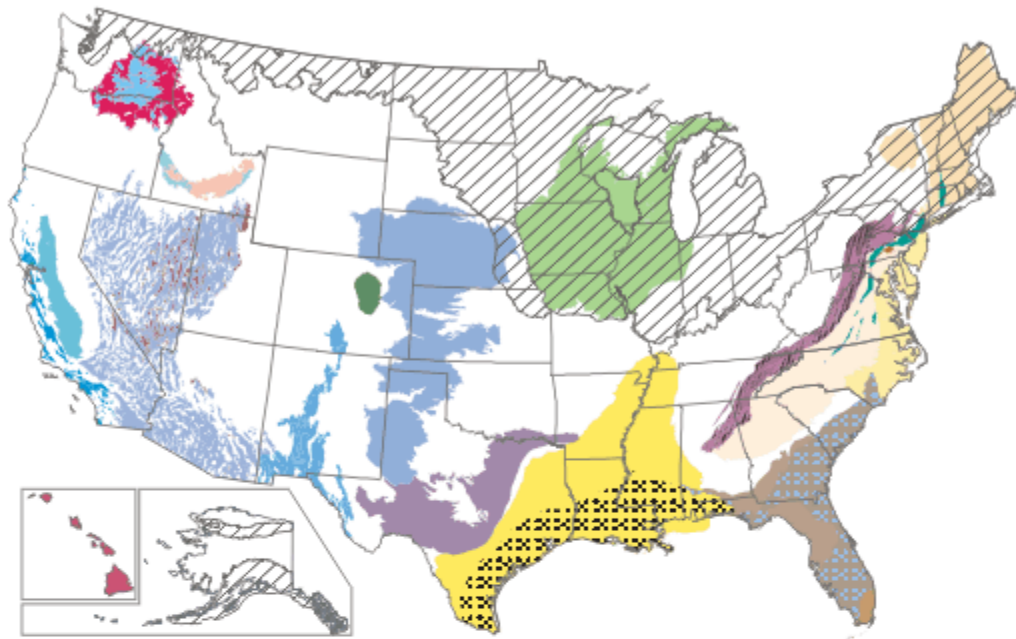


- New England and Mid-Atlantic
- South Atlantic-Gulf and Tennessee
- Great Lakes, Ohio, Upper Mississippi, and Souris-Red-Rainy
- Missouri
- Lower Mississippi, Arkansas-White-Red, and Texas-Gulf
- Rio Grande, Colorado, and Great Basin
- Pacific Northwest
- California

Revised Sept. 2004

Source: Seaber and others, 1987, Hydrologic Unit Maps, USGS Water-Supply Paper 2294.

Locations of Regional Assessments in Principal (or Other) Aquifers



EXPLANATION

- | | |
|---|--|
| Basin And Range | Hawaiian Volcanic-rock Aquifers—Locally Overlain By Sedimentary Deposits |
| Basin-fill aquifers | New England Crystalline-rock Aquifers |
| Carbonate-rock aquifers | High Plains Aquifer |
| Biscayne Aquifer | Mississippi Embayment-texas Coastal Uplands Aquifer System |
| California Coastal Basin Aquifers | Northern Atlantic Coastal Plain Aquifer System |
| Cambrian-Ordovician Aquifer System | Piedmont and Blue Ridge |
| Central Valley Aquifer System | Carbonate-rock aquifers |
| Coastal Lowlands Aquifer System | Crystalline-rock aquifers |
| Columbia Plateau | Early Mesozoic Aquifers |
| Basin-fill aquifers | Rio Grande Aquifer System |
| Basaltic-rock aquifers | Snake River Plain |
| Denver Basin Aquifer System | Basaltic-rock aquifers |
| Edwards-Trinity Aquifer System | Basin-fill aquifers |
| Floridan Aquifer System | Valley And Ridge Aquifers – Carbonate-rock Aquifers Are Patterned |
| Surficial Aquifer System (overlying the Floridan) | |
| Glacial Aquifer System | |

Program Performance Overview

Only one GPRA output measure and one PART performance measure can be tied exclusively to NAWQA; however, in conjunction with the other USGS water programs and an array of reimbursable projects funded by partner agencies, NAWQA contributes to all the measures listed in the performance table below.

End Outcome Goal 1.4: Resource Protection: Improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment.									
End Outcome Goal End Outcome Measure / Intermediate or PART Measure / PART Efficiency or other Outcome Measure	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
GPRA End Outcome Measures									
% targeted science products that are used by partners for land or resource management decisionmaking (SP)	UNK	UNK	UNK	UNK	UNK	≥90%	≥90%	0	≥90%
Intermediate Outcome Measures and Bureau and PART Outcome Measures Ensure the quality and relevance of science information and data to support decisionmaking									
% of U.S. with ground-water quality status and trends information to support resource management decisions (PART)	0	39%	45%	58%	51%	51%	54%	+3%	54%
Comments:	Target was exceeded in 2006 because work planned for 2007 was moved into 2006, to ensure smoother field operations in the long term. Change in 2008 planned (not due to budget changes).								
% improvement in accuracy of watershed (SPARROW) model prediction for total nitrogen and total phosphorus (measured as reduced error) (PART)	40%	31%	32%	24%	32%	32%	32%	0	32%
Comments:	This measure has proved extremely difficult to calculate with any degree of accuracy and difficult to understand in terms of linkage to the budget; thus, the USGS will be proposing a change to the measure as part of the 2009 budget process.								
% of streamflow stations with real-time measurement/ reporting of water quality (PART) (denominator = 7,451)	6% (450)	7% (520)	8% (600)	9% (700)	6% (450)	8% (600)	5% (400)	-3% (-200)	9% (698)
Comments:	Changes in 2007 President's budget and 2008 are due to proposed decreases in Cooperative Water Program (see page I - 51). This measure indicates the number of sites (out of 7,451 real-time streamgauge sites) equipped to provide real-time information on at least one water-quality parameter such as pH, specific conductance, water temperature, or dissolved oxygen. Reliable cost information for this metric is not yet available because of the complexity of equipment variations involved, the variance in costs at different sites, and the diverse patchwork of funding that supports this activity.								

Hydrologic Monitoring, Assessments, and Research

End Outcome Goal 1.4: Resource Protection: Improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment.									
End Outcome Goal End Outcome Measure / Intermediate or PART Measure / PART Efficiency or other Outcome Measure	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
Intermediate Outcome Measures and Bureau and PART Outcome Measures									
Ensure the quality and relevance of science information and data to support decisionmaking									
Quality: X% of studies validated through appropriate peer review or independent review (SP)	100%	100% (137)	100% (136)	100% (136)	100% (135)	100% (135)	100% (135)	0	100% (135)
PART Efficiency and Other Output Measures									
Systematic analyses and investigations delivered to customers	UNK	137	136	130	135	135	135	0	135
Total actual/projected cost (\$000)	UNK	\$54,800		\$54,400	\$54,000	\$54,000	\$54,000	0	
Actual/projected cost per scientific report or other product (whole dollars)	UNK	\$400,000		\$400,000	\$400,000	\$400,000	\$400,000	0	
Comments:	<p>Decrease from 2006 to 2007 reflects impact of inflation and absorption of some fixed costs.</p> <p>Cost per scientific product is an average that includes the cost of writing, editing, peer review, and publication of each product, as well as the cost of the studies from which the products are derived. Reimbursable costs are included in the calculation. The cost per product is derived by dividing the number of products by the amount of funding dedicated to the portions of the program that produce publications for an external audience. The remainder of the program (called "technical support") results in internal products that are not counted in this metric (such as technical memoranda that prescribe methods for water-quality sampling). The break-out of technical support versus the rest of the program is shown each year in the President's budget request.</p> <p>Difference between 2006 plan and 2006 enacted is due to the lag time at year's end in entering data in the reports tracking system, which shows how many scientific publications have been distributed to customers. Since year-end reporting is required before the end of September, publications distributed in the last few days of the month were missing from the year-end report. A later check of the reports tracking system showed that the year-end target was met and exceeded. (Additional publications that caused USGS to ultimately exceed targets included 34 products from the water programs that were provided to reimbursable customers as a result of work that was not factored into performance targets because the receipt of reimbursable funds occurred after performance targets were set.</p>								
Contributing Programs:	NAWQA, Cooperative Water Program.								
Average cost per analytical result, adjusted for inflation, is stable or declining over a 5-year period (PART)	\$8.64	\$8.63	\$8.64	\$8.34	\$8.64	\$8.64	\$8.64	0	\$8.64
Comments:	This PART efficiency measure (a comparison between annual costs and a 5-year moving average) is computed by calculating the total number of determinations (sample analyses) for the year, divided by the total income to the National								

National Water-Quality Assessment

End Outcome Goal 1.4: Resource Protection: Improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment.									
End Outcome Goal End Outcome Measure / Intermediate or PART Measure / PART Efficiency or other Outcome Measure	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
	Water Quality Laboratory (NWQL) for analytical services. The calculation does not include funding that supports "sustaining" activities at the NWQL, which take place regardless of the number of samples processed.								
Note: The 2007 plan is the performance level based upon a projection of 2007 likely enacted made during the first quarter of 2007. The 2008 plan and 2012 long-term targets build on the 2007 plan. To the extent Congress enacts a 2007 appropriation that is different from the 2007 projection, the 2008 plan and 2012 targets may require revision.									

This page intentionally left blank.

Activity: Water Resources Investigations

Subactivity: Hydrologic Monitoring, Assessments, and Research
Program Component: Toxic Substances Hydrology

	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Toxic Substances Hydrology (\$000)	14,386	13,215	+515	0	13,730	+515
<i>Total FTE</i>	<i>51</i>	<i>51</i>	<i>0</i>	<i>0</i>	<i>51</i>	<i>0</i>

Program Overview

The Toxic Substances Hydrology (Toxics) program provides unbiased and reliable scientific information and tools that explain the occurrence, behavior, and effects of toxic substances in the Nation's hydrologic environments. These results support sound decisionmaking by resource managers, regulators, industry, and the public at the Federal, State, and local levels.

The contamination problems investigated by the Toxics program are widespread and pose significant risk to human health and the environment. Based on input from many agencies and organizations, the USGS identifies high priority problems for intensive, field-based research. These field studies are conducted at representative sites, watersheds, or areas that focus on subsurface, point-source contamination or nonpoint source contamination at the watershed or regional scale. Study results help water managers improve environmental monitoring, characterize and manage contamination, develop best management practices, form regulatory policies and standards, register the use of new chemicals, and guide chemical manufacture and use. The program complements other USGS programs that monitor and assess the quality of the Nation's waters by focusing rapidly on new issues and on new and understudied contaminants, by identifying which issues warrant future attention, and by developing improved and needed methods.

The Toxics program's strengths are its long-term field-based approach, interdisciplinary research teams, ability to address contamination problems with a wide range of geographic scales and geologic terrain, and ability to bring fundamental scientific knowledge to define the natural environmental response to contamination and natural clean-up capacity. Maintenance of long-term field research laboratories and data collection on extensive regional and national networks makes this contribution particularly unique.

The Toxics program works in partnership with other Federal agencies to ensure that priorities for science needs are coordinated, including other Interior bureaus, the EPA, USDA, DOD, DOE, the Nuclear Regulatory Commission, and more recently, public health agencies such as the Centers for Disease Control and Prevention (CDC), the Food and Drug Administration, and the National Institute for Environmental Health Sciences. Because the USGS is an objective science agency, program information and methods often provide a basis for consensus in contentious issues and for achieving cost efficiencies by meeting the needs of numerous

Hydrologic Monitoring, Assessments, and Research

management and regulatory agencies. Scientists from universities, other Federal agencies, and industry find significant research opportunities through collaboration in Toxics program activities and at program research sites. Program results are distributed at briefings for regulatory agencies and industry groups, at workshops, at national scientific meetings, in USGS reports, and in scientific journals and books.

The Toxics program complements and coordinates with a range of other USGS programs by —

- Providing new methods and information to monitoring and assessment programs such as NAWQA,
- Addressing environmental effects of resource development with programs such as the Energy Resources and Mineral Resources programs, and
- Evaluating the connections between environmental contamination of toxicological effects in fish and wildlife with the Contaminant Biology program.

The goals of the Toxics program support the Department's strategic plan, specifically the goal of improving the understanding of national ecosystems and resources through integrated interdisciplinary assessment. In conjunction with other USGS programs and an array of reimbursable projects funded by partner agencies, the Toxics program contributes to the measures and PART program performance measures shown in the table at the end of this section.

Toxics program activities over the next 5 years will be guided by *The U.S. Geological Survey, Toxic Substances Hydrology Program Five-Year Plan, 2007-11*, which has been compiled with broad input from stakeholders and from other USGS programs.

More information about the Toxics program is available on the Web at <http://toxics.usgs.gov/>.

2008 Program Performance

The 2008 budget request for the Toxics program is \$13,730,000 and 51 FTE. The program includes three major components:

Investigations of Subsurface, Point-source Contamination — Interdisciplinary USGS research teams conduct long-term intensive field investigations of common types of subsurface contamination in a variety of hydrogeologic environments. These investigations provide fundamental knowledge of the processes that control contaminant-plume transport and persistence. This knowledge and new methods are applied to similar sites across the Nation. The Toxics program conducts the only organized research on subsurface contamination from point sources within the USGS and is looked upon by those responsible for contaminated site cleanup as a unique provider of information and methods on issues such as contamination in fractured rock aquifers and long-term performance of monitored natural attenuation. This program component also includes development of laboratory and field methods. (Estimates for FY 2006, \$4.9 million; FY 2007, \$4.8 million; FY 2008, \$4.8 million)

Investigations of Watershed-scale and Regional-scale Contamination — Watershed-scale and regional-scale investigations address contamination problems typical of widespread land uses or human activities that may pose a threat to human and environmental health throughout

a significant portion of the Nation. These investigations involve characterizing contaminant sources, investigating the mechanisms by which nonpoint-source contamination affects aquatic ecosystems, and investigating the processes that transform contaminants into different and possibly more toxic forms. This program component also includes development of laboratory and field methods. (Estimates for FY 2006, \$6.7 million; FY 2007, \$5.6 million; FY 2008, \$5.6 million)

Technical Support — The USGS has a long tradition of providing national technical support for its geographically distributed water resources studies. This support provides quality control to assure the technical excellence of water resources field programs and provides a structured way of transferring new technology to investigative and data activities that are primarily conducted in USGS Water Science Centers in each State. Technical support also includes a formal way of establishing priorities for water research by the USGS and provides a mechanism to make water resources information available to other agencies, the scientific community, and the public. In the case of the Toxics program, this amount also includes support for various interdisciplinary Priority Ecosystem studies, some of which are described in the Science on the Landscape section beginning on page F-1. (Estimates for FY 2006, \$2.8 million; FY 2007, \$2.8 million; FY 2008, \$2.8 million)

In 2008, the program will contribute increased scientific knowledge and tools related to subsurface point-source contamination issues associated with —

- Hydrocarbons, fuel oxygenates, biofuels, and other petroleum-related contaminants,
- Mixed (radionuclide and conventional) waste disposal and contamination in arid environments,
- Contamination in fractured-rock aquifers, and
- Contaminant plumes with complex chemical mixtures, such as landfills and treated wastewater discharges.

The program also will contribute increased scientific knowledge and tools related to regional- and watershed-scale contamination issues associated with —

- Hard-rock mining,
- Chemicals of emerging environmental concern (emerging contaminants),
- Mercury in aquatic ecosystems,
- Pesticide contamination in hydrologic environments,
- Human stresses on sensitive aquatic ecosystem, and
- Amphibian research.

As outlined in the Toxics Program 5-Year Plan, Program activities related to subsurface point-source contamination research will be reevaluated and prioritized through a planning workshop with stakeholder representation.

Hydrologic Monitoring, Assessments, and Research

Program Performance Overview

End Outcome Goal 1.4: Resource Protection: Improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment									
End Outcome Goal End Outcome Measure / Intermediate or PART Measure / PART Efficiency or other Outcome Measure	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
GPRA End Outcome Measures									
% targeted science products that are used by partners for land or resource management decisionmaking (SP)	UNK	UNK	UNK	UNK	UNK	≥90%	≥90%	0	≥90%
Intermediate Outcome Measures and Bureau and PART Outcome Measures									
Ensure availability of long-term environmental and natural resource information, data, and systematic analyses needed by land and resource managers for informed decisionmaking									
% of targeted contaminants for which methods are developed to assess potential environmental and human health significance (PART)	10%	20%	30%	85%	33%	33% (55/168)	40% (89/223)	+7%	73% (72/99)
Comments:	Change in 2008 is planned (not due to budget change).								
Contributing Programs:	Toxic Substances Hydrology, Hydrologic Research and Development.								
Intermediate Outcome Measures and Bureau and PART Outcome Measures									
Ensure the quality and relevance of science information and data to support decisionmaking									
% of studies validated through appropriate peer review or independent review (SP)	100%	100% (32)	100% (31)	100% (30)	100% (30)	100% (31)	100% (31)	0	100% (27)
PART Efficiency and Other Output Measures									
Systematic analyses and investigations delivered to customers	NA	32	31	30	30	31	31	+1	27
Total actual/projected cost (\$000)	\$12,800		\$12,000		\$12,000	\$12,400	\$12,400	+\$400	
Actual/projected cost per scientific report or other product (whole dollars)	\$400,000		\$400,000		\$400,000	\$400,000	\$400,000	\$400,000	
Comments:	<p>Difference between 2007 Plan and 2008 Plan is due to a difference in funding between the 2007 President's Budget and the 2007 CR that eliminates funding for an unrequested earmark and reduces funding for a study of contamination by "produced waters" (a byproduct of petroleum development).</p> <p>Change from 2006 to 2007 is planned (not due to budget changes).</p> <p>Difference between 2006 plan and 2006 enacted is due to the lag time at year's end in entering data in the reports tracking system, which shows how many scientific publications have been distributed to customers. Since year-end reporting is required before the end of September, publications distributed in the last few days of the month were missing from the year-end report. A later check of the reports tracking system showed that the year-end target was met and exceeded. (Additional publications that caused USGS to ultimately exceed targets included 34 products from the water programs that were provided to reimbursable customers as a result of work that was not factored into performance targets because the receipt of reimbursable funds occurred after performance targets were set.</p>								
Note: The 2007 plan is the performance level based upon a projection of 2007 likely enacted made during the first quarter of 2007. The 2008 plan and 2012 long-term targets build on the 2007 plan. To the extent Congress enacts a 2007 appropriation that is different from the 2007 projection, the 2008 plan and 2012 targets may require revision.									

Activity: Water Resources Investigations

Subactivity: Hydrologic Monitoring, Assessments, and Research
Program Component: Hydrologic Research and Development

	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Hydrologic Research and Development (\$000)	14,609	13,653	+514	0	14,167	+514
<i>Total FTE</i>	<i>268</i>	<i>264</i>	<i>0</i>	<i>0</i>	<i>264</i>	<i>0</i>

Program Overview

The Hydrologic Research and Development (HR&D) program conducts long-term sustained research on complex problems in the hydrologic sciences and supports the research and development needs of other water resource and USGS programs. HR&D program investigations integrate hydrological, geological, chemical, climatic, and biological science in addressing water resources issues. The program seeks to maintain an appropriate balance between high-risk high-reward research that leads to major scientific breakthroughs and future applications, and more applied research that helps keep the program relevant and focused on today's water resource issues. The efforts of the HR&D program are typically multidisciplinary in nature and require strong collaborative relations, both among scientists funded by the program and with scientists in other parts of the USGS, in Federal and State agencies, universities, and foreign countries.

Use of Cost and Performance Information

In 2007 the USGS will implement a VSIP/VERA for the National Research Program (NRP), which is funded largely by HR&D and encompasses research units at three major centers: Reston, Denver, and Menlo Park. This action is the result of an extensive workforce/staff planning effort that identified and quantified workforce requirements in the NRP. Changing program goals and priorities require a different balance of workforce skills to implement new strategic opportunities and directions. Also, restructuring and reduction of programmatic activities as a result of years of level funding, coupled with rising salary and other fixed costs, have reduced funds available for operational expenses. Programmatic restructuring will occur within the current organizational structure. Positions were identified for VSIP and VERA offers through analyses of workforce needs and funding projections for programs managed by the NRP.

The long-term goals of HR&D are —

- To understand ecological and biogeochemical processes in the context of the hydrologic cycle and of process responses to system perturbations, to enable discrimination between natural and human-induced changes, and to ensure effective water-availability, water-quality, and ecosystem management,
- To understand chemical and biochemical processes affecting organic and inorganic solutes and gases in aquatic systems to enable evaluation of water quality, helping managers make informed water-management decisions,

Hydrologic Monitoring, Assessments, and Research

- To understand the physical processes controlling the distribution and quality of the Nation's surface-water resources to improve flood and drought hazard mitigation,
- To understand the movement, availability, and transport of subsurface water in order to minimize further contamination of the Nation's ground waters, optimize aquifer remediation efforts, and ensure effective ground-water management,
- To understand stream-channel morphology and erosional processes governing the source, mobility, and deposition of sediment to ensure scientifically based management of rivers, dams, and reservoirs, and
- To understand long-term processes in small watersheds, including the effect of atmospheric and climatic variables, and provide water and land managers with information needed for water resources management.

The goals of HR&D support the Department's strategic plan, specifically the goal of improving the understanding of national ecosystems and resources through integrated interdisciplinary assessment. In conjunction with other USGS programs and an array of reimbursable projects funded by partner agencies, HR&D contributes to the outcome measures and PART program performance measures shown in the table at the end of this section.

2008 Program Performance

The 2008 budget request for HR&D is \$14,167,000 and 264 FTE. To fulfill their critical role in support of other USGS programs, scientists funded by HR&D —

- Provide training, workshops, reviews, and advice on water resource issues to respond to national, regional, and local needs,
- Provide specialized laboratory services, such as chemical and isotopic analyses and methods to characterize microbes,
- Develop new geophysical and geochemical techniques and numerical modeling tools, and
- Provide advice to USGS leadership on future program directions.

The program includes two components:

- Long-term interdisciplinary research (Estimates for FY 2006, \$13.4 million; FY 2007, \$13.7 million; FY 2008, \$14.2 million), and
- Short-term research to meet congressional priorities (Estimates for FY 2006, \$1.2 million; FY 2007, \$0; FY 2008, \$0).

The long-term interdisciplinary research funded by the program provides the core funding for the National Research Program (NRP) and the smaller Water, Energy, and Biogeochemical Budgets (WEBB) program. Both the NRP and the WEBB programs are also dependent on funding from other USGS programs, and they leverage their core funds with funds from other Federal and State agencies. These linkages ensure that research efforts are focused on

developing new concepts and future techniques and remain relevant to current USGS programs and Interior management responsibilities.

The 5-Year Plan for HR&D is being updated, with a goal of completion in 2007, to align with the bureau science strategies that were developed in 2006. Several forms of internal and external reviews are used to evaluate progress in the HR&D program. Plans and accomplishments of each scientific project are internally reviewed on a yearly basis. In addition, in-depth reviews of projects and associated personnel are conducted to examine: the relationship of project work to the USGS mission; productivity, relevance, and scientific impact; plans and goals for the next 5 years; and the expertise and responsibilities of project personnel. The Research Grade Evaluation Process, a double-tiered peer/research-manager review system, ensures that the progress of each research scientist funded by HR&D is thoroughly reviewed by other scientists and program managers at least once every 4 years. In addition, the National Academy of Sciences conducts reviews through its Committee on USGS Water Resources Research, parts of which apply to research funded by HR&D.

The FY 2008 planned activities listed below demonstrate the utility of products that are counted under the output measures for "systematic analyses and investigations delivered to customers" and "formal workshops or training provided to customers." They are all related to the "long-term interdisciplinary research" component of the HR&D program.

Yukon River Basin — Recent climate warming has accelerated permafrost thawing throughout the Yukon River basin. Thawing is making vast stores of frozen organic material available for hydrologic export to the Bering Sea or for decomposition and subsequent emission of carbon dioxide and methane to the atmosphere. Continued studies in the Yukon basin will focus on quantifying the terrestrial-aquatic-atmospheric interactions of organic carbon across watershed types and on projection of climate change effects on carbon cycling in subarctic ecosystems. Current estimates of carbon export to the Bering Sea are based on measurements made on the Yukon River at Pilot Station. Planned new studies in 2008 would focus on the transport and processing of carbon in the vast Yukon Delta region, downstream of Pilot Station and upstream of the five mouths of the Yukon River.

Climate Change — One of the most significant problems associated with climate change is the increased uncertainty in the global distribution and amount of precipitation and the resulting streamflow. This uncertainty has important potential effects on water resources for agriculture, industry, and domestic supply. In 2008, the USGS will develop improved computer models of the global climate system, and will use regional models to enhance understanding of conditions leading to climatological extremes and resultant hydrologic hazards, and regional and global climatic precursors of hydrologic events and hazards.

Nutrient Cycling, Biotic Response, and Mercury Contamination in the Lower Mississippi and Florida Everglades — The lower Mississippi receives considerable inputs of nutrients, especially nitrate, whereas the Florida Everglades receives considerable inputs of mercury. The USGS will conduct studies to monitor and assess the complex coupling between nutrient transport and removal mechanisms, biotic responses to excess nutrients, the consequent build-up of highly reactive carbon from decaying algal blooms, and the impact on mercury methylation. Improved understanding of these processes will allow better management of water and sediment resources and scientifically based responses to nutrient and mercury issues.

Drought — During the past several decades, the United States as a whole has been wetter than the long-term average, and although short-term (1–3 years) droughts have affected some

Hydrologic Monitoring, Assessments, and Research

parts of the Nation, prolonged droughts of the magnitude experienced during the 1930s and 1950s have not occurred. A USGS research effort in collaboration with scientists from the Midwestern Regional Climate Center, NOAA, State water agencies, and universities will characterize the development and persistence of drought in the conterminous United States. This study will be conducted in cooperation with the USGS Hydrologic Networks and Analysis and National Streamflow Information programs. The study objective is to provide a scientific basis that will allow improved, longer-term management of water resources across the Nation during both wet and dry periods.

New Techniques Related to Streamflow — Emerging and traditional technologies for the estimation of streamflow to assist in forecasting flood magnitudes will be evaluated and new methods are being developed. Studies will focus on flood data from the Southeast. A pilot study in the Arkansas–White–Red River Basin will make it possible for the USGS to improve the accuracy of calculated streamflow characteristics, thus improving the forecasting of flood magnitudes and travel times.

Development of a General Surface Flow and Sedimentation Model — In cooperation with the National Streamflow Information Program, HR&D scientists will develop a two-dimensional surface-water computer model as a precursor to increasingly complex models that will include features such as sediment transport, flow over dry areas, and dam-break flows. This work has a wide range of potential applications, ranging from the improved management of sediment transport in the Lower Mississippi to slow land loss and seawater encroachment in the wetlands, to the management or restoration of ecological environments in river systems.

Integrated Modeling of Ground-Water / Surface-Water Interactions — Traditionally, numerical models of ground-water and surface-water flow and transport have been conducted in isolation, at the expense of a proper description of their significant interactions and feedback effects. In 2008, the USGS will construct models that integrate ground-water/surface-water interactions and will apply these models to a diversity of water resource management problems, including "whole-system" management of watersheds and assessments of the potential impacts of ground-water pumping on streamflow. This effort will extend the capabilities and impact of current USGS-developed numerical models, such as MODFLOW and the Modular Modeling System.

Coalbed Methane Hydrology — The USGS will investigate and evaluate hydrological properties of fractured coal aquifers through a variety of geophysical logging techniques and observations. This effort will provide a better assessment of water storage and transport in areas of coalbed methane development, and will be coupled with geochemical investigations of the solutes and nutrients associated with waters produced during extraction of coalbed methane. Study results will help guide best management practices and provide fundamental improvements in the use of geophysical techniques and in understanding fractured-coal aquifers and nutrient reactions and transformations.

Program Performance Overview

Only one performance measure can be tied exclusively to HR&D (systematic analyses and investigations delivered to customers); however, in conjunction with the other programs in this subactivity and an array of reimbursable research projects, HR&D contributes to the PART measures listed below.

End Outcome Goal 1.4: Resource Protection: Improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment									
End Outcome Goal End Outcome Measure / Intermediate or PART Measure / PART Efficiency or other Outcome Measure	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
GPRA End Outcome Measures									
% targeted science products that are used by partners for land or resource management decisionmaking (SP)	UNK	UNK	UNK	UNK	UNK	≥90%	≥90%	0	≥90%
Intermediate Outcome Measures and Bureau and PART Outcome Measures Ensure availability of long-term environmental and natural resource information, data, and systematic analyses needed by land and resource managers for informed decisionmaking									
% of targeted contaminants for which methods are developed to assess potential environmental and human health significance (PART)	10%	20%	30%	85%	33%	33% (55/168)	40% (89/223)	+7%	73% (72/99)
Comments:	Change in 2008 is planned (not due to budget change).								
Contributing Programs:	Toxic Substances Hydrology, Hydrologic Research and Development.								
Intermediate Outcome Measures and Bureau and PART Outcome Measures Ensure the quality and relevance of science information and data to support decisionmaking									
Quality: X% of studies validated through appropriate peer review or independent review (SP)	100%	100% (35)	100% (32)	100% (30)	100% (30)	100% (32)	100% (30)	0	100% (30)
Intermediate Outcome Measures and Bureau and PART Outcome Measures									
Systematic analyses and investigations delivered to customers	UNK	35	32	30	30	32	30	-2	30
Total actual/projected cost (\$000)	UNK	\$14,000		\$12,000	\$12,000	\$12,800	\$12,000	\$800	
Actual/projected cost per scientific report or other product (whole dollars)	UNK	\$400,000		\$400,000	\$400,000	\$400,000	\$400,000	\$400,000	
Comments:	Difference between 2007 Plan and 2008 Plan is due to a difference in funding between the 2007 President's Budget and the 2007 CR that eliminates funding for unrequested earmarked studies.								

Hydrologic Monitoring, Assessments, and Research

End Outcome Goal 1.4: Resource Protection: Improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment									
End Outcome Goal End Outcome Measure / Intermediate or PART Measure / PART Efficiency or other Outcome Measure	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
	<p>Cost per scientific product is an average that includes the cost of writing, editing, peer review, and publication of each product, as well as the cost of the studies from which the products are derived. Non-Federal matching funds are included in the calculation.</p> <p>Difference between 2006 plan and 2006 enacted is due to the lag time at year's end in entering data in the reports tracking system, which shows how many scientific publications have been distributed to customers. Since year-end reporting is required before the end of September, publications distributed in the last few days of the month were missing from the year-end report. A later check of the reports tracking system showed that the year-end target was met and exceeded. (Additional publications that caused USGS to ultimately exceed targets included 34 products from the water programs that were provided to reimbursable customers as a result of additional work that was not factored into performance targets because the receipt of reimbursable funds occurred after performance targets were set.)</p>								
<p>Note: The 2007 plan is the performance level based upon a projection of 2007 likely enacted made during the first quarter of 2007. The 2008 plan and 2012 long-term targets build on the 2007 plan. To the extent Congress enacts a 2007 appropriation that is different from the 2007 projection, the 2008 plan and 2012 targets may require revision.</p>									

Activity: Water Resources Investigations

Subactivity: Hydrologic Monitoring, Assessments, and Research
Program Component: National Streamflow Information Program

	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
National Streamflow Information Program (\$000)	13,944	16,764	+531	+1,650	18,945	+2,181
<i>Total FTE</i>	<i>40</i>	<i>40</i>	<i>0</i>	<i>0</i>	<i>40</i>	<i>0</i>

Summary of 2008 Program Changes for National Streamflow Information Program

Request Component	(\$000)	FTE
• Fixed costs of national streamgaging network	+1,400	0
• Hazards Assessment and Mitigation Initiative	+250	0
TOTAL Program Changes	+1,650	0

Justification of 2008 Program Changes

The 2008 budget request for the National Streamflow Information Program is \$18,945,000 and 40 FTE, a program change of +\$1,650,000 and 0 FTE from the 2007 President's budget. The proposed change includes two parts:

- an increase of \$1,400,000 to fund fixed costs of Federally-funded streamgages in the national streamgaging network and to ensure continued operation of currently active streamgages that are part of the NSIP national network but funded in cooperation with others (in those cases where partners are no longer able to provide adequate funds), and
- an increase of \$250,000 for activities of the Hazards Assessment and Mitigation initiative in Southern California and the Gulf of Mexico.

Operational Costs of National Streamgaging Network (+\$1,400,000 / 0 FTE)

Some of this increase will be used to fully fund operational costs of streamgages in the national streamgaging network that are currently supported by USGS. These operational costs include such items as vehicle costs (acquisition, operation, and maintenance), equipment, supplies, and travel. Most of the rest of the increase will be used to either reactivate recently discontinued NSIP Federal-goal streamgages or to supplement funding for operation and maintenance of NSIP Federal-goal streamgages that are currently active but funded through partnerships with others in cases where there is inadequate funding to keep the streamgage active. The exact allocation of

Hydrologic Monitoring, Assessments, and Research

funds between these activities will not be known until late 2007 or early 2008, when partner contributions to network operations for 2008 are better known. This use of funds will help keep the network more stable and reduce the loss of streamgages in the future.

The USGS has the responsibility within the Federal government for collecting and disseminating information about flow in the Nation's rivers and streams. To do this, the USGS currently operates a network of about 7,300 streamgages nationwide that provides near-real time data critical to activities such as protecting life and property from floods; water resource assessment, planning, and management; habitat protection; recreation safety and enjoyment; and the engineering design required for planning of our Nation's infrastructure. The plan for a fully operational national streamgaging network was published and submitted to Congress in 1999 (*Streamflow Information for the Next Century*) and is available on the Web (<http://pubs.usgs.gov/of/2004/1263/>). Primary NSIP performance measures are based on this plan, and funding increases have been requested for 2007 and 2008 to further achievement of blueprint laid out in the plan.

The streamgaging network is supported by four funding sources: the USGS Cooperative Water Program, the USGS NSIP, other Federal agencies (primarily the Corps of Engineers), and about 800 State and local funding partners. The last two sources account for 70 percent of the streamgaging network funding; the NSIP funding is about 13 percent of what would be required to fully implement the program as planned.

The funding increase is needed because the current streamgaging network depends heavily on partner interests and funds. There can be significant year-to-year changes in individual streamgages in operation, including the loss of streamgages resulting from decreases in funding provided by partners. These changes cause instability in the network, which is currently demonstrated in that more than 200 streamgages across the Nation have recently been discontinued or are threatened to be discontinued in the near future, in addition to the loss of approximately the same number of streamgages from 2003 through 2005. Beginning in 2004, part of the NSIP Federal-goal national backbone network began to be affected by these losses. The instability in the network and the loss of streamgages are a concern to the users of streamflow information. The intent of this funding request is to help reverse this trend of increasing instability and critical streamgage loss. Although partner funding will continue to be affected by State and local financial issues and priorities, this funding increase for NSIP will help ensure that critically important streamgages within the national network are not lost due to rising operational costs in the short term. Recently deactivated streamgages will be restored, and currently active streamgages that are threatened to be discontinued can be maintained.

The proposed increase in NSIP funding of \$1,400,000 would be used to help meet the goals of NSIP described below under "Program Overview." Because most of the increase is intended to cover the impacts of inflation on non-

Use of Cost and Performance Information

The budget proposes an increase of \$1.4 million in NSIP for 2008 to ensure continued viability of the national streamgaging network. This proposal is based on several factors:

- The ability of NSIP to maintain the number of streamgages in operation (a key performance measure),
- Recommendations of an external task force that reviewed the Cooperative Water Program in 2006,
- Findings of a 2006 cost comparison study that compared USGS streamgage operations with those of two other organizations, and
- The need to continue meeting performance targets for the national streamgaging network, as shown in USGS and Department Strategic Plans.

pay items such as vehicles, gasoline, and equipment, much of the increase would be spent on streamgauge operation and maintenance, and no new FTE are requested.

The most critical investments would be to fully cover operational costs for the network, in addition to reactivating some recently discontinued streamgages and supplementing funding for critical streamgages that are threatened. This would help stabilize performance targets for two program performance measures:

- 6,297 real-time streamgages reporting in NWISWeb, and
- 84 percent of Nation's river basins have streamgages (assumes all reactivated streamgages are in basins with no currently active streamgages).

These changes are in accordance with the recommendations of the National Research Council's Committee on Water Resources Research, which completed an assessment of the USGS plans for NSIP at the end of 2004. The Committee's report said, "Overall, the Committee concludes that the National Streamflow Information Program is a sound, well-conceived program that meets the Nation's needs for streamflow measurement, interpretation, and information delivery."

The NRC report recommended increased Federal support of a base streamgaging network to assure long-term viability of the network for meeting national needs. This budget proposal for 2008 takes a step in that direction, providing funds adequate to cover inflation so that valuable streamgages are not lost due to the level of support provided through the USGS NSIP.

Hazards Assessment and Mitigation Initiative

(+\$250,000 / 0 FTE)

More Americans are at risk from being severely impacted by natural hazards now than at any other time in our Nation's history. In the United States each year, natural hazards cause hundreds of deaths and cost tens of billions of dollars in disaster aid, disruption of commerce and destruction of homes and critical infrastructure. The FY 2008 hazards initiative is part of a larger multi-hazard, multi-year proposal, linking research results and data with information dissemination to provide an integrated approach to hazards research, warning, and mitigation. This initiative relies and builds on ongoing work in USGS hazards programs. The hazards initiative will continue and enhance the work started in the 2007 Integrated Multi-Hazards demonstration project in Southern California and will use the concepts and lessons learned from that project and apply them to hazards and areas not emphasized in the demonstration project. New work will focus on hurricane science for the Gulf Coast.

Southern California (+\$100,000) has one of the Nation's highest potentials for extreme, catastrophic losses from natural hazards such as earthquakes, tsunamis, fires, landslides, and floods. Estimates of expected losses from these hazards in the eight counties of Southern California exceed \$3 billion per year. These numbers are expected to increase as the present population of 20 million grows at more than 10 percent per year.

The goal of the Demonstration Project being initiated in FY 2007 is to reduce losses from natural hazards by developing better hazards science and facilitating the application of that science to decisionmaking in Southern California. Additional work proposed for FY 2008 would build upon that foundation. The USGS will work with collaborators to guide the direction of future research and to apply the results of scientific research to loss reduction. Partners include

Hydrologic Monitoring, Assessments, and Research

State, county, city, and public lands government agencies, public and private utilities, industry, academic researchers, FEMA, NOAA, USFS, BLM, and local emergency response agencies.

Specific capabilities and products provided by this initiative in 2008 will include 3 new streamgages with the ability to transmit data in real time via satellite telemetry. These streamgages will be added to the Southern California network to fill critical gaps in areal coverage. The data from these streamgages are used in flood, landslide, and debris-flow forecasting and warning.

The Nation's coastal areas (+\$150,000) are particularly vulnerable to the impacts of hurricanes. These impacts include flooding from coastal storm surge and inland rivers; damage to physical features such as barrier islands, mainland beaches, wetlands and estuaries that provide the first line of defense when a hurricane strikes; and, as the hurricane moves inland, catastrophic landslides in mountainous areas. Current forecasts suggest that the frequency and magnitude of hurricanes making landfall in this region in coming years is likely to remain elevated relative to the past several decades. In addition, there are more lives and property at risk now than even a decade ago because of recent rapid population growth in coastal regions. In the aftermath of the historic hurricane seasons of 2004 and 2005 a substantial effort is needed to improve the science and information base for forecasting and responding to hurricane impacts to this most vulnerable of coastal settings, and partnerships at the Federal, State, and local level are critical for the success of such an effort.

Specific capabilities and products provided by this initiative will include —

- A storm-surge monitoring network for deployment in vulnerable coastal areas to provide improved data for models that forecast floods and hurricane impacts. This effort will lead to more timely and accurate evacuation notices, better engineering designs for levees, and a more robust basis for land-use and development decisions.
- Web-based data and map integration tools and statistical techniques to improve estimates of hurricane flood risk. The resulting models would enable the user to calculate streamflow probabilities, and particularly the probability of flooding, for ungaged streams and adjacent lands.

National Streamflow Information Program

Program Performance Change

	2004 Actual	2005 Actual	2006 Actual	2007 CR ¹	2008 Base Budget (2007 PB + Fixed Costs)	2008 Plan	Program Change Accruing in 2008	Program Change Accruing in Outyears
					A	B=A+C	C	D
Content and expanse of knowledge base — % of proposed streamflow sites currently in operation that meet one or more Federal needs (denominator = 4,425) (PART) (SP)	64% (2,832)	61% (2,700)	62% (2,742)	62% (2,742)	62% (2,742)	64% (2,832)	+2% (+90)	0
# real-time streamgages reporting in NWISWeb	5,978	6,246	6,496	6,195	6,194	6,297	+103	0
Total actual/projected cost (\$000)	\$80,703	\$84,321	\$87,696	\$83,633	\$86,716	\$88,158	+\$1,442	
Actual/projected cost per streamgage (national average) whole dollars)	\$13,500	\$13,500	\$13,500	\$13,500	\$14,000	\$14,000	\$14,000	
Comments	<p>The +103 change from the 2008 base is a result of the proposed increase for NSIP streamgage operations (+100) and the proposed increases for Hazards Assessment and Mitigation (+3).</p> <p>Cost is a national average that includes operation and maintenance, salary and transportation for technicians who perform site visits, salary for records management and validation, and a small amount for replacement of equipment when a gage is disabled by lightning strike or other event. This replacement of equipment does not include replacement of gages that are lost in large numbers during floods or hurricanes. In practice, the cost of an individual streamgage varies depending on the size of the stream, type of terrain, need for cableways or other specialized equipment at the site, and distance of each site from the nearest USGS office.</p> <p>Most of the +103 streamgages will be reactivated, rather than completely new gages. A completely new gage incurs construction costs ranging from \$25,000–\$30,000, plus 6 months of operation (average of about \$7,000); after the first year the new streamgages reverts to the national average cost of \$14,000.</p>							
% of Nation's river basins that have streamflow stations (PART) (denominator = 2,223 river basins defined by 8-digit hydrologic unit codes)	77% (1,712)	82% (1,825)	81% (1,800)	84% (1,870)	83% (1,845)	84% (1,870)	+1% (+25)	0
Total actual/projected cost (\$000)	\$23,112	\$24,638	\$24,300	\$25,245	\$25,830	\$26,180	+\$350	
Actual/projected cost per hydrologic unit (8-digit hydrologic unit codes) (whole dollars)	\$13,500	\$13,500	\$13,500	\$13,500	\$14,000	\$14,000	\$14,000	
Comments	<p>Assumes a single streamgage in each basin, where 2,223 basins are defined nationwide by 8-digit hydrologic unit codes; however, many basins require more than one streamgage to accurately assess conditions. This metric may never attain 100% because not all basins may require streamflow data (e.g., a basin with no population may not require any assessment of flood risk or land use changes).</p>							

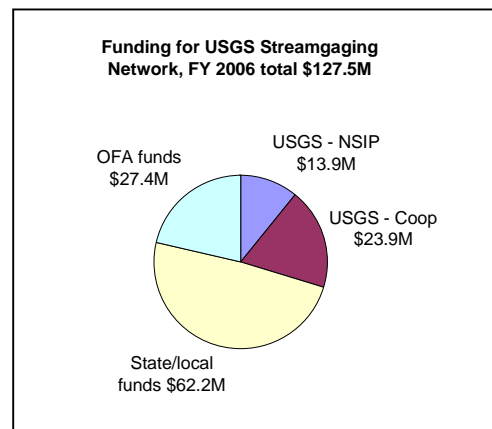
Hydrologic Monitoring, Assessments, and Research

	2004 Actual	2005 Actual	2006 Actual	2007 CR ¹	2008 Base Budget (2007 PB + Fixed Costs)	2008 Plan	Program Change Accruing in 2008	Program Change Accruing in Outyears
					A	B=A+C	C	D
# systematic analyses & investigations delivered to customers	0	0	0	0	0	0	0	2
Comments	+2 systematic analyses accrue in 2009 due to increase proposed for the 2008 Hazards Mitigation and Assessment initiative. Cost data are not available for this measure because this program has never counted publications products before. An average cost across the entire Water Resources Investigations budget activity is \$400,000 per scientific publication or other product; however, the products generated by the Hazards Mitigation and Assessment initiative are expected to be less costly.							
¹ The performance and cost data in the 2007 CR column is presented at the 2007 plan level, which is based upon a projection of 2007 likely enacted made during the first quarter of 2007. The 2008 plan builds on the 2007 plan. To the extent Congress enacts a 2007 appropriation that is different from the 2007 projection, the 2008 plan may require revision. Note: Projected costs may not equal program change as these are full costs, which may include funds from other sources and (or) use averages. Column A: The level of performance and costs expected in 2008 at the 2007 President's budget level plus funded fixed costs. Reflects the impact of prior year funding changes, management efficiencies, absorption of prior year fixed costs, and trend impacts, but does not reflect the proposed program change. Column D: Outyear performance beyond 2008 addresses lagging performance — those changes occurring as a result of the program change (not total budget) requested in 2008. It does <u>not</u> include the impact of receiving the program change again in a subsequent outyear.								

Program Overview

The mission of NSIP is to provide the streamflow information and understanding required to meet national, regional, State, and local needs. To meet this mission, NSIP has five major program objectives:

- Develop an enhanced streamgaging network in which there is a baseline of about 4,700 streamgages to meet national needs that are fully funded by Federal sources, supplemented by streamgages that are funded in partnerships to meet local needs.
- Improve streamflow data delivery to users. This includes redundant data delivery systems to ensure the continued availability of data during catastrophic events and improved storage, retrieval, and data analyses abilities.
- Evaluate streamflow information and characteristics through regional assessments.
- Improve data collection and analysis for floods and droughts.
- Research and develop new procedures, equipment, and techniques for obtaining and analyzing streamflow information.



USGS flood hazard experts work closely with local, State, and Federal partners, in pursuit of the national goals of reducing the toll of natural disasters and building disaster-resilient communities. The streamflow information produced by the USGS is crucial to the success of

the NWS Advanced Hydrologic Prediction Services and the FEMA's floodplain map modernization initiative that began in FY 2003. Neither of these programs designed to save lives and property from flooding can be successful without the streamflow information provided by the USGS NSIP.

NSIP Federal goal streamgages reflect that portion of the national streamgaging network that is planned to be funded exclusively by the USGS and, therefore, that part of the network over which the USGS maintains maximum control. NSIP is the Federal core of the national streamgaging program that helps to assure stability of long-term data collection. In addition to NSIP funding, support for the network is supplied by other Federal agencies and by 800 State, local, municipal, and tribal partners through the Cooperative Water Program. The shared funding and single-agency operation of the USGS network provides high-quality information to all potential users, for a wide variety of uses, at low cost to the Federal Government. Because a single agency operates this network, data are collected using nationally consistent methods, which enables comparability of data across jurisdictional boundaries and acceptance of results by water management agencies and courts at all levels of government. Operation of the national network by a single agency also helps to minimize the costs of providing the needed streamflow information by consolidating the data collection and information management infrastructure required.

The goals of NSIP support the Department's strategic plan, specifically the goal of improving the understanding of national ecosystems and resources through integrated interdisciplinary assessment. In conjunction with the Cooperative Water Program, Hydrologic Networks and Analysis, and an array of reimbursable projects funded by partner agencies, NSIP contributes to the outcome measure and PART performance measures shown in the table at the end of this section.

Streamgaging Cost Evaluation

The USGS recently completed an evaluation of the cost of the USGS streamgaging program compared to two State agencies and one regional water agency. The evaluation showed that the USGS costs for providing the streamflow information were slightly higher than the non-Federal agencies. Much of the higher USGS cost was attributed to factors involving managing a program with over 800 partners and to support national level services and infrastructure.

The evaluation showed that other factors affecting the cost included the quality and availability of the streamflow information that was affected by the purposes of the data collection. For example, some agencies collect the data for immediate use but do not maintain the historical archives that enable analysis of long-term trends, which are vital for determining the 100-year flood risk and for forecasting water availability as it relates to changes in climate or land use. Some other agency streamgages are used only for specific purposes, such as low-flow analyses, so less effort is invested in high flow measurements. At all USGS streamgages, the information is collected to support all uses.

Based on this analysis, there is an indication that this program is operating in the most cost-efficient way currently possible. The USGS, however, continues to study the issue and will seek additional cost efficiencies where possible. Meanwhile, funding adjustments will be needed to keep program performance level in the face of rising costs, which historically have increased about 3.8 percent per year.

2008 Program Performance

The 2008 budget request for NSIP is \$18,945,000 and 40 FTE, a program change of +\$1,650,000 and 0 FTE from the 2007 President's budget. The most critical 2008 investments would be to fully cover operational costs for the network. Program activities for FY 2008 fall into the following major categories:

Hydrologic Monitoring, Assessments, and Research

- Maintain and operate a nationwide Federal-interest streamgaging network for measuring streamflow and related environmental variables (precipitation, temperature) reliably and continuously in time (Estimates for FY 2006, \$8.3 million; FY 2007, \$9.6 million; FY 2008, \$11.7 million),
- Provide a better understanding of hydrologic extremes (floods and droughts) by more intensive data collection during and immediately following the event and analyses of the information collected (Estimates for FY 2006, \$0.1 million; FY 2007, \$0.1 million; FY 2008, \$0.1 million),
- Provide periodic assessments and interpretation of streamflow information on a regional scale (Estimates for FY 2006, \$0.1 million; FY 2007, \$0.1 million; FY 2008, \$0.1 million),
- Develop, implement, and maintain a highly reliable system for real-time streamflow information delivery to customers that includes data processing, quality assurance, storage, and easy access (Estimates for FY 2006, \$1.3 million; FY 2007, \$1.6 million; FY 2008, \$1.3 million),
- Investigate, develop, and implement new methodologies and equipment to more accurately, safely, and inexpensively obtain and deliver streamflow information (Estimates for FY 2006, \$1.2 million; FY 2007, \$1.2 million; FY 2008, \$1.3 million),
- Program coordination (Estimates for FY 2006, \$0.4 million; FY 2007, \$0.4 million; FY 2008, \$0.6 million),
- Technical support for geographically distributed USGS water resources studies and data collection activities, including mechanisms for quality control, technology transfer, and priority setting (Estimates for FY 2006, \$2.5 million; FY 2007, \$2.5 million; FY 2008, \$2.7 million), and
- Integrated Multi-Hazards Demonstration Project (Estimates for FY 2006, \$0; FY 2007, \$0.9 million; FY 2008, \$1.1 million).

The 5-Year Plan for NSIP is being updated, with a goal of completion in 2007, to align with the bureau science strategies that were developed in 2006.

In addition to 2008 efforts to stop or reverse the decreasing trend in the number of active NSIP Federal-goal streamgages, a notable evaluation and analysis of streamgaging costs will conclude with the publication of a report comparing the costs and products of the USGS streamgaging program to three non-Federal agencies' streamgaging programs.

In a related budget proposal, in 2008, the Hydrologic Networks and Analysis Program includes \$500,000 for streamgages to advance creation of the National Water Quality Monitoring Network for U.S. Coastal Waters and their Tributaries, as called for in the Ocean Action Plan (see the write-up for Hydrologic Networks and Analysis, which begins on page I – 43).

Program Performance Overview

There are no performance measures that can be tied exclusively to NSIP; however, in conjunction with the Cooperative Water Program, Hydrologic Networks and Analysis, and an array of reimbursable projects funded by 800 partner agencies, NSIP contributes to all the measures listed below.

End Outcome Goal 1.4: Resource Protection: Improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment									
End Outcome Goal End Outcome Measure / Intermediate or PART Measure / PART Efficiency or other Outcome Measure	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
GPRA End Outcome Measures									
% targeted science products that are used by partners for land or resource management decisionmaking (SP)	UNK	UNK	UNK	UNK	UNK	≥90%	≥90%	0	≥90%
Intermediate Outcome Measures and Bureau and PART Outcome Measures									
Ensure availability of long-term environmental and natural resource information, data, and systematic analyses needed by land and resource managers for decisionmaking									
Content and expanse of knowledge base — % of proposed streamflow sites currently in operation that meet one or more Federal needs (denominator = 4,425) (PART) (SP)	64% (2,832)	61% (2,700)	62% (2,742)	62% (2,742)	62% (2,742)	62% (2,742)	64% (2,832)	+2% (+90)	64% (2,832)
Comments:	The change from the 2007 plan is a result of the proposed increase for NSIP streamgauge operations and the proposed increases for Hazards Assessment and Mitigation.								
Contributing Programs:	NSIP, Hydrologic Networks and Analysis, Cooperative Water Program (USGS and State/local contributions), reimbursements from other Federal agencies.								
% of river basins that have streamflow stations (PART) (denominator = 2,223 river basins, as defined by 8-digit hydrologic unit codes)	77%	82% (1,825)	81% (1,800)	81% (1,800)	84% (1,870)	84% (1,870)	84% (1,870)	0	72% (1,606)
Total actual/projected cost (\$000)	\$24,637		\$24,300		\$25,245	\$25,245	\$26,180		
Actual/projected cost per river basin (defined by 8-digit hydrologic unit codes) (whole dollars)	\$13,500		\$13,500		\$13,500	\$13,500	\$14,000		
Comments:	Assumes a single streamgauge in each basin, where 2,223 basins are defined nationwide by 8-digit hydrologic unit codes; however, many basins require more than one streamgauge to accurately assess conditions. This metric may never attain 100% because not all basins may require streamflow data (e.g., a basin with no population may not require any assessment of flood risk or land use changes).								
Contributing Programs:	NSIP, Cooperative Water Program (USGS and State/local contributions), reimbursements from other Federal agencies.								

Hydrologic Monitoring, Assessments, and Research

End Outcome Goal 1.4: Resource Protection: Improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment									
End Outcome Goal End Outcome Measure / Intermediate or PART Measure / PART Efficiency or other Outcome Measure	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
% of States with Web-based Streamflow statistics tools to support water management decisions (PART) (denominator = 50 States)	4%	10% (5)	18% (9)	14% (7)	20% (10)	20% (10)	25% (12.5)	+5%	30% (15)
Comments:	Cooperative Water Program funding limitations have slowed progress on jointly funded streamstats projects at the State level, causing USGS to not meet the 2006 target for this measure. See http://water.usgs.gov/osw/streamstats/ssonline.html for current national status. Changes in 2008 and 2012 planned (not due to budget increase).								
Contributing Programs:	NSIP, Hydrologic Networks and Analysis, Coop Water Program.								
PART Efficiency and Other Outcome Measures									
# systematic analyses & investigations delivered to customers	0	0	0	0	0	0	0	0	0
Comments:	+2 systematic analyses accrue in 2009 due to increase proposed for the 2008 Multi-Hazards initiative, as shown on Program Performance Change table. Cost data are not available for this measure because this program has never counted publications products before. An average cost across the entire Water Resources Investigations budget activity is \$400,000 per scientific publication or other product; however, the products generated by the Hazards Mitigation and Assessment initiative are expected to be less costly.								
# real-time streamgages reporting in NWISWeb	5,978	6,246	6,165	6,496	6,195	6,195	6,297	+102	6,297
Total actual/projected cost (\$000)	\$80,703	\$84,321		\$87,696	\$83,633	\$83,633	\$88,158	+\$1,428	
Actual/projected cost per streamgauge (national average) (whole dollars)	\$13,500	\$13,500		\$13,500	\$13,500	\$13,500	\$14,000	\$14,000	
Comments:	Target was exceeded in 2006 due to receipt of additional reimbursements from partner agencies. Change in 2008 is due to increase in NSIP. The +103 change from the 2007 plan is a result of the proposed increase for NSIP streamgauge operations (+100) and the proposed increases for Hazards Assessment and Mitigation (+3). Cost is a national average that includes operation and maintenance, salary and transportation for technicians who perform site visits, salary for records management and validation, and a small amount for replacement of equipment when a gage is disabled by lightning strike or other event. This replacement of equipment does not include replacement of gages that are lost in large numbers during floods or hurricanes. In practice, the cost of an individual streamgauge varies depending on the size of the stream, type of terrain, need for cableways or other specialized equipment at the site, and distance of each site from the nearest USGS office.								

National Streamflow Information Program

End Outcome Goal 1.4: Resource Protection: Improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment									
End Outcome Goal End Outcome Measure / Intermediate or PART Measure / PART Efficiency or other Outcome Measure	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
	Most of the +103 streamgages will be reactivated, rather than completely new gages. A completely new gage incurs construction costs ranging from \$25,000–\$30,000, plus 6 months of operation (average of about \$7,000); after the first year the new streamgages reverts to the national average cost of \$14,000.								
Contributing Programs:	NSIP, Hydrologic Networks and Analysis, Cooperative Water Program (USGS and State/local contributions), reimbursements from other Federal agencies.								
% of WRD streamflow stations with 30 or more years of record (PART) (denominator = number of real-time streamgages reporting in NWISWeb)	60% (baseline)	58% (3,622 / 6,246)	62% (3,822 / 6,165)	59% (3,833 / 6,496)	63% (3,902 / 6,195)	63% (3,902 / 6,195)	62% (3,913 / 6,297)	-1% (+11)	65% (3,571 / 5,493)
Total actual/projected cost (\$000)	\$48,897		\$51,597		\$52,677	\$52,677	\$54,782	+\$14	
Actual/projected cost per streamgage (national average) (whole dollars)	\$13,500		\$13,500		\$13,500	\$13,500	\$14,000	\$14,000	
Comments:	Percentage decreases in 2008 because of a change in the denominator, due to addition of new streamgages to the network. As new streamgages are added, the percentage of streamgages with 30 years of record decreases.								
Contributing Programs:	NSIP, Cooperative Water Program (USGS and State/local contributions), reimbursements from other Federal agencies.								
Note: The 2007 plan is the performance level based upon a projection of 2007 likely enacted made during the first quarter of 2007. The 2008 plan and 2012 long-term targets build on the 2007 plan. To the extent Congress enacts a 2007 appropriation that is different from the 2007 projection, the 2008 plan and 2012 targets may require revision.									

This page intentionally left blank.

Activity: Water Resources Investigations

Subactivity: Hydrologic Monitoring, Assessments, and Research
Program Component: Hydrologic Networks and Analysis

	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Hydrologic Networks and Analysis (\$000)	29,358	28,251	+927	+1,500	30,678	+2,427
<i>Total FTE</i>	<i>217</i>	<i>212</i>	<i>0</i>	<i>+5</i>	<i>217</i>	<i>+5</i>

Summary of 2008 Program Changes for Cooperative Water Program

Request Component	(\$000)	FTE
• National Water Quality Monitoring Network	+1,500	+5
TOTAL Program Changes	+1,500	+5

Justification of 2008 Program Changes

The 2008 budget request for Hydrologic Networks and Analysis is \$30,678,000 and 217 FTE, a program change of +\$1,500,000 and +5 FTE from the 2007 President's budget.

National Water Quality Monitoring Network (NWQMN) (+\$1,500,000 / +5 FTE)

The program increase continues USGS efforts to implement the President's Ocean Action Plan (OAP) and to engage in interagency efforts to advance the implementation strategy of the Ocean Research Priorities Plan in support of the Near-term Priorities identified therein. The FY 2008 proposed activities address the Department's Resource Protection strategic goal in support of the end outcome goal: "improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment." This increase complements a related increase in the Coastal and Marine Geology Program (\$1,500,000), and both increases are coordinated with new, complementary efforts in the NOAA and the EPA.

This increase permits the initial implementation of the National Water Quality Monitoring Network ("the Network") called for in the OAP and defined through the efforts of some 40 Federal, State, and local agencies, monitoring associations, or professional organizations including the USGS, EPA, and NOAA and described in the plan entitled, "National Water Quality Monitoring Network for U.S. Coastal Waters and their Tributaries." This plan, approved by members of the Advisory Committee on Water Information (ACWI) and by the Council on Environmental Quality, National Science and Technology Council (CEQ/NSTC), provides for interagency pilot studies in FY 2007 to inventory existing monitoring assets, identify gaps between network design specifications and current data collection, refine the Network's observational and data sharing requirements, and identify next steps for Network implementation. The FY 2008 proposed increase (\$1,500,000 to Hydrologic Networks and

Hydrologic Monitoring, Assessments, and Research

Analysis) will provide \$1,000,000 for assessments needed to advance the NWQMN and \$500,000 for streamgages to advance the creation of the NWQMN. FY 2008 activities supported by the proposed increase will build upon pilot study results leading to demonstration projects designed to reveal the feasibility of the Network, refine observational parameters and temporal and geographic sampling frequencies and scales, and develop data sharing, summarization, and reporting methodologies.

An integrated overview of activities related to the OAP, including this proposed increase and the related increase proposed for the Coastal and Marine Geology Program, is presented in the Science on the Landscape section, which begins on page F-1.

Program Performance Change

	2004 Actual	2005 Actual	2006 Actual	2007 CR ¹	2008 Base Budget (2007 PB + Fixed Costs)	2008 Plan	Program Change Accruing in 2008	Program Change Accruing in Outyears
					A	B=A+C	C	D
# real-time water-quality sites reporting in NWISWeb	1,062	1,125	1,102	887	887	See comments below		
Comments	The most likely performance impact from the +\$1.5 million increase requested for the National Water Quality Monitoring Network is the addition of new water-quality monitoring sites. However, the number of sites will not be known until an evaluation and gap analysis of current regional water quality monitoring networks is completed, later in 2007 (for example, the analysis might indicate that rain gages are needed, rather than stream-based water-quality sampling sites). This approach to the Network design has been approved by CEQ/NSTC and the interagency ACWI, as noted above in the Justification of 2008 Program Changes section.							
Content and expanse of knowledge base — % of proposed streamflow sites currently in operation that meet one or more Federal needs (denominator = 4,425) (PART) (SP)	64% (2,832)	61% (2,700)	62% (2,742)	62% (2,742)	62% (2,742)	64% (2,832)	+2% (+90)	0
# real-time stream-gages reporting in NWISWeb	5,978	6,246	6,496	6,195	6,194	6,297	+103	0
Total actual/projected cost (\$000)	\$80,7033	\$84,321	\$87,696	\$83,633	\$86,716	\$88,158	+\$1,442	
Actual/projected cost per stream-gage (national average) (whole dollars)	\$13,500	\$13,500	\$13,500	\$13,500	\$14,000	\$14,000	\$14,000	
Comments	Change in 2008 is due to increase in NSIP (see page I - 31-33). Cost is a national average that includes operation and maintenance, salary and transportation for technicians who perform site visits, salary for records management and validation, and a small amount for replacement of equipment when a gage is disabled by lightning strike or other event. This equipment replacement does not include replacement of gages lost in large numbers during floods or hurricanes. In practice, the cost of an individual streamgage varies depending on size of the stream, type of terrain, need for cableways or other specialized equipment at the site, and distance of each site from the nearest USGS office.							
¹ The performance and cost data in the 2007 CR column is presented at the 2007 plan level, which is based upon a projection of 2007 likely enacted made during the first quarter of 2007. The 2008 plan builds on the 2007 plan. To the extent Congress enacts a 2007 appropriation that is different from the 2007 projection, the 2008 plan may require revision.								

Hydrologic Networks and Analysis

	2004 Actual	2005 Actual	2006 Actual	2007 CR ¹	2008 Base Budget (2007 PB + Fixed Costs)	2008 Plan	Program Change Accruing in 2008	Program Change Accruing in Outyears
					A	B=A+C	C	D

Note: Projected costs may not equal program change as these are full costs, which may include funds from other sources and (or) use averages.

Column A: The level of performance and costs expected in 2008 at the 2007 President's budget level plus funded fixed costs. Reflects the impact of prior year funding changes, management efficiencies, absorption of prior year fixed costs, and trend impacts, but does not reflect the proposed program change.

Column D: Outyear performance beyond 2008 addresses lagging performance — those changes occurring as a result of the program change (not total budget) requested in 2008. It does not include the impact of receiving the program change again in a subsequent outyear.

Program Overview

Data on the quantity and quality of water in the Nation's streams, lakes, and aquifers, as well as analytical studies, are necessary for the wise planning, development, utilization, and protection of the Nation's water resources. The Federal funds appropriated through the Hydrologic Networks and Analysis (HNA) program support three distinct water-quality networks described below, selected hydrologic analysis and modeling activities, and a small but vital portion of the overall information delivery activity of the USGS water resources programs.

The HNA program supports the Department's strategic plan, specifically the goal of improving the understanding of national ecosystems and resources through integrated interdisciplinary assessment. In conjunction with other USGS programs and an array of reimbursable projects funded by partner agencies, HNA contributes to the outcome measure and PART program performance measures shown in the table at the end of this section.

2008 Program Performance

The 2008 budget request for HNA is \$30,678,000 and 217 FTE, a program change of +\$1,500,000 and +5 FTE from the 2007 President's budget. HNA includes four major components:

- **Hydrologic Networks** — Long-term national networks for the collection of data on water quality and acid precipitation, including the National Stream Quality Accounting Network, the Hydrologic Benchmark Network, and the National Atmospheric Deposition Program / National Trends Network. This program component also includes activities related to the newly proposed National Water Quality Monitoring Network. (Estimates for FY 2006, \$4.4 million; FY 2007, \$4.5 million; FY 2008, \$6.1 million)
- **Hydrologic Analysis** — Studies of climate variability and change, watershed modeling activities in support of the BOR, USGS science for the NPS, DOI Cost-Share (which pays the portion of indirect costs not covered by the standard overhead charge on reimbursable projects that the USGS water programs conduct for other Interior bureaus), support for the USGS National Research Program in the hydrologic sciences, and support for the USGS Priority Ecosystems Science program. (Estimates for FY 2006, \$11.8 million; FY 2007, \$10.4 million; FY 2008, \$10.8 million)

Hydrologic Monitoring, Assessments, and Research

- **Information Delivery** — Delivery of results and water information beyond the immediate needs of funding agencies or programs (the USGS funds the delivery of basic hydrologic data directly as a part of the overall cost of the data collection). This activity has two pieces: publications and the computer-based National Water Information System. This component of the HNA program also supports activities of the ACWI and its subcommittees. (Estimates for FY 2006, \$5.6 million; FY 2007, \$5.7 million; FY 2008, \$5.9 million)
- **Technical Support** — National technical support for geographically distributed USGS water-resources studies, including quality control to assure the technical excellence of water resources programs. Technical support also provides a structured way of transferring new technology to USGS investigative and data activities that are primarily conducted in the USGS Water Science Centers located in each State, and a formal way of establishing priorities for water-resources research by the USGS. (Estimates for FY 2006, \$7.1 million; FY 2007, \$7.2 million; FY 2008, \$7.4 million)

The objectives of these program components are as follows:

- Monitor the chemical quality of rain and snowfall,
- Monitor streamflow and the water quality of streams and ground water to fulfill USGS obligations for specific river basin compacts and treaties,
- Provide direct technical support to Interior bureaus for hydrologic concerns,
- Understand the impacts of global climate change; monitor long-term changes in streamflow and stream quality at sites relatively unaffected by human activities,
- Provide direct technical support to the NPS for water-quality concerns,
- Monitor the water quality and trends of selected major rivers,
- Maintain and enhance USGS data delivery systems to process and disseminate water data and study results, and
- Develop decision-support systems for specific river basins in the western United States.

Some of these activities (such as monitoring) are fairly fixed and will not change for a number of years. Others have some flexibility in planning and implementation. The 5-Year Plan for HNA is being updated, with a goal of completion in 2007, to align with the bureau science strategies that were developed in 2006.

Because of the wide range of activities funded by HNA, the water-quality data and analytical information that the USGS provides through this program are used by a variety of stakeholders, including other Interior bureaus (through the NPS water quality partnership and the DOI Cost-Share), EPA and USDA (both customers for baseline water-quality information), Department of Commerce (for real-time flood level information provided

New Activities for 2008 Related to the Ocean Action Plan

The next phase of the National Water-Quality Monitoring Network will include demonstration studies that will begin in FY 2008.

During that phase, one or more regional networks (most likely those participating in the 2007 pilot projects) will be redesigned or augmented to address data gaps identified through the pilot projects by adding sensors in the field, collecting and analyzing additional environmental parameters (or sampling existing parameter suites more frequently or more densely), improving data management and sharing, or other activities that move existing demonstration study area networks toward functionalities described in the Network design.

through the National Water Information System, which this program supports), State and local governments (for both water-quality and flood level information), academia, consulting and advocacy organizations, industry, and private citizens.

Hydrologic Monitoring, Assessments, and Research

Program Performance Overview

End Outcome Goal 1.4: Resource Protection: Improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment									
End Outcome Goal End Outcome Measure / Intermediate or PART Measure / PART Efficiency or other Outcome Measure	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
GPRA End Outcome Measures									
% targeted science products that are used by partners for land or resource management decisionmaking (SP)	UNK	UNK	UNK	UNK	UNK	≥90%	≥90%	0	≥90%
Intermediate Outcome Measures and Bureau and PART Outcome Measures									
Ensure the quality and relevance of science information and data to support decisionmaking									
Quality: X% of studies validated through appropriate peer review or independent review (SP)	100%	100% (65)	100% (64)	100% (64)	100% (64)	100% (63)	100% (64)	+1	100% (62)
Intermediate Outcome Measures and Bureau and PART Outcome Measures									
Ensure availability of long-term environmental and natural resource information, data, and systematic analyses needed by land and resource managers for decisionmaking									
Content and expanse of knowledge base — % of proposed streamflow sites currently in operation that meet one or more Federal needs (denominator = 4,425) (PART) (SP)	64% (2,832)	61% (2,700)	62% (2,742)	62% (2,742)	62% (2,742)	62% (2,742)	64% (2,832)	+2% (+90)	64% (2,832)
Comments:	The change from the 2007 plan is a result of the proposed increase for NSIP streamgange operations and the proposed increases for Hazards Assessment and Mitigation (see page I - 31-33).								
Contributing Programs:	NSIP, Hydrologic Networks and Analysis, Cooperative Water Program (USGS and State/local contributions), reimbursements from other Federal agencies.								
PART Efficiency and Other Output Measures									
# systematic analyses & investigations delivered to customers	UNK	65	64	64	64	63	64	+1	62
Total actual/projected cost (\$000)	\$26,000		\$25,600		\$25,600	\$25,200	\$25,600	+400	
Actual/projected cost per scientific report or other product (whole dollars)	\$400,000		\$400,000		\$400,000	\$400,000	\$400,000	\$400,000	
Comments:	Change from 2007 plan to 2008 is due to impact of CR. Cost per scientific product is an average that includes the cost of writing, editing, peer review, and publication of each product, as well as the cost of the studies from which the products are derived. Non-Federal matching funds are included in the calculation. Difference between 2006 plan and 2006 enacted is due to the lag time at year's end in entering data in the reports tracking system, which shows how many scientific publications have been distributed to customers. Since year-end reporting is required before the end of September, publications distributed in the last few days of the month were missing from the year-end report. A later check of the reports tracking system showed that the year-end target was met and								

Hydrologic Networks and Analysis

End Outcome Goal 1.4: Resource Protection: Improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment									
End Outcome Goal End Outcome Measure / Intermediate or PART Measure / PART Efficiency or other Outcome Measure	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
	exceeded. (Additional publications that caused USGS to ultimately exceed targets included 34 products from the water programs that were provided to reimbursable customers as a result of additional work that was not factored into performance targets because the receipt of reimbursable funds occurred after performance targets were set.)								
# real-time streamgages reporting in NWISWeb	5,978	6,246	6,165	6,496	6,195	6,195	6,297	+102	6,297
Total actual/projected cost (\$000)	\$80,7033	\$84,321		\$87,696	\$83,633	\$83,633	\$88,158	+\$1,428	
Actual/projected cost per streamgage (national average) (whole dollars)	\$13,500	\$13,500		\$13,500	\$13,500	\$13,500	\$14,000	+\$14,000	
Comments:	<p>Target was exceeded in 2006 due to receipt of additional reimbursements from partner agencies. Change in 2008 is due to increase in NSIP (see page I - 31-33).</p> <p>The +103 change from the 2007 base is a result of the proposed increase for NSIP streamgage operations (+100) and the proposed increases for Hazards Assessment and Mitigation (+3).</p> <p>Cost is a national average that includes operation and maintenance, salary and transportation for technicians who perform site visits, salary for records management and validation, and a small amount for replacement of equipment when a gage is disabled by lightning strike or other event. This replacement of equipment does not include replacement of gages that are lost in large numbers during floods or hurricanes. In practice, the cost of an individual streamgage varies depending on the size of the stream, type of terrain, need for cableways or other specialized equipment at the site, and distance of each site from the nearest USGS office.</p> <p>Most of the +103 streamgages will be reactivated, rather than completely new gages. A completely new gage incurs construction costs ranging from \$25,000–\$30,000, plus 6 months of operation (average of about \$7,000); after the first year the new streamgages reverts to the national average cost of \$14,000.</p>								
Contributing Programs:	NSIP, Hydrologic Networks and Analysis, Coop Water Program (USGS and State/local contributions), and reimbursements from other Federal agencies.								
# real-time ground-water sites reporting in NWISWeb	799	796	692	917	685	685	689	+4	689
Comments:	Target was exceeded in 2006 due to receipt of additional reimbursements from partner agencies. Change in 2007 is due to impact of inflation.								
Contributing Programs:	Ground-Water Resources Program, Hydrologic Networks and Analysis, Coop Water Program (USGS and State/local contributions), and reimbursements from other Federal agencies.								
# real-time water-quality sites reporting in NWISWeb	1,062	1,125	896	1,102	887	887	887	0	887
Comments:	Target was exceeded in 2006 due to receipt of additional reimbursements from partner agencies. Change in 2007 is due to impact of inflation.								

Hydrologic Monitoring, Assessments, and Research

End Outcome Goal 1.4: Resource Protection: Improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment									
End Outcome Goal End Outcome Measure / Intermediate or PART Measure / PART Efficiency or other Outcome Measure	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
Contributing Programs:	Hydrologic Networks and Analysis, Coop Water Program (USGS and State/local contributions), and reimbursements from other Federal agencies.								
# of formal workshops or training provided to customers	UNK	11	11	11	11	11	11	0	11
Note: The 2007 plan is the performance level based upon a projection of 2007 likely enacted made during the first quarter of 2007. The 2008 plan and 2012 long-term targets build on the 2007 plan. To the extent Congress enacts a 2007 appropriation that is different from the 2007 projection, the 2008 plan and 2012 targets may require revision.									

Activity: Water Resources Investigations

Subactivity: Cooperative Water Program

	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Cooperative Water Program (\$000)	62,833	62,171	+2,410	-2,200	62,381	+210
<i>Total FTE</i> ^{a/}	716	694	0	-18	676	-18

^{a/} The FY 2008 decrease of 18 FTE is matched by a decrease ranging from -18 to -36 FTE in the reimbursable program, for a total decrease ranging from -36 to -54 FTE.

Summary of 2008 Program Changes for Cooperative Water Program

Request Component	(\$000)	FTE
<ul style="list-style-type: none"> • Cooperative interpretive studies 	-2,200	-18
TOTAL Program Changes	-2,200	-18

Justification of 2008 Program Changes

The 2008 budget request for the Cooperative Water Program is \$62,381,000 and 676 FTE, a program change of -\$2,200,000 and -18 FTE from the 2007 President's budget.

Cooperative Interpretive Studies (-\$2,200,000 / -18 FTE)

This decrease is proposed to offset the \$1,400,000 increase proposed for the National Streamflow Information Program and other higher priority USGS programs. The decrease would result in 13 fewer interpretive studies of water resources issues that are conducted through the Cooperative Water Program. Studies that were scheduled to conclude at the end of FY 2007 will be targeted. About 263 new studies would begin at this funding level.

Since the cooperators provide about two-thirds of the funding for the program, the content of projects is determined in consultation with those cooperators, and specific focus areas are often not known until workplans and joint funding agreements are established during the fiscal year. Thus, the USGS cannot say which specific studies would be stopped in 2008. However, likely topical areas to be reduced include —

- Water quality issues such as determining the effects of land use practices on water quality,
- Water availability and use,
- Wetlands, lakes, reservoirs, and estuaries,
- Water resources issues in the coastal zone, and

Water Resources Investigations

- Environmental effects on human health.

Other impacts of the reduction include the loss of 18 FTE associated with the appropriated program.

Program Performance Change

	2004 Actual	2005 Actual	2006 Actual	2007 CR ¹	2008 Base Budget (2007 PB + Fixed Costs)	2008 Plan	Program Change Accruing in 2008	Program Change Accruing in Outyears
					A	B=A+C	C	D
X% of studies validated through appropriate peer review or independent review (SP)	100%	100%	100%	100% (137)	100% (126)	100% (113)	0 (-13)	0
# systematic analyses & investigations delivered to customers	UNK	138	137	137	126	113	-13	0
Total Projected Cost (\$000)	UNK	\$23,460	\$23,460	\$23,290	\$21,420	\$19,210	-\$2,210	
Projected Cost per scientific report or other product (whole dollars)	UNK	\$170,000	\$170,000	\$170,000	\$170,000	\$170,000	\$170,000	
Comments	<p>Difference between 2007 CR column and 2008 Base column is due to a \$2 million difference in funding between the 2007 President's Budget and the 2007 CR.</p> <p>Cost per scientific product is an average that includes the annual cost of writing, editing, peer review, and publication of each product, as well as the cost of the studies from which the products are derived. Non-Federal matching funds are included in the calculation.</p>							
% of U.S. with ground-water availability status and trends information to support resource management decisions (PART) (denominator = 65 principal aquifers)	5% (3.5)	7% (4.5)	8% (5.5)	9% (6)	7% (4.5)	6% (4)	-1% (-0.5)	0
Total Projected Cost (\$000)		\$1,575	\$1,925	\$2,100	\$1,688	\$1,500	-\$188	
Projected Cost per regional ground-water availability project (national average) (whole dollars)		\$350,000	\$350,000	\$350,000	\$375,000	\$375,000	\$375,000	
Comments	<p>Change in 2008 results from decrease proposed for the Cooperative Water Program.</p> <p>Measure indicates the number of regional ground-water evaluation projects (status and trends in ground-water availability) that coincide with total number of the Nation's 65 principal aquifers, as designated in the National Atlas. Average cost per project is \$350,000, though actual costs range from <\$100,000 to >\$500,000 per project, depending on the scope and location of the study. Project costs include salaries, travel, training, vehicles, supplies, report production, and printing.</p> <p>Contributing programs: Cooperative Water Program (appropriated and non-Federal matching funds), Ground-Water Resources Program, and reimbursable studies funded by other Federal agencies. Average cost per project is \$350,000–\$375,000, though actual costs range from <\$100,000 to >\$500,000, depending</p>							

Cooperative Water Program

	2004 Actual	2005 Actual	2006 Actual	2007 CR ¹	2008 Base Budget (2007 PB + Fixed Costs)	2008 Plan	Program Change Accruing in 2008	Program Change Accruing in Outyears
					A	B=A+C	C	D
on study scope and location. Project costs include salaries, travel, training, vehicles, supplies, report production, and printing.								
¹ The performance and cost data in the 2007 CR column is presented at the 2007 plan level, which is based upon a projection of 2007 likely enacted made during the first quarter of 2007. The 2008 plan builds on the 2007 plan. To the extent Congress enacts a 2007 appropriation that is different from the 2007 projection, the 2008 plan may require revision.								
Note: Projected costs may not equal program change as these are full costs, which may include funds from other sources and (or) use averages.								
Column A: The level of performance and costs expected in 2008 at the 2007 President's budget level plus funded fixed costs. Reflects the impact of prior year funding changes, management efficiencies, absorption of prior year fixed costs, and trend impacts, but does not reflect the proposed program change.								
Column D: Outyear performance beyond 2008 addresses lagging performance — those changes occurring as a result of the program change (not total budget) requested in 2008. It does <u>not</u> include the impact of receiving the program change again in a subsequent outyear.								

Program Overview

As the primary Federal science agency for water-resource information, the USGS monitors the quantity and quality of water in the Nation's rivers and aquifers, assesses the sources and fate of contaminants in aquatic systems, develops tools to improve the application of hydrologic information, and ensures that its information and tools are available to all potential users. The contributions of the Coop Program help to achieve this broad, diverse mission. For more than 100 years, the Coop Program has been a highly successful cost-sharing partnership between the USGS and water-resource agencies at the State, local, and tribal levels. The Coop Program has been successful because it —

- Combines Federal and non-Federal resources in addressing many of the Nation's most pressing water resource issues, resulting in great cost savings to both the Federal Government and the States,
- Conducts studies across the country in each of the 50 States, Puerto Rico, and U.S. Trust Territories, allowing the USGS to form a national picture of important water-resources issues and potential solutions,
- Uses standardized methods of data collection and analysis across the country, so that information and results of studies are comparable from one State to another, and so that

Use of Cost and Performance Information

Two recent external reviews of the USGS Cooperative Water Program were conducted under the auspices of the Advisory Committee on Water Information. The most recent, in 2004–05, was a 5-year progress review on implementation of recommendations from the first review, conducted in 1999.

The review Task Force found that "Significant progress has been made by the USGS since the release of the 1999 Cooperative Water Program Task Force report. Although the total number of water monitoring stations is slightly lower now than in past years, the number of stations across the country for which real-time water resources monitoring data are available is significantly higher, which has been of great benefit to water users, water managers and the general public. Furthermore ... data quality has improved, due in part to the ability of the new telemetry equipment to help identify faults in a timely manner and the advent and use of acoustic technology."

In choosing budget offsets for 2008, the USGS opted to reduce the number of interpretive cooperative studies, rather than reduce cooperative data collection activities. This will continue the trend of preserving and improving the monitoring activities that are so vital to the program's stakeholders.

Water Resources Investigations

knowledge gained from one study contributes significantly to understanding the hydrology in other parts of the country,

- Helps resolve inter-jurisdictional disputes by assessing conditions at State boundaries and by assuring all parties that the data and results of investigations are objective and are equally available to all parties, and
- Combines the utilization of USGS offices within the State with the much larger national infrastructure of the USGS. This infrastructure includes the National Water Quality Laboratory, the National Water Information System, the National Research Program (which provides new methods and consultation on difficult scientific issues), instrumentation testing facilities, and a national system of quality assurance.

The goals of the Coop Program support the Department's strategic plan, specifically the goal of improving the understanding of national ecosystems and resources through integrated interdisciplinary assessment. In conjunction with NSIP, Hydrologic Networks and Analysis, and an array of reimbursable projects funded by partner agencies, the Coop Program contributes to the outcome measures and PART program performance measures shown in the table at the end of this section.

In addition to providing information responsive to State or local needs, the Coop Program provides information that supports the activities of many Federal agencies. Some of these activities are —

- Forecasting floods,
- Managing surface-water supplies,
- Monitoring hydroelectric power production,
- Setting waste disposal limitations,
- Regulating industrial discharges,
- Designing highway structures,
- Measuring the downstream transport of pollutants or nutrients,
- Determining total maximum daily loads,
- Evaluating mine permits,
- Planning and evaluating land reclamation,
- Evaluating fish habitat,
- Quantifying Indian water rights, and
- Quantifying Federal reserved water rights.

2008 Program Performance

The 2008 budget request for the Cooperative Water Program subactivity is \$62,381,000 and 676 FTE, a program change of -\$2,200,000 and -18 FTE from the 2007 President's budget. The program includes three major components:

Data Collection Activities

(Estimates for FY 2006, \$31.4 million; FY 2007, \$32.1 million; FY 2008, \$34.4 million)

Cooperatively funded hydrologic data collection activities are underway in every State, Guam, Puerto Rico, and the U.S. Virgin Islands. Over the past few years, the Coop Program has provided sole support or partial support for well over half of the sites where the USGS collects data on surface-water levels and flow, ground-water levels, and ground-water quality. In addition, the Coop Program supports collection of data on surface-water quality, which is becoming increasingly important to the States as they monitor total maximum daily loads (TMDLs), to comply with the requirements of the Clean Water Act.

All these data provide resource managers with the information they need to determine the suitability of water for various uses, identify trends in water quality, and evaluate the effects of

various stresses on the Nation's ground water and surface water resources. Much of the data collected at USGS monitoring sites is provided free of charge on the Internet. This includes historical data, as well as real-time data, which are generally less than 4 hours old. The real-time data are used routinely by emergency management agencies, State and municipal agencies, businesses, irrigators, and recreational boaters and fishers.

Most of the USGS data collection stations serve multiple purposes and many are funded, wholly or in part, through joint-funding agreements. Normally, these stations, though funded by various organizations, are operated as part of an integrated network rather than as stand-alone entities. For this reason, cooperating organizations are billed on the basis of average station cost, rather than actual cost, which rarely can be precisely known. This procedure benefits these organizations and the USGS in at least two ways: administrative costs are reduced because financial transactions are simplified, and definitive cost information is available to all parties for planning purposes at the beginning of the fiscal year. This arrangement also assures that data collection in remote areas or areas which may be otherwise problematic (due to vandals, extreme flooding, lightning strikes) during a given period of time do not become so expensive that they must be dropped from the network.

Interpretive Studies

(Estimates for FY 2006, \$25.1 million; FY 2007, \$23.7 million; FY 2008, \$21.6 million)

In addition to data collection activities, the Coop Program supports about 750 hydrologic studies each year. Water resource studies define, characterize, and evaluate the extent, quality, and availability of water resources. The results of these investigations are published and provided to State agencies, which use them as the basis for managing the water resources for which they are responsible. Also, these investigations provide information that can be synthesized and applied to a variety of hydrogeologic and climatic settings across the Nation, greatly expanding the usefulness and transferability of USGS study results nationwide.

Technical Support

(Estimates for FY 2006, \$6.3 million; FY 2007, \$6.4 million; FY 2008, \$6.4 million)

The USGS has a long tradition of providing national and regional technical support for its geographically distributed water resources studies. This support provides quality control to assure the technical excellence of water resources field programs and provides a structured way of transferring new technology to USGS investigative and data activities that are primarily conducted in Water Science Centers in each State. Technical support also includes a formal way of establishing priorities for water resources research by the USGS and provides a mechanism to make water resources information available to other agencies, the scientific community, and the public.

In July 2005, Congress modified, clarified, and finalized report language that has a significant impact on the Coop Program. Accordingly the Program's 5-Year Plan is being updated and reviewed to conform to the new outline, format, and internal/external team approach.

Topical areas that will receive special attention in 2008 include the following:

The availability of water to meet the needs of growing communities, agriculture, energy production, and critical ecosystems continues to be a nationwide challenge. The Cooperative Water Program provides essential hydrologic information needed to assess the quantity of water available to communities to support water supply planning and allocation to a wide range of

Water Resources Investigations

users. In 2008, the Coop Program will support thousands of streamgages and ground-water observation wells that define the availability of surface and ground waters, and will conduct numerous hydrologic investigations needed to evaluate the quantity of available ground water. A recent example of this work includes completion of a sophisticated computer ground-water flow model of the Virginia Coastal Plain, an important water supply for more than 2 million people. This work includes detailed characterization of the newly discovered Chesapeake Bay Impact Crater and its influence on the regional ground water system. For more information, see <http://va.water.usgs.gov/projects/va089.html>.

Providing clean-safe drinking water to citizens is a high national priority, and the Coop Program works with State and local governments to assess the quality of the Nation's drinking water supply. In 2008, the USGS will work with the California Water Resources Control Board to continue an assessment of 116 of California's priority ground-water basins. With many partners, the USGS is developing an understanding of natural and human factors that affect ground-water quality, providing early indications of potential water-quality problems, and contributing to the long-term management and protection of ground-water resources affecting one in eight Americans. For more information, see <http://ca.water.usgs.gov/gama/>.

One of the most pressing ecosystem questions that the Nation faces is how to preserve and enhance the quality of aquatic and riparian ecosystems in the face of increasing pressure to withdraw surface water and ground water. Through the Coop Program the USGS is working with State and local agencies to evaluate the instream flow requirements of aquatic ecosystems. This effort entails the development of both new information and new techniques. A recent notable example includes the USGS effort to develop a Hydroecological Integrity Assessment Process for New Jersey, which should provide a prototype for broad applicability nationwide. A report describing this new tool can be found at <http://www.fort.usgs.gov/products/publications/21598/21598.pdf>.

Program Performance Overview

There are no performance measures that can be tied exclusively to the Coop Program; however, in conjunction with the NSIP, Hydrologic Networks and Analysis, and an array of reimbursable projects funded by 800 partner agencies, the Coop Program contributes to all the measures listed below.

End Outcome Goal 1.4: Resource Protection: Improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment									
End Outcome Goal End Outcome Measure / Intermediate or PART Measure / PART Efficiency or other Outcome Measure	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
GPRA End Outcome Measures									
% targeted science products that are used by partners for land or resource management decisionmaking (SP)	UNK	UNK	UNK	UNK	UNK	≥90%	≥90%	0	≥90%
Intermediate Outcome Measures and Bureau and PART Outcome Measures									
Ensure availability of long-term environmental and natural resource information, data, an systematic analyses needed by land and resource managers for informed decisionmaking									
Content and expanse of knowledge base — % of proposed streamflow sites currently in operation that meet one or more Federal needs (denominator = 4,425) (PART) (SP)	64% (2,832)	61% (2,700)	62% (2,742)	62% (2,742)	62% (2,742)	62% (2,742)	64% (2,832)	+2% (+90)	64% (2,832)
Comments:	The change from the 2007 plan is a result of the proposed increase for NSIP streamgange operations and the proposed increases for Hazards Assessment and Mitigation (see page I - 31-33).								
Contributing Programs:	NSIP, Hydrologic Networks and Analysis, Cooperative Water Program (USGS and State/local contributions), reimbursements from other Federal agencies.								
% of U.S. with ground-water quality status and trends information to support resource management decisions (PART)	0	39%	45%	58%	51%	51%	54%	+3%	54%
Comments:	Target was exceeded in 2006 because work planned for 2007 in the NAWQA Program was moved into 2006, to ensure smoother field operations in the long term. Change in 2008 planned (not due to budget changes).								
% of U.S. with ground-water availability status and trends information to support resource management decisions (PART) (denominator = 65 principal aquifers)	5% (3.5)	7% (4.5)	8% (5.5)	8% (5.5)	7% (4.5)	9% (6)	6% (4)	-3% (-2)	9%
Total Projected Cost (\$000)	\$1,575		\$1,925		\$1,575	\$2,100	\$1,500	-\$600	

Water Resources Investigations

End Outcome Goal 1.4: Resource Protection: Improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment									
End Outcome Goal End Outcome Measure / Intermediate or PART Measure / PART Efficiency or other Outcome Measure	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
Projected Cost per regional ground-water availability project (national average) (whole dollars)		\$350,000		\$350,000	\$350,000	\$350,000	\$375,000	\$375,000	
Comments:	Change in 2008 results from decrease proposed for the Cooperative Water Program. Measure indicates the number of regional ground-water evaluation projects (status and trends in ground-water availability) that coincide with total number of the Nation's 65 principal aquifers, as designated in the National Atlas. Average cost per project is \$350,000–\$375,000, though actual costs range from <\$100,000 to >\$500,000 per project, depending on the scope and location of the study. Project costs include salaries, travel, training, vehicles, supplies, report production, and printing.								
Contributing Programs:	Cooperative Water Program, Ground-Water Resources Program								
% of States with Web-based Streamflow statistics tools to support water management decisions (PART) (denominator = 50 States)	4%	10% (5)	18% (9)	14% (7)	20% (10)	20% (10)	25% (12.5)	+5%	30% (15)
Comments:	Cooperative Water Program funding limitations have slowed progress on jointly funded streamstats projects at the State level, causing USGS to not meet the 2006 target for this measure. See http://water.usgs.gov/osw/streamstats/ssonline.html for current national status. Changes in 2008 and 2012 planned (not due to budget increase).								
Contributing Programs:	NSIP, Hydrologic Networks and Analysis, Coop Water Program.								
Intermediate Outcome Measures and Bureau and PART Outcome Measures									
Ensure the quality and relevance of science information and data to support decisionmaking									
X% of studies validated through appropriate peer review or independent review (SP)	100%	100% (138)	100% (138)	100% (137)	100% (126)	100% (137)	100% (113)	0 (-24)	100% (113)
PART Efficiency and Other Output Measures									
# systematic analyses & investigations delivered to customers	UNK	138	138	137	126	137	113	-24	113
Total Projected Cost (\$000)	UNK	\$23,460		\$23,460	\$21,420	\$23,290	\$19,210	-\$4,080	
Projected Cost per scientific report or other product (whole dollars)	UNK	\$170,000		\$170,000	\$170,000	\$170,000	\$170,000	\$170,000	
Comments:	Decrease in 2008 is due to reduction proposed in the number of interpretive cooperative studies (-13) and to the \$2 million difference in funding between the 2007 President's Budget and the 2007 CR (-11). Cost per scientific product is an average that includes the cost of writing, editing, peer review, and publication of each								

Cooperative Water Program

End Outcome Goal 1.4: Resource Protection: Improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment									
End Outcome Goal End Outcome Measure / Intermediate or PART Measure / PART Efficiency or other Outcome Measure	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
	<p>product, as well as the cost of the studies from which the products are derived. Non-Federal matching funds are included in the calculation.</p> <p>Difference between 2006 plan and 2006 enacted is due to the lag time at year's end in entering data in the reports tracking system, which shows how many scientific publications have been distributed to customers. Since year-end reporting is required before the end of September, publications distributed in the last few days of the month were missing from the year-end report. A later check of the reports tracking system showed that the year-end target was met and exceeded. (Additional publications that caused USGS to ultimately exceed targets included 34 products from the water programs that were provided to reimbursable customers as a result of additional work that was not factored into performance targets because the receipt of reimbursable funds occurred after performance targets were set.)</p>								
# real-time streamgages reporting in NWISWeb (PART)	5,978	6,246	6,165	6,496	6,195	6,195	6,297	+102	6,297
Total Projected Cost (\$000)	\$80,703	\$84,321		\$83,227	\$83,632	\$83,633	\$88,158	+\$1,428	
Projected cost per streamgage (national average) (whole dollars)	\$13,500	\$13,500		\$13,500	\$13,500	\$13,500	\$14,000	+\$14,000	
Comments:	<p>Target was exceeded in 2006 due to receipt of additional reimbursements from partner agencies. Change in 2008 is due to increase in NSIP (see page I - 31-33).</p> <p>The +103 change from the 2007 base is a result of the proposed increase for NSIP streamgage operations (+100) and the proposed increases for Hazards Assessment and Mitigation (+3).</p> <p>Cost is a national average that includes operation and maintenance, salary and transportation for technicians who perform site visits, salary for records management and validation, and a small amount for replacement of equipment when a gage is disabled by lightning strike or other event. This replacement of equipment does not include replacement of gages that are lost in large numbers during floods or hurricanes. In practice, the cost of an individual streamgage varies depending on the size of the stream, type of terrain, need for cableways or other specialized equipment at the site, and distance of each site from the nearest USGS office.</p> <p>Most of the +103 streamgages will be reactivated, rather than completely new gages. A completely new gage incurs construction costs ranging from \$25,000–\$30,000, plus 6 months of operation (average of about \$7,000); after the first year the new streamgages reverts to the national average cost of \$14,000.</p>								
% of WRD streamflow stations with 30 or more years of record (PART) (denominator = number of streamgages reporting in NWISWeb)	60% (baseline)	58% (3,622 / 6,246)	62% (3,822 / 6,165)	59%	63% (3,902 / 6,195)	63% (3,902 / 6,195)	62% (3,913 / 6,297)	-1% (+11)	66% (4,165 / 6,297)
Total Projected Cost (\$000)		\$48,897		\$51,597	\$52,677	\$52,677	\$54,782	+\$154	

Water Resources Investigations

End Outcome Goal 1.4: Resource Protection: Improve the understanding of national ecosystems and resources through integrated interdisciplinary assessment									
End Outcome Goal End Outcome Measure / Intermediate or PART Measure / PART Efficiency or other Outcome Measure	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
Projected cost per streamgage (national average) (whole dollars)		\$13,500		\$13,500	\$13,500	\$13,500	\$14,000	\$14,000	
Comments:	<p>Decrease due to NSIP increase (reactivating or establishing new streamgages causes a drop in % of stations with 30 years of record) (see page I - 31-33).</p> <p>Denominator changes every year because it reflects the number of streamgages reporting in real time in NWISWeb. For this measure, the denominator changes annually (or in some cases daily) because the measure represents the number of 30-year streamgages as a percentage of the total number of streamgages in operation. Since the total number of streamgages changes constantly throughout the year, the denominator must change if this measure is to reflect the state of the streamgaging network accurately.</p>								
<p>Note: The 2007 plan is the performance level based upon a projection of 2007 likely enacted made during the first quarter of 2007. The 2008 plan and 2012 long-term targets build on the 2007 plan. To the extent Congress enacts a 2007 appropriation that is different from the 2007 projection, the 2008 plan and 2012 targets may require revision.</p>									

Biological Research

	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Cost & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Biological Research and Monitoring (\$000)	140,086	135,692	+3,664	+4,050	143,406	+7,714
<i>FTE</i>	1,035	1,023	0	+7	1,030	+7
Biological Information Management and Delivery (\$000)	23,794	21,967	+311	0	22,278	+311
<i>FTE</i>	82	75	0	0	75	0
Cooperative Research Units (\$000)	14,664	14,938	+492	0	15,430	+492
<i>FTE</i>	130	130	0	0	130	0
Total Requirements (\$000)	178,544	172,597	+4,467	+4,050	181,114	+8,517
Total FTE	1,247	1,228	0	+7	1,235	+7
Impact of the CR		[4,984]		[-4,984]	[0]	[-4,984]

Impact of the CR

(-\$4,984,000)

The 2008 budget restores the priorities of the 2007 President's budget by funding 2007 programmed fixed cost increases, eliminating unrequested 2006 congressional earmarks, and implementing the program enhancement and program reduction initiatives included in the 2007 President's budget.

Activity Summary

The 2008 budget request for the Biological Research is \$181,114,000 and 1,235 FTE, which is a net change of +\$8,517,000 and +7 FTE from the 2007 level. Additional information on program changes is provided in each subactivity section of this document.

The U.S. Geological Survey (USGS) Biological Research Activity generates and distributes information needed in the conservation and management of the Nation's biological resources. This program serves as the Department of the Interior's biological research arm and continues the strong traditions for management-oriented research developed within the Department's land management bureaus. Core biological research capability at 17 research centers and associated field stations, one technology center, and 40 Cooperative Research Units supports research on fish, wildlife, and habitats that is used by Federal and State government and nongovernmental organizations.

The USGS works closely with its partners and customers in defining priorities, developing science plans, and carrying out its biological research to support the needs of research management organizations. This focus on knowing and meeting partners' needs, establishing a

Biological Research

goal for partner satisfaction, and measuring performance toward reaching that goal has improved the quality of USGS products and services.

A list of science centers and field stations appears at the end of the discussion of the information subactivity. A list of cooperative research units appears in the discussion of that subactivity.

This program addresses the Department's Resource Protection strategic goal of improving the understanding of national ecosystems and resources through integrated interdisciplinary assessment.

USGS biologists work toward program goals in collaboration with other scientists, customers, and partners. Biologists combine their expertise with that of the other USGS disciplines in interagency ecosystem initiatives across the United States, from South Florida to the Pacific Northwest, where scientists are working together to understand, evaluate, and provide options for restoring fish and wildlife habitats and for better resource-management decisions.

Information generated by the Biological Research program also contributes to achieving improved management of the Nation's water resources, availability of maps and map data, and improved decisionmaking regarding land and water use. These goals are supported by the efforts conducted in three subactivities: Research and Monitoring, Information Management and Delivery, and Cooperative Research Units.

Workforce Planning

Continued success in providing the Nation with outstanding biological science depends on developing and maintaining a flexible, skilled workforce that can take advantage of science and business opportunities of the future. The Biological Resources discipline is currently reviewing occupations, along with retirement projections, to identify workforce gaps and future skill needs. From these data, this program will be able to assemble a comprehensive profile of its workforce and anticipate hiring needs as to meet future science needs of the USGS.

To address workforce skill mix balances in a constrained funding environment, the Cooperative Research Units program offered Voluntary Separation Incentive Program (VSIP) and Voluntary Early Retirement Authority (VERA) opportunities, focused on salary recovery from six restructuring actions throughout the program. This action reduced scientific staffing levels and capabilities. Authority for reduction of an additional 4 positions may be requested in FY 2008. Combining existing vacancies with natural attrition and new vacancies to be created through planned management actions, the program expects to have 26 or more research scientists vacancies (22 percent of Unit science positions will be vacant and unfunded) as FY 2008 begins. However, university and State agency contributions to the program remain strong, as does Federal, State, and local government reimbursable funding for research and technical assistance activities. The program's appropriated dollars continue to be matched by State, university, and Federal partners, and other entities' contributions at a ratio of approximately three matching dollars to each appropriated dollar.

Subactivity Overview

Biological Research comprises of three subactivities:

Research and Monitoring — The USGS serves the biological research needs of Interior bureaus and others by providing scientific information through research, inventory, and monitoring investigations. Biological studies develop new methods and techniques to identify, observe, and manage fish and wildlife, including invasive species, and their habitats; inventory populations of animals, plants, and their habitats; and monitor changes in abundance, distribution, and health of biological resources through time. Interior land and resource managers use USGS biological science to maintain the health, diversity, and ecological balances of biological resources while meeting public needs, such as game harvests and the use of public lands and waters, all of which enable the managers to address the Department's strategic goal of improving the understanding of national ecosystems and resources through integrated interdisciplinary assessment.

USGS specialists also provide technical assistance to Interior bureaus and other customers in applying the information, methodologies, and tools developed by the USGS in addressing resource management problems. In a collaborative process, the USGS involves the users of scientific results by engaging them in the identification and prioritization of their information needs as research is planned. Interior bureaus and other customers and partners, where appropriate, are involved in an adaptive process to find solutions and develop new methods by testing research results in the field.

Information Management and Delivery — Science-based decisionmaking is a Department of the Interior priority, particularly as it pertains to the conservation, management, and use of the Nation's natural resources. To facilitate this, the USGS is committed to making available the data and information that are critical to scientific discovery and application. Data sets, maps, and other information on products are vital to achieve this goal. This subactivity supports the Department's Resource Protection strategic goal of improving the understanding of national ecosystems and resources through integrated interdisciplinary assessment.

The USGS works in cooperation with many organizations across the country to provide critical information to partners, stakeholders, customers, and the general public. Through electronic infrastructures, the USGS delivers relevant data and information faster and in more usable formats than in the past, leading to better stewardship of our natural resources.

Cooperative Research Units — This cooperative program allows government and nongovernmental entities with common interests and responsibilities for natural resource management to address biological resources issues collaboratively. Through this unique program, biologists from Federal and State governments and academia are able to work as a team and focus their expertise and creativity on the resolution of biological resources issues. This subactivity supports the Department's Resource Protection strategic goal of improving the understanding of national ecosystems and resources through integrated interdisciplinary assessment.

Federal support of the Cooperative Research Units program is matched with State and university contributions of expertise, equipment, facilities, and project funding. Through university affiliations, Federal scientists train future natural resource professionals.

This page intentionally left blank.

Activity: Biological Research

Subactivity: Biological Research and Monitoring

	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Cost & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Biological Research and Monitoring (\$000)	140,086	135,692	+3,664	+4,050	143,406	+7,714
<i>Total FTE</i>	<i>1,035</i>	<i>1,023</i>	<i>0</i>	<i>+7</i>	<i>1,030</i>	<i>+7</i>

Summary of 2008 Program Changes for Biological Research and Monitoring

Request Component	(\$000)	FTE
• Healthy Lands Initiative - Green River, Wyoming	+5,000,000	+10
• Mammalian Population Ecology and Habitat	-300,000	0
• Contaminants - Endocrine Disruption and Damage Assessment	-650,000	-3
TOTAL Program Changes	+4,050,000	+7

Justification of 2008 Program Changes

The 2008 budget request for the Biological Research and Monitoring subactivity is \$143,406,000 and 1,030 FTE, which is a program change of +\$4,050,000 and +7 FTE.

The USGS proposes the following increase in support of the Secretary of the Interior's Healthy Lands Initiative:

Green River, Wyoming **(+\$5,000,000 / +10 FTE)**

Program Changes associated with the Healthy Lands Initiative are described in the Science on the Landscape section beginning on page J-1.

The USGS proposes to eliminate funding for the following lower priority studies in FY 2008:

Mammalian Population Ecology and Habitat **(-\$300,000 / 0 FTE)**

The USGS proposes a \$300,000 reduction in 2008 to the Wildlife: Terrestrial and Endangered Resources program in mammalian population ecology and habitat to provide resources for higher priority research activities within the USGS. The proposed reduction would discontinue scientific activities focused on the ecology, populations, and habitats of mammals such as black bears and elk. The proposed decrease impacts support of the Department's Resource Protection goal relative to terrestrial wildlife research by eliminating 1 systematic analysis and investigation in 2010.

Biological Research

Contaminants — Endocrine Disruption and Damage Assessment (-\$650,000 / -3 FTE)

The USGS proposes a \$650,000 decrease in 2008 for Contaminants Biology program to provide resources for higher priority research activities within the USGS. The proposed decrease would reduce activities related to resource damage assessment, and endocrine disruption and intersex fish. The requested decrease would not impact the USGS efficiency measure that relates to improvement in detectability limits for selected high-priority environmentally-available chemical analyses. The proposed decrease impacts support of the Department's Resource Protection goal relative to environmental contaminants research by eliminating 3 systematic analyses and investigations in 2010 and 3 FTEs in 2008.

Program Performance Change

	2004 Actual	2005 Actual	2006 Actual	2007 CR ¹	2008 Base Budget (2007 PB + Fixed Costs)	2008 Plan	Program Change Accruing in 2008	Program Change Accruing in Outyears
					A	B=A+C	C	D
Resource Protection: Percent of targeted science products that are used by partners for land or resource management decision making	UNK	60%	86.9%	65%	65%	65%	0	0
Resource Protection: Quality: % of studies validated through appropriate peer review or independent review	5/5 100%	5/5 100%	5/5 100%	5/5 100%	5/5 100%	11/11 100%	6/6 --	10/10 100%
Resource Protection: # of systematic analyses and investigations	5	5	5	5	5	11	+6	+10
Total Projected Cost (\$000)	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$4,200	+\$3,200	\$0
Projected Cost per systematic analysis (whole dollars)	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	--	--
Comments	<p>The Healthy Lands Initiative accelerates completion of systematic analyses and investigations to evaluate treatments and develop adaptive management options for sage habitats for the benefit of sage grouse on Interior managed lands. A total of 14 new systematic analyses and investigations will be delivered in the outyears. Proposed decreases eliminate 4 systematic analyses and investigations in 2010.</p> <p>Systematic analyses, the product of research, require one to five years for completion. Some studies already underway in these areas will be completed in 2007 and 2008. The influx of new funding will accelerate completion of some research projects currently in progress as well as initiate other research projects that will conclude in the outyears. The USGS used an annual snapshot of the Resource Protection ABC research work activity cost data averaged over time as a surrogate cost per unit. To this the USGS added a proportional share of the cost derived for the Resource Protection science management activity. For 2004 through third quarter 2006, the average unit cost for systematic analyses is approximately \$200,000 for the Resource Protection mission area which correlates to the average cost that the program had historically used before implementation of ABC.</p>							

Biological Research and Monitoring

	2004 Actual	2005 Actual	2006 Actual	2007 CR ¹	2008 Base Budget (2007 PB + Fixed Costs)	2008 Plan	Program Change Accruing in 2008	Program Change Accruing in Outyears
					A	B=A+C	C	D
Resource Protection: # of formal workshops and training provided to customers	2	2	2	2	2	5	+3	0
Total Projected Cost (\$000)	\$160	\$160	\$160	\$160	\$160	\$400	+\$240	\$0
Projected Cost per workshop (whole dollars)	\$80,000	\$80,000	\$80,000	\$80,000	\$80,000	\$80,000	--	--
Comments	For workshops, which support land managers in applying the science, and are a shorter term product, the USGS used the average unit cost of \$80,000 based on the technical assistance and proportional share of the science management work activity for 2005 for the Resource Protection mission. Other Interior goals will also accrue performance from systematic analyses produced, workshops conducted, and monitoring stations added to the network.							
Resource Protection: # of real-time ground-water sites reporting in NWIS-Web	0	0	0	0	0	4	+4	0
Total Projected Cost (\$000)	\$0	\$0	\$0	\$0	\$0	*	*	\$0
Projected Cost per ground water site (whole dollars)	--	--	--	--	--	*	--	--
Comments	* In the first year of operation, the cost of a single well ranges from \$4,000–\$10,000 and includes the cost of getting permission to use a landowner's existing well, characterization of the site (depth of well, type of pump, establishment of measurement benchmark), and installation of scientific instruments. Wherever possible, the USGS retrofits existing wells with the needed equipment, but if a well is required in a location where none are available, drilling costs can range from \$5,000–\$25,000, depending on terrain, rock type, and the depth and diameter of the well. After the first year, annual operating costs range from \$1,000–\$7,000, depending on frequency of sampling, presence or absence of a recorder, real-time capability, distance of the well from the office, and other factors.							
<p>¹ The performance and cost data in the 2007 CR column is presented at the 2007 plan level, which is based upon a projection of 2007 likely enacted made during the first quarter of 2007. The 2008 plan builds on the 2007 plan. To the extent Congress enacts a 2007 appropriation that is different from the 2007 projection, the 2008 plan may require revision.</p> <p>Note: Projected costs may not equal program change as these are full costs, which may include funds from other sources and (or) use averages.</p> <p>Column A: The level of performance and costs expected in 2008 at the 2007 President's budget level plus funded fixed costs. Reflects the impact of prior year funding changes, management efficiencies, absorption of prior year fixed costs, and trend impacts, but does not reflect the proposed program change.</p> <p>Column D: Outyear performance beyond 2008 addresses lagging performance — those changes occurring as a result of the program change (not total budget) requested in 2008. It does <u>not</u> include the impact of receiving the program change again in a subsequent outyear.</p>								

Program Overview

The Biological Research and Monitoring subactivity generates specialized biological research and monitoring information needed to effectively manage and conserve biological resources. This program addresses the Department of the Interior Resource Protection strategic goal of improving the understanding of national ecosystems and resources through integrated interdisciplinary assessment. Key indications of USGS performance are reflected in the intermediate outcome measures for ensuring availability of long-term environmental and natural resource information, data and systematic analyses needed by land and resource managers for informed decision making, and ensuring the quality and relevance of science information and data to support decision making. The USGS conducts research and monitoring that focuses on understanding how ecosystems (diverse communities of living organisms interacting with one another and with the physical environment) are structured, function, and provide "ecosystem services." The Department manages vast Federal lands and the biological resources that inhabit them. The Department's land- and resource-management bureaus need the scientific understanding and the technical tools to wisely manage these lands and resources on a sustainable basis. The Biological Research and Monitoring subactivity provides science information for resource managers needs.

Use of Cost and Performance Information

Improving Administrative Services at the National Wildlife Health Center (NWHC):

The NWHC underwent an Administrative Review in April 2005. The survey results were helpful to the Administrative Review Panel for getting a sense of how the staff viewed the day-to-day operation of the Center. Two functions of the Center that the survey identified as needing attention included (1) timekeeping and (2) the travel authorization and voucher process. Based on the survey results, the panel gave special attention to these two functions and recommended specific changes which have been implemented by NWHC management.

The USGS also tracks outputs including the number of systematic analyses and investigations delivered to customers and the number of workshops/training with USGS sponsorship or participation to transfer results to customers and partners. Performance measures resulting from the PART are incorporated into the performance tables located in the Performance Goal Table section beginning on page B-1.

In 2012, under the end outcome goal of understanding of national ecosystems and resources through integrated interdisciplinary assessment, the USGS Biological Research and Monitoring subactivity expects to deliver to its customers about 911 systematic analyses and investigations and 72 formal workshops and training.

There is a 2-year lag between initiating research and obtaining results (systematic analyses and investigations). For example, additional funds provided in 2006 will increase the number of systematic analyses or investigations delivered to customers in 2008.

Use of Cost and Performance Information

Enhancing Customer Satisfaction With the Goals and Products of the Biomonitoring of Environmental Status and Trends (BEST) Project:

The results of this survey of FWS and USGS audiences indicate broad support for the goals of the BEST Project. Not surprisingly, the Project's primary client bureau (FWS) expressed a higher awareness and use of BEST products compared to USGS respondents. Individual comments provided valuable insights into ways to improve the visibility, value, and utility of the Project and its products.

Research is needed to reduce and avoid the costs of controlling and eradicating the rapidly growing number of invasive species being introduced into and spreading within the

United States as a result of increasing global travel and commerce and increasing human impacts on lands and water. For example, the damage to wildlife, livestock, and public health from invasive fire ants, plus the cost of control, is estimated at \$500 million annually in Texas alone. Diseases among wildlife can have profound impacts on both people and animals. They can devastate poultry and livestock operations, threaten the last remaining individuals of an endangered species, or spread from animals to humans, creating a public health hazard. Since 1999, outbreaks of West Nile Virus in the United States have infected more than 23,500 people, caused 805 deaths, and resulted in billions of dollars of economic loss. USGS biological research seeks to understand the underlying causes of wildlife disease and disease emergence and to provide resource managers and decisionmakers with the tools needed to manage and prevent diseases that impact the Nation's natural resources.

Adaptive management, a system of sequential, objective-driven decision making in which resource managers learn from and continually adapt their management strategies with new knowledge and findings, is becoming a more and more valuable tool in the biological resource community. USGS scientists were lead authors in producing the Technical Guide for Adaptive Management in the Department of the Interior. The Guide presents an operational definition of adaptive management, identifies the conditions in which it should be considered, and describes the process of using adaptive management for managing natural resources. The adaptive approach to management is framed in terms of structured decision making, with an emphasis on uncertainty about resource responses to management actions and the value of reducing that uncertainty to improve management. The Guide provides a general framework for adaptive management for Interior agencies that can be further tailored as needed to specific agency resource responsibilities and institutional arrangements.

One example of efforts in adaptive management is the Glen Canyon Dam Adaptive Management Program (GCDAMP). The GCDAMP was established in 1996 to provide a process for cooperative integration of Glen Canyon dam operations, downstream resource protection and management, monitoring and research information, and improving the values for which the Glen Canyon National Recreation Area and the Grand Canyon National Park were established. The USGS Grand Canyon Monitoring and Research Center is a key component of the GCDAMP.

The Healthy Lands Initiative, proposed in FY 2008, promotes the concept of cooperative conservation; supports the Department's Resource Protection strategic end outcome goal of improving the understanding of national ecosystems and resources through integrated interdisciplinary science. The initiative includes collaborative efforts in Wyoming's Green River Basin by conducting habitat analysis, monitoring, and development of restoration techniques.

The USGS national-level approach to managing biological and natural resource data and scientific information ensures the application of standards that foster opportunities for collaboration and cooperation. The USGS places a premium on partnerships at all levels of government and with nongovernmental entities, including the private sector. These partners use USGS-generated scientific data and information that contribute to the knowledge base, which then become available to Interior land and resource managers, and others.

The USGS works closely with its partners and customers in defining priorities, developing science plans, and carrying out its biological research to support the needs of research management organizations. Key partners in many of these endeavors include Interior bureaus, other Federal agencies, States, Tribes, and private organizations with regional and ecosystem-specific interests.

Biological Research

An example of such a partnership is the Science Support Partnership (SSP) program that addresses the priority science needs of the FWS. Since 2001, the USGS has undertaken approximately 350 projects in support of FWS local, regional, and national programs such as:

- Migratory bird management,
- Endangered species recovery,
- Freshwater fisheries restoration,
- Ecosystem-based management,
- Molecular and biotechnology tools for management,
- Coastal habitat conservation,
- Functional models for adaptive management,
- Fish and wildlife law enforcement, and
- National Wildlife Refuge System management.

The SSP program has provided tremendous benefits to FWS efforts in conserving the Nation's fish and wildlife resources.

The following table displays program-funding estimates for three fiscal years for the Biological Research and Monitoring subactivity.

Biological Research and Monitoring Program Areas (Dollars in millions)			
Program	2006 Enacted	2007 Estimate	2008 Request
Status and Trends	19.3	19.8	20.3
Contaminant Biology	9.7	8.9	8.5
Fisheries: Aquatic and Endangered Resources	24.2	21.9	22.5
Wildlife: Terrestrial and Endangered Resources	45.1	43.9	44.8
Terrestrial, Freshwater, & Marine Ecosystems	31.5	31.0	36.8
Invasive Species	10.3	10.2	10.5
Total Biological Research & Monitoring	\$140.1	\$135.7	\$143.4

The following sections describe the Biological Research and Monitoring subactivity by program area of which all support Interior's Resource Protection strategic goal of improving the understanding of national ecosystems and resources through integrated interdisciplinary science.:

Status and Trends of Biological Resources

(Estimates for FY 2006, \$19.3 million; FY 2007, \$19.8 million;
FY 2008, \$20.3 million)

To protect and conserve the living resources entrusted to their care, Federal land and resource managers must first understand the condition, or status, of those resources: what they are (inventory), where they are located (distribution), how many there are (abundance), and how they change over time (trend)—information only long-term, scientifically sound monitoring can produce. Long-term monitoring of the environment is fundamental to:

- Detecting changes that may signal degradation of natural systems,
- Assessing the effectiveness of management actions,
- Identifying new or emerging problems,
- Validating research results and models, and
- Promoting increased public understanding and appreciation of our living resources.

The USGS Status and Trends of Biological Resources program (for more information visit: http://biology.usgs.gov/status_trends/index.html) measures, predicts, assesses, and reports the status and trends of the Nation's biological resources to advance research, facilitate resource management and stewardship, and promote public understanding and appreciation of the Nation's living resources, with emphasis on Federal lands.

Biological Research

The Department of the Interior relies upon biological monitoring information to achieve its mission, measure its success in responding to trust resource and other legislative mandates, and determine its progress toward meeting the Department's Resource Protection strategic goal of improving the understanding of national ecosystems and resources through integrated interdisciplinary science.

Program goals, as outlined in the program's 5-year plan, are to:

- Facilitate integrated monitoring from a variety of sources at multiple spatial and temporal scales to describe and track the abundance, distribution, productivity, and health of the Nation's plants, animals, and landscapes,
- Develop and evaluate inventory and monitoring methods, protocols, experimental designs, analytic tools, models, and technologies to measure biological status and trends,
- Collect, archive, and share critical, high-quality monitoring data in cooperation with partners to determine the status and trends of biological resources, and
- Produce and provide analyses and reports that synthesize information on the status and trends of the Nation's flora, fauna, and ecosystems and be responsive to the needs of the scientific community, land and resource managers, policymakers, and the public.

National Park Monitoring — USGS scientists assist national parks with inventory and monitoring protocol development and other monitoring-related research needs such as assistance with monitoring planning and design, statistical data analysis, and review/revision of existing protocols. USGS scientists and technical specialists address priority issues identified by the National Park Service that typically involve and benefit several parks and require multiyear efforts.

Park-Oriented Biological Support —The USGS and the National Park Service, through the Natural Resource Preservation Program, jointly support biological projects that provide exploratory research and technical assistance to national parks.

National Wildlife Refuge Monitoring — The Status and Trends of Biological Resources program is partnering with the National Wildlife Refuge System of the U.S. Fish and Wildlife Service with the goal of improving science-based management on refuges with a focus on adaptive management, a sequential, decisionmaking process for continually improving management policies and practices by learning from the outcomes of previous decisions.

Bird Banding Laboratory — Bird banding is a universal technique for studying the movement, survival, and behavior of birds. The Bird Banding Laboratory (BBL) provides high-quality banding data in a timely manner for use in developing effective bird conservation and management strategies throughout North America. A Federal Advisory Committee has been chartered to help the BBL achieve maximum success and relevancy to its banders and data users in the 21st century.

Breeding Bird Survey — The North American Breeding Bird Survey (BBS) was launched in 1966, utilizing 600 roadside routes to obtain range-wide population data on breeding birds in the United States and Canada east of the Mississippi River. Today, the BBS provides the foundation for non-game, land bird conservation in North America with over 3,200 skilled

volunteer participants sampling 3,000 routes annually across the continental United States and southern Canada.

Great Lakes — In coordination with the Fisheries: Aquatic and Endangered Resources program, USGS scientists conduct a regional deepwater science, large vessel program that complements other Interior activities with large-scale multiyear strategic investigations. The program provides long-term, consistent, lakewide assessment of forage fish stocks that support sport and commercial fish species, monitor invasive species for protection and restoration of the Great Lakes, and provide scientific and technological monitoring tools for aquatic species assessment and conservation in the Great Lakes.

Standards and Protocols — USGS scientists develop statistically valid, efficient, and feasible protocols that are relevant to the needs of resource managers for monitoring the abundance, distribution, productivity, and health of the Nation's plants, animals, and ecosystems. The USGS has been an active participant in the development of and support for the Natural Resource Monitoring Partnership (NRMP), a collaborative effort by the natural resource management community to improve monitoring efforts to support effective evaluation and decisionmaking. Current participants include State, Federal, and Canadian natural resource management agencies, nongovernmental organizations, and academic institutions. To foster coordination and collaboration of monitoring efforts, the NRMP provides two collaborative, internet-based tools:

- **Monitoring Protocol Library** — An internet-accessible, searchable database that provides information on monitoring protocols and resource assessment methodologies organized to facilitate reference and use.
- **Monitoring "Locator"** — An internet-based, GIS application that allows users to identify what natural resource monitoring is being conducted within a particular area (e.g., State, province, county or other selected geographical area).

Taxonomy, Systematics, and Museum Studies —The National Museum of Natural History is a major repository of scientific information used by USGS scientists to study natural variation in many groups of animals. Curation of North American vertebrate collections at the Smithsonian Institution provides stewardship of an important scientific database available to scientists from around the world. The USGS also maintains a biological collection at the Museum of Southwestern Biology at the University of New Mexico. Scientists provide long-term care and management of this collection of Southwest vertebrates and guidance to Interior customers and museum colleagues.

Predictive Population Modeling — Through development of predictive population models, the Status and Trends program assists resource managers in making difficult decisions by reducing the uncertainty associated with population responses to habitat and environmental change allowing managers to project the likely outcome of various management alternatives on populations of plants and animals.

Science for Decision-Support Systems — Decision-support systems are computer-based tools that bridge the gap between quality information and management decisionmaking bringing the best scientific and human dimensions information to bear on specific natural resource issues.

Contaminant Biology

(Estimates for FY 2006, \$9.7 million; FY 2007, \$8.9 million;
FY 2008, \$8.5 million)

The Contaminant Biology program provides high quality, objective scientific information on exposure and effects of environmental contaminants on the Nation's biotic resources and, in particular, the trust resources of the Department of the Interior. Toxicology and chemistry expertise, research, information, scientific interpretations, monitoring tools, and models are used by Interior and other agencies to prevent contamination; manage, protect, and restore contaminated Interior lands and trust resources; and fulfill recreational, statutory, and regulatory responsibilities. Improving scientific understanding of safe levels of contamination in the environment saves money by enabling agencies to protect trust species while establishing reasonable, realistic, and less costly cleanup levels. This program supports the Department's Resource Protection strategic goal of improving the understanding of national ecosystems and resources through integrated interdisciplinary science.

This program conducts environmental toxicology research and plans to increase emphasis in development of molecular biology techniques related to contaminant mixtures; research to support restoration of contaminated habitat; development of toxicological and chemical data and methods for endocrine disruptors and emerging contaminants such as brominated flame retardants; comparative toxicity among species to improve reliability of criteria and standards for protecting species of concern; and completion of work in the Mark Twain National Forest.

Program goals, as outlined in the program's 5-year plan, are:

- Toxicology and Chemistry — Determine the causes, fate, exposure and effects of environmental contaminants. Develop and standardize biomarkers, molecular biology methods and techniques and other analytical and toxicological methods,
- Contaminated Habitats — Develop the scientific basis for assessment, restoration, and monitoring of habitats that are contaminated by mining, agriculture, urban wastewater, industry, and chemical control agents. Develop the toxicological basis to remediate and prevent contamination effects of chemical controls for invasive species, fire, and other hazards, and
- Integration of Ecological Stressors — Improve the scientific basis for evaluating the effect of multiple stressors, at all levels of biological organization and at multiple temporal or spatial scales.

Fisheries: Aquatic and Endangered Resources

(Estimates for FY 2006, \$24.2 million; FY 2007, \$21.9 million;
FY 2008, \$22.5 million)

Research conducted in the Fisheries: Aquatic and Endangered Resources (FAER) program centers on the determination of factors affecting the growth, health, diversity, and survival of fish and other native aquatic fauna, and aquatic community structure and function. Based on the genetics, life history, behavior, and habitat requirements of aquatic organisms, USGS scientists provide the scientific information needed by aquatic resource managers to develop and evaluate methods for restoring and managing aquatic populations. High quality scientific information about the distribution of species of concern and their habitats, and the biological integrity of multijurisdictional aquatic systems are provided to resource managers to support adaptive

management of the Nation's aquatic species and habitats. High priority is given to studies that directly assist other Interior agencies and national, international, State, and tribal efforts to manage inter-jurisdictional fishery and aquatic resources. USGS supports the National Fish Habitat Initiative, a multi-agency partnership whose goal is to protect, restore, and enhance the Nation's fish and aquatic communities through partnerships that foster fish habitat conservation and improve the quality of life for the American people. USGS expertise in genetics, fish health and diseases, aquatic animal drug and chemical research, native and endangered fishes, other freshwater organisms, and aquatic habitats provides long-term research support, quick response, and technical assistance in support of the Department's Resource Protection strategic goal of improving the understanding of national ecosystems and resources through integrated interdisciplinary science.

The FAER 5-year strategic plan has been developed through an extensive collaborative effort to predict and identify the aquatic biological information needs of our partners and customers, and to posture USGS science to respond to ongoing and future challenges. The plan describes the current and future roles of the FAER program and projected coordinated research with USGS disciplines and programs, Interior partners, and other natural resource managers.

Program goals, as outlined in the program's 5-year plan, are to:

- Provide scientific information about the diversity, life history and species interactions that affect the condition and dynamics of aquatic communities,
- Provide scientific information about factors and processes that affect aquatic organism health in support of survival, protection, conservation and recovery,
- Quantify and describe functional relationships among aquatic species and habitats to provide information to conserve or restore aquatic community structure and function,
- Provide science support for natural resource managers by investigating the factors that contribute to the conservation and recovery of aquatic species at risk,
- Develop research and technology tools to provide the scientific basis for developing adaptive management strategies and evaluating their effectiveness for restoration efforts to sustain aquatic resources, and
- Provide research support and technical assistance to Interior bureaus, other Federal and State government agencies, Tribes, and non-governmental organizations to support natural resource management problem solving and decisionmaking.

Reasons for aquatic species decline include health effects such as disease, changes in the availability and quality of water, habitat loss, invasive species, and contaminants. Restoration of declining populations depends on critical science information provided by an integrated program of research to determine the biology of individual aquatic species and the ecological relationships between those species and their habitats. The USGS is providing resource managers with science-based tools for addressing these issues through improved systematic analyses, data collection, analysis and modeling focused on linking biological, physical, and chemical factors with others contributing to alterations in species composition and health. Most USGS endangered species research supports recovery of species already having legal status under the Endangered Species Act of 1973, as amended. To help managers achieve the goals of recovery plans, USGS scientists investigate the life history requirements of listed species and factors limiting their populations. Better knowledge of both critical requirements and limiting factors is needed for managers to act effectively to promote restoration of populations.

Biological Research

USGS scientists investigate fish species and aquatic organism diversity in large freshwater lakes, large rivers and major tributaries, estuaries and nearshore areas. Important sport and commercial species such as salmon, steelhead, and sturgeon, as well as forage and prey species are studied to provide fishery managers with information to help mitigate the impact of aquatic diseases, barriers, and habitat loss. USGS scientists operate a Bio-Level III aquatics laboratory to investigate the heritability and spread of aquatic pathogens and diseases. This unique capability allows scientists to study, develop, and use advanced genetic and molecular tools to detect and identify introduced or invasive aquatic diseases, fishes, or other aquatic organisms that imperil the Nation's aquatic resources. USGS scientists develop and adapt advanced research tools such as remote sensing, hydroacoustics and geospatial technologies to characterize aquatic populations and the community dynamics of large lakes, reservoirs, impounded and free-flowing stretches of major rivers, estuaries, and coastal areas.

Klamath Basin — Interdisciplinary research of the USGS Biological Resources and Water Resources disciplines in the Klamath Basin focuses on determining the effects of changing water availability, water quality, climate, and management actions on population dynamics and required aquatic habitat of important endangered fishes, and on ecological responses of wetlands and the watershed.

High Priority Fisheries Research for the U.S Fish and Wildlife Service (FWS) — The USGS continues to address critical research needs of the FWS in support of imperiled and at-risk species, inventory and monitoring programs, and fisheries and aquatic resources management. High priority fisheries research for the FWS provided by the science support partnership is determined annually by FWS science needs.

Quick Response Program – Fisheries Issues — Studies undertaken by this program involve scientific research that is short-term and provides critical scientific information about aquatic species and aquatic habitats required for making credible and effective adaptive management decisions.

Endangered Fish and Aquatic Species — USGS endangered species research provides biological information needed to restore currently listed populations, support delisting wherever possible, or preclude future listings by clarifying species' status or suggesting timely preventive actions.

Fish and Aquatic Species at Risk — Species-at-Risk activities lead to conservation options and actions that reduce the need for listing species as threatened or endangered.

Fish Passage — Fish passage projects focuses on the physiological, behavioral, and hydraulic phenomena that determine the successful navigation of barriers by fish and other at-risk aquatic species and the efficiency of artificial structures designed to allow passage through or around obstacles.

Great Lakes — In coordination with the Status and Trend program, USGS scientific research, in support of interjurisdictional management of the Great Lakes fish and aquatic resources, facilitates information transfer across jurisdictional boundaries to promote ecosystem level adaptive management, conservation, and restoration in the Great Lakes basin. Studies focus on genetics, life history, trophic interactions, health, habitat requirements, and ecology of deepwater and near shore fisheries and aquatic resources in the Great Lakes and its tributaries.

Chemical and Drug Approval and Registration — The USGS collaborates with the U.S. Fish and Wildlife Service, the USDA Agricultural Research Service, the States acting through the International Association of Fish and Wildlife Agencies and private drug sponsors to conduct research required by the Federal Food and Drug Administration, Center for Veterinary Medicine to gain approval for fishery management drugs and chemicals.

Coastal Fisheries — USGS scientists study how coastal and estuarine fish and other aquatic species are affected by changes in their habitat and interactions with other resident and migratory species to provide aquatic resource managers with information needed to conserve and restore important aquatic resources.

Fish Biology — The USGS fishery research program examines the biology, genetic diversity, and health, all phases of the life cycles of fish and other aquatic organisms, and their habitat requirements to develop research to answer the science information needs of fishery managers to aid the development of techniques to restore fish populations.

Fish Genetics — Research in fish and aquatic organism genetics characterizes the diversity, variability, and taxonomic status of individuals, stocks, strains, and populations to provide natural resource managers with the ability to identify native, cultured, introduced, and invasive fish and aquatic organisms to provide information for the development of science-based conservation and restoration strategies for aquatic resources.

Fish Disease — Fish disease research focuses on development of new techniques for the detection and identification of emerging pathogens and causative agents, disease resistance and immunology, and understanding the role of stress and environmental factors upon disease outbreaks, severity, and cycles.

Native Mussels — USGS native mussels research activities determine their life histories, hosts, distribution and abundance, and identify how invasive species and environmental degradation of streams, rivers, and lakes are affecting mussel populations.

Large Rivers — USGS research related to water availability and the unique aquatic resources and conditions found in America's large rivers, such as the Colorado, Missouri, Mississippi, and Columbia, is providing vital information on fish community structure and function, aquatic community dynamics and function, critical habitat, hydrology and hydraulics of the rivers, sediments, and water quality.

Wildlife: Terrestrial and Endangered Resources

(Estimates for FY 2006, \$45.1 million; FY 2007, \$43.9 million;
FY 2008, \$44.8 million)

Research conducted in the Wildlife: Terrestrial and Endangered Resources program focuses on meeting the wildlife-related information needs of Interior's natural resource management bureaus and other partners as authorized by law. This program supports investigations to determine factors influencing the distribution, abundance, and condition of wildlife populations and communities. Studies also focus on developing the tools and methods needed to prevent and manage disease in free-ranging wildlife and to evaluate the effects of disease on wildlife populations. This program supports the Department's Resource Protection strategic goal of improving the understanding of national ecosystems and resources through integrated interdisciplinary science.

Biological Research

Program goals, as outlined in the program's 5-year plan, are to:

- Provide the scientific foundation for the conservation of terrestrial plants, wildlife, and habitats by developing the basic biological information that partners need to formulate adaptive management strategies,
- Provide tools and techniques for effective science-based management, such as predictive models, decision support systems, and expert systems,
- Identify the factors that contribute to and (or) limit the conservation and recovery efforts for terrestrial plant and wildlife species-at-risk,
- Institute an adaptive science approach to support the adaptive management of terrestrial plants and wildlife and provide technical assistance to natural resource managers, and
- Continue to build additional research capabilities, expertise, and to meet the emerging needs of USGS partners as wildlife issues take on new importance in today's society.

Reversing the rapid loss of biological diversity remains one of the greatest challenges to natural resource managers. The reasons for species decline are numerous and include habitat loss, habitat degradation, competition with invasive species, environmental contaminants, and disease, among others. Restoring declining wildlife populations thus depends on an integrated program of research to develop critical information on the biology of individual species and the ecological relationships among those species, their communities, and their habitats. Through investigations that link physical, chemical, and biological factors impacting species composition and health, the USGS provides land and resource managers with the tools needed to address these issues.

Imperiled species research focuses on identifying factors responsible for the decline of threatened and endangered species populations, and assisting in the development of management plans and methods to restore depleted populations and to prevent further declines. USGS imperiled species research supports recovery of species already having legal status under the Endangered Species Act of 1973, as amended, as well as those in long-term population decline but not yet listed. To help managers achieve the goals of recovery plans, USGS scientists investigate the life requirements of imperiled species and factors limiting their populations. Better knowledge of both requirements and limitations is needed for managers to act effectively to promote restoration of populations.

Cooperative studies among the USGS National Wildlife Health Center, other USGS science centers, the Southeastern Cooperative Wildlife Disease Study, State natural resource agencies, and the International Association of Fish and Wildlife Agencies are now underway to determine causes and impacts of wildlife diseases such as avian influenza, West Nile Virus, and chronic wasting disease. In addition, efforts have begun to examine interactions between wildlife and human diseases. This work is being conducted in partnership with other Federal agencies, such as the Department of Health and Human Services and the U.S. Department of Agriculture.

High Priority Wildlife Research for the U.S. Fish and Wildlife Service (FWS) — The USGS develops tools and technologies to assist wildlife refuges to measure the effects of land management practices on habitats of declining and at-risk species, and to determine the needs for habitat conservation planning. The USGS also conducts two subprograms to provide unforeseeable research or technical assistance support requested by the FWS. Studies undertaken by these subprograms involve short-term, scientific research and provide critical information required for making credible and effective resource management decisions:

- **FWS Science Support Partnership** — USGS Science Centers and Cooperative Research Units work collaboratively with the FWS to address FWS mission-critical science needs.
- **Quick Response Program** — This activity provides unforeseen short-term research on technical assistance needs requested by the FWS.

Endangered Wildlife and Terrestrial Species — USGS endangered species research provides biological information needed to restore currently listed populations, support delisting wherever possible, or preclude future listings by clarifying species' status or suggesting timely preventive actions.

Wildlife and Terrestrial Species at Risk — Species-at-Risk activities lead to conservation options and actions that reduce the need for listing species as threatened or endangered.

Migratory Birds — USGS research efforts on migratory birds are international in scope and are coordinated with the FWS, State and tribal wildlife agencies, and the Canadian and Mexican Federal wildlife agencies. Migratory bird research includes projects on individual species, communities, habitat relationships, and applied work for increasing the number and diversity of birds.

Natural Resource Preservation Program (NRPP) — USGS biologists conduct short-term, tactical research to meet the natural resource management needs of the National Park Service. NRPP funds help fill gaps in applied biological research in the Nation's national parks and allow the USGS to address research needs significant to park resource managers.

Wildlife Disease — Managing wildlife losses and minimizing disease outbreaks depends on effective diagnostic and technical support, knowledgeable guidance, and timely intervention. The USGS has a unique mission to provide information, technical assistance, and research on State, national, and international wildlife health issues on such diseases as highly pathogenic avian influenza, West Nile Virus, and chronic wasting disease.

- **Highly Pathogenic Avian Influenza** — In response to the growing threat to human health and wildlife populations presented by the highly pathogenic form of the avian influenza virus, the USGS has initiated an early detection effort in partnership with the FWS, NPS, USDA Animal and Plant Health Inspection Service, the Centers for Disease Control and Prevention, and State agencies. The USGS conducts sampling of live birds, hunter-taken birds, and environmental materials for the virus, as well as increasing its response and analytical capability associated with migratory bird mortality events. These activities are being conducted as part of a coordinated, interagency program to provide agricultural, wildlife, and human health officials with advance warning to the presence of highly pathogenic avian influenza in North American wild bird populations.
- **West Nile Virus** — The USGS assists the Centers for Disease Control and Prevention and State and Federal agencies in the national West Nile Virus Surveillance program through viral testing of wildlife specimens, primarily birds, at diagnostic laboratories such as the USGS National Wildlife Health Center. The USGS also collaborates with these agencies to document the geographic spread of the virus across the United States and to increase the understanding of the U.S. epidemic since it was first discovered in New York City in 1999. Concurrently, the USGS is working cooperatively with State and

Biological Research

Federal natural resource and wildlife agencies to investigate regional wildlife mortality events (die-offs) potentially associated with West Nile Virus.

- **Chronic Wasting Disease** — The USGS, along with the U.S. Department of Agriculture and a number of State and Federal agencies, is involved in critical research and information sharing on chronic wasting disease (CWD). CWD is a fatal disease affecting elk and deer and belongs to the same family as mad cow disease in cattle and scrapie in sheep. Originally observed in only captive animals, it has recently been discovered in wild deer populations in ten States. States are looking to the USGS to provide research, technical assistance, and other forms of support to combat CWD. To help meet the need, USGS scientists are investigating how CWD is transmitted, what conditions lead to disease outbreaks, and how to manage outbreaks once they occur. In addition, the Disease Information Node of National Biological Information Infrastructure has developed a CWD Data Clearinghouse that provides a means for State and Federal agencies to share CWD-related data quickly and securely.

Amphibian Research and Monitoring — The USGS leads a coordinated effort extending beyond Interior bureaus to include other Federal, State, and academic partners, to determine the status of amphibian populations nationwide and investigate potential causative factors for their decline.

Terrestrial, Freshwater, and Marine Ecosystems (Estimates for FY 2006, \$31.5 million; FY 2007, \$31.0 million; FY 2008, \$36.8 million)

The USGS ecosystems research program supports diverse research activities focused on understanding factors controlling the structure, function, composition, and condition of terrestrial, freshwater, and marine ecosystems; their variability in space and time; and the "ecosystem services" they provide to benefit human communities and economies. Investigations identify, explain, and predict ecological impacts of human and natural disturbances on ecosystems and their component biological species and processes, including impacts of climate variability and change, natural hazards such as hurricanes and wildfire, and human management and land use practices. Research results provide the basis for the adaptive management of ecosystems and natural resources, development of forecasting models and decision support tools that integrate ecological knowledge with management options, and development of frameworks and approaches for restoring ecosystems impaired by natural hazards and human actions to sustainable levels. Research activities also focus on developing understanding and indices of ecosystem sensitivity to change and vulnerability to specific stressors, and providing information to mitigate adverse effects on ecosystems and biological communities.

Studies of ecosystem productivity, food-web relationships and energy flow, cycling of nutrients and other biogeochemical processes, and the diversity of biological communities are examples of ecosystem research. Topical areas for ecosystem research include the ecology of wetland, lake and river, forest, arid land, arctic, grassland, coral reef, and outer continental shelf ecosystems; disturbances and landscape ecology; modeling ecological systems and quantifying ecosystem services; restoration ecology; fire ecology; and global change studies. In addition to the scientific community, primary customers for research information and knowledge developed by the ecosystems program include land and resource managers and decision and policymakers within Interior and other Federal and State land management and regulatory agencies, as well as NGOs and the public. This program supports the Department's Resource

Protection strategic goal of improving the understanding of national ecosystems and resources through integrated interdisciplinary science.

The current goals of the ecosystems program, which will be revised as the program's 5-year plan is completed in FY 2007, are as follows:

- Quantify and understand factors influencing patterns of temporal and spatial variability in key ecosystem components and processes,
- Model factors controlling ecosystem patterns at various scales and develop decision support systems which integrate this information with management options,
- Develop indices of ecosystem sensitivity to change and vulnerability to potential stressors, and tools to predict ecosystem responses to environmental change,
- Devise restoration and adaptive management frameworks for impaired ecosystems, and
- Identify long-term research areas representative of US ecosystems of interest to Interior land managers.

Science on the DOI Landscape — The Science on the DOI Landscape initiative continues to be a successful collaboration between each USGS region and regional Interior offices. Interior bureaus have collaborated with USGS in project planning and implementation by leveraging funds or in-kind services to make this venture a true partnership. Although issues vary among regions and Interior bureaus, the common theme among all projects is recognition of Interior priority needs and quick response in providing information to answer questions and issues posed by Interior bureaus.

Climate Change — The USGS climate change program is an interdisciplinary research program that seeks to develop understanding of the consequences of global change processes, including climate change and variability, for ecosystems and their component biota and processes. Studies, funded for 3-5 years based on a competitive review process, seek to determine the response of ecosystems and biological communities and species to climate change and to assess future global climate change impacts.

Coastal Habitats, Wetlands, and Adjacent Uplands — USGS scientists conduct research to investigate coastal (including the Great Lakes) wetland structure and function to assess the resilience of wetland functions and the ecosystem services they provide to natural hazards and human activities, to predict changes in functions and ecosystem services in response to future environmental changes, to determine restoration and sustainable management practices for these systems, and to evaluate the effectiveness of current management actions.

Fire Ecology — The USGS conducts fire ecology research to understand the effects of wildland fire on ecosystem structure and function, and on other ecological attributes such as wildlife habitat. Research is also directed at understanding fire history and fire regimes; interactions of fire with invasive species (e.g., cheatgrass) and climate variability; fire relations with vegetation structure and effectiveness of fuels treatments; and development of guidelines for restoring and rehabilitating fire-impacted ecosystems and watersheds.

Outer Continental Shelf Marine Environmental Studies — USGS research supports the needs of the Minerals Management Service (MMS) for information on long-term ecological effects of offshore oil and gas exploration and production, including effects of active and decommissioned production platforms, and of sand and gravel dredging activities for beach

Biological Research

nourishment, on fish and deep sea corals, and on the condition, composition, and vulnerability of biological communities in areas of potential or new production or dredging.

Coral Reefs — The USGS conducts research on issues facing resource managers, including understanding conditions needed for productive and healthy reef communities, effects of land use on reef health and disease in support of the Coral Reef Task Force, and evaluating management options for human activities and how they influence reef integrity and biodiversity.

Rangelands and Grasslands — The USGS conducts studies on native grasslands and managed rangelands to assess ecosystem condition, determine spatial patterns of rare plants, and evaluate native plant diversity and species richness as impacted by past management and invasive species.

Deserts and Arid Lands — In the Southwest, USGS scientists are investigating the effects of natural and human disturbances on discrete soil units and the biota they support, including native soil biological crusts and their role in protecting soils.

Prairie Wetlands — USGS researchers are investigating factors influencing the use of restored wetlands by birds, amphibians, and macroinvertebrates, and quantifying recovery of non-wildlife functions such as carbon sequestration. Research is also conducted on wetland processes at a landscape scale, interactions of wetland biota with hydrology, geochemistry, and sedimentation in fragmented grassland landscapes.

Forested Wetlands — USGS research focuses on wetland regeneration and restoration in the southeastern United States, including site selection and preparation; forest mix and biodiversity enhancements; planting and community structure; management procedures and monitoring providing information for managing forested wetland flora and fauna and to quantify the role forested wetlands play in nutrient cycling and retention and in carbon sequestration.

Forest Ecosystems in the Pacific Northwest — USGS research focuses on healthy forest management in the Pacific Northwest, including understanding forest systems, sustaining biodiversity and ecosystem function, developing resource management options, recovery of sensitive and status species, supporting management of aquatic forest habitats, conducting landscape scale assessments, and addressing forest stressors such as climate change, fire, and pathogens.

Invasive Species

(Estimates for FY 2006, \$10.3 million; FY 2007, \$10.2 million;
FY 2008, \$10.5 million)

Non-indigenous invasive plants and animals cause increasing harm to native species and significant economic losses by reducing productivity and diminishing opportunities for beneficial uses of forests, croplands, rangelands, and aquatic resources. Many species introduced decades ago have begun to spread rapidly in U.S. ecosystems and pose increasing threats to lands and waters managed by the Department of the Interior. They harm native ecosystems and are contributing factors in the listing of 40 percent of threatened and endangered species. The economic costs associated with invasive species exceed \$100 billion per year. This program supports the Department's Resource Protection strategic goal of improving the understanding of national ecosystems and resources through integrated interdisciplinary science.

The goals of the Invasive Species Program address:

- Prevention,
- Early Detection and Rapid Assessment of New Invaders,
- Monitoring and Forecasting of Established Invaders,
- Effects of Invasive Species,
- Control and Management, and
- Information Systems (in cooperation with Biological Information Management and Delivery subactivity).

Program goals, as outlined in the program's 5-year plan, are to:

- Conduct research on priority pathways,
- Develop innovative control methods,
- Develop a national forecasting system for invasive species, and
- Maintain a National Invasive Species Information Network.

The Department is also continuing its participation in an interagency performance budget on invasive species that is coordinated through the National Invasive Species Council (NISC). The Department's bureaus work in partnership with other Federal agencies, State, local, and tribal governments, and private sources to perform the seven functions of invasive species management: prevention, early detection and rapid response, control and management, restoration, research, education and public awareness, and leadership and international cooperation.

The USGS plays an important role in Federal efforts to combat invasive species in natural and semi-natural areas through early detection and assessment of newly established invaders, monitoring of invading populations, improving understanding of the ecology of invaders and factors in the resistance of habitats to invasion, and development and testing of prevention and alternative management and control approaches. USGS research on invasive species includes all significant groups of invasive organisms in terrestrial and aquatic ecosystems.

The USGS plays a significant role in implementing the National Invasive Species Management Plan (Plan), developed by the NISC, as called for in the Presidential Executive Order on invasive species. To meet the goals of the Plan, the USGS Invasive Species program provides management-oriented research and delivers information needed to prevent, detect, control, and eradicate invasive species and to restore impaired ecosystems. Facilitating these efforts is the National Institute for Invasive Species Science, a growing consortium of partnerships between government and non-governmental organizations that is administratively housed in the USGS Fort Collins Science Center in Colorado. USGS researchers are leading or cooperating in efforts to integrate the capabilities of the USGS and partners, including Federal and State resource agencies, to help provide the information, methods, technologies, and technical assistance needed for effective responses to terrestrial and aquatic invaders threatening U.S. ecosystems and native species. An important focus is on developing models for predicting the probable spread and impacts of invaders, in cooperation with NASA Goddard Space Flight Center, the USGS EROS Data Center, and others.

(<http://www.nrel.colostate.edu/projects/niiss/niiss.html>)

Biological Research

To ensure the strategic allocation of resources to combat invasive species, the NISC, co-chaired by the Secretary of the Interior, the Department of Agriculture, and the Department of Commerce, developed the first interagency example of a performance-based budget. Based on common goal statements, strategies, actions, and performance measures, the NISC selected priority topical and geographical areas of focus, and member agencies developed coordinated budget requests to address these. The Department participates in the development of this interagency performance budget on invasive species which links spending levels with levels of performance.

Hawaiian Invaders — USGS research focuses on the ecology and control of highly invasive plants (e.g., miconia, faya tree, strawberry guava, Kahili ginger), including exploration and testing for biological control agents; animals (e.g., Argentine ant, yellow jackets, brown tree snake on Guam); wildlife disease organisms; and methods for reducing the impacts of invasive species on the region's unique native flora and fauna.

Weeds in the West — The USGS is conducting a multiscale, integrative program for mapping infestations and accurately monitoring the spread of invasive plants (i.e., weeds) in western forests and rangelands, improving methods for predicting areas most vulnerable to invasions, and assessing the effects of management practices and natural disturbances on invasions. The USGS is assessing the effects of invasions on ecosystems and native species (e.g., fire ecologists are determining how invasive species alter the frequency and intensity of wild fires) and providing improved methods for reducing the adverse impacts of invasive weeds and for restoring public range lands affected by weed invasions.

Invasives in the East — The USGS conducts research on invasive species that threaten ecosystems and native species in the eastern United States including terrestrial and aquatic surveys of non-indigenous species in eastern parks and wildlife refuges, studies of pathways for establishment and spread of invasive species, research on the impacts of invasive species and factors in invasions, and development of methods to control or eliminate invasive species to promote healthy native communities that are resistant to invasion.

Great Lakes Invaders — USGS research supports cooperative efforts in the Great Lakes region to prevent and control the spread of invasive fish, such as the round goby and sea lamprey, reduce the pervasive impacts of zebra mussels on U.S. waterways, and manage or mitigate the adverse ecological and economic impacts of the invaders.

2008 Program Performance

The USGS serves the biological research needs of Interior bureaus and others by providing scientific information through research, inventory, and monitoring investigations. Biological studies develop new methods and techniques to identify, observe, and manage fish and wildlife, including invasive species, and their habitats; inventory populations of animals, plants, and their habitats; and monitor changes in abundance, distribution, and health of biological resources through time.

For instance, in 2007 and 2008, the USGS will continue research on highly pathogenic avian influenza (HPAI) in wild birds in response to the growing threat to human health and wildlife populations. In 2006, at the urging of the Homeland Security Council, the USGS developed a partnership with the U.S. Department of Agriculture's Animal and Plant Health Inspection

Service (APHIS), U.S. Fish and Wildlife Service, National Park Service, and the States to create an "early warning system" for HPAI in wild birds. A deadly form of avian influenza swept across Asia and Europe in 2005, infecting nearly 100 people and causing millions of dollars in economic loss to those raising domestic chickens, ducks, and geese. The timing and direction of its movement led many in the scientific community to believe that migratory birds may have played a role in its spread. With 26 species of migratory birds moving regularly between Asia and North America, the possibility of wild birds introducing the virus to North America is very real. USGS and its partners quickly designed and implemented an HPAI early detection system to collect and analyze samples taken from live birds, hunter-killed birds, birds involved in natural mortality events, captive "sentinel" birds, and the environments in which these birds live. Within the first eight months of this effort, USGS and FWS biologists collected over 20,000 samples from live and hunted birds on Interior-managed lands in Alaska and the Pacific region. Specialists with the USGS National Wildlife Health Center have successfully analyzed each of these samples plus another 800 from wild bird mortality events for the presence of HPAI. In addition, USGS has developed a web-based avian information data system to manage the large volume of information pouring in from APHIS, USGS, and the States. This unified, interagency database will facilitate the analysis of sampling and laboratory results from across the country. As of this writing, approximately 45,000 detailed scientific records are now included in the database.

The following 2008 planned program accomplishments listed below demonstrate the utility of "systematic analyses and investigations delivered to customers" and "number of formal workshops or training provided to customers."

Program: Invasive Species

Project Name: Early Detection and Control of Low Density Brown Treesnake Populations

Project Description: The brown treesnake colonization of Guam has resulted in the loss of 17 native species from the island over the past four decades, and further dispersal to other islands would be similarly devastating ecologically. In 2008, USGS researchers will continue to test and refine new techniques for detecting, trapping, and controlling incipient populations of brown treesnakes on potential recipient islands. For example, the feasibility of using trained dogs to detect brown treesnakes in forested environments where they often occur at very low densities will be tested. Modifications to existing trapping equipment and protocols are being developed to increase trap capture rates for small-sized snakes, and researchers are investigating new barrier designs to protect endangered species from snake predation and prevent snakes from entering the inter-island transportation network

Program: Fisheries: Aquatic and Endangered Resources

Project Name: USGS Ecological Flow Indicators for Adaptive Management of Water Availability in Managed Systems.

Project Description: Water availability is of national interest as urbanization and other land use issues change the nature of water allocation across the country. Human health, local economies, recreation, and priority species all benefit from healthy aquatic systems. The USGS is at the forefront of research to determine functional interactions among biological, hydrological, and geological attributes of natural and managed aquatic systems and their contribution to the sustainability of ecological services. In 2008, USGS scientists in the Fisheries: Aquatic and Endangered Resources program, working in cooperation with the USGS Water discipline National Research program, Ground Water Resources program, and Coastal and Marine Geology program, will develop new methods to measure the biological integrity of aquatic communities and aquatic systems under different water management regimes. Advanced measurements of hydrogeomorphological attributes of aquatic systems will be synthesized with

Biological Research

biotic responses to provide decision analysis and risk assessment tools for the adaptive management of water resources. These tools will provide science-based information to water managers and policy makers to support the sustainability of healthy aquatic systems.

Performance

In some instances, actual performance exceeded the USGS plan in FY 2006 for the number of systematic analyses and investigations provided to customers, and the number of formal workshops or training provided to customers. In FY 2005, for the FY 2007 budget, the USGS worked on standardizing definitions and consistency in their application. Effectively, the measures were rebaselined and outyear targets will be adjusted accordingly. However, the process will need another year to test before the USGS can become confident in predicting results.

Under the Resource Protection strategic goal, changes result from additional funding provided in 2006. In most cases, there is a 2-year lag between initiating research and obtaining results. Additional funds provided in 2006 are increasing the number of systematic analyses or investigations delivered to customers in 2008 by 11.

Under the Resource Protection strategic goal, the 2008 proposed decreases would result in 4 fewer systematic analyses or investigations delivered to customers in 2010.

Also, under the Resource Protection strategic goal, the 2008 proposed increase for the Healthy Lands Initiative would result in 6 new systematic analyses delivered to customers and 3 new workshops and training provided to customers in 2008. Also, 14 new systematic analyses and investigations would be delivered to customers in 2010.

PART

In FY 2005, for the FY 2007 budget, the Administration reviewed the Biological Research and Monitoring (BRM) program using the PART process. The program was found to be working effectively with partners and fulfilling its mission and rated the program moderately effective.

The PART also found:

- The program has met program goals. For example, 96 percent of customers are satisfied with usefulness of scientific and technical products.
- BRM has made progress coordinating research, but could take steps to improve accessibility of research and monitoring products. While BRM works collaboratively with other organizations, more formal coordination is lacking with the Biological Information Management and Delivery program and other Interior bureaus.
- BRM program reviews have not been adequate. While the program uses various methods for reviews, they have been by research area rather than biology-wide, and were not regularly implemented, or sufficiently independent.

The following recommendations were developed to improve the performance of the program:

- Developing a plan with the Biological Information program to maximize access to research and data and provide timely reports on the status and trends of the Nation's biological resources.
- Implementing regular, comprehensive, and independent reviews for all biological research, monitoring and information management activities.
- Developing performance measures with the FWS to improve coordination for conservation of fish and wildlife populations of management concern.

The USGS has developed action plans for each recommendation having milestones and targets approved by the Department and OMB and tracked in the Department's Management Initiatives Tracking System (MITS). All actions are on schedule or, when milestones appear to be delayed for cause, are renegotiated with OMB and the Department and amended in MITS. The Department quarterly reviews ensure accountability of PART programs, milestone progress explanation, target delay explanations and any pertinent implementation impacts of Action Plan implementation.

Biological Research

Program Performance Overview									
End Outcome Goal 1.4: Resource Protection: Improving the understanding of national ecosystems and resources through integrated interdisciplinary assessment									
End Outcome Goal End Outcome Measure / Intermediate or PART Measure / PART Efficiency or other Outcome Measure	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
End Outcome Measures									
% of targeted science products that are used by partners for land or resource management decision making (SP)	UNK	60%	60%	86.9%	65%	65%	65%	0	67%
Intermediate Outcome Measures and Bureau and PART Outcome Measures									
% of North American migratory birds for which scientific information on their status and trends are available (SP) (PART) (BRM)	UNK	26%	26%	26%	26% (169/650)	26% (169/650)	27.1% (176/650)	+1.1%	27.1% (176/650)
Comments	Planned performance change within base funding.								
% of targeted fish and aquatic populations for which information is available regarding limiting factors (SP) (PART) (BRM)	UNK	31%	31%	31%	37% (44/119)	37% (44/119)	41% (49/119)	+5%	51% (61/119)
Comments	Planned performance change within base funding.								
% of targeted invasive species for which scientific information and decision support models are available to improve early detection (including risk assessments) and invasive species management (SP) (PART) (BRM)	UNK	51.6%	51.6%	51.6%	52.5% (3.15/6)	52.5% (3.15/6)	53.3% (3.2/6)	0	54% (3.25/6)
Comments	Planned performance change within base funding.								
X% improvement in detectability limits for selected, high priority environmentally available chemical analytes (PART) (BRM)	UNK	UNK	6%	6%	12%	12%	20%	+8%	48%
Comments	Planned performance change within base funding.								
Increase long-term trend precision (decrease bias) for existing species monitored through the Breeding Bird Survey to enable a detection of 50% population decline of relevant species within 20 years (PART) (BRM)	UNK	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0	0.0008

Biological Research and Monitoring

Program Performance Overview									
End Outcome Goal 1.4: Resource Protection: Improving the understanding of national ecosystems and resources through integrated interdisciplinary assessment									
End Outcome Goal End Outcome Measure / Intermediate or PART Measure / PART Efficiency or other Outcome Measure	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
% of studies validated through appropriate peer review or independent review (SP)	666/666 100%	1,314/1,314 100%	842/842 100%	1,093/1,093 100%	865/865 100%	865/865 100%	878/878 100%	0	911/911 100%
PART Efficiency and Other Output Measures									
Average cost per sample for selected, high priority environmentally available chemical analytes (PART Eff Measure)	UNK	\$700	\$700	\$680	\$680	\$680	\$650	-\$30	\$567
Total Projected Cost (\$000)	UNK	UNK	TBD	TBD	TBD	TBD	TBD	--	TBD
Projected Cost per sample (whole dollars)	UNK	\$700	\$700	\$680	\$680	\$680	\$650	-\$30	\$567
Comments	Planned performance change within base funding.								
# of systematic analyses & investigations delivered to customers	666	1,314	842	1,093	865	865	878	+13	911
Total Projected Cost (\$000)	\$133,200	\$262,800	\$168,400	\$218,600	\$173,000	\$173,000	\$175,600	+\$2,600	\$182,200
Projected Cost per systematic analysis (whole dollars)	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	--	\$200,000
Comments	<p>The Healthy Lands Initiative accelerates completion of 6 systematic analyses and investigations in 2008 to evaluate treatments and develop adaptive management options for sage habitats for the benefit of sage grouse on Interior managed lands. A total of 14 systematic analyses and investigations will be delivered in the outyears. Increases provided in 2006 result in an additional 7 systematic analyses and investigations in 2008. Proposed decreases in 2008 eliminate 4 systematic analyses and investigations delivered in 2010.</p> <p>Systematic analyses, the product of research, require one to five years for completion. Some studies already underway in these areas will be completed in 2007 and 2008. The influx of new funding will accelerate completion of some research projects currently in progress as well as initiate other research projects that will conclude in the outyears. The USGS used an annual snapshot of the Resource Protection ABC research work activity cost data averaged over time as a surrogate cost per unit. To this the USGS added a proportional share of the cost derived for the Resource Protection science management activity. For 2004 through third quarter 2006, the average unit cost for systematic analyses is approximately \$200,000 for the Resource Protection mission area which correlates to the average cost that the program had historically used before implementation of ABC.</p>								
# of formal workshops or training provided to customers (instances/issues/events)	51	247	71	127	71	72	72	0	72
Total Projected Cost (\$000)	\$4,080	\$19,760	\$5,680	\$10,160	\$5,680	\$5,760	\$5,760	0	\$5,760
Projected Cost per workshop (whole dollars)	\$80,000	\$80,000	\$80,000	\$80,000	\$80,000	\$80,000	\$80,000	--	\$80,000

Biological Research

Program Performance Overview									
End Outcome Goal 1.4: Resource Protection: Improving the understanding of national ecosystems and resources through integrated interdisciplinary assessment									
End Outcome Goal End Outcome Measure / Intermediate or PART Measure / PART Efficiency or other Outcome Measure	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
Comments	For workshops, which support land managers in applying the science, and are a shorter term product, the USGS used the average unit cost of \$80,000 based on the technical assistance and proportional share of the science management work activity for 2005 for the Resource Protection mission. Other Interior goals will also accrue performance from systematic analyses produced, workshops conducted, and monitoring stations added to the network. Change in 2008 is a net result of increased funding for the Healthy Lands Initiative and a decrease in Priority Ecosystems.								

Activity: Biological Research

Subactivity: Biological Information Management and Delivery

	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Cost & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Biological Information Management and Delivery (\$000)	23,794	21,967	+311	0	22,278	+311
<i>Total FTE</i>	82	75	0	0	75	0

Program Overview

The Biological Information Management and Delivery activities are performed through the USGS Biological Informatics program. The mission of this program is to create the informatics framework, provide scientific content, and develop the public and private partnerships needed for the understanding and stewardship of our Nation's biological resources. The Biological Informatics program provides access to data and information for science-based decisionmaking, particularly as it pertains to the conservation, management, and use of the Nation's natural resources. In addition, the program develops and makes available tools, models, visualizations, and applications to aid policy and resource managers in the analysis and synthesis of scientific data to support decisionmaking. The program works in cooperation with many organizations throughout the United States and the world to provide biological information to partners, stakeholders, customers, and the general public. Through electronic infrastructures, the program delivers relevant data and information faster and in more interoperable formats than in the past, leading to better stewardship of the Nation's natural resources.

This program addresses the Department of the Interior Resource Protection strategic goal of improving the understanding of national ecosystems and resources through integrated interdisciplinary assessment. The USGS plays a vital role in making biological data and information more accessible and useable. Key indications of USGS performance are reflected in the intermediate outcome measures for ensuring availability of long-term environmental and natural resource information, data and systematic analyses needed by land and resource managers for informed decision making.

The USGS also tracks outputs including the number of systematic analyses and investigations delivered to customers and the number of workshops/training with USGS sponsorship or participation to transfer results to customers and partners. Performance measures resulting from the PART are incorporated into the performance tables located in the Performance Goal Table section beginning on page B-1.

In 2012, the USGS Biological Research and Monitoring subactivity expects to deliver to its customers about 36 systematic analyses and investigations and 19 formal workshops and training.

Biological Research

The program's progress is assessed by metrics that are reported through the Government Performance and Results Act reporting structure, and within several executive level reporting and oversight strategies including the Administration's Program Assessment and Rating Tool (PART) and the Capital Asset Plan and Business Case (Exhibit 300). Tracked activities include efficiencies such as the cost per gigabyte managed, outputs such as the number of systematic analyses delivered to customers, and outcomes such as percent of U.S. land with land characterization and species distribution information available for resource management decision making updated in the last 5 years.

Program Components

The core and interdependent components of the Biological Informatics program have been specifically designed to integrate information across geographic and political scales (local to global) and biological levels of organization (genomes to biomes).

The following are the core components of the Biological Information Management and Delivery subactivity.

- *Landscapes, Stewardship, and Species Distributions.* The Gap Analysis Program (GAP) generates databases on native vertebrate species distributions and natural land cover types to provide State, regional, and national conservation assessments.
- *Biosystematics and Nomenclature.* The Integrated Taxonomic Information System (ITIS) is under development to provide an authoritative source of species names and their hierarchical classification. The completed portions serve as a taxonomic standard for other program components and the global community, enabling the comparison of biodiversity data sets at all biological levels.
- *Genomes to Biomes.* The National Biological Information Infrastructure (NBII) continues development to provide the biological community and others with a fully digital, interactive, distributed system that provides scientifically reliable biological data and information and a suite of tools for analysis, synthesis, and forecasting. Network-wide methods and standards for organizing content to enhance the retrieval, integration, and use of information are a key component of the NBII.

The program works collaboratively with others to ensure that it is building a store of high quality data and information that can be used to address resource management issues. To that end, the program engages USGS science centers and other programs, non-governmental organizations, museums, universities, international organizations, and other partners in the creation of data content and resources to address resource management needs.

Program goals, as outlined in the program's 5-year plan, are to:

- Increase the availability and usefulness of biological resources data and information (content),
- Implement technologies and tools to integrate, analyze, visualize, and apply biological information to natural resource issues (tools),
- Develop, apply, and promote the adoption of standard practices, protocols, and techniques to enhance knowledge discovery and retrieval from various resources (infrastructure),

- Facilitate information science research that supports the advancement of biological informatics capabilities (research), and
- Apply innovative technologies and best practices to improve the development, description, and dissemination of biological information to customers (customers).

Customers and Partners — The USGS national-level approach to managing biological and natural resource data and scientific information ensures the application of standards that foster opportunities for collaboration and cooperation. The USGS places a premium on partnerships at all levels of government and with nongovernmental entities, including the private sector. These partners use USGS-generated scientific data and information that contributes to the knowledge base, which then becomes available to Interior land and resource managers, and others.

For example, each node of the National Biological Information Infrastructure (NBII) is developed through the collaboration of the partners and customers involved with that node. All together, NBII has over 250 partner organizations and agencies that help define the direction both of individual nodes and of the NBII as a whole.

National Biological Information Infrastructure (NBII) — The NBII is a tool for making biological data, information, and associated tools and technologies more accessible for customers and partners to use in making informed decisions regarding resource management, environmental considerations, disease vectors, control of invasive species, and other issues.

The NBII uses the capabilities of the Web and other advanced technologies to establish a distributed "federation" of biological data and information sources through which users can find biological information, retrieve it, and apply it to resource management questions. Partners and customers that take part in this effort include government agencies at all levels, private sector organizations, natural history museums, libraries, academic institutions, international scientific organizations, and the public.

The USGS works with many public and private partners in implementing the NBII to:

- Develop a nationwide network of NBII "nodes" focused on geographic and thematic perspectives,
- Expand the overall content of the NBII, and
- Develop and apply new information tools and technologies.

The NBII is a networked series of regional and thematic nodes. Regional nodes focus on and provide services within a particular geographic area of the country. Within a region, activities address broad biological themes and issues that are high priority to stakeholders in that region. Currently, NBII has initiated eight regional nodes.

The thematic nodes of NBII are responsible for coordinating data and information within the scope of their assigned science focus areas at a national level. In doing so, they both initiate data gathering activities and coordinate relevant local data sets from the regional nodes. They also place a high priority on developing tools to allow users to interact with data from diverse sources. Currently, NBII has initiated four thematic nodes.

In addition to regional and thematic nodes which approach the task of making data and information accessible from geographic and topical perspectives, effort also is aimed at developing the infrastructure that underlies the data and information network. This infrastructure

Biological Research

consists not only of the hardware and software required to make the network run. It also consists of the standards that must be implemented to make network-wide interoperability possible. As the node structure grows, a robust infrastructure becomes more and more critical so that necessary products and services may be provided to all nodes and not duplicated at node locations. This infrastructure, used by all nodes, enables network-wide search, access, and retrieval, and sharing of tools.

Gap Analysis — The Gap Analysis Program (GAP) provides broad geographic information on the status of species and their habitats and identifies the degree to which native animal and plant species are represented in the present-day mix of conservation lands (those species not adequately represented constitute conservation "gaps"). Currently, GAP products are available for most of the country. These products include digital databases describing statewide land-cover assemblages, distributions of mammals, birds, reptiles, and amphibians, and characterizations of land stewardship. The current emphasis of the program is on completing GAP projects in the few States where data are not available, updating selected regions of the country with state-of-the-art methods and technologies, and developing partnerships with data users to facilitate use of GAP information in land-management decisions.

The USGS continues to emphasize GAP research and the development of applications to better serve the needs of Interior's land management bureaus, including the U.S. Fish and Wildlife Service, the Bureau of Land Management, and other agencies such as the U.S. Forest Service. New mechanisms being implemented to facilitate access to GAP products include regional views, species information at regional and national scales, and user-defined online mapping.

Integrated Taxonomic Information System (ITIS) — The USGS leads and works with other Federal agencies (including the Environmental Protection Agency, USDA Agricultural Research Service, USDA Natural Resources Conservation Service, National Oceanic and Atmospheric Administration, Smithsonian Institution, National Science Foundation, Fish and Wildlife Service, and the National Park Service), organizations, institutions, and taxonomic specialists across the United States and internationally to develop and operate the largest taxonomic thesaurus and database of its kind in the world. The ITIS provides an accepted scientific name (with a unique Taxonomic Serial Number) as the "common denominator" for accessing information on such topics as biodiversity, invasive species, declining amphibians, migratory birds, fishery stocks, pollinators, agricultural pests, and emerging diseases. The ITIS supports the development of the only comprehensive national taxonomic database that provides free access (directly over the Internet) to standard scientific names for all U.S. plant and animal species.

Vegetation Characterization — USGS scientists assist National Parks with inventorying and monitoring with efforts focused on creating national vegetation standards, technologies, and products. This activity enables delivery of national-scale descriptions of vegetation to meet specific information needs identified by the National Park Service with additional cooperative projects for the FWS and BLM. Products are aimed at monitoring efforts such as planning and designing monitoring protocols, performing statistical data analyses, and achieving efficiencies such as dovetailing protocols for invasive species inventory and fire fuels related to vegetation to ensure integrated field data collection protocols.

FY 2008 Program Performance

The 2008 budget request for the Biological Information Management and Delivery subactivity is \$22,278,000 and 75 FTE.

Under the Resource Protection end outcome goal of improving the understanding of national ecosystems and resources through integrated interdisciplinary assessment, the metrics for the number of gigabytes managed shown in the performance tables are cumulative. Previous records will be maintained and an estimated 21 additional gigabytes will be added in FY 2008. Estimate is based on history, adjusted for expected funding levels. The average cost per gigabyte of data available through servers under program control is expected to decrease by \$3,000 in 2008. Planned increases in data available through NBII with a corresponding budget decrease reduces planned cost per unit.

In 2008, the Biological Informatics program expects to deliver to its customers about 36 systematic analyses and investigations and 19 formal workshops/training courses.

The Biological Informatics program provides access to data and information for science-based decisionmaking, particularly as it pertains to the conservation, management, and use of the Nation's natural resources. In addition, the program develops and makes available tools, models, visualizations, and applications to aid policy and resource managers in the analysis and synthesis of scientific data to support decisionmaking.

For instance, in 2007 and 2008, the USGS GAP program will continue updating land cover and species distribution data in two regions of the United States, the Northwest and Southeast. Characterization and mapping of vegetation types developed by GAP are used for conservation planning, reserve design, and species modeling. Species distribution data is needed for many species conservation efforts. The regional focus of these updates will also allow State conservation and land management agencies and Federal land managers to better plan land use across State boundaries. This supports the program measure "% of U.S. land with land characterization and species distribution information available for resource management decision-making updated in the last 5 years."

In 2007 and 2008, the Biological Informatics program will continue to develop the Department of the Interior's national framework for invasive species early detection, rapid assessment and response. The framework was created to respond to the growing threats and impacts of invasive species throughout the United States and to help identify and coordinate current efforts to combat invasions by non-native species into the United States. Building on results of an extensive survey and workshop conducted in FY 2006 of Federal, State, academic, and nongovernmental organizations to determine what components of the developing framework are currently underserved, this program will begin to develop tools and coordination efforts to address these gaps in the framework. Tools will also be developed to make existing resources in the framework more accessible to decision makers. This will build the framework toward its ultimate goal of promoting the timely forecasting, identification, reporting, verification, and response to invasive species. This initiative will support the program measure "Amount of invasive species data available online via the NBII, to assist in modeling and forecasting the spread of invasives."

PART

In FY 2005, for the FY 2007 budget, the Administration reviewed the Biological Information Management and Delivery (BIMD) program using the PART. The program was found to be working effectively with partners and fulfilling its mission and rated the program moderately effective.

Additionally, the PART found:

- The program has met program goals. For example, 96 percent of customers are satisfied with usefulness of scientific and technical products.
- BIMD has made progress coordinating research, but could take steps to improve accessibility of research and monitoring products. While BRM works collaboratively with other organizations, more formal coordination is lacking with the Biological Information Management and Delivery program and other Interior bureaus.
- BIMD program reviews have not been adequate. While the program uses various methods for reviews, they have been by research area rather than biology-wide, and were not regularly implemented, or sufficiently independent.

Beginning in 2006, several milestones were identified to begin addressing these recommendations, and measurable progress to-date has been achieved. The 2007 Improvement Plans that address these recommendations are as follows:

- Identify barriers and pilot potential solutions as part of the plan to maximize access to research and data and provide timely reports on the status and trends of the nation's biological resources.
- Develop and provide access to a suite of data and information, including baseline state of knowledge indices, for US Fish and Wildlife Service-designated focal species of management concern to improve coordination for conservation.
- Conduct an alternatives analysis and establish approach for conducting comprehensive and independent reviews for all of the Biological research, monitoring, and information management activities.

USGS has developed action plans having milestones and targets in the Department's Management Initiatives Tracking System (MITS). All actions are on schedule or, when milestones appear to be delayed for cause, are renegotiated with OMB and the Department and amended in MITS. The Department quarterly reviews ensure accountability of PART programs, milestone progress explanation, target delay explanations, and any pertinent implementation impacts of Action Plan implementation.

Program Performance Overview									
End Outcome Goal 1.4: Resource Protection: Improving the understanding of national ecosystems and resources through integrated interdisciplinary assessment									
End Outcome Goal End Outcome Measure / Intermediate or PART Measure / PART Efficiency or other Outcome Measure	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
Intermediate Outcome Measures and Bureau and PART Outcome Measures									
X% of US land with land characterization and species distribution information available for resource management decision-making updated in the last 5 years (BIMD PART)	18.3%	23.3%	28.3%	42.3%	34%	34%	39%	+5%	18%
Comments	Planned performance change within base funding.								
X% of North American migratory birds for which scientific information on their status (species distribution and number) and trends are available in a standardized and exchangeable format, to improve conservation plans of federal and state agencies (BIMD PART)	15%	20%	25%	25%	30%	30%	35%	+5%	55%
Comments	Planned performance change within base funding.								
X% of US federally-listed threatened and endangered or indicator fish species for which scientific information on A species status is available in a standardized and exchangeable format to improve conservation plans of federal and state agencies (BIMD PART)	2.6%	7.5%	12.5%	12.4%	17.5%	17.5%	20%	+2.5%	28.5%
Comments	Planned performance change within base funding.								
PART Efficiency and Other Output Measures									
# of formal workshops or training provided to customers (instances/issues/events) (BIMD)	22	23	22	23	16	19	19	0	19
Total Projected Cost (\$000)	UNK	UNK	UNK	UNK	\$72,000	\$85,500	\$85,500	--	\$85,500
Projected Cost per workshop/training (whole dollars)	UNK	UNK	UNK	UNK	\$4,500	\$4,500	\$4,500	--	\$4,500
# of cumulative gigabytes managed (BIMD)	360	791.25	800	1,134.22	820	820	841	+21	925
Comments	Planned performance change within base funding.								

Biological Research

Program Performance Overview									
End Outcome Goal 1.4: Resource Protection: Improving the understanding of national ecosystems and resources through integrated interdisciplinary assessment									
End Outcome Goal End Outcome Measure / Intermediate or PART Measure / PART Efficiency or other Outcome Measure	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
Average cost per gigabyte of data available through servers under Program control (BIMD PART Eff Measure)	\$66,000	\$63,000	\$60,000	\$17,155	\$55,000	\$55,000	\$52,000	-\$3,000	\$44,000
Comments	The average cost per gigabyte of data available through servers under program control is expected to decrease by \$3,000 in 2008. Planned increases in data available through NBII with a corresponding budget decrease reduces planned cost per unit.								

Science Centers and Field Stations Summary

Center Name	Location	FY 2006 ^{1/} Estimate (\$000)	FY 2007 ^{1/} Estimate (\$000)	FY 2008 ^{1/} Estimate (\$000)
Center for Biological Informatics	Lakewood, CO	6,542	6,542	6,542
Program Description: The Center facilitates access to and use of biological data and information through leadership in establishing standards, developing information products, and using information technologies. The Center supports such programs as GAP Analysis, the USGS/National Park Service Vegetation Mapping, and the National Biological Information Infrastructure.				
Upper Midwest Environmental Science Center	LaCrosse, WI	3,873	3,676	3,676
Program Description: The Center provides scientific leadership in a variety of areas including river ecology, restoration of degraded habitats, development of chemicals for fishery management, declining species, invasive aquatic species impacts and control, contaminants, and development of decision support models. The Center has lead responsibility for the Upper Midwest Amphibian Research and Monitoring Initiative and the Long Term Resource Monitoring Program on the Upper Mississippi River. Scientists at the Center anticipate emerging problems and information gaps and provide the leadership and the commitment to action needed for effective resource management.				
Field Stations: N/A				
Leetown Science Center	Leetown, WV	7,963	8,083	7,860
Program Description: The Center conducts research to provide land and resource managers information needed to restore, enhance, maintain, and protect biological resources and their supporting systems.				
Field Stations:				
Aquatic Ecology Laboratory	Leetown, WV	2,169	2,208	2,160
Fish Health Research Laboratory	Leetown, WV	1,368	1,410	1,356
Southern Appalachian Field Laboratory	Knoxville, TN	461	421	410
Great Smoky Mountain Field Station	Gatlinburg, TN	36	40	39
Northern Appalachian Research Laboratory	Wellsboro, PA	1,199	1,229	1,189
Conte Anadromous Fish Research Laboratory	Turners Falls, MA	1,838	1,876	1,830
Orono Field Station	Orono, ME	125	130	135
Columbus Field Station	Columbus, OH	147	164	148
Restoration Technology Laboratory	Leetown, WV	407	404	393
Directorate/Information Resources Management	Leetown, WV	213	201	200
National Wildlife Health Center	Madison, WI	7,145	7,145	7,145
Program Description: The Center provides national and international leadership for addressing health issues involving wildlife resources under Interior's stewardship and to foster partnerships with others to address wildlife health as a component of ecosystem health.				
Field Stations:				
Honolulu Field Station	Honolulu, HI	220	240	240

Biological Research

Center Name	Location	FY 2006 ¹⁷ Estimate (\$000)	FY 2007 ¹⁷ Estimate (\$000)	FY 2008 ¹⁷ Estimate (\$000)
Patuxent Wildlife Research Center	Laurel, MD	13,301	13,301	13,301
Program Description: The Center focuses on wildlife research and management, specializing in wildlife conservation, especially in such areas as waterfowl harvest management, wildlife habitat improvement, the effects of environmental contaminants, endangered species conservation, migratory bird management, and wildlife population analysis.				
Field Stations:				
Orono	Orono, ME	169	169	169
Athens	Athens, GA	966	966	966
Vicksburg	Vicksburg, MS	355	355	355
Narragansett	Narragansett, RI	507	507	507
Smithsonian	Washington, DC	1,515	1,515	1,515
Syracuse	Syracuse, NY	142	142	0
Blacksburg	Blacksburg, VA	164	164	164
Biological Science Office of the Florida Integrated Science Center (formerly the Florida Caribbean Science Center)				
Biological Science Office of the Florida Integrated Science Center (formerly the Florida Caribbean Science Center)	Gainesville, FL	4,638	4,684	4,731
Program Description: The Center provides natural resource managers with scientific information needed for effective conservation with emphasis on biological resources of the Florida peninsula, the Southeastern States, and the Caribbean region. The Center focuses on coastal and marine ecology, ecosystems restoration ecology, invasive species, and biological diversity.				
Field Stations:				
Northeast Laboratory	Gainesville, FL	0	0	0
South Florida Field Stations	Miami/Homestead/ Ochopee, FL	1,197	1,209	1,221
Virgin Islands Field Station	St. John, U.S. Virgin Islands	134	135	136
Center for Coastal Geology and Regional Marine Studies	St. Petersburg, FL	864	873	882
Great Lakes Science Center				
Great Lakes Science Center	Ann Arbor, MI	9,401	8,001	8,001
Program Description: The Center meets the Nation's need for scientific information for restoring, enhancing, managing, and protecting the living resources and their habitats in the Great Lakes Basin Ecosystem. This mission is accomplished with scientific knowledge gained through quality research, inventory and monitoring, and information transfer.				
Field Stations:				
Lake Superior Biological Station	Ashland, WI	2,134	719	719
Lake Ontario Biological Station	Oswego, NY	373	373	373
Lake Erie Biological Station	Sandusky, OH	558	558	558
Cheboygan Vessel Base	Cheboygan, MI	340	340	340
Munising Biological Station	Munising, MI	109	109	109
Lake Michigan Ecological Research Station	Porter, IN	498	498	498
Hammond Bay Biological Station	Hammond Bay, MI	38	38	38
Tunison Lab. of Aquatic Science	Cortland, NY	917	917	667

Science Centers and Field Stations

Center Name	Location	FY 2006¹ Estimate (\$000)	FY 2007¹ Estimate (\$000)	FY 2008¹ Estimate (\$000)
Fort Collins Science Center	Fort Collins, CO	7,745	7,800	7,900
Program Description: The Center conducts research and develops technical applications to assist land managers in understanding and managing biological resources, habitats and ecosystems. The Center is home to the National Institute of Invasive Species Science. The Center conducts research related to species & habitats, aquatic systems, riparian ecology, global change, fire ecology, and herbivore ecosystems in support of Department of the Interior bureaus and the International Center for Applied Ecology.				
Field Stations:				
Arid Lands Field Station	Albuquerque, NM	666	600	600
Jemez Mountain Field Station	Los Alamos, NM	146	154	160
Northern Prairie Wildlife Research Center	Jamestown, ND	4,476	4,476	4,476
Program Description: The Center develops research information on the quantitative ecological requirements for sustainable wildlife populations primarily in grasslands and wetlands, determines the distribution of flora and fauna, and identifies consequences of habitat loss, management, and restoration.				
Field Stations: N/A				
Columbia Environmental Research Center	Columbia, MO	6,878	6,663	6,663
Program Description: The Center provides scientific information and data needed to address national and international environmental contaminant issues, and effects of habitat alterations on aquatic and terrestrial ecosystems.				
Field Stations:				
Texas Gulf Coast	Corpus Christi, TX	418	419	419
Texas Gulf Coast	College Station, TX	142	142	142
Padre Island Field Station	Padre Island, TX	48	0	0
International Falls Field Station	International Falls, MN	98	98	98
Yankton Field Station	Yankton, SD	123	110	110
Jackson Field Station	Jackson, WY	130	137	137
National Wetlands Research Center	Lafayette, LA	4,843	4,883	4,883
Program Description: The Center conducts research to address loss of wetlands in coastal systems, the changes in fresh and estuarine systems because of changes in water quality, and the resulting effects on birds.				
Field Stations:				
Corpus Christi Field Station	Corpus Christi, TX	90	90	90
Baton Rouge Field Station	Baton Rouge, LA	106	106	106

Biological Research

Center Name	Location	FY 2006 ¹ Estimate (\$000)	FY 2007 ¹ Estimate (\$000)	FY 2008 ¹ Estimate (\$000)
Northern Rocky Mountain Science Center	Bozeman, MT	3,001	2,800	2,500
Program Description: The Center conducts research to provide land and resource managers information needed to restore, enhance, maintain, and protect natural resources of the Rocky Mountain ecosystems.				
Field Stations:				
Glacier Field Station	West Glacier, MT	358	358	358
Missoula Field Station	Missoula, MT	117	117	117
Western Fisheries Research Center	Seattle, WA	3,652	3,706	3,706
Program Description: The Center provides scientific research and technical assistance to support the best possible stewardship of the natural resources, emphasizing fish populations and aquatic ecosystems of the West.				
Field Stations:				
WFRC Seattle Lab	Seattle, WA	1,979	1,990	1,990
Columbia River Research Lab	Cook, WA	402	402	402
Reno Field Station	Reno, NV	327	327	327
Dixon Field Station	Dixon, CA	236	236	236
Klamath Falls Field Station	Klamath Falls, OR	552	595	595
Marrowstone Marine Station	Nordland, WA	156	156	156
Biological Science Office of the Alaska Science Center	Anchorage, AK	6,665	6,533	6,555
Program Description: The Center provides biological information and research findings to resource managers, policymakers, and the public to support sound management of biological resources and ecosystems in Alaska. The Center's research focuses on arctic and subarctic ecosystems, marine mammal ecology, migratory birds, and terrestrial mammal ecology. The Center has duty stations in various locations that do not have independent budgets.				
Pacific Island Ecosystems Research Center	Honolulu, HI	2,964	3,000	3,150
Program Description: The Center conducts research to provide managers of terrestrial and marine resources information needed to restore, enhance, maintain, and protect biological resources and their supporting ecosystems in the Pacific Basin.				
Field Stations:				
Kilauea Field Station	Hawaii National Park, Hawaii, HI	1,967	1,884	1,978
Haleakala Field Station	Makawao, Maui, HI	277	343	360
Manoa Field Station	Honolulu, Oahu, HI	48	48	50
Western Ecological Research Center	Davis, CA	6,567	6,698	6,832
Program Description: The Center provides biological information and research findings to resource managers, policymakers, and the public to support sound management of biological resources and ecosystems in California, Nevada, Arizona, and Utah. The Center's research focuses on work related to endangered species, waterfowl, amphibians, fire ecology, global change, and other ecological issues.				
Field Stations:				
Santa Cruz Field Station	Santa Cruz, CA	647	660	673
Dixon Field Station	Dixon, CA	826	843	860
Davis Station	Davis, CA	180	184	188

Science Centers and Field Stations

Center Name	Location	FY 2006^{1/} Estimate (\$000)	FY 2007^{1/} Estimate (\$000)	FY 2008^{1/} Estimate (\$000)
Western Ecological Research Center Field Stations (continued):				
San Diego Field Station	San Diego, CA	1,213	1,237	1,262
Channel Island Field Station	Ventura, CA	281	287	293
Point Reyes Field Station	Point Reyes, CA	244	249	254
Redwood Field Station	Arcata, CA	150	153	156
Sequoia-Kings Station	Tree Rivers, CA	573	584	596
Yosemite Field Station	Portal, CA	377	385	393
San Francisco Bay Field Station	Vallejo, CA	451	460	469
Box Springs Field Station	Riverside, CA	210	214	218
Las Vegas Field Station	Las Vegas, NV	934	953	972
Forest and Rangeland Ecosystem Science Center				
	Corvallis, OR	5,987	4,987	4,987
Program Description: The Center provides scientific understanding and technology to support sound management and conservation of forest and rangeland ecosystems in the Pacific Northwest and Intermountain West.				
Field Stations:				
Regional Ecosystem Office	Portland, OR	163	15	15
Corvallis Research Group	Corvallis, OR	2,696	1,790	1,830
Olympic Field Station	Port Angeles, WA	342	350	360
Snake River Field Station	Boise, ID	1,545	1,600	1,635
University of Washington Field Station	Seattle, WA	161	165	168
Southwest Biological Science Center				
	Flagstaff, AZ	2,006	2,066	2,128
Program Description: The Center conducts research and provides technical support to assist land managers with resource management and stewardship throughout the Southwest. Research focuses on arid-lands ecology, invasive species, ecosystem restoration, climate change, endangered species, wildlife-human interactions, inventory and monitoring, and other ecological issues. The Center also includes the Grand Canyon Monitoring and Research Station, which studies the effects of the operation of Glen Canyon Dam on downstream resources within the Colorado River Ecosystem.				
Field Stations:				
Grand Canyon Monitoring and Research Center	Flagstaff, AZ	0 (funded by receipts from power revenue)	0 (funded by receipts from power revenue)	0 (funded by receipts from power revenue)
Sonoran Field Station	Tucson, AZ	755	631	650
Colorado Plateau Field Station	Flagstaff, AZ	675	821	846
Canyonlands Field Station	Moab, UT	576	614	632

^{1/} Science Center and Field Station funding are estimates and do not include cyclical funds.

This page intentionally left blank.

Activity: Biological Research

Subactivity: Cooperative Research Units

	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Cost & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Cooperative Research Units (\$000)	14,664	14,938	+492	0	15,430	+492
Total FTE	130	130	0	0	130	0

Program Overview

The Cooperative Research Units program is a unique cooperative partnership among Federal and State governments and universities providing one of the strongest partnerships between the USGS and Federal and State management agencies. The goals of the Cooperative Research Unit program are to sustain and maintain:

- A cost-effective, national network of Federal/State/university partnerships pursuant to the Cooperative Research Units Act, with a legislated mission of research, education, and technical assistance on issues related to fish, wildlife, ecology, and natural resources.
- A quality-driven, customer-oriented, network of expertise for research, teaching, and technical assistance that is responsive to the resource information needs of State resource agencies and host universities participating in the Cooperative Research Units program.
- Science capabilities that are responsive to the resource management information needs of bureaus in the Department of the Interior and provide Department bureaus with access to these capabilities.
- Science programs in the USGS that are enhanced and supported through partnership building and outreach to the natural resource management community.

This program addresses the Department of the Interior Resource Protection strategic goal of improving the understanding of national ecosystems and resources through integrated interdisciplinary assessment by providing natural resource managers scientific information and trained personnel to inform management decisionmaking. Under Resource Protection, the USGS tracks outputs including the number of systematic analyses and investigations delivered to customers and the number of workshops/training with USGS sponsorship or participation to transfer results to customers and partners.

In 2012, under the end outcome goal of improving the understanding of national ecosystems and resources through integrated interdisciplinary assessment, the Cooperative Research Units

Biological Research

program expects to deliver to its customers about 205 systematic analyses and investigations and 15 formal workshops and training.

The USGS Cooperative Research Unit program is comprised of 40 Cooperative Research Units located at universities in 38 States, with a headquarters office in Reston, VA. The program is designed to purposefully leverage cooperative partnerships with Federal and State agencies to address mutual needs of all partners in a cost effective manner, by stationing Federal scientists at universities to: (1) help identify and respond to natural resource information needs through the pooling of resources among agencies; (2) participate in the advanced scientific training of university graduate students; and, (3) provide Federal and other natural resource managers access to university expertise and facilities through geographically dispersed science organization of the Units. Federal support of the Cooperative Research Units is multiplied by State and university cooperator contributions of expertise, equipment, facilities, and project funding, thereby enhancing the program's cost-effectiveness. Through university affiliations, Unit scientists train future natural resource professionals and provide opportunities through graduate education to diversify the Federal workforce.

Each Cooperative Research Unit is directed by a Coordinating Committee of Federal, State, university, and non-government representatives. Each Coordinating Committee establishes the goals and expectations for each Unit within the program's mission of research, education, and technical assistance. The mix of priorities is established locally and may change annually based on the local needs of the cooperators and funding available from cooperators and program partners, including Interior bureaus. Program accountability and performance standards and related oversight of Federal scientists ensures that research and resulting scientific information products support the goals of the USGS as well as key Department of the Interior natural resource management bureaus.

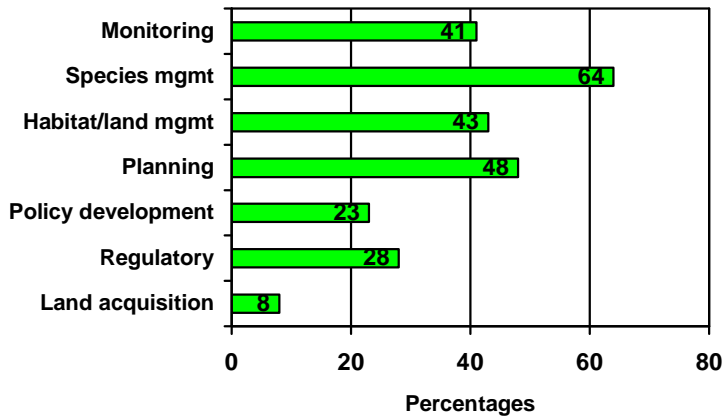
To address workforce skill mix balances in a constrained funding environment, the program offered Voluntary Separation Incentive Program (VSIP) and Voluntary Early Retirement Authority (VERA) opportunities, focused on salary recovery from six restructuring actions throughout the program. This action reduced scientific staffing levels and capabilities. Authority for reduction of an additional 4 positions may be requested in FY 2008. Combining existing vacancies with natural attrition and new vacancies to be created through planned management actions, the program expects to have 26 or more research scientists vacancies (22 percent of Unit science positions will be vacant and unfunded) as FY 2008 begins. However, university and State agency contributions to the program remain strong, as does Federal, State, and local government reimbursable funding for research and technical assistance activities. The program's appropriated dollars continue to be matched by State, university, and Federal partners, and other entities' contributions at a ratio of approximately three matching dollars to each appropriated dollar.

Use of Cost and Performance Information

In FY 2006, the CRU program instituted a customer survey to support cost and performance activities. The survey quantified how the CRU research agenda, set largely by state and federal program cooperators, relates to resource agency decision-making, a key long term outcome performance measure. This information contributed to the creation of a new staffing plan that assures a geographic distribution and mix of expertise to most efficiently meet the needs of the USGS and other program partners during times of austere budgets. The survey data confirm that the federal investment in the program is being efficiently leveraged to achieve long term outcomes of the USGS as well as the program's key partners and cooperators. Federal agency partners, for example, are using program's research results to support a host of management decisions, with a focus on species management (see figure).

An example of Unit information being used for by management to ultimately save millions of dollars is work by the Oregon Cooperative Fish and Wildlife Research Unit. The Oregon Unit developed a bioenergetics model that demonstrated Caspian terns consumed 10 -12 Million juvenile salmon and trout (salmonids) throughout the Columbia River Basin. Unit scientists then developed relocation techniques and moved a large tern colony from a primary nesting and feeding site in the middle of the estuary to another island closer to the ocean. This relocation moved the terns away from the mid-estuary concentrations of young salmonids on which they fed, to a site where non-salmonid marine fish would serve as the primary food source for the terns. This novel, large-scale relocation project was extremely successful at reducing tern predation on juvenile salmonids by 70 percent projecting 6-9 million young salmonids, many of them listed species that otherwise would be lost annually to tern predation. This work has contributed very significantly to efforts by state and federal agencies that spend millions of dollars annually to restore anadromous salmonid populations in the Columbia River Basin.

Federal Agency Use of Research Products



Biological Research

The following table lists cooperative research units by State:

Cooperative Research Units Locations

Alabama	Auburn University
Alaska	University of Alaska
Arizona	University of Arizona
Arkansas	University of Arkansas, Fayetteville
California	Humboldt State University
Colorado	Colorado State University
Florida	University of Florida
Georgia	University of Georgia
Hawaii	University of Hawaii
Idaho	University of Idaho
Iowa	Iowa State University
Kansas	Kansas State University
Louisiana	Louisiana State University
Maine	University of Maine
Maryland	University of Maryland, Eastern Shore
Massachusetts	University of Massachusetts
Minnesota	University of Minnesota
Mississippi	Mississippi State University
Missouri	University of Missouri
Montana	Montana State University (Fish Unit) University of Montana (Wildlife Unit)
Nebraska	University of Nebraska, Lincoln
New Mexico	New Mexico State University
New York	Cornell University
North Carolina	North Carolina University
Oklahoma	Okalahoma State University
Oregon	Oregon State University
Pennsylvania	Pennsylvania State University
South Carolina	Clemson University
South Dakota	South Dakota State University
Tennessee	Tennessee Tech University
Texas	Texas Tech University
Utah	Utah State University
Vermont	University of Vermont
Virginia	Virginia Polytechnic University
Washington	University of Washington
West Virginia	West Virginia University
Wisconsin	University of Wisconsin, Stevens Point (Fish Unit) University of Wisconsin, Madison (Wildlife Unit)
Wyoming	University of Wyoming

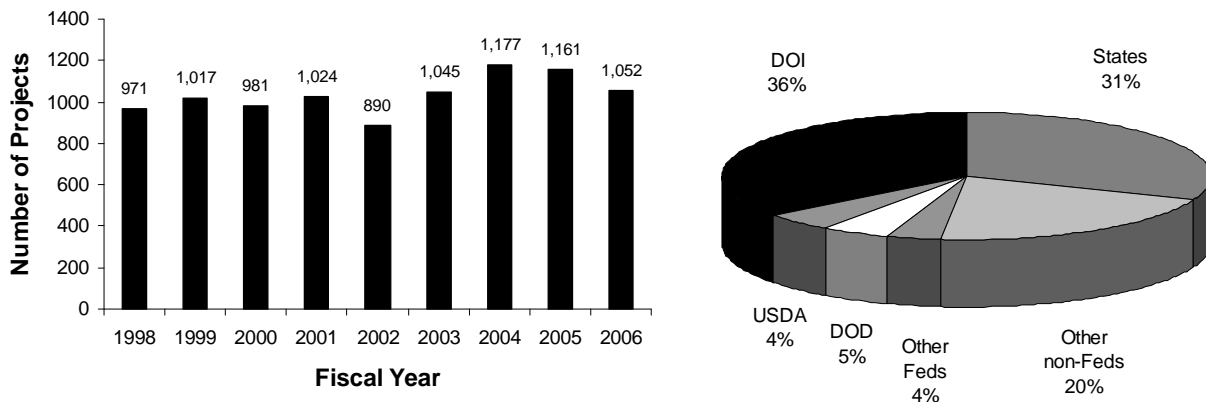
2008 Program Performance

The 2008 budget request for the Cooperative Research Units subactivity is \$15,430,000 and 130 FTE.

In 2008, under the end outcome goal of improving the understanding of national ecosystems and resources through integrated interdisciplinary assessment, the USGS Cooperative Research Units (CRU) program expects to deliver to its customers about 205 systematic analyses and investigations and 13 formal workshops/training courses. Additionally, the program expects to provide training for over 550 students, graduating 90 students with advanced degrees in fish and wildlife conservation and natural resources science.

The program will maintain its association with its network of State, university, and Federal cooperators and partners in 38 States. It will remain highly productive in scientific, academic, and outreach activities though at a reduced scientific staffing and capability levels. Through affiliations with host universities, Unit scientists will directly advise and mentor graduate more than 575 graduate students, graduate more than 90 students, and be active in the guidance and direction of numerous other graduate students pursuing degrees in natural resource sciences. The program activities also involve Unit sponsorship of undergraduate and graduate education programs for minorities that are underrepresented in the Federal workforce.

The program will maintain a strong record of research services to State and Federal natural resource agencies. It is anticipated that the number and mix of agency sponsored projects will remain similar that of FY 2006 as shown below. Unit scientists, affiliates, and students are expected to publish fewer papers, technical reports, present a smaller number of workshops, and initiate 5-10 percent fewer new studies in FY 2008 relative to FY 2006 numbers due to reduced staff levels. For FY 2006, 1,052 research projects were active, 140 Federal projects were completed, and 108 new projects initiated in response to Federal agency needs. In that same year, Unit scientists and students published 288 scientific papers, submitted 123 technical reports to management agencies, and gave 37 workshops or short-courses to natural resource professional societies and agencies.



Number of projects by year and funding sources for projects active during FY 2006.

Biological Research

In FY 2006, the program, with input from its partners, completed its 5 year strategic plan. The plan was fully implemented in FY 2007 with the expectation that all performance metrics will be achieved. Significant plan metrics to be accomplished in FY 2008 include the completion of electronic databases started in FY 2007. These databases will make available on line for the first time, complete information on all Federal research projects conducted by the CRU program. Additionally, new needs for student orientation and training materials will be developed to meet a need identified in a student satisfaction survey conducted in FY 2006 and FY 2007. These materials will be incorporated into a part of a new core competency model to be phased in starting in FY 2008. The strategic plan also called for increased use of feedback mechanisms to management. Formal satisfaction surveys of research sponsors, as initiated in FY 2006 and incorporated into the program's business practices in FY 2007, will continue.

The USGS participates in annual program reviews at the local level and receives feedback from reviews and activities of a National Cooperator's Coalition consisting of non-Federal program cooperators and other interested parties. In FY 2006, the CRU program designed and issued surveys to measure program performance (long-term outcomes) related to customer satisfaction with the quality and timeliness of delivery of science products and to track the use of science products in natural resource decision making by partners. The survey results showed 96 percent satisfaction with product quality and timeliness of delivery and partner use of products in management decision making. Results of these surveys have provided robust data and information to improve the management and delivery of the program.

Education remains a key part of the program's mission. To date, a combined total of more than 7,000 MS and PhD degrees in the sciences have been awarded through the program. A draft report titled "Higher Education: Federal Science Technology, Engineering, and Mathematics Programs and Related Trends, GAO-05-887" reported significant reductions in MS (14 percent) and PhD (30 percent) students enrolled nationwide in biological and agricultural sciences when comparing the 1995-96 versus the 2003-2004 academic years. The number of CRU-enrolled MS and PhD students declined only slightly (3 percent fewer students enrolled in CRU MS program and 5 percent fewer in PhD programs). Thus, the program is outperforming the national student numbers trend (4.6 times better for MS students and 6 times better for PhD students) in advanced biological and agricultural training. Ninety-seven percent of the program's cooperators and partners viewed the students graduating from the program as either very competitive or competitive for positions within their agency, indicating the high value being placed on the graduates of the program. This high valuation of program students matches student placement data upon graduation.

Program Performance Overview									
End Outcome Goal 1.4: Resource Protection: Improving the understanding of national ecosystems and resources through integrated interdisciplinary assessment									
End Outcome Goal End Outcome Measure / Intermediate or PART Measure / PART Efficiency or other Outcome Measure	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
Intermediate Outcome Measures and Bureau and PART Outcome Measures									
# of students complete degree requirements for MS, PhD, and post doctoral program under the direction and mentorship of Unit Scientists (CRU) (BUR)	106	100	100	103	95	95	90	-5	60
Comments									
X% of CRU students that work on subsequent fish and wildlife science advance degrees or obtain employment in the fish and wildlife or other natural resources field, within targeted dates post-graduation (CRU) (BUR)	UNK	UNK	Baseline	95%	TBD	95%	95%	0	95%
Comments	The 2012 target assumes full staffing for Cooperative Research Units; current staffing is 84%								
% of studies validated through appropriate peer review or independent review (SP)	100%	100%	100%	100%	100%	100%	100%	0	100%
PART Efficiency and Other Output Measures									
# of systematic analyses & investigations delivered to customers (CRUs)	293	236	235	517	225	225	205	-20	205
Comments	Funds appropriated to the Cooperative Research Unit program are used to staff, support, and manage USGS participation. In FY 2007, 96% of program dollars were allocated to staff salaries and benefits, a percentage well above the historical range of 89-91%. This percentage increase for salaries and benefits has occurred during a time when the number of funded science positions has decreased by 19 (15%) since FY 2002. Increased personnel costs led to a reduction in program support for Unit operations and Cooperator services in FY 2007. For example, long-standing support of diversity projects at the University of Arizona and at the University of Arkansas at Pine Bluff are now at minimum levels, and new diversity projects that were planned for FY 2006, 2007, and 2008 have been postponed. In addition to this, anticipated attrition and unfilled vacancies for Cooperative Research Units impacts -20 systematic analyses delivered in 2008.								
# of formal workshops or training provided to customers (instances/issues/events)	21	25	18	41	15	15	13	-2	15
Comments	Anticipated attrition and unfilled vacancies impacts -2 CRU workshops and training delivered in 2008.								

This page intentionally left blank.

Enterprise Information

Subactivity	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Enterprise Information Security and Technology	24,866	25,972	+430	-1,500	24,902	-1,070
<i>FTE</i>	<i>81</i>	<i>78</i>	<i>0</i>	<i>0</i>	<i>68</i>	<i>-10</i>
Enterprise Information Resources	16,900	16,636	+405	0	17,041	+405
<i>FTE</i>	<i>94</i>	<i>91</i>	<i>0</i>	<i>0</i>	<i>91</i>	<i>0</i>
National Geospatial Program	4,628	68,622	+1,555	0	70,177	+1,555
<i>FTE</i>	<i>17</i>	<i>387</i>	<i>-45</i>	<i>-10</i>	<i>342</i>	<i>-55</i>
Total Requirements (\$000)	46,394	111,230	+2,390	-1,500	112,120	+890
Total FTE	192	556	-45	-10	501	-55
Impact of the CR		[-535]		[+535]	[0]	[+535]

Impact of the CR

(-\$535,000)

The 2008 budget restores the priorities of the 2007 President's budget by funding 2007 programmed fixed cost increases, eliminating unrequested 2006 congressional earmarks, and implementing the program enhancement and program reduction initiatives included in the 2007 President's budget.

Activity Summary

The 2008 budget request for the Enterprise Information Activity \$112,120,000 and 501 FTE, which is a net change of +\$890,000 and -55 FTE from the 2007 President's Budget. Additional information on program changes is provided in each subactivity of this document.

The Enterprise Information (EI) Activity serves as the focal point for the bureau's information-related resources and activities; information technology infrastructures (networks, hardware and software); information and communications policies and standards; and information services (such as libraries, information centers, and the USGS presence on the Internet). A robust information architecture and comprehensive information security are key components of the integrated information environment. Within the integrated information environment, diverse and distributed databases, geospatial data assets, and information are accessed and used seamlessly by scientists, collaborators, customers, and the public to address complex natural science issues. The EI strengthens scientific inquiry within USGS and the broader natural science community by having a more efficient and less complex path to relevant USGS information in all forms – and enhanced access to services that deliver science information that can easily be understood, shared, and applied.

Use of Cost and Performance Information

Taxpayer Dollars Leveraged 74 Percent by Partnering — The USGS saved taxpayers nearly \$8 million in 2006 by coordinating its purchase of high resolution imagery with other government agencies. Instead of paying full price for imagery over 49 urban areas, USGS coordinated with others to jointly purchase data, enabling a 74 percent discount.

Enterprise Information

The EI is responsible for planning and monitoring the bureau's investment in geospatial information and IT, information security and management, information policy and standards, and information science. The duties, functions, and responsibilities of a Chief Information Officer are fulfilled in USGS by the Geospatial Information Officer (GIO), who also serves administratively as the Associate Director for Geospatial Information. The GIO is responsible for overall policy direction, management, and oversight of geospatial information, database, and coordination; computing systems acquisition, development, and integration; IT capital planning and investment management; information security; human capital for managing information resources; E-Government initiatives and innovation; strategic planning for information resources; enterprise architecture and advancing the Federal Enterprise Architecture (FEA); records management; privacy; and information collection, dissemination, access, and delivery. This suite of responsibilities is consistent with those of other Federal government agencies and leading private-sector entities in its comprehensive approach to information assets and is in accord with recommendations of the Government Accountability Office (GAO).

Geospatial Data Leadership — Joining USGS IT and geospatial assets into a single management portfolio led by the GIO has reaped several benefits: (1) It positions USGS as a national geospatial leader and knowledge broker in National Spatial Data Infrastructure (NSDI), (2) New regional geospatial information offices have enabled a stronger customer-based focus, (3) Geospatial IT activities are better coordinated across a greater range of projects and expertise (such as development of the Geospatial Modernization Blueprint along with the geospatial profile document for the FEA), (4) Opportunities for geospatial data partnering with State and local agencies have been expanded by adding IT specialists in the local offices, enabling and supporting closer ties to State-based geographic information councils and leveraging and aligning Federal strategies, plans, and resources with comparable State resources. Effective stewardship (and not ownership) of these USGS information assets has enabled citizens, agencies, and partners to tap reliable, timely, one-touch geographic display and access to a wealth of science knowledge, information, and data.

Workforce Planning

The GIO is conducting extensive workforce analysis to identify and support future needs. The GIO has undergone and will continue to execute skills assessments for information management and technology. Voluntary Separation Incentive Payments/Voluntary Early Retirement Authority (VSIP/VERA) and competitive sourcing under OMB Circular A-76 guidelines are tools that are being used to implement these future needs. As a follow-on to the 2004 USGS mapping workforce restructure, coupled with the USGS Director's decision from August 2004 to bring *The National Map* under the GIO, USGS has embarked on further steps toward organizational transformation. One of these steps included a 2006 buyout, in which USGS significantly downsized its geospatial data production staff to position itself with the strategic direction for future workforce balancing. Because mapping technology has significantly changed, a large, field-based operation is no longer cost effective for USGS to maintain. Hence USGS needed to gain functional and salary flexibilities in the near term to position the workforce for the next 5-7 years.

In 2005, the bureau aligned its mapping activities and created the National Geospatial Technical Operation Center (NGTOC), a single organization having a national capability and the potential to consolidate its four mapping centers (Reston, VA; Rolla, MO; Lakewood, CO; and Menlo Park, CA). The NGTOC was tasked with supporting all map production activities and technical

services associated with the NGP, including the previous CTM program, management of the FGDC, GOS, and Interior's Enterprise Geospatial Information System.

The NGTOC A-76 study is proceeding, with an anticipated award date of September-October 2007. In October 2006 USGS closed the NGTOC IV (previously the Western Mapping Center) in Menlo Park, and in January 2007 USGS closed the NGTOC I (previously the Mapping Applications Center) in Reston, Virginia. As of February 2007, the Performance Work Statement (PWS) is in its final review stages. The USGS expects to award a contract in the fall of 2007 to either a private contractor or to one of two Most Efficient Organization (MEO) government proposals from Rolla, Missouri or Denver, Colorado.

The USGS created an Enterprise Publishing Network from a significant restructure of its workforce and business processes, using the High Performing Organization model. The restructuring achieved a unified bureau publishing policy, streamlined the publishing technical and business functions to ensure operational efficiencies accompanied by a significant reduction of staff and reduced of the number of operating locations by more than half. This is accomplished while maintaining the high quality of the scientific publications of USGS.

Enterprise Information Technology and Centralized Services — The 2008 budget for the Department includes programmatic increases for USGS for projects and programs that are funded through the Departmental Working Capital Fund to support enterprise approaches designed to improve effectiveness and efficiency. These include the Financial Business and Management System (FBMS) that will consolidate operations from independently operated bureau and office programs.

Subactivity Overview

The Enterprise Information Activity comprises three subactivities:

Enterprise Information Security and Technology supports USGS information security and technology efforts. The information security component ensures compliance with all Federal information technology mandates and is responsible for the electronic security of and access to all USGS data and information assets. The telecommunications and computing infrastructure components support enterprise services network, directory services, technical support, enterprise architecture, email, and e-authentication.

Enterprise Information Resources guides and manages bureau-level systems and activities in information policy, information integration and delivery, and science education. The information integration and delivery component provides direction, coordination, and strategic planning of scientific data integration and management relating to Web-Internet services, science publishing, libraries, information centers, and enterprise-level coordination of educational activities and geographic information systems. The information resource management component supports compliance with statutory mandates and regulations for records archiving and management, privacy, Freedom of Information Act (FOIA), Section 508 of the Rehabilitation Act, E-Government Act, OMB Data Quality Guidelines, OMB Peer Review Requirements, Paperwork Reduction Act, and investment technology capital asset planning.

National Geospatial Program coordinates and provides leadership in geospatial activities that ensure the development, maintenance, and availability of geographic data and related geographic knowledge in support of the NSDI. It also conducts prospectus-based geographic

Enterprise Information

information science research projects as part of the Center of Excellence for GIScience (CEGIS).

Activity: Enterprise Information

Subactivity: Enterprise Information Security and Technology

	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Enterprise Information Security and Technology (\$000)	24,866	25,972	+430	-1,500	24,902	-1,070
<i>Total FTE</i>	<i>81</i>	<i>78</i>	<i>0</i>	<i>-10</i>	<i>68</i>	<i>-10</i>

Summary of 2008 Program Changes for Enterprise Information Security and Technology

Request Component	(\$000)	FTE
• Enterprise Functions	-1,500	-10
TOTAL Program Changes	-1,500	-10

Justification of 2008 Program Changes

The 2008 budget request for the Enterprise Information Security and Technology Subactivity is \$24,902,000 and 68 FTE, a net program change of -\$1,070,000 and -10 FTE from the 2007 President's Budget.

Enterprise Functions **(-\$1,500,000 / -10 FTE)**
 A decrease of \$1,500,000 would be achieved through economies of IT centralization, consolidated software and hardware purchases, and workforce planning.

Program Performance Change

No current Enterprise Information GPRA metrics are impacted by the proposed program change. This reduction is due to efficiencies in the EI program, allowing it to continue the same level of effort with fewer resources.

Program Overview

The **Enterprise Information Security and Technology Subactivity** — This program addresses the Department of the Interior Management Excellence through Modernization strategic goal. This goal is furthered by USGS achievements in:

- Increasing efficiency, consistency, and integration of Information Technology (IT) infrastructure and operations across the bureau,
- Facilitating greater oversight, accountability, transparency, and performance measurement relating to the management of the bureau's information investments,
- Enhancing data sharing and integration across USGS science disciplines and programs through greater reliance on common IT infrastructure and support services, and
- Increasing the USGS's ability to respond quickly and comprehensively to new governmentwide information directives and mandates (e.g., for information security),

Use of Cost and Performance Information

Enhancement of IT Security Operations: The USGS addressed weaknesses in its IT Security program. By redirecting existing resources (staff and funding), the USGS has made improvements in the following areas:

Strengthening (hardening) the outer perimeter of the USGS wide area network, including establishing "de-militarized zone," double-layer security controls for all the major connections between the USGS network and the public Internet.

Enhanced scanning and monitoring of the USGS network to significantly reduce Internet vulnerabilities and more quickly detect intrusions.

Strengthening overall policies and management of IT security across the bureau, including realigning existing staff to increase capabilities of the bureau-level IT security staff, upgrading the position and responsibilities of the bureau's IT Security Manager, incorporating specific IT security responsibilities in the position descriptions and performance evaluations of key personnel, including all Senior Executive Service managers, and completing IT security awareness training for all USGS employees.

These actions resulted in the USGS improving its performance on the monthly DOI IT Security evaluation by over 50 percent in an 8-month period.

The Enterprise Information Security and Technology (EIS&T) subactivity supports the USGS information security and technology efforts. The information security component ensures compliance with all Federal IT mandates and is responsible for the electronic security of and access to all USGS data and information assets. The telecommunications and computing infrastructure components support enterprise services network, directory services, technical support, enterprise architecture, email, and e-authentication.

2008 Program Performance

The 2008 budget request for the Enterprise Information Security and Technology is \$24,902,000 and 68 FTE.

This subactivity supports the USGS's information security and technology efforts. The information security component ensures compliance with all Federal information technology mandates and regulatory requirements. Staff in this area is responsible for the electronic security of and access to all USGS data and information assets. The telecommunications and computing infrastructure components support enterprise services network, directory services, technical support, enterprise architecture, email, and e-authentication (smartcards).

Information Technology Security

(Estimates for FY 2006, \$6.3 million, FY 2007, \$6.4 million; FY 2008, \$6.1 million)

The information technology (IT) security component supports USGS information security program, including compliance with the Federal Information Security Management Act (FISMA) and other Federal laws directing information technology. It is responsible for information technology security operations to ensure the confidentiality, integrity, and availability of USGS data and information assets.

The USGS endorses the DOI direction to achieve rigorous IT security. Ensuring that networks and systems are secure and protecting the integrity of the data and information they house are two of the most critical issues facing the USGS. The bureau's approach to improving its overall security posture is two-fold: (1) a focus on maintaining certification and accreditation of critical information systems, and (2) strengthening the overall IT security program of the bureau.

Acquiring, managing, and overseeing evolving IT security technologies and procedures along with high expectations for cost and operational efficiencies pose significant challenges. A centralized approach to IT security, as opposed to a piecemeal or ad hoc implementation of various tools in different USGS offices and programs, is key to enabling efficiencies and a strong security posture.

The USGS will continue to rigorously maintain compliance with FISMA mandates for establishing and keeping the USGS's electronic infrastructure secure and protected. The 2008 improvements to the USGS security infrastructure include: (1) stronger IT security plans; (2) maintaining certification and accreditation of major systems; (3) enhanced computer incident response capabilities including very prompt reporting of security incidents to the Federal Computer Incident Response Center; (3) IT security training for all USGS employees, contractors, volunteers, students, and emeritus; and (4) establishing standard procedures for secure system configuration and operation to protect the confidentiality, integrity, and availability of IT systems and the information they contain. Training and awareness activities include annual IT security awareness training and role-based training for employees and contractors with significant IT security responsibilities, as well as assurance and compliance.

The USGS IT Security Steering Committee serves as the focal point for all IT security activities by overseeing policy formulation and appropriate review of policy, standards, and guidelines and by ensuring policies are consistently applied throughout USGS. This committee also ensures that a correct balance is maintained between the requirements of IT security and the sometimes unique technology needs of USGS science activities. Compliance with established standards and best practices are measured by routinely conducting management control and internal site reviews.

Security Certification and Accreditation — The FISMA-implementing security certification and accreditation regulations (OMB Circular A-130) require that all Federal high-risk IT systems be reviewed for security compliance on a periodic basis. Funding for re-certification and accreditation of program-specific IT systems (such as those of *The National Map*) comes from EIS&T and NGP subactivities. In addition to periodic re-certification and accreditation of USGS systems (usually every three years), it is necessary to continually monitor and maintain certification and accreditation status, as required by OMB. Barring any major changes to

existing USGS systems, no systems are scheduled to be reaccredited during 2008. Previously certified and accredited systems will be monitored and assessed to ensure ongoing compliance with FISMA mandates. During 2008 USGS will continue to work closely with all its system owners to ensure that all requirements are met.

Security Operations — The USGS carefully scrutinizes its network security systems, including monitoring and assessment of systems and networks to ensure constant security compliance, identify potential vulnerabilities, detect security intrusions, and respond effectively to any and all IT security events and incidents. As part of this scrutiny, USGS routinely tests its network for potential penetration vulnerabilities. This responsibility includes managing all IT security operations and implementing best-practices to ensure the confidentiality, integrity, and availability of USGS data and information assets.

In 2008 USGS security operations will (1) integrate penetration testing capabilities into the monthly assessment program for all its IT systems to ensure potential vulnerabilities are properly classified and corrected appropriate to the threat-level, (2) develop and implement content management procedures to ensure that information is appropriately classified and managed in accordance with requirements for the separation of low-, moderate-, and high-impact information, and (3) apply enhanced IT security controls and procedures to respond to prevailing threats to the confidentiality, integrity, and availability to USGS IT systems and the information they contain.

Telecommunications

(Estimates for FY 2006, 7.5 million, FY 2007, \$8.6 million, FY 2008, \$8.3 million)

Enterprise Services Network — The Department's Enterprise Services Network (ESN) consolidates all telecommunications networks into one integrated system. In 2008, USGS will work with the Department to institutionalize Internet 2 as a Department service, not just a USGS-provided service. USGS will complete "flattening" the USGS networks to the ESN in early FY 2008.

Computing Infrastructure

(Estimates for FY 2006, \$11.0 million, FY 2007, \$11.0 million; FY 2008, \$10.5 million)

Active Directory — Active Directory (AD) is a commercial off-the-shelf directory service that provides a consistent office automation infrastructure and a single point of access for systems administration within the Department of Interior. By adopting AD, USGS IT infrastructures has migrated from a decentralized and distributed IT organization to one which is consistent, highly efficient, and accountable. In 2008, the USGS AD implementation, part of the larger DOI AD architecture, is complete for all USGS facilities and hence moves to an operations and maintenance phase focused on providing effective, efficient, and secure directory services. The USGS is integrating several parallel projects with AD, aimed at increasing IT security, infrastructure consistency, and improved system administration. These projects include Enterprise Messaging Services, Domain Name Services, and common Change and Configuration Management.

IT Service Desk Consolidation — The USGS IT Service Desk System serves as a single point of contact for all IT support for USGS employees and contractors throughout USGS facilities across the country. The system, built on specialized hardware and software (i.e., for call tracking, automated call distribution, knowledge management, and configuration

management), consists of IT support personnel from across the USGS who are formally linked together through organizational and matrix hierarchy to provide consistent IT customer service. At the heart of this system is the Denver IT Service Desk, which provides a multi-channel (voice, email, web), single point of contact for all IT customer support. The Service Desk has primary responsibility for incident resolution, request tracking, and customer satisfaction. It provides improvements and efficiencies in response time, problem resolution, and quality of technical support, while also relieving individual offices from having to perform these functions independently. Efficiencies are gained through incident resolution during the initial call, by on-line self-help tools, and a searchable knowledge management system.

In 2008, USGS will continue to expand the IT Service Desk System to support more USGS offices. Currently all of the offices in the Reston National Center and four offices in the Denver Federal Center are served by this feature. In addition, web-based support tools and Knowledge Centered Support processes will be further refined to provide more consistent and effective customer support.

Enterprise Architecture — The USGS Enterprise Architecture activities include participation in the collaborative effort with the other bureaus and the Department in the development and evolution of the Interior Enterprise Architecture, and to ascertain and document the unique requirements of the USGS that are not articulated in the Interior Enterprise Architecture. The Interior Enterprise Architecture approach highlights and prioritizes lines of business across the Department for further analysis. Modernization blueprints are being developed for several lines of business documenting what capabilities exist and what is the desired future state. These blueprints enable the alignment of IT investments with business needs and strategic goals and will help to improve mission performance and productivity gains through process re-engineering. The USGS Enterprise Architecture project ensures that Bureau IT investments and USGS scientific and administrative programs are aligned within the Department architecture. The USGS Enterprise Architecture team works closely with the USGS Capital Planning and Investment Control (CPIC) and the USGS Security Certification and Accreditation team to align USGS systems with investments and security. In 2008, USGS will continue to support and maintain the Department's Enterprise Architecture Repository (DEAR). Working closely with the USGS Investment Review Board, NGP, Unified Geospatial Enterprise Architecture Management Advisory Council, FGDC, and the Department's Enterprise Geospatial Information Management consortium, the USGS enterprise architecture team will continue to support the Blueprint process.

E-Authentication — E-Authentication (or logical access to systems) is one of three components of the Homeland Security Presidential Directive 12 (HSPD-12) (the others being access to Federal buildings and personal identification). In 2008, the USGS HSPD-12 E-Authentication team will investigate the implementation of single sign-on capabilities using smartcards, digitally sign official documents, and encrypt email.

Performance Overview

The Enterprise Information Security and Technology Subactivity addresses the Department of the Interior strategic goal of Management Excellence (Modernization).

The following table highlights important performance measures for the Enterprise Information Security and Technology Subactivity. Since the program change only affects a small portion of the program and performance, cost data derived would not provide any analytical benefit.

Enterprise Information Security and Technology

Program Performance Overview									
End Outcome Goal: 5.2: Management Excellence: Advance Modernization/Integration									
End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
GPRA End Outcome Measures									
Percent of IT systems that have Certification and Accreditation (C&A) and are maintaining C&A status (SP) (EIS&T)	UNK	UNK	100%	100%	100%	100%	100%	0	100%
Intermediate Outcome Measures and Bureau and PART Outcome Measures E-Government and Information Technology Management									
<i>Efficient IT Management.</i> Score achieved on the OMB Enterprise Architecture Framework (SP) (EIS&T)	UNK	UNK	Level 3	Level 3	Level 4	Level 4	Level 4	0	Level 5
<i>Efficient IT Management.</i> Stage achieved on the GAO IT Investment Management Framework (SP) (EIS&T)	UNK	UNK	UNK	63% stage 3	70% stage 3	70% stage 3	100% stage 3	+30%	Stage 4 & 5 targets to be set by DOI
<i>Efficient IT Management.</i> Score achieved on the NIST Federal IT Security Assessment Framework (SP) (EIS&T)	UNK	UNK	4	3.37	3.5	3.5	4.5	+1	4.5
Annual % of USGS IT systems completing the C&A process and/or maintaining C&A status. (BUR) (EIS&T)	UNK	UNK	100%	100%	100%	100%	100%	0	100%
IT Investment Management Annual % of USGS IT investments reviewed, approved, and monitored through the CPIC process. (BUR) (EIS&T)	UNK	UNK	100%	100%	100%	100%	100%	0	100%
Quarterly % of customers satisfied with service from USGS IT Service Desk (BUR) (EIS&T)	Did not exist	Did not exist	93%	94%	94%	94%	94% with expanding customer base, or 95% with current customer base	0	97%

Program Performance Overview									
End Outcome Goal: 5.2: Management Excellence: Advance Modernization/Integration									
End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
Quarterly % of identified USGS security incidents that receive corrective action within timeframes required by the DOI Incident Response Policy (BUR) (EIS&T)	25%	50%	75%	75%	100%	100%	100%	0	100%
Note: The 2007 plan is the performance level based upon a projection of 2007 likely enacted made during the first quarter of 2007. The 2008 plan and 2012 long-term targets build on the 2007 plan. To the extent Congress enacts a 2007 appropriation that is different from the 2007 projection, the 2008 plan and 2012 targets may require revision.									

This page intentionally left blank.

Activity: Enterprise Information

Subactivity: Enterprise Information Resources

	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Enterprise Information Resources (\$000)	16,900	16,636	+405	0	17,041	+405
<i>Total FTE</i>	<i>94</i>	<i>91</i>	<i>0</i>	<i>0</i>	<i>91</i>	<i>0</i>

Summary of 2008 Program Changes for Enterprise Information Resources

The 2008 budget request for the Enterprise Information Resources Subactivity is \$17,041,000 and 91 FTE. There are no program changes requested for the Enterprise Information Resources Program in FY 2008.

Program Overview

The Enterprise Information Resources (EIR) Subactivity guides and manages bureau-level systems and activities in information policy, information integration and delivery, and science education. The information integration and delivery component provides direction, coordination, and strategic planning of scientific data integration and management relating to Web-Internet services, science publishing, libraries, information centers, and enterprise-level coordination of educational activities and geographic information systems. The information resource management component supports compliance with statutory mandates and regulations for records archiving and management, privacy, Freedom of Information Act (FOIA), Section 508 of the Rehabilitation Act, E-Government Act, Office of Management and Budget (OMB) Data Quality Guidelines, OMB Peer Review Requirements, Paperwork Reduction Act, and investment technology capital asset planning.

Use of Cost and Performance Information

In 2006, USGS is making significant progress beyond planned performance in key information resources areas:

Streamlining the Publications Business Model Across USGS — The USGS

Publications High Performing Organization (HPO) opened for business October 1, 2005, and created more efficient business processes, enterprise solutions, and workforce flexibility for the Visual Information functions at USGS. In 2006 it is on target to achieve a 25 percent reduction in USGS publishing staff FTE (254 to 190), 15 percent salary cost reduction, and reduce the number of USGS locations involved in publishing activities from 60 to 34.

The USGS is committed to increasing efficiency and effectiveness of its scientific information integration and dissemination services through the Natural Science Network (NSN) of integrated information, science, and knowledge to ensure that the latest USGS science data are easily and quickly available to citizens, agencies, academia, and the private sector in accessible formats.

The objective is to optimize each individual customer's ability to "find, get, and use" USGS information and products tailored to their specific requirements.

The USGS continues to focus on maturing its procedures and processes for Capital Planning and Investment Control (CPIC), following Government Accountability Office's IT Investment Management Maturity Model. The objectives are to maintain compliance with CPIC requirements from OMB and Interior, to ensure the bureau's overall IT investment portfolio supports USGS and Interior strategic goals and priorities, and to ensure that the Investment Review Board (IRB) follows established, repeatable processes for major IT investment selection, control and evaluation.

2008 Program Performance

The 2008 budget request for the Enterprise Information Resources is \$17,041,000 and 91 FTE.

Under the Management Excellence goal of modernization and integration, the 2008 proposed changes would result in redirecting the expected savings resulting from ongoing efficiencies and streamlining in the HPO for EPN.

The EPN will employ bureau-wide workflow tracking and use contracts to accommodate workflow fluctuations. This will improve the timeliness of processing reports and enable quantitative internal assessment. The improved organization of the publishing functions at USGS will also enable greater technical review of the Publishing Service Centers. The EPN will provide improved customer service by ensuring timely delivery of mission science, especially during times of emergency and natural disaster. The Information Product Data System will enable formalized production and reporting, use of lifecycle management software, workload balancing, and tracking of progress toward USGS publishing business goals.

Information Integration and Delivery

(Estimates for FY 2006, \$13.9, FY 2007, \$13.6 million; FY 2008, \$ 13.9 million)

Information Integration and Delivery activities focus on transforming existing functions and services to reflect the changing nature of USGS science and science products; achieve efficiencies in the accessibility, delivery, and integration of USGS information through enterprise-level approaches; employ innovative and cost-effective technologies; and utilize future skills planning and partnerships for a flexible and balanced workforce.

Information Centers and Library — The USGS information offices and library provide scientific and product information and technical assistance to a wide range of customers both internal and external, and to the natural science community as a whole. These offices use a variety of tools and capabilities to provide access to USGS science and identify sources of scientific information outside of the Survey. They also serve as a conduit for feedback between customers of USGS data and information and the USGS scientific and technical community. Significant emphasis is now being placed on increasing digital library capabilities, including electronic library subscriptions and new technologies that enhance flexibility and accessibility to research information.

Enterprise Publishing — Accurate, efficient, and timely reporting of its unbiased science are key factors enabling USGS to fulfill the role of a world leader in the natural sciences through scientific excellence and responsiveness to societal needs. Enterprise Publishing focuses on

developing bureau-level policies, business practices and procedures to maintain the USGS reputation for quality and unbiased published science. This includes updated, bureau-wide standards for peer and policy review of all information products. A new system will be implemented to support metadata, workflow and document management. The USGS continues implementing an Enterprise Publishing Network (EPN). A final review of the EPN transition to the new organization will be conducted at the end of 2007. Adjustments will be made to meet the performance goals as stated in the High Performing Organization (HPO) plan.

Science Quality — The scientific reputation of the USGS for excellence, integrity, and objectivity is one of the Bureau's most important assets. This reputation for reliable science brings authority to data and findings, creates and protects long-term credibility, and ensures that the public trust is met. The Science Quality activities of the USGS ensure compliance with existing DOI and OMB requirements for peer review and information quality and monitor internal policies, practices, and procedures related to these efforts.

Enterprise Web — The USGS Enterprise Web (EWeb) project manages the USGS web presence to ensure that it is customer-focused and in consistency with all Federal requirements and policy. It provides Web services, tools and best practices for Bureau website managers and content owners to deliver and integrate USGS science by topic, issue, and place. It maintains the current enterprise web operations and infrastructure, while addressing remaining needs.

Education — The USGS is engaged in a variety of educational activities over a range of instructional levels, and both formal and informal settings. This is accomplished by coordinating students internships, conducting workshops and presentations at national science and science education meetings, coordinating national earth science events, maintenance and development of the Bureau's principal educational web site, and responding to the science education requests of our partners in professional science societies. USGS Education also works closely with other Federal science agencies on a range of initiatives for purposes of maintaining national preeminence and workforce requirements in science and technology.

Enterprise Geographic Information Systems — The USGS is taking a bureau- and department-wide approach to managing Geographic Information Systems (GIS) technology and applications. In 2008 the following support will continue:

- Administration and deployment of the department-wide ESRI Enterprise License Agreement (ELA) and
- Provide Bureau-wide training and technical support.

Information Resource Management

(Estimates for FY 2006, \$3.0 million, FY 2007, \$3.0 million, FY 2008, \$3.1 million)

Information Resource Management activities focus on establishing, monitoring, and directing policy that enables the USGS to fulfill statutory and regulatory information resource requirements.

Complying with Statutory Mandates — Effective bureau compliance with Federal information mandates is important for ensuring the security and reliability of USGS science information assets. Using a single bureau-level point of coordination and oversight, the USGS developed an integrated, comprehensive, and dynamic compliance program. One result of the

consolidation is a more unified approach to establishing policies and practices for compliance with all Federal mandates, particularly in the areas of records management (Federal Records Act), privacy (Privacy Act and the E-Government Act), information collection (Paperwork Reduction Act), Section 508 (Rehabilitation Act), and the Freedom of Information Act. In 2008 activities will concentrate on working with DOI to developing a pilot electronic record management system, on continuing scientific data rescue efforts, and on full compliance with privacy mandates.

Capital Asset Planning and Investment Control (CPIC) — The USGS continues to mature its CPIC processes and procedures for planning and managing IT projects based on the GAO IT Investment Management maturity model. These processes comply with the Clinger-Cohen Act of 1996 and OMB Circulars A-11 and A-130. The USGS Associate Director for Geospatial Information is responsible for developing these bureauwide policies and procedures to continue to mature the CPIC process toward full compliance. The CPIC program ensures that the USGS Investment Review Board follows established processes for the selection of major IT investments (defined as costing more than \$5 million per year or otherwise having far reaching program or policy significance), and for the control and evaluation phases, which include a regular cost, schedule, and performance review of all major IT projects and annual reviews of all non-major projects. Approved major IT investment business cases and approved non-major IT investments are critical documents for preparing the OMB Exhibit 53. In 2008, USGS will be working toward 100 percent compliance on GAO IT Investment Management stage 3 requirements.

Performance Overview

The Enterprise Information Resources Subactivity addresses the Department's strategic plan for Management Excellence strategic goal of advance modernization/integration.

The following table highlights important performance measures for the Enterprise Information Resources Subactivity. Since the program change only affects a small portion of the program and performance, cost data derived would not provide any analytical benefit.

Program Performance Overview									
End Outcome Goal: 5.2: Management Excellence: Advance Modernization/Integration									
End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
Intermediate Outcome Measures and Bureau and PART Outcome Measures									
E-Government and Information Technology Management									
<i>Implement Records Management Strategy.</i> % of all bureaus and offices developing consistent records management policy (SP) (EIR)	UNK	UNK	UNK	UNK	100%	100%	100%	0	100%
% of earth science instructors in the U.S., K-16, using USGS educational materials (BUR) (EIR)	UNK	UNK	UNK	UNK	UNK	UNK	Baseline	N/A	TBD
Total USGS public web content managed by the enterprise web infrastructure (BUR) (EIR)	UNK	UNK	UNK	UNK	UNK	UNK	Baseline	N/A	TBD
Total # of internships and fellowships supported and/or facilitated by the USGS educational program (BUR) (EIR)	18	22	30	55	55	55	55	0	55
PART Efficiency and Other Output Measures									
# of new and legacy information products added to the USGS publications database (BUR) (EIR)	UNK	UNK	67,500	70,351	67,500	67,500	67,500	0	All legacy completed, and all new added annually.
# of online bibliographic records (BUR) (EIR)	4,196	3,872	3,872	6,381	6,381	6,381	6,381	0	80,000
Note: The 2007 plan is the performance level based upon a projection of 2007 likely enacted made during the first quarter of 2007. The 2008 plan and 2012 long-term targets build on the 2007 plan. To the extent Congress enacts a 2007 appropriation that is different from the 2007 projection, the 2008 plan and 2012 targets may require revision.									

This page intentionally left blank.

Activity: Enterprise Information

Subactivity: National Geospatial Program

	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
National Geospatial Program (\$000)	4,628	68,622 ¹	+1,555	0	70,177	+1,555
Total FTE	17	387	-45 ²	-10	342	-55

¹ The Cooperative Topographic Mapping Program was moved to the Enterprise Information Program in FY 2007

² Because of the NGTOC closings in Menlo Park, California and Reston, Virginia, the NGP will have a decrease of 55 FTE in FY 2008.

Summary of 2008 Program Changes for National Geospatial Program

The 2008 budget request for the National Geospatial Program Subactivity is \$70,177,000 and 342 FTE, a net program change of +\$1,555,000 and -55 FTE from the 2007 President’s Budget.

There are no Program Changes requested for the National Geospatial Program in FY 2008.

Program Overview

The National Geospatial Program (NGP) provides for a common set of current, accurate, and nationally consistent basic geospatial information. This tapestry of base content fulfills an inherently governmental and specifically Federal role to provide collective access to and discovery of geospatial data to meet the science, land, and resource management needs of our nation. Current, accurate, and consistent geospatial data that describe the landscape of America and locate features that can be integrated and displayed are the starting point—the basic framework—from which land and resource decisions and economic and environmental policies can be made. Decision makers at all levels of government, land and resource managers, emergency responders, homeland security personnel, scientists in a variety of disciplines, and others in many walks of life rely on this geospatial information. Scientific and land management information are enriched as well when overlaid on a base topographic map.

Use of Cost and Performance Information

In 2006, USGS made significant progress beyond planned performance in key geospatial information areas:

- **Reduced data acquisition costs** — For *Imagery For The Nation*, all participating Federal, State, and local governments will save about 25 percent of data acquisition costs by using a single Federal contract mechanism coordinated by USGS and by contracting for imagery data collection over larger areas. By coordinating the imagery data processing, quality assurance and control, distribution, and archiving activities, partner agencies will save an additional 14 percent of their costs.
- **Return on Investment savings** — The overall Return on Investment (ROI) achieved by keeping to a single set of standards for all aspects of the orthoimagery life cycle (data gathering to processing to management and distribution) is estimated to be 19 percent.

The NGP serves as organizer, promoter, and integrator for the basic framework of critical geospatial assets and provides the leadership that places “geographic knowledge at the fingertips of the Nation.” The program has two-fold mission, stated as long-term goals, which frame and drive the 5-year program goals. One long-term goal focuses on leadership and the prominent role of partners and stakeholders. The other focuses on the operational aspects and technical services needed to implement the National Spatial Data Infrastructure (NSDI) and provide useful geospatial information to decisionmakers.

Long-Term Goal 1: (Leadership) Providing leadership and guidance for key stakeholders

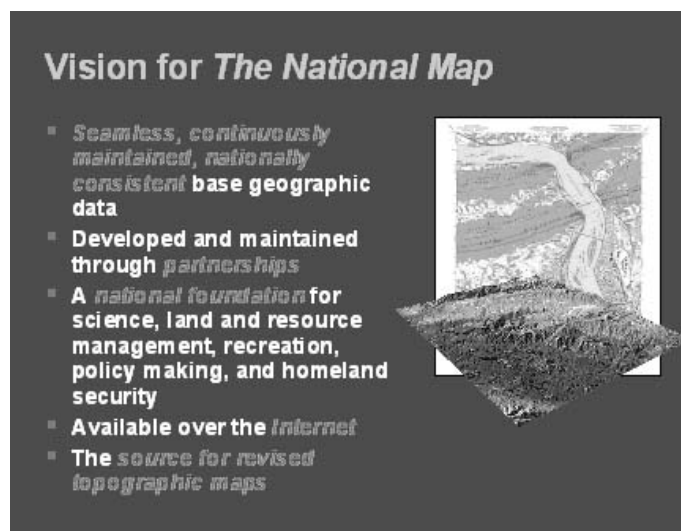
- Develop policy,
- Provide incentives to potential partners,
- Develop key standards and data models,
- Coordinate and facilitate the governance structure for the NSDI,
- Negotiate collaborative agreements with partners,
- Develop a national geospatial enterprise architecture, and
- Provide a forum for technology transfer, best practices, and program guidance.

Long-term Goal 2: (Operations) Implementing key components of the NSDI

- Host spatial datasets, Web sites, knowledge base, and tools for discovery and access,
- Provide data integration and quality assurance of spatial data,
- Staff enterprise architecture, governance body, and spatial operations,
- Conduct and sponsor research for geospatial information science,
- Provide contract management for operations,
- Conduct training, education, and consultation,
- Adopt a posture of being the data producer of last resort, and
- Make map products accessible.

The National Map

The USGS continues to implement and improve *The National Map* by developing a network of distributed digital databases, combining Federal, State, and local information, to provide a single, up-to-date, consistent mapping framework for the country. *The National Map* provides a seamless base of digital geographic data that will serve multiple government agencies base mapping needs; and will provide the source data needed for updating and maintaining the Nation’s topographic maps.



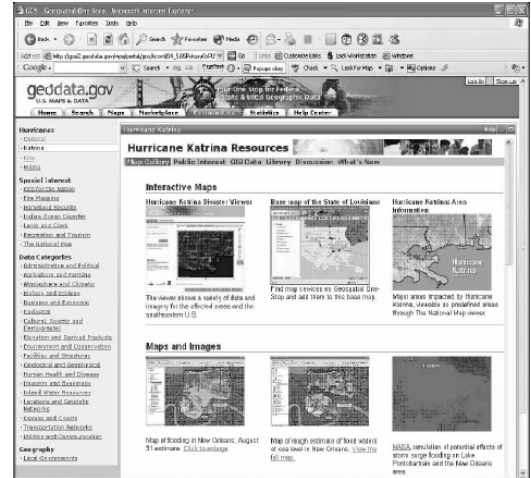
Vision for *The National Map*

- *Seamless, continuously maintained, nationally consistent base geographic data*
- *Developed and maintained through partnerships*
- *A national foundation for science, land and resource management, recreation, policy making, and homeland security*
- *Available over the Internet*
- *The source for revised topographic maps*

The slide features a small inset image of a topographic map showing a river valley and surrounding terrain.

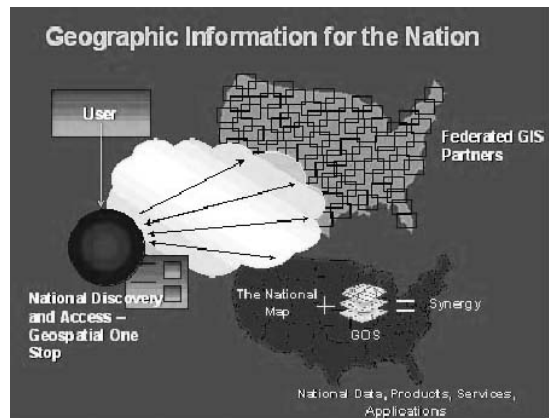
Geospatial One-Stop

In 2008, USGS will provide organizational leadership, management, and funding support for the Geospatial One-Stop portal through the NGP. The portal, located at <http://www.geodata.gov>, serves as the government’s gateway for the discovery and access to the Nation’s distributed geospatial resources. Thousands of GIS organizations are developing digital geographic data bases across the country. These data sets developed by local, Tribal, state, federal governmental organizations, as well as data from academia and the private sector are published to the GOS Portal via metadata descriptions. The data, as well as Internet mapping services, models, applications, and place based publications can all be organized, discovered and accessed through the GOS portal.



Leveraging the Power of Geospatial One-Stop and The National Map

When the wealth of the nation’s geospatial resources, discoverable through geodata.gov are combined with the base data available through *The National Map*, the NGP can fulfill its stated vision – “to provide leadership to place geographic knowledge at the fingertips of the Nation.” The synergy that results from combining the power of *The National Map* and Geospatial One-Stop can form the basis for analyzing and supporting the diverse business of government; and helping to solve problems facing decisionmakers at all organizational levels.



The USGS is committed to making geographic knowledge easily accessible to customers and partners through increased use of advanced computing, adoption of interoperable standards, archiving, and communication tools and through innovative collaboration with public and private organizations. This goal is being accomplished via the Internet using the Geospatial One-stop and *The National Map* for information access and delivery. FGDC provides coordination mechanisms and a governance structure to bring together partners, pursue creative investment strategies, and promote sound policy guidance for the entire geospatial community. Geospatial One-Stop provides the primary Internet portal linking *The National Map* and the USGS scientific databases to other organizations’ geospatial, natural science, and socio-economic databases. This capability will unify USGS geospatial programs and greatly improve communication tools for responding to public inquiries and expanding cooperation with private industry in product development and dissemination.

The NGP consists of three components: Geospatial Coordination, Geospatial Integration, and Partnership Implementation. In general,

Geospatial Coordination includes:

- Developing standards, data models, enterprise architectures, information policies; promoting best practices and coordinating the geospatial activities of Federal agencies;
- Supporting Emergency Operations;
- Serving as Secretariat for the Federal Geographic Data Committee; and
- Supporting development and implementation of NSDI.

Geospatial Integration includes:

- Implementing the Geospatial One-Stop web portal to provide tools for the discovery, access and sharing of geospatial resources; and
- Implementing *The National Map* (including the *National Atlas of the United States*®) that encompasses converting, integrating, providing for quality control and assurance, managing, providing access to, archiving, applying, and acquiring geospatial data. These activities occur through the USGS or organizations under contract to or in partnership with the USGS.

Partnership Implementation includes:

- Providing for USGS geospatial liaisons and support personnel, who develop partnerships and data-sharing consortia directly with State, local, and tribal agencies, field offices of Federal agencies, and others; and projects that result from these partnerships.

2008 Program Performance

The 2008 budget request for the National Geospatial Program is \$70,177,000 and 342 FTE.

The NGP comes under the Resource Protection goal of improving the understanding of national ecosystems and resources through integrated interdisciplinary assessment.

Geospatial Coordination

(Estimates for FY 2006, \$4.6 million; FY 2007, \$9.2 million; FY 2008, \$9.4 million)

The USGS provides staff and leads the Federal Geographic Data Committee Secretariat. The Federal Geographic Data Committee (FGDC) is an interagency coordinating committee responsible for facilitating OMB Circular A-16 related activities and implementation of the NSDI. The NSDI vision is that *“Current and accurate geospatial data will be available to contribute locally, nationally, and globally to economic growth, environmental quality and stability, and social progress.”* FGDC Secretariat staff initiates and lead the activities essential to reaching broad agreement within the national and international geospatial community on the key organizational, technical and policy issues to make the vision a reality.

The geospatial data and information to provide service to citizens is managed by the thousands of independent agencies and jurisdictions distributed across the landscape of this vast Nation. In order for accurate and current geospatial data to be made available to all—at the lowest possible cost—effective coordination mechanisms must be in place—both locally and nationally. The 2005 FGDC strategic planning effort—the Future Directions initiative—recommended formation of a National Geospatial Coordination Council to address external coordination roles and responsibilities. The FGDC Steering Committee endorsed the recommendation and the FGDC staff is proceeding to draft the charter for a FACA-compliant intergovernmental

committee. In 2008, the FGDC Secretariat will implement a new open, inclusive and effective governance structure.

Reaching agreements on technical matters including standards, specifications and data models and on information policies such as privacy, intellectual property rights, and funding models are essential to realize the vision of the NSDI. The FGDC has a leadership role in three key activities in the technical and policy sphere: the Geospatial Line of Business, the DOI Geospatial Modernization Blueprint and the Federal Enterprise Architecture Geospatial Profile.

In 2008, USGS' participation will emphasize the incorporation of digital rights management for geographic data, which will allow greatly improved ways of integrating and accessing data sets with differing levels of security and licensing requirements. The USGS will also lead the implementation of a Federal Enterprise Architecture geospatial profile. Advances in this area will allow USGS more flexibility in integrating data from Federal, State, and local government agencies as well as private industry that must adhere to certain access and integrity restrictions. The FGDC will take the following actions:

- Draft DOI Geospatial Data and Information Policy,
- Begin to implement the recommendations of the Geospatial Blueprint beginning with defining "Authoritative Data Sources,"
- Seek endorsement of the FEA Geospatial Profile by FGDC and CIO Council,
- Develop common definitions and budget IT codes for use in forthcoming 2007 OMB geospatial data investments data call,
- Release for initial review the trails content standard and the Department of Homeland Security data model, and
- Complete public reviews of the following standards: Street Addressing, Vegetation Classification, Hydro Units, US Nat'l Grid, and US Profile.

The value of geospatial data and technologies to Federal programs is generally recognized, and the efforts to coordinate activities have been acknowledged. The national geospatial community has emphasized metadata, clearinghouses, standards, partnerships, and articulation of framework data. Federal agencies, too, are embedding geospatial capabilities in their program activities and systems.

The transformations toward a national GIS and toward management excellence will both be enhanced by effectively managing national geospatial investments. An enterprise system requires knowledge of the investments necessary to develop and operate that system; hence, the need for an investment strategy arm of the NGPO. One of the key areas of the Federal Government that must be transformed if this vision is to be achieved is to develop a strategic plan for geospatial investments. An enterprise system of geospatial data and applications requires not only an organized method for understanding national investments but also a commitment to ensure that those investments meet business needs and are sustainable.

Emergency Operations

The Office of Emergency Operations promotes the adoption of USGS programs as the underpinning for Federal mapping activities and those of other public and private sector

Enterprise Information

organizations with homeland security, homeland defense, law enforcement and incident command mission responsibilities.

In 2008 Emergency Operations staff will continue to coordinate with US Northern Command to provide expertise in support of preparations for natural disasters, coordinate with the Department of Homeland Security to align the NGP strategic actions with the strategic priorities of DHS; provide direct support to the U.S. Marshals Service, and continue engagement with the Intelligence community to ensure continued coordination with National domestic geospatial activities.

Geospatial Integration

(Estimates for FY 2006, \$0; FY 2007, \$46.0 million; FY 2008, \$47.1 million)

The USGS facilitates the development of and maintains critical, comprehensive databases to ensure the integration, availability, preservation, and dissemination of geospatial data to serve the natural sciences' needs for systematic analyses and investigations. These databases also support the national infrastructure for managing and sharing geographic knowledge across all levels of government, and with citizens. In unifying the USGS geospatial programs, the NGP has positioned itself to serve as the geospatial knowledge broker for the Nation, building and making accessible geospatial databases that help provide a foundation for the USGS to respond to present and anticipated needs to understand environmental and natural resource issues on local, regional, and national scales and to enhance predictive and forecast modeling capabilities.

The NGP will continue to enlarge its role and capabilities to provision geospatial data for emergency management and response purposes. In times of emergencies, USGS is providing 24/7 access and delivery of data through the GOS, *The National Map*, and the Hazards Data distribution System.

Private sector firms provide a number of essential products and skills needed to achieve the goals and objectives of the NGP, including production of base geospatial products, such as orthoimagery, elevation and vector feature data, revised maps, and the development of a wide range of value-added products that meet public needs. The USGS uses these services for data acquisition when necessary and to offer a suite of contract vehicles for State and local governments to use to achieve economies of scale on projects. Through the Geospatial Products and Services Contract (GPSC), the USGS is able to contract map production activities and related services, thereby meeting expectations of both the Congress and OMB for Federal use of private sector services. Through a variety of contracts, GPSC offers one-stop shopping for geospatial data, providing access to selected firms for geospatial data services and commercially available remotely sensed airborne and satellite data.

Enterprise Architecture

Geospatial data, information, and technology collectively provide a foundation for innumerable applications that support government at all levels, academia, and the private sector. Currently, geospatial enterprise architectures are proliferating at all levels of government. In general, these efforts are not well coordinated and may be incompatible, which can hinder the goal of a seamless information environment where data, applications, and services can flow freely between entities.

The NGPO will continue to lead the efforts of the geospatial community to unify disparate geospatial enterprise architectures, aligning them with the Federal Enterprise Architecture (FEA) and ensuring that the needs of the non-Federal community are accommodated. This National Geospatial Enterprise Architecture will be a common point of reference for the development of physical architectures that will ensure standards-based geospatial interoperability at all levels of government. A unified geospatial enterprise architecture will demonstrate management excellence by identifying common lines of business and be the model for further transformations necessary to implement the key components of the NSDI.

In 2008, through the Geospatial Profile, USGS will provide guidance for including geospatial information in agency information architectures. This is being accomplished by examining and documenting current business, performance, and service models; extracting best practices; and then designing a plan that is aligned with the Federal Enterprise Architecture vision. The Department Enterprise Architecture Repository (DEAR), the Bureau Enterprise Architecture Repository (BEAR), and the Data Reference Model (DRM) will all be incorporated as part of the validation activity. Advances in this area will allow the USGS more flexibility in integrating data from Federal, State, and local government agencies as well as private industry that must adhere to certain access and integrity restrictions.

Data Themes of *The National Map*

The NGP is responsible for seven of the eight *National Map* data themes: orthoimagery, elevation, hydrography, transportation, man-made structures, boundaries, and geographic names. (Land cover remains the responsibility of the Geographic Research, Investigations, and Remote Sensing Activity.) At medium resolution, elevation, orthoimagery, and hydrography are 100 percent complete for first-time coverage. The 2008 work focuses on extending high-resolution coverage for these data themes. The data themes below are grouped as priority data themes (those for which the USGS will target its data integration and development activities) and secondary data themes (those for which the USGS depends on others for data). Most of the effort is devoted to integrating data from data sources and providing access to the resulting seamless coverage of geospatial data.

USGS efforts emphasize data themes that are available through *The National Map*, plus the development of topographic maps from *National Map* data. As a geospatial data broker/facilitator/integrator of geographic knowledge, USGS coordinates the requirements of constituents, cooperators, and partners to set priorities for orthoimagery, elevation, hydrography, and geographic names data. Based on these customer needs, the current emphasis on high-resolution elevation and hydrography will continue. For orthoimagery, the primary focus is on high-resolution imagery for major population and government centers in the Nation. USGS will also support partners for maintaining nationwide medium resolution imagery. Implementation is continuing for databases of transportation and boundary data from the Bureau of the Census, and a database for man-made structures from Federal, State, and local government agencies.

Priority Data Themes

National Orthoimagery Databases — Digital orthoimagery technology has matured in the past 15 years to become an essential data set in enterprise geospatial databases in nearly all levels of government. This is because of its utility as a base map for a wide range of applications and the cost-effectiveness to acquire and maintain up-to-date orthoimagery data. Furthermore,

repetitive orthoimagery coverage provides a useful tool for monitoring change over time. New technologies continue to drive the demand to higher resolution imagery for reduced costs.

The USGS is cooperating with other government agencies to acquire orthoimagery, at various resolutions, in order to fulfill their requirements for orthoimagery data. In particular, Farm Services Agency for its crop compliance program; Natural Resources Conservation Service for its resource inventory and soils mapping program; U.S. Forest Service for forest management program; Department of Homeland Security (DHS) and National Geospatial-Intelligence Agency for homeland security and emergency response applications. The USGS is also responsible for the archive and dissemination of orthoimagery to the general public through *The National Map* which provides for national coverage of the U.S. for science investigations, geographic analysis, land use planning, environmental impact studies, and commercial applications.

Orthoimagery data have become critical to all levels of government. USGS, along with several other cooperating Federal agencies, is supporting the **Imagery for the Nation** (IFTN) initiative, and intends to transition its acquisition role and continue its coordination role with State and local agencies. The multi-resolution requirements of the IFTN also necessitate fine-tuning the programmatic planning with the USGS elevation program (see elevation data theme below).

Federal agencies generally require orthoimagery resolutions from 1-meter (medium resolution) for resource management to 0.3-meters (high resolution) for Homeland Security applications. These resolution requirements can be satisfied with either airborne or satellite technologies. However, Federal agencies require public domain data to fully satisfy their missions, which generally dictate airborne platforms and standard aerial photography or airborne digital sensors.

Age and Availability of Orthoimagery in <i>The National Map</i>			
	2005	2006	2007
Medium Resolution ^{a/}			
Less than 5 years	6%	25% ^{b/}	51% ^{b/}
5-10 years	48%	39%	28%
More than 10 years	46%	36%	21%
Top 50 urban areas			
Less than 2 years	49% ^{c/}	56%	54%
2-4 years	51%	44%	44%
More than 4 years	0%	0%	2%
^{a/} Coverage of orthoimagery at medium resolution (1-meter) for the U.S. (including Puerto Rico and portions of Alaska) was completed in 2002. ^{b/} Improvement in relative age of medium resolution orthoimagery is due in part to partnership with Department of Agriculture's Farm Service Agency for imagery over 11 western states. ^{c/} USGS anticipates using savings from employee buyouts to complete first-time coverage for urban areas and to improve its ability to meet 2-year currentness requirements. Coverage is lacking for approximately eight percent of the area.			

Table 1: Age and Availability of Orthoimagery in *The National Map*

Medium resolution (one meter) orthoimagery (see figure 1), is planned for updates on a 5-year cycle. The USGS is cooperating with USDA Farm Service Agency in 11 western States where the agencies' technical and programmatic needs coincide. In this effort to coordinate data acquisition, USGS funds acquisition of imagery over Interior and other Federal lands (except those of the U.S. Forest Service), and the Farm Service Agency funds acquisition of data over

agricultural lands. This approach is documented through a joint performance metric that began in 2006 between USGS and the Farm Service Agency. In other areas, particularly in eastern States, USGS participates in consortia that operate on a statewide or regional basis, and typically acquires imagery with a resolution finer than one meter. For example, in 2008 the USGS will continue participation in multiyear orthophoto consortia in the States of New York and Florida. In such arrangements, consortia provide imagery for urban and county areas. For data access, national coverage of this imagery is available in *The National Map* and can be discovered through Geospatial One-Stop.

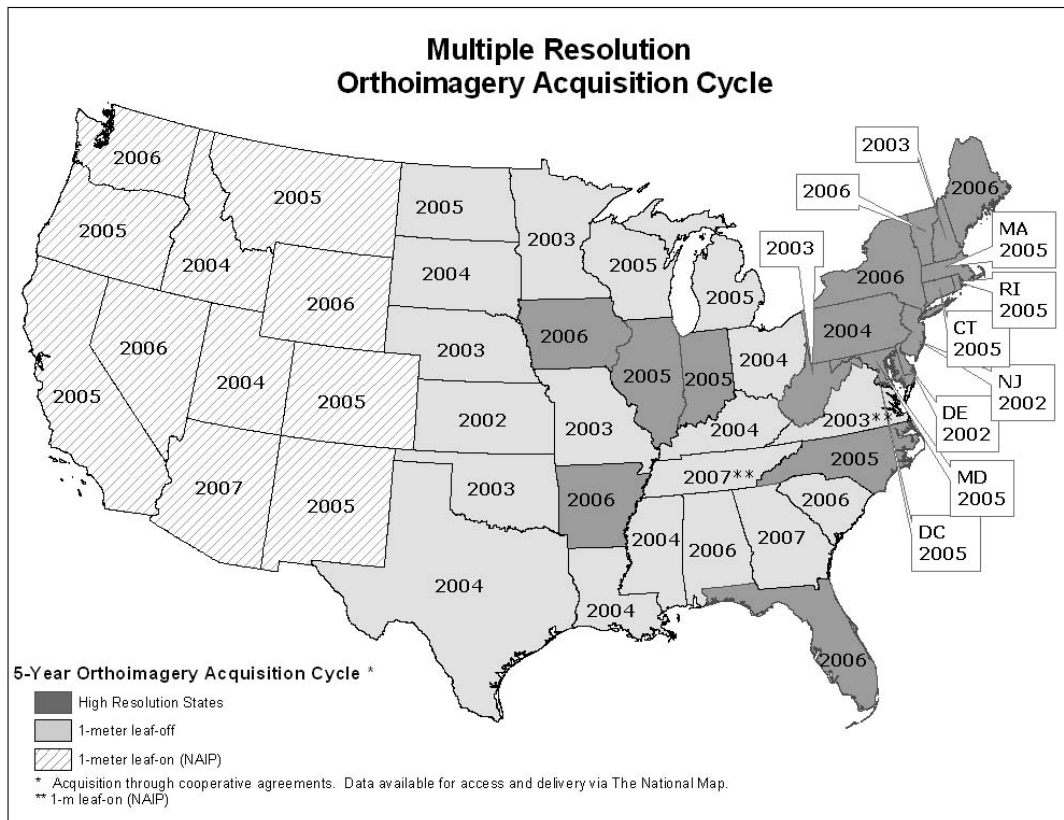


Figure 1. The map shows the underlying strategy for maintaining medium-resolution orthoimagery. In eleven western States USGS will work with the Farm Service Agency and other partners. In the east, USGS will use a more adaptive strategy by working with Federal, State, and local partners to identify needs.

For the Nation’s urban areas, the orthoimagery has a resolution finer than one meter and requires updating on a 2- to 4-year cycle to capture these constantly-changing areas.

The focus is on 133 of the Nation’s most populous and administratively important urban areas, and the data support a number of homeland security, public safety, emergency response, and other applications. State, regional, and local governments participate in the acquisition of these data (for example, in 2006 these partners funded 76% of the acquisition costs). When these data are received, USGS immediately makes them available to the Federal homeland security, defense, and intelligence communities. They also become available for viewing and/or download via seamless download services available as part of *The National Map*. Imagery from the private sector is also playing a more prominent role, as data from commercial high-

resolution satellites become available. Areas planned for data maintenance and updating in 2008 are shown in figure 2.

National Elevation Dataset (NED) — Elevation data provide three-dimensional surface models of the Earth's surface. USGS makes elevation data available both for land areas and, in cooperation with the National Oceanic and Atmospheric Administration, under coastal waters.

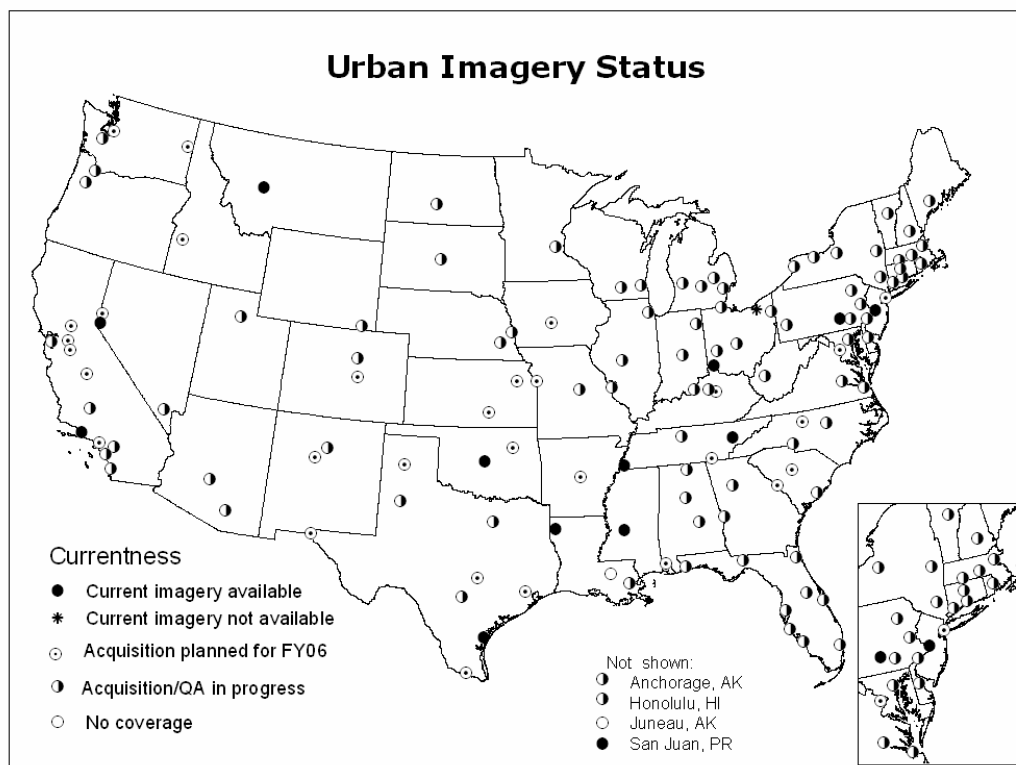
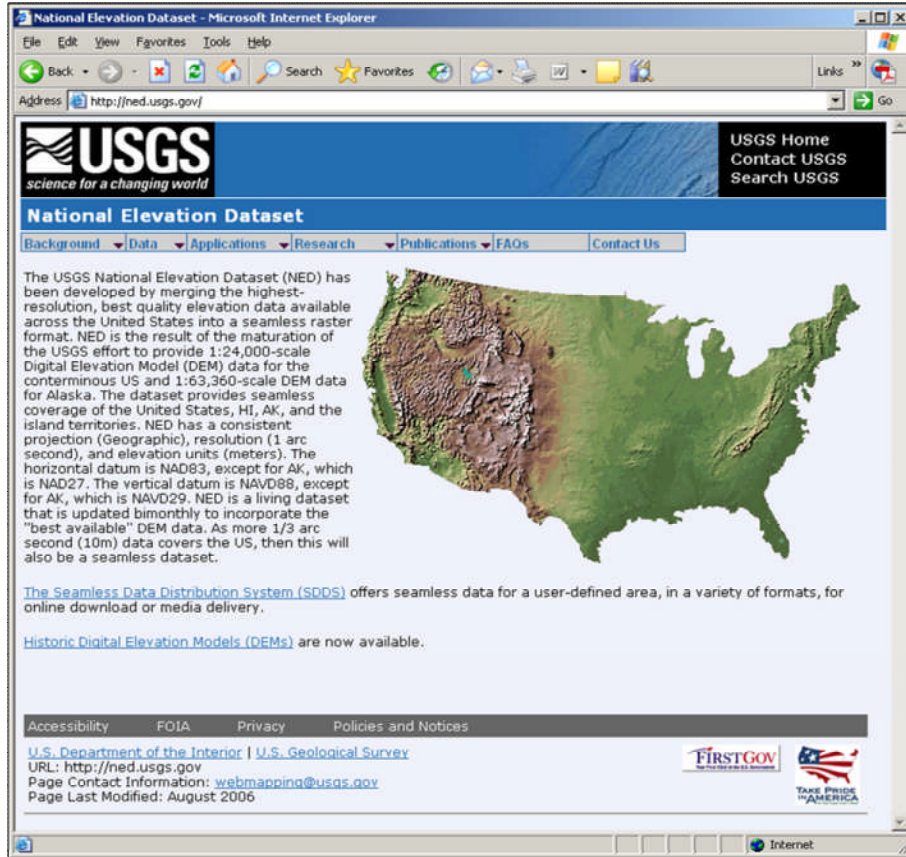


Figure 2. Map of 133 of the Nation's most populous or administratively important cities, and the currentness of Imagery for these areas. Areas for which imagery is more than two years (Top 50) or four years old are candidates for FY 2008 activities.

The heights (or depths), referenced to a vertical datum, are organized in a grid. Elevation data support modeling of drainage networks and geometric correction of remotely sensed data. Elevation data are critical to decision-support systems, such as hydrologic studies in support of flood mitigation and response; dispersion modeling to predict and respond to events that spread over land or in surface water; and for predicting wildfire behavior. The growing demand for elevation data in populated areas, and flood plains in particular, drives USGS investments for integrating detailed elevation data into national data holdings.

USGS identifies digital elevation data based on the resolution (spacing between the points) of the grid. One arc-second (equivalent to thirty-meter) posted elevation data are complete and available for the entire United States. Current USGS efforts concentrate on providing finer resolution of elevation data at 1/3- and 1/9-arc-second (equivalent to ten- and three-meter respectively) post spacing. The data are developed from a variety of sources, including State and local governments and the private sector.

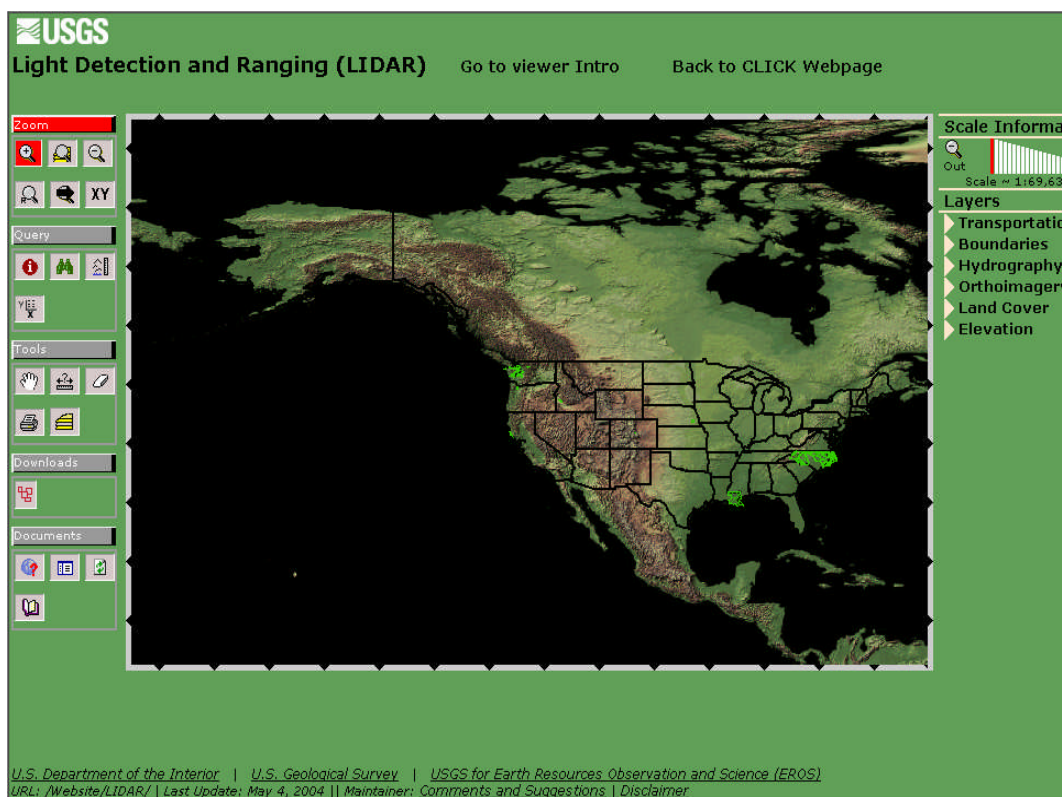


The elevation theme includes best available data from Federal, State, local, and private sector partners and is made available in NED, the elevation component of *The National Map* and Geospatial One-Stop. The USGS anticipates continuing to work closely with the Federal Emergency Management Agency to incorporate elevation data acquired through that agency's flood plain map modernization program and to continue the program of exchanging elevation data with the US Forest Service. The 1/9 arc-second elevation data, which have in the past focused on the Nation's urban areas, have become a vital tool for supporting homeland security efforts. USGS anticipates incorporating significant acquisitions of 1/9 arc-second data acquired by States as part of statewide imagery and elevation acquisitions and other federal agencies into the National Elevation Dataset.

Status of NED in <i>The National Map</i>			
	2005	2006	2007
High Resolution ^{1/} (1/3 arc-second (10 meter))	52%	60%	68%
^{1/} The high-resolution dataset is focusing on first-time coverage for 49 States (excludes Alaska), Puerto Rico, and Virgin Islands.			

The USGS Center for LIDAR Information, Coordination and Knowledge (CLICK) is a 2006 addition to the elevation program. It is a virtual Center (though housed at EROS Data Center), aimed to take advantage of existing LIDAR data and information for scientific (non-mapping)

research needs nation wide. Raw LIDAR data submitted to the CLICK will be processed and entered into the NED.



National Hydrography Dataset (NHD) — This USGS-lead multi-agency program is designed to build and continue to maintain the first-ever state-of-the-art digital geospatial dataset of the nation’s surface water to create new capabilities in water science. This provides complete nationwide data that virtually all scientists can agree on, eliminating duplication of effort, improve the sharing of scientific data, and standardizing the technology to greatly reduce the cost of the science. The hydrography data theme contains naturally occurring and manmade bodies of water, paths through which water flows, and related features. The hydrographic data contain positional and descriptive information that support applications such as referencing observations, modeling the flow of waters and transport of materials in stream networks, and making maps.

Status of NHD in <i>The National Map</i> ^{1/}			
	2005	2006	2007
High Resolution ^{2/} (1:24,000 scale)	79%	92%	100%

^{1/} The medium resolution dataset covering 49 States (excludes Alaska), is available in *The National Map*. The dataset was completed in 2002; it is not updated as work is focused on higher-resolution data.

^{2/} The higher-resolution dataset will include first-time coverage for all 50 States (Alaska at 1:63,360 scale), Puerto Rico, and Virgin Islands.

USGS organizes these data in the National Hydrography Dataset, the hydrography component of *The National Map*. Accessible via Geospatial One-stop and *The National Map* viewer, the NHD contains comprehensive and detailed data about America's surface waters. The NHD assigns unique identifiers for each segment of the country's surface waters. This approach provides a common map base through which different organizations georeference their water-related business data. NHD is used by the Environmental Protection Agency in its Watershed Assessment, Tracking & Environmental Results (WATERS) system, State agencies for meeting reporting required by the Federal Water Pollution Control Act (Clean Water Act), and the U.S. Forest Service in its Natural Resource Information System (NRIS) water module. The NHD also is used by the Bureau of the Census in its map modernization activities, USGS StreamStats project, and other activities, and many other organizations.

The "high" resolution version of the data is expected to be completed in 2007. This version is created from USGS 1:24,000-scale topographic maps and similar sources provided by a vast partnership of contributors. Also available is "medium" resolution for the conterminous United States and Hawaii completed in 2002. These data are created from less detailed 1:100,000-scale maps. A new resolution of data at 1:5,000-scale is now becoming of interest to the user community. One example of this "local" resolution data was created from very detailed maps for Vermont. These data are derived through partnerships with Federal agencies such as the U.S. Forest Service, National Park Service, Bureau of Land Management, and Environmental Protection Agency, and State and local government agencies

With complete initial coverage of high-resolution data, attention will shift to the revision and maintenance of the data and to more detailed resolutions. Training, tool development and strategies for sharing updates among State, local and Federal agencies will be a major focus. Much of the work will shift to a process of data stewardship where the user community, organized largely on a state-by-state basis with federal participation, will use their local knowledge to update the data. This activity is important to maintain the value of a national set of data that can be used support the whole geospatial community.

Geographic Names — The USGS Geographic Names Project is comprised of two functions, providing the Secretariat and staff for the U.S. Board on Geographic Names (BGN), and managing the Geographic Names information System (GNIS). The BGN is an interagency body consisting of representatives from various Federal departments and agencies, and is empowered by Public Law to issue standard geographic names for use on all material (maps, documents, reports, data files) published by the Federal Government and its contractors. Geographic names are a critical and important reference component for scientific investigations and emergency responders, as well as for land and resource management operations throughout the Federal Government. A large number of local, State, and Tribal agencies adhere to the guidelines and policies of the BGN and participate actively in the standardization effort. The BGN makes decisions on new names and name changes to physical and cultural geographic features.

The BGN is also authorized to disseminate the official names and locative attributes of all cultural ("administrative") features, including schools, hospitals, and such emergency preparedness locations as police and fire stations.

GNIS is the authoritative database for all geographic names, all of which must adhere to the BGN's principles, policies, and procedures. In addition to data developed from decisions made by the BGN, GNIS contains data received through partnerships with Federal agencies, State Names Authorities, State GIS offices, and Tribal authorities. GNIS serves as the names layer of

The National Map, and is a major component and factor in the Geospatial One-Stop (GOS). For FY 2008, USGS plans to continue providing the Secretariat and staff for the BGN, as well as managing and upgrading the database and its services in support of the Federal Geographic Names Project.

Secondary Data Themes

Transportation feature data — The transportation data theme consists of roads, railroads, airports, and miscellaneous transportation features. This information is important for highway departments, land managers, and utility companies in applications such as calculating distance along a specific path or the proximity of roads to power lines. It is also crucial for determining evacuation routes for emergency response and other applications. The transportation theme includes best available data from Federal partners such as the Census Bureau and the Department of Transportation, State and local agencies, and private industry. In 2008 USGS will continue to make available for seamless viewing and downloading final data updates applied from the Census Bureau's *MAF/TIGER Accuracy Improvement Project*. The USGS will continue to work with the Census Bureau, the USDOT and other Federal agencies to incorporate a common definition of Federal geospatial data requirements for transportation data into a shared national dataset. These common requirements will reduce data calls to maintenance partners at Federal, State and local levels and improve the opportunities for data sharing as part of NSDI. Incorporating these requirements will also improve the capabilities for applications through the availability of more complete and more consistent, seamless, integrated data. The USGS will continue to work with States to improve coordination of data updates through stewardship programs.

Man-Made Structures feature data — The structures data theme is comprised of man-made features important to planners, land managers, utility companies, and the general public for a broad range of analyses and applications. This theme is key for the locations of critical structures, which are of vital interest to emergency responders. The data include those from Federal partners including agencies of the Departments of Homeland Security and Defense, and State and local government agencies. In 2008 USGS will continue to integrate data from these sources and make them available for seamless viewing and downloading at a national level. The USGS will also replicate these updates to partner organizations.

Boundary feature data — The boundary data theme depicts administrative and jurisdictional information. The theme is critical for government agencies and other organizations requiring jurisdictional information. It is also important to State planners, land managers, the general public, and utility companies for a broad range of applications. The boundary theme relies on data from Federal partners such as the U.S. Census Bureau, other Federal agencies, and State and local agencies. In FY 2008, for boundaries of jurisdiction, the USGS will continue to make available for seamless viewing and downloading data being developed by the Census Bureau. It will also continue to work with Federal, State, and local governments to develop strategies to maintain boundaries data through data stewardship agreements and through further development of a geospatial data infrastructure. USGS will integrate these data, and make them available for seamless viewing, and downloading.

Data Integration and Maintenance

After attaining national coverage for these data themes, it is important to establish a mechanism to update the coverage to maintain currentness. To attain maximum current coverage, partnerships must be developed to maintain and make available the geospatial data. States

geospatial data councils play crucial roles assisting as partnership coordinators, area integrators, and data producing engines. A critical measure of success for National Geospatial Program will be the progress in establishing maintenance partnerships to expand coverage and maintain currentness. (See Partnership Implementation Section).

The USGS contributes to *The National Map* by coordinating requirements for collection, integrating data from various sources for the national databases, taking an active role in quality assurance and quality control activities for each data theme, and maintaining a small production capability for those areas for which there is no partner for updating geospatial data; that is, the USGS is the producer of last resort. The USGS also has the responsibility for building and maintaining integrated seamless databases for partner-generated data.

Topographic Maps

The most widely known form of topographic information is the USGS primary series topographic map, which gives a complete and consistent picture of the Nation's lands. The maps, complemented by digital forms of the mapped information and aerial and satellite imagery, support numerous government activities, including aiding other Interior bureaus in carrying out their stewardship and regulatory responsibilities, saving lives and property in natural and human-induced disasters, and providing a basis upon which other USGS science programs can present their information. These spatial data continue to be used widely by State, regional, and local governments, the private sector, and other organizations. Citizens use the maps in educational, recreational, environmental, and conservation activities, and to explore and understand natural resource issues. The maps help people connect with the Earth through the power of place and geography.

The USGS completed large-scale map coverage for the United States in the 1990s. The topographic map revision program has been unable to maintain the currentness of this national database of graphic products and had dedicated its resources on building *The National Map*. Building on the successful print on demand work of producing digital versions of USGS graphics products in support of the Katrina recovery efforts, the USGS will continue to expand its capability and inventory of digital versions using National Map data from its partners. In 2008, USGS will produce topographic maps along the east coast (2 counties deep) from Florida through Delaware, where suitable data exists in *The National Map*. Where suitable vector data do not exist over those areas, USGS will produce image maps.

USGS will continue to develop a web-based solution for map production (topographic and image maps).

Working with the USGS Natural Science Network, scans of existing topographic maps will be made where USGS are currently making maps along the eastern coast and serve these maps through USGS store, *The National Map*, and GOS.

Work will be undertaken to explore options for working with the private sector in this area.

Data Access and Discovery

The USGS ensures that geospatial data associated with the 8 major themes and map products prepared from these data are accessible to the public and available to partners. Access activities include coordinating the integration of national geospatial databases held by the USGS, other Agencies, States and locals. The USGS focuses on providing around-the-clock, free, or low-cost access to the national databases of public domain elevation, hydrography,

orthoimagery, transportation, boundaries, structures, land cover, and geographic names data. Users can browse, select, and retrieve geographic data and information for their area of interest. Users can also have access to digital versions of graphics product through *The National Map* print on demand functionality. USGS provides a means for viewing these data through *The National Map* and the Geospatial One Stop web sites. National databases and partner's web mapping services are documented using the Federal metadata standard.

In 2008, USGS will support and upgrade (as needed) continued access to the seamless national databases it hosts and web mapping services made available by partners. Significant technological upgrades that facilitate quicker and more efficient dissemination have been made or are in the midst of being implemented that will support a wider spectrum of services and users. All of these data sets are accessible through the Geospatial One Stop.

Archive

The USGS provides for long term archive and retrieval of its data and metadata. The USGS strives to hold all of its data in near-line archives with an off-site tape backup for redundancy. Procedures are developed to maintain original data sets such as high-resolution orthoimagery quadrangles, digital raster graphics, digital line graphs, and digital elevation information. The USGS geospatial data archive provides public web access to historical source data to allow these important data to be analyzed for changing trends over time. In FY 2008, the USGS will continue to maintain the archive of these materials and support the growth of this archive with new data continuing to be acquired in support of the National Geospatial Program.

Geospatial Data Standards

Access to data is easier and more efficient using the technological advances of the Internet and open geospatial standards and protocols. This approach allows USGS geographic data to be used more readily by all levels of government, private organizations, and the public. These open interfaces and protocols "geo-enable" the Internet and allow distributed complex spatial information and services to be accessible to a wide range of applications. As these interfaces and protocols mature, the USGS expects to realize its vision of interoperable, distributed, multi-level databases forming *The National Map* and Geospatial One-stop portal component of the National Spatial Data Infrastructure. The Federal Geographic Data Committee serves as the lead federal executive body charged with the leadership, development, implementation, and review of spatial data standards.

USGS Standards development is coordinated with the Federal Geographic Data Committee, consistent with requirements of the National Spatial Data Infrastructure and Geospatial One-Stop initiative, to help ensure that data from *The National Map* and other sources can be integrated. Standards development was identified in the FY 2004 Performance Assessment Rating Tool review of the USGS Geography Discipline and Exhibit 300 documentation as one of the major goals of the program.

The USGS is identified in Office of Management and Budget Circular A-16 and the Geospatial One-Stop Initiative as the lead Federal agency responsible for the elevation, hydrography, and orthoimagery data themes. This responsibility includes the development, maintenance, and promulgation of standards for the collection of nationally consistent geospatial data. In addition, the USGS establishes digital cartographic and geospatial data quality control procedures for collecting data in a form that meets these standards. USGS is also responsible for supporting

federal requirements for the standardization of geographic names, and has led the development of NSDI standards for metadata, data accuracy, and data transfer.

The USGS coordinated the development of standards for digital orthoimagery, hydrography and elevation as part of its participation in the Geospatial One-Stop initiative and the FGDC. In addition, the Geographic Names Information System (GNIS) has provided the basis for developing a standard for minimum geographic feature attributes and supporting that standard with a registry of feature IDs and names. In FY 2008, USGS will support the American National Standards Institute's (ANSI) process for adopting these and other standards developed through Geospatial One-Stop and the FGDC as national standards.

The USGS promotes standards development through its management of, and technical participation in, the work of international, national, and interagency efforts. These efforts include participation in the American National Standards Institute, International Organization for Standardization, and the National Digital Ortho Program and National Digital Elevation Program. The USGS is participating with the Open Geospatial Consortium to develop specifications enabling diverse geospatial databases and systems to work together.

The National Atlas of the United States®

The National Atlas offers reliable and authoritative products and services that any American citizen can use to reach a deeper understanding and appreciation of the geography of our Nation. It is a partnership with other Federal agencies and industry that makes it easier for users to find, get, and use reliable and authoritative geographic information. The products and services are designed specifically for public use and are developed and refined based on a continuous dialog with Atlas customers. The Atlas also serves as a gateway to those who need the very detailed, basic map information provided by *The National Map*.

The Atlas features a Map Maker that lets users easily design, explore, and print their own maps at no cost. There are dynamic maps that show changes in America over time. The Atlas makes available page-size printable maps for those needing simple, prepared maps at home, at school, or in the office. For those who want to know the stories behind the maps and how geographic data are used, the National Atlas includes interesting and informative articles. Continuing the USGS legacy of publishing high-quality paper maps, the Atlas also includes accurate and attractive Wall Maps covering diverse topics. For professional consumers of geographic information, the National Atlas project offers more than 2,000 reliable, documented, and integrated digital geospatial (map layers).

For professional users of Federal geospatial and geostatistical data, nationalatlas.gov offers its fully documented, fully integrated, expert map information in industry standard formats. The National Atlas project makes its authoritative data available through a number of channels, including the Geospatial One Stop, *The National Map* Web viewer, Google Earth, the USGS Seamless Data Server, the National Atlas node of the NSDI Clearinghouse, and through the National Atlas node in the Environmental Systems Research Institute's (ESRI's) Geography Network. The Atlas project provides online interactive map services that adhere to Open Geospatial Consortium (OGC) specifications. This means that professionals can include National Atlas maps and functions on their own Web sites or use them in their own mapping applications without having to download National Atlas data.

Not only do National Atlas products foster a better understanding of the United States among individual Americans, they also set our Nation's place in regional and global contexts. Atlas

partnerships have broadened to bilateral agreements with atlas programs in Canada and Mexico. Together, the three countries have built the basic framework for a North American atlas. Data offerings have been harmonized at the borders so that there is authoritative and seamless mapping information for the entire continent. Extensive documentation for these data has been prepared in three languages. These seamless maps have been embraced by the trilateral Commission for Environmental Cooperation (one of three North American Free Trade Agreement, NAFTA, commissions) as the foundation for its environmental atlas of North America. The National Atlas of the United States has also joined the international Global Map project to provide standardized small-scale mapping information for the entire world. We are compiling our own data, but we are making certain that these map files are also matched along our northern and southern borders so that the Global Map offerings from Canada, Mexico, and the United States are the best available.

Partnership Implementation

(Estimate for FY 2006, \$0; FY 2007, \$13.4 million; FY 2008, \$13.7 million)

The success of USGS' geospatial activities depends on partnerships and collaboration with the geospatial community. There are many potential partners because the business practices of nearly every Federal, State, and local agency and many private organizations have at least some tie to geospatial information. Some of these are long-standing partnerships that have been going on for decades, and others are new relationships developed in response to evolving opportunities, technology, and demands for geospatial information.

By leveraging partner participation, Federal funds can go further in collecting, analyzing, disseminating, and applying geospatial data needed by many Federal programs. The USGS' partnerships activities ensure the development and maintenance of base geographic data consistent with national content specifications by seeking new partnership opportunities, building relationships with geospatial organizations, and working collaboratively to prepare the base geospatial data. Although partner organizations collect, manage, and store basic geospatial data in response to their specific needs, in general they have no mission requirements to make these data available for secondary use, nor are they generally capable of data integration on a national scale. Within the Federal government, the USGS has this national leadership role. Furthermore, USGS provides leadership in forming partnerships with these organizations to provide access to their data at a variety of scales, developing protocols for data integration, developing processes for data maintenance, serving data to a variety of users, and assisting in improving applications of these data.

Partnerships also include support for research and development with the private sector, the development of standards, and coordination with public interest organizations representing State, local, and tribal governments.

Federal Partnerships — The USGS seeks to leverage its resources with other Federal agencies both for cooperation with other agencies and to improve the interactions of the Federal Government with other sectors, particularly State and local governments. In FY 2008, the USGS will accomplish these partnerships through formal mechanisms such as the Federal Geographic Data Committee, the Geospatial One-Stop initiative, the National Digital Orthophoto Program, the National Digital Elevation Program, and the Board on Geographic Names, as well as through bilateral interactions with partner agencies outside these groups. Examples include: support for Interior bureaus' geospatial data needs; ongoing agreements with the National Geospatial-Intelligence Agency to develop high-resolution imagery and elevation data over urban areas and to act as an intermediary with State and local governments; working with the

Department of Homeland Security to utilize geospatial techniques for events planning and for enhancing State homeland security plans; coordinating geospatial activities with the Federal Emergency Management Agency to help mitigate, respond to, and recover from natural disasters; working with agencies in the Department of Agriculture to coordinate the development of imagery, elevation, and hydrography data, topographic maps, and participation in *The National Map*; working with the U.S. Census Bureau to prepare and exchange imagery, hydrography, road, and boundary data; and coordinating hydrographic data with the Environmental Protection Agency, and bathymetric data with the National Oceanic and Atmospheric Administration.

State, Local, and Tribal Government Partnerships — The USGS has a long history of partnering with State and local entities to increase the coverage of geographic data. USGS interacts with these organizations by participating in state and regional geospatial information coordination groups and through bilateral agreements with State and local government agencies to help build the National Spatial Data Infrastructure.

The USGS will also document and promote a “best practices” model to help partners contribute and share their data in the NSDI. Work will continue to develop state and local partnerships such as those described in the FY 2006 Accomplishments and FY 2007 Planned Program Performance sections below. In addition, USGS will work with states to integrate geospatial data needs and GIS techniques into their Homeland Security Plans.

Montana Builds Critical Structures Geodatabase Model

The GIS Committee of the Montana Disaster and Emergency Services Office and the USGS, NSDI Partnership Office have partnered to develop the Montana Critical Infrastructure and Structures geodatabase model. This geodatabase model is a federated distributed model of structure features and related infrastructure which facilitates analysis and criticality evaluation for multiple disciplines, including homeland security. Model development was partially funded through a USGS CTM grant in 2005 with work continuing on model refinement and application development that will feed infrastructure information into numerous national, state, and local applications.

Private-Sector Organizations — Engaging the private sector enables the USGS to leverage private sector resources to develop *The National Map* and the National Spatial Data Infrastructure more broadly. These partnerships, such as those provided through USGS’ participation in the Open Geospatial Consortium, involve the initial research and development that provide the essential underlying technology. Other activities involve the collection and analysis of geospatial data; the distribution of data, either electronically or in hard copy; and the use of geospatial data to develop value-added products that meet the needs of a wide variety of users.

Public Interest Organizations — Public interest organizations such as NSGIC and the National Association of Counties (NACo) offer an opportunity to reach out to many potential partners. These organizations represent State and local government agencies and help coordinate a variety of issues with national program stewards for geospatial products. In FY 2007, the USGS will build on experience gained in working with NSGIC and NACo to work more closely with other public interest organizations such as the Urban and Regional Information Systems Association, the National Governors Association, the Western Governors Association, and the National League of Cities.

This component provides funds needed to support partnerships for The National Map and NSDI in two ways. The first is funding to support the USGS Geospatial Liaisons, who work with State,

local, and tribal agencies, and field offices of Federal agencies to address geospatial needs and promote long-term partnerships. The Liaisons organize, maintain, and document partnership agreements and help partner organizations make their web mapping services and data available through The National Map. They identify geospatial data needs within the States they represent, evaluate partner databases and web mapping services, participate in State and regional geospatial data councils, and provide for outreach to local communities of users. Liaison responsibilities have expanded to include broader efforts to implement NSDI and Geospatial One-Stop. The USGS is committed to establishing NSDI Partnership Offices in every State to enable the Geospatial Liaisons to most effectively interact with partners. In 2008 USGS will establish new NSDI Partnership Offices in remaining States that lack a resident Geospatial Liaison.

Other funds provide incentives to State, local, and tribal organizations to engage in partnerships with USGS, especially those that aid the development, maintenance, and application of national databases. This funding may take the form of grants, cooperative agreements, or other mechanisms that enable the USGS to leverage the resources of the partner to accomplish shared goals. Funds for partnership projects are allocated based on needs (such as lack of current data for urban areas), opportunities (such as the availability of technically capable partners), and merit (projects are awarded on a competitive basis).

Performance Overview

The National Geospatial Program Subactivity addresses the Department of the Interior Serving Communities (Advance knowledge through scientific leadership and inform decisions through the application of science) and Management Excellence (Modernization) strategic goals.

The following table highlights important performance measures for the National Geospatial Subactivity:

Program Performance Overview									
End Outcome Goal 1.4: Resource Protection: Improving the understanding of national ecosystems and resources through integrated interdisciplinary assessment									
End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
GPRA End Outcome Measures									
% of targeted science products that are used by partners for land or resource management decision making (SP)	UNK	UNK	UNK	UNK	UNK	≥90%	≥90%	0	≥90%
Intermediate Outcome Measures and Bureau and PART Outcome Measures <i>Ensure availability of long-term environmental and natural resource information, data and systematic analyses needed by land and resource managers for informed decision making</i>									
% of surface area of the coterminous U.S. for which high-resolution geospatial datasets are cataloged, managed, and available through <i>The National Map</i> (SP) (NGP)	UNK	UNK	UNK	UNK	UNK	83% (581/700)	84% (587/700)	+1%	90% (630/700)
% of the area of 11 Western States for which orthoimagery have been acquired through a FSA/USGS partnership with other entities to achieve a 5-year cycle for 1-meter NAIP imagery (BUR) (NGP)	UNK	43%	36%	23%	62%	62%	62%	0	62%
% of total cost FSA and USGS saved through partnering with other entities for imagery acquisition of 1-meter NAIP orthoimagery (BUR) (NGP)	UNK	44%	40%	41%	36%	36%	0	-36%	0
Annual % of data acquisition costs for <i>The National Map</i> funded by partners (RePART Eff. Measure) (NGP)	45%	47%	20%	74%	60%	60%	60%	0	75%
Quarterly % of customers that identify or indicate (via a survey) that USGS NGP Outreach materials and activities (information and publications, conferences, training and workshops) met their needs/requirements (BUR) (NGP)	Did not Exist	Did not Exist	Did not Exist	Did not Exist	Did not Exist	Did not Exist	Baseline	N/A	TBD
Quarterly % of time that USGS managed geospatial data and information	Did not Exist	Did not Exist	Did not Exist	Did not Exist	Did not Exist	Did not Exist	Baseline	N/A	TBD

Enterprise Information

Program Performance Overview									
End Outcome Goal 1.4: Resource Protection: Improving the understanding of national ecosystems and resources through integrated interdisciplinary assessment									
End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
dissemination systems (i.e., Geospatial One-Stop Portal, <i>The National Map</i> , NSDI Clearinghouses) are accessible online to customers (BUR) (NGP)									
% of GIO partners reporting satisfaction with partnership agreements (BUR) (EIR & NGP)	UNK	UNK	UNK	UNK	UNK	UNK	Baseline	N/A	TBD
% of total cost of geospatial data and geospatial services saved through Geospatial Line of Business Joint Business Case (BUR) (NGP)	UNK	UNK	UNK	UNK	UNK	UNK	Baseline	N/A	TBD
PART Efficiency and Other Output Measures									
# of annual gigabytes of geospatial data collected (BUR) (NGP)	34,815	6,023	26,728	76,550	25,428	25,428	24,344	-1,084	35,000
# of cumulative gigabytes of geospatial data managed (BUR) (NGP)	85,857	108,035	175,207	187,842	200,635	200,635	249,679	+49,044	400,000
# of formal workshops and/or training provided to customers (BUR) (NGP)	UNK	29	23	51	17	17	17	0	18
Note: The 2007 plan is the performance level based upon a projection of 2007 likely enacted made during the first quarter of 2007. The 2008 plan and 2012 long-term targets build on the 2007 plan. To the extent Congress enacts a 2007 appropriation that is different from the 2007 projection, the 2008 plan and 2012 targets may require revision.									

Science Support

	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Science Support (\$000)	69,302	67,382	+1,317	+1,972	70,671	+3,289
Total FTE	421	421	0	0	421	0
Impact of the CR		[+1,920]		[-1,920]		[-1,920]

Impact of the CR (-\$1,920,000)

The 2008 budget restores the priorities of the 2007 President's budget by funding 2007 programmed fixed cost increases and program reduction initiatives included in the 2007 President's budget.

Summary of 2008 Program Changes for Science Support

Request Component	(\$000)	FTE
<ul style="list-style-type: none"> • Financial Business Management System (FBMS) 	+1,972	0
TOTAL Program Changes	+1,972	0

Justification of 2008 Program Changes

The 2008 budget request for Science Support is \$70,671,000 and 421 FTE, a program change of +\$1,972,000 and 0 FTE from the 2007 President's Budget.

FBMS (+\$1,972,000/+0 FTE)

The 2008 budget request includes an increase of \$1.972 million for implementation of a Department-wide Financial and Business Management System (FBMS), to support the Bureau's share of the 2008 charge from the Centralized Billing Working Capital fund. Departmentwide, the 2008 budget includes \$40.4 million in appropriated funding for implementation of FBMS. The 2008 request supports implementation of new modules for property and initial budget formulation. Core financials and eGrants were implemented in the first bureaus in 2006, and the acquisition module is scheduled for 2007. The Department is implementing the system in phases by Bureaus, with the all bureaus scheduled to be implemented by the end of 2011. The 2008 request will support implementation of the new modules for the Office of Surface Mining and Minerals Management Service, and all modules for the Bureau of Land Management. The 2008 request represents the peak funding year for the project, as it involves the implementation of the remaining modules, and would allow the Department to retire eleven additional legacy systems.

The Departmentwide Programs budget justification includes additional materials supporting this Departmentwide request for FBMS under the Working Capital Fund.

Program Overview

Science Support funds the executive and managerial direction of the bureau, as well as bureau sustaining support services. Science Support has four components: leadership activities, the Office of Administrative Policy and Services, the Office of Human Capital and bureauwide costs.

Leadership — The Director serves as Chief Executive of the USGS with ultimate authority for all strategy, policy, and program decisions. This includes direct involvement in program, budget, finance, and communications development. The Deputy Director serves as Chief Operating Officer supporting the Director in implementing policy decisions, with a focus on operational issues.

The Executive Leadership Team is composed of 15 senior policy-level leaders of the bureau including the Director and Deputy Director. It identifies issues of interest and concern to the USGS enterprise and functions as a senior advisory body to the Director and as the principal mechanism for building a bureau-centered culture.

Associate Directors have oversight of national programs, establish program direction and goals, and serve as science advisors to the Director for their respective program areas. Regional Directors are responsible for meeting regional science and operational needs through integrated science centers and other means. The bureau uses regional science programs and integrated science centers as tools to effectively coordinate program activities in addressing regional issues.

The Office of Budget and Performance and the Office of Communications report to the Director and provide bureau-level advice and staff assistance to the Director and executive leadership. This advice includes bureauwide policy, guidance, and direction for:

- Budget formulation, execution, presentation, and advocacy with the Department, Office of Management and Budget, and Congressional Appropriations Committees,
- Strategic planning and performance management, and
- Communicating information about USGS research, programs, activities and products, and liaison and close coordination between USGS and the Congress, the Department, and other bureaus for congressional and public affairs matters.

Use of Cost and Performance Information

USGS managers receive quarterly reports, "Funding and Reimbursable Income Performance Results," that provide indicators of how well financial processes and procedures are working in each of the 171 USGS cost centers, and whether these practices are understood and followed. Currently there are 4 categories (Status of Budgetary Resources, Reimbursable Agreements, Status of Reimbursable Income, and Prompt Pay), with a total of 10 measures that are used to monitor different aspects of financial practices. Each measure receives one of three summary ratings: Good Performance, Fair Performance, or Needs Improvement. Performance analysis of cost centers, Regions, and the Bureau as a whole is distributed and discussed. Management actions are taken to improve the bureau performance.

The **Office of Administrative Policy and Services** provides bureau-level policy, program direction, and leadership for science support. These support services include accounting and

fiscal management; general services and office support; security; safety, environmental protection, and occupational health; contract negotiation and administration; grant administration; technology transfer, facilities and property management; and business information systems management. The Associate Director for Administrative Policy and Services, also serves as the USGS Chief Financial Officer (CFO).

The **Office of Human Capital** provides bureau-level leadership, program direction, and staff support for human capital programs, including equal employment opportunity, diversity and affirmative employment programs, personnel management policy and operations; employee development, competency management and technical, managerial and leadership training and development.

Bureauwide Costs — Bureau sustaining costs are budgeted centrally. The budget for these costs is formulated annually based on past actual expenses and an estimate of future need. Certain essential program support costs are relatively uncontrollable by the USGS and, because of the nature of organization and billing arrangements, are more effectively and efficiently managed centrally (e.g., payments to the Department of the Interior for services provided through the Departmental Working Capital Fund for departmentwide centralized services, payments to the Department's National Business Center (NBC) for administrative systems and automated data processing services provided through the NBC Working Capital Fund, and other costs, such as the Federal Lab Consortium and Flexibility Spending Account). Other bureau-level costs include payments to the Department of Labor for unemployment compensation and on-going injury compensation and human resources initiatives. The Science Support Activity also partners with other Interior bureaus and offices to provide shuttle service to and from the Main Interior Building to the Reston area.

FY 2008 Program Performance Estimates

The President's Management Agenda — Offices within the Science Support Activity manage and oversee bureauwide implementation of the President's Management Agenda initiatives that are part of ongoing departmentwide and governmentwide efforts to implement innovative Federal programs that promote improved financial management, competitive sourcing, strategic management of human capital, expanded electronic Government, management of assets, transportation, and energy use, environmental stewardship, and budget and performance integration. Highlights of USGS efforts in FY 2008 on these initiatives and other bureau-level policy, program direction, and leadership activities of USGS follow:

- **Financial Management Improvements** — The USGS continues to enhance performance, but was rated red for FY2006 due to a material weakness in noncompliance with OMB Circular A-133, Single Audit Act. The bureau has prepared an aggressive and comprehensive corrective plan that will return the USGS immediately to a "yellow" score. Additionally, the bureau is continuing to work with the Department and OMB to meet the "getting to green" requirements by demonstrating successful usage of management reports for decision making purposes in a given program. The USGS will demonstrate this with the many management reports available to manage the bureau's reimbursable program, which accounts for approximately 25 percent of the bureau's funds. During FY 2008, the bureau will refine our implementation of OMB Circular A-123 by standardizing the reviews and documentation of management control reviews conducted by regional centers. The bureau continued the process of two "hard close" accounts that was started in FY 2006, after the end of the 2nd and 3rd quarters; these

Science Support

activities allowed the bureau to closely examine the results and served to highlight problems that needed to be addressed. The USGS will also continue participation and implementation plans for transition to the Department's Financial and Business Management System (FBMS).

- **Strategic Management of Human Capital** — In FY 2008, the Office of Human Capital will continue focus on Organizational Performance. Research in FY 2006 and FY 2007 on the USGS Organizational Excellence Model provided a systemic way to understand the linkage between organizational dimensions (people, processes, structures, and leadership and management) and organizational performance. With this understanding of how these dimensions affect organizational performance, the Office of Human Capital will be addressing priority actions to increase performance by focusing on the most critical levers for success. The Office of Human Capital will continue to provide organization development consulting to assist in implementing strategic change and assess on-going organization performance at the bureau, regional and center levels. Analysis of major demographic and organizational trends as part of the dashboard measures developed in FY 2007, in addition to information gained from the Organizational Excellence research, will drive implementation of management strategies to help employees and managers deal with the impact of organizational change brought about by competitive sourcing, workforce adjustments and restructuring activities, and provide managers with concrete information on how to increase organizational performance at all levels of the USGS.

Lastly, a Human Capital focus in FY 2008 will be the assessment and evaluation of strategies and tools for workforce and succession planning including the use of the mentoring program as a succession planning tool. And, data from the competency management tool in the Exceed Module of the Learning Management System will be used to focus attention on mission critical occupation competencies and guide the development of strategic training and development plans in the USGS.

- **Leadership Development** — The USGS will continue to develop leadership skills and behaviors at all levels of the organization in FY 2008, through its internal leadership training program, championed and participated in by USGS senior executives and augmented by online performance support tools and external leadership development resources. During FY 2008, the USGS will maintain its current program and longitudinal evaluation of that program, focus on identifying gaps in the leadership development pipeline, and experiment with additional training, coaching, or other performance support mechanisms to close those gaps.
- **Competency Management** — In FY2007 and FY 2008, the USGS will be placing major emphasis on ensuring that the USGS is using competencies in the management of human capital operations.
 - **Mission Critical Competency Management** — In FY 2007, the USGS will reformat mission critical occupations competencies for loading into DOI Learn competency module with plans to make them available for assessment by the end of FY 2007. In addition, the USGS will work with DOI Learn team members to refine information reporting capabilities, link identified skill needs to course listings and (or) other developmental opportunities, and help managers use this information to strategically plan for the use of training and development dollars for high priority skill development needs.

- **Core Competencies for Managers** — The USGS will use the Core Competencies for Managers Model to develop structured interview questions and input to the On-line Recruitment System for hiring into supervisory and managerial positions, use assessment of supervisory and managerial competencies to set priorities for supervisory and managerial training and development to increase supervisory and managerial performance at all levels.
- **Partnership and Collaboration Competencies** — In FY2007, the USGS will support performance in partnership and collaboration competencies by providing a workshop on collaboration and partnering for business and science leaders and by developing and supporting a community of practice on partnering and collaboration to provide on-going support for development of these critical competencies.
- **Core Competencies for Safety and Health** — The USGS has developed safety and health core competencies required by full time professionals and collateral-duty personnel at all grade levels. This initiative included identification of the basic tasks of the positions, development of reference manuals that provided guidance on safety and health roles and responsibilities, template position documents, and individual development plan guidance. USGS efforts have resulted in the departmentwide adoption of this core competencies guidebook. USGS safety training and policy documents will be updated in FY 2007 to reflect these guidelines and subsequently posted for employee access on the internal safety Web site.
- **Tools for Managers** — In FY 2007, the USGS will support managers in the use of on-line tools provided through DOI Learn to assess skills and workforce competencies; to develop succession strategies, to prioritize and deliver training, and development; and to develop technology enabled learning to meet high priority dispersed training needs.
- **Workforce Diversity** — Improving workforce diversity is a priority for the USGS and a significant workforce planning issue. During FY 2008 the USGS will continue implementation strategies to comply with the requirements of the Equal Employment Opportunity Commission's (EEOC) Management Directive (MD)–715, particularly with regard to the identification of barriers that prevent the accomplishment of diversity and affirmative employment goals. The USGS will use new, real-time reporting tools that will assist Human Resource (HR) and line managers with identifying demographic trends and recruitment opportunities. The USGS will use the USGS Diversity Council to help identify barriers to diversity and recommend solutions to management. The USGS will direct its recruitment efforts to provide our regions with additional fiscal resources to establish relationships with local colleges and universities with majors in the USGS programs and with high enrollments of minority students. The USGS will continue implementing the Department's Workforce Diversity Plan and focus on goals measured by outcomes in recruitment, retention, zero tolerance and accountability.
- **Competitive Sourcing** — In FY 2008, USGS will implement the recommendations of Business Strategy Reviews (BSR) conducted on Information Technology and Science, accounting for approximately 50 percent of total full time equivalents (FTE) on the USGS FAIR Act Inventory. Funds will be required for external expertise for these reviews and studies. FTE resources are required to implement and manage the USGS Competitive Sourcing Initiative, including the oversight of contractor support, development of Competitive Sourcing Plans and management of the FAIR Act inventory collection process. Under the Competitive Sourcing mandate, implemented through the OMB

Science Support

Circular A-76, Federal agencies are required to review commercial functions performed by Federal employees.

USGS continues to complete business strategy review (BSR) efforts on business areas as defined in the Competitive Sourcing Green Plan FY 2005–FY 2008 that has been coordinated and approved by the Department. In FY 2007, USGS will conduct BSRs on Information Technology and Science. Studies of both the National Water Quality Lab and geospatial data production functions in the National Geospatial Technical Operations Center (NGTOC) will be completed in FY 2007. In FY 2006, USGS completed BSRs on the Library and Information Services and Administrative Management business areas, totaling more than 1,700 FTE.

- **Workforce Adjustments** — In FY 2007, the USGS will continue its workforce planning efforts to assess the impacts of competitive sourcing initiatives, Voluntary Early Retirement Authority/Voluntary Separation Incentive Payments (VERA/VSIP), and other workforce strategies that will shift the numbers and balance of USGS employees and skills. These efforts will include the pursuit of additional authorities for VERA/VSIP from OPM and OMB, in addition to updating the Bureau workforce plan, incorporating succession planning as required by recent OPM regulations.
- **Budget and Performance Integration** — A comprehensive system of program evaluations executed through a 5-year program review schedule, National Research Council reviews, the Administration's Program Assessment Rating Tool (PART) evaluations, and Organizational Assessments are all fundamental to an integrated program- and budget-planning process that ensures that the management of programs and funding is handled appropriately and uniformly at local, regional, and national levels. In FY 2007, the USGS will complete development and implement use of a database that contains all USGS commitments including GPRA; PART; Secretary's MBO; congressional directives; OMB directives and internal controls. Collectively, these represent the Bureau's overall organizational commitments and the database will enable us to better develop individual performance plans that are aligned with organizational commitments and easily cascaded into the bureau as well as facilitate completion of a robust Organizational Assessment for FY 2007. For the FY 2008 Budget process, USGS documented full cost of achieving performance goals, demonstrated the costing relationship of intermediate and outcome measures, and cited marginal cost and incremental performance in program initiative funding requests.

The USGS Director's Assurance Statement, Internal (Management) Control Reviews and Audit Follow-Up, continue to lead the Department in scope, thoroughness, and documentation. The USGS continues to implement the Department's Strategic Plan as an integrating framework for budget and performance. Specific measures tied to departmental priorities are used in SES performance plans and are cascaded to all employees. USGS implements Activity Based Costing/Management (ABC/M) objectives, through a distributed planning and budgeting system that uses ABC/M data and interfaces with the financial system to provide budget and program managers financial information to support the development of annual budgets. Capturing cost of work will help USGS better document the basis for cost-share projects, assessment, and cost recovery.

- **Asset Management** — As measured in the PMA Scorecard for Real Property, improving policy and guidance and updating planning is significant for providing the

management processes, tools, concepts, and context for improving asset management and setting the foundation to realize results. To achieve this outcome, in FY 2008 the USGS is updating the bureau Asset Management Plan to align it with the regional and science center Site Specific Asset Business Plans that were completed in FY 2007, and is conducting formal reviews of other Asset Management policy and guidance. These policy documents are being updated and supplemental guidance is provided as necessary. To assist managers in making informed investment decisions, the bureau is establishing targets for improving performance of our assets and will incorporate these into the bureau Asset Management Plan. A key performance measure will be the reduction of unneeded assets.

- **Transportation Management** — USGS will continue to work towards meeting the transportation management goals outlined by the PMA Scorecard for Transportation Management, which includes goals for meeting the requirements of E.O. 13149. Information obtained from the FY 2007 Fleet Inventory and Utilization Data Validation effort will be utilized to conduct an assessment and provide recommendations to optimize the placement of vehicles to increase vehicle sharing and the use of alternative fuels. The USGS will work to implement the long term goals of the Fleet Management Strategic Plan. A Fleet Acquisition and Replacement Plan will be implemented as a strategy for acquiring higher fuel economy vehicles.
- **Energy Management** — USGS will continue to work to achieve the goals of the Energy Policy Act of 2005 (EPA 2005), as measured by the PMA Scorecard for Energy Management. USGS will sustain the current reduction of 15 percent in energy intensity at all facilities compared with the FY2003 baseline established by EPA 2005. This reduction exceeds the target of a 6 percent reduction in energy consumption by the end of FY 2008. To the extent practical and technically feasible, the USGS will seek to obtain a minimum of 2.5 percent of our electricity from renewable sources. The USGS continues a quarterly review of the advance metering implementation plan. To ensure that advance metering is installed at all facilities where it's feasible, the USGS will continue to update the plan.
- **Environmental Management** — USGS will continue to work to achieve the goals of the environmental management scorecard and the new executive order (EO) expected to be finalized in FY 2007. We expect new guidance from EPA and the Office of the Federal Environmental Executive (OFEE) that will present USGS with implementation challenges. We expect the goals and reporting requirements to be more stringent and more difficult to achieve at current resource levels. However, USGS will make every effort to meet the new requirements and maintain the green scorecard rating.

USGS will implement mission-focused environmental management systems at appropriate organizational levels by FY 2009 and use these tools to support attaining our strategic goals by FY 2012. We will systematically manage environmental risks while minimizing cost, improve performance and enhance cooperation with our many stakeholders, partners and the public. We will work to spread best business practices across the Department, advancing the President's Management Agenda.

- **Technology Transfer** — The Federal Technology Transfer Act, 15 USC 3710 as amended, requires each Federal laboratory having 200 or more full-time scientific, engineering and related technical positions to establish a research and technology

Science Support

application function. Within USGS this function is housed in the Office of Policy and Analysis where two FTE's service USGS Science Centers and offices throughout the country.

As part of their duties the team negotiates and drafts Cooperative Research and Development Agreements (CRADAs); Technical Assistance Agreements, Facility Use Agreements, and Patent Licenses. It also manages the USGS intellectual property and inventions program; markets USGS technology opportunities and assistance to industry, non-profits, academic institutions, and State agencies; and provides training to USGS personnel on technology transfer and intellectual property protection. USGS has a total of 46 current patents. During FY 2006, the U.S. Patent and Trademark Office accepted filings for 2 new USGS patents and issued 3 patents to USGS. The table below summarizes the number of completed projects in FY 2006. The 61 agreements completed in FY 2006 represent a 48 percent increase over the number of agreements concluded in FY 2005.

(Dollars in thousands)

Technology Transfer FY 2006	Total Number	Private/Small Businesses	Non-Profits / Academic Institutions	Government/ International Entities	Partner Contributions	USGS In-Kind Contribution
CRADAs	14	7 / 4	2 / 0	0 / 1	\$1,407	\$509
Other Agreements	47	16 / 10	7 / 11	2 / 1	\$1,699	\$565
Patent Licenses	15	0 / 13	0 / 2	0 / 0	\$50	\$0

USGS science and research contributes to a broad range of collaborative projects in the private and academic sector. Highlights of FY 2006 include the establishment of a CRADA with the Consortium of Universities for the Advancement of Hydrological Sciences (CUASHI), a non-profit corporation. This CRADA will support a variety of efforts to expand inter-disciplinary research that connects climate, earth and life sciences and links them to health and society. Additionally, there are several new technical projects aimed at developing additional analytical and modeling tools for capturing seismic information and integrating existing USGS mineral and geologic data sets that will be used to support federal and local infrastructure decision making.

Performance Overview

The Science Support Activity promotes the orderly and efficient conduct of USGS programs through organizational leadership, shared administrative support services, and promotion of common business practices. This activity supports the Department's management excellence goal. Key indications of USGS performance are reflected in the end outcome goals for increasing accountability, and advancing modernization/integration. To measure progress in achieving the intermediate outcome goals of improving financial management, human capital management, organizational reviews and acquisition, USGS tracks intermediate measures such as obtain unqualified audit, percent of material weaknesses and material non-compliance issues that are corrected on schedule, number of MD-715 identified deficiencies that have been corrected, number of employees trained in collaboration and partnering competencies, and the number of full time equivalent (FTE) in competitive sourcing studies completed during the fiscal year.

End Outcome Goal: 5.1: Management Excellence: Increase Accountability

End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007Plan to 2008	Long-term Target 2012
GPRA End Outcome Measures									
Obtain unqualified audit (SP)	Unqualified Opinion	Unqualified Opinion	Unqualified Opinion	Unqualified Opinion	Unqualified Opinion	Unqualified Opinion	Unqualified Opinion	0	Unqualified Opinion
Intermediate Outcome Measures and Bureau and PART Outcome Measures									
Improved Financial Management									
Corrective actions: Percent of material weaknesses and material non-compliance issues that are corrected on schedule (SP)	UNK	UNK	100%	100%	100%	100%	100%	0	100%

End Outcome Goal: 5.2: Management Excellence: Advance Modernization/Integration

Intermediate Outcome Measures and Bureau and PART Outcome Measures									
Human Capital Management									
<i>Diversity</i> : The # of MD-715 identified deficiencies that have been corrected (SP)	UNK	UNK	UNK	UNK	UNK	2	3	+1	TBD (Establish baseline in FY 2007)
<i>Cooperative Conservation Internal Capacity</i> : # of employees trained in collaboration and partnering competencies (SP)	UNK	UNK	UNK	UNK	UNK	150 FTE	200 FTE	+50	400 FTE
Intermediate Outcome Measures and Bureau and PART Outcome Measures									
Organizational Reviews and Acquisitions									
<i>Competition</i> : Number of full time equivalent (FTE) in competitive sourcing studies completed during the fiscal year (SP)	0 FTE	0 FTE	70 FTE	70FTE	524 FTE	512 FTE	TBD (Unknown until Business Strategy Reviews complete.)	NA	TBD (Unknown until Business Strategy Reviews complete.)

This page intentionally left blank.

Facilities

	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Rental Payments	71,805	72,388	+1,240	0	73,628	+1,240
<i>FTE</i>	0	0	0	0	0	0
Operations and Maintenance	19,604	19,711	+191	0	19,902	+191
<i>FTE</i>	54	54	0	0	54	0
Deferred Maintenance & Capital Improvement	3,373	3,373	0	+4,650	8,023	+4,650
<i>FTE</i>	1	1	0	0	1	0
Total Requirements (\$000)	94,782	95,472	+1,431	+4,650	101,553	+6,081
Total FTE	55	55	0	0	55	0
Impact of the CR		[-2,593]		[+2,593]		[+2,593]

Impact of the CR

(+\$2,593,000)

The 2008 budget restores the priorities of the 2007 President's budget by funding 2007 programmed fixed cost increases, and implementing the program enhancement and program reduction initiatives included in the 2007 President's budget.

Activity Summary

The 2008 budget request for the Facilities Activity is \$101,553,000 which is a net change of +\$6,081,000 and 0 FTE from the 2007 President's Budget. Additional information on program change is provided in the Deferred Maintenance Capital Improvement subactivity section.

Funds for this activity provide safe and functional workspace and facilities for accomplishing the bureau's scientific mission. The appropriated funds included in this activity cover approximately 80 percent of recurring USGS facilities costs. Customers, through reimbursable funding provide approximately 14 percent, and USGS science programs provide the remaining funds.

This activity supports the Department of Interior's Management Excellence goal of Advance Modernization/Integration through the intermediate outcome goal of Facilities Improvement. This activity tracks outcomes such as;

Use of Cost and Performance Information

The Bureau developed its Asset Management Plan (AMP), summarizing the Bureau's current asset inventory, documenting the condition of the inventory, and articulates the Bureau's strategy and plan for improving the management and condition of the Bureau's asset inventory. The AMP also describes the Bureau's strategy and process for managing the total cost of asset ownership and serves as a framework to guide asset investment decisions, including operations, preventive maintenance, component renewal, repair and construction.

The USGS also developed a 5- year Space Management Plan (SMP), supporting the Bureau's AMP and Asset Business Plans (ABP). The SMP provides a framework, strategic vision, and plan of action for effective bureau space management of GSA provided space, USGS direct leases, and owned property. The plan is used by USGS management to implement bureau space goals, including consolidation, collocation, and disposal. Information contained in this document is focused on mission dependency and program requirements for space.

Facilities

overall condition of building and structures; percent change in the operating costs per square foot of building that are “not-mission dependent” as reported in Federal Real Property Profile (FRPP) in the current fiscal year compared to the previous fiscal year; percent change in the total number of building reported as “under utilized” or “not utilized” in the FRPP; and the percent of assets targeted for disposal that were disposed. This activity also tracks outputs including "number of bureau condition assessments completed" (within a 5-year cycle), "number of deferred maintenance and capital improvements, and new Capital Improvement Projects."

The USGS defines facilities as separate and individual buildings, structures, or other constructed real property improvements. The USGS further defines facilities to include all locations where USGS activities are conducted including office space, laboratory space, warehouse space, and related parking and common space. The USGS has classified large (greater than 45 feet in length) research vessels as facilities.

The goal for the facilities program is to meet bureau science needs while optimizing facilities location, distribution, and use to control or reduce costs. Objectives for meeting this goal include:

- Coordinate facility planning with science planning to provide safe, high-quality workspace aligned with science needs,
- Meet performance targets by improving space utilization, controlling rent and operating costs, and releasing unneeded space,
- Eliminate the deferred maintenance backlog,
- Establish an effective maintenance program at each owned facility to meet industry best practices, and
- Increase co-location consistent with science program objectives.

Facility Planning — The Bureau completed Site-Specific Asset Business Plans (ABP) to further support the Bureau’s Asset Management Plan (AMP). The ABP’s are 5 to 10 year plans addressing specific needs of a field unit, campus, or region covering all assets reported in the Federal Real Property Profile (FRPP).

Bureau Systems — This activity utilizes a Web-based facilities information system which continues to streamline the budget data collection process for facilities and increases the availability of much-needed management information on bureau real property holdings. Comprehensive facility condition assessments continue to identify deficiencies that need priority attention, creating an information base that promotes effective stewardship and a more informed asset investment process. The implementation of Interior’s standard facilities maintenance management system provides the capability for the USGS to report our operations and maintenance consistently across the bureau.

Maintaining America's Heritage — The Department of Interior is committed to preserving and maintaining operational facilities and major equipment investments as well as to responsible stewardship of Interior’s managed natural and cultural treasures. The FY 2007 USGS budget request includes \$38 million for facilities and equipment maintenance and deferred maintenance under the Maintaining America’s Heritage initiative. The Operations and Maintenance and the Deferred Maintenance and Capital Improvements subactivity descriptions provide details on the

immediate and long-term maintenance projects underway and planned for the next 5 years to ensure that facilities and equipment are functional, safe, and useful to the fullest extent of their lifecycle.

Congressional Directives

The FY 2006 Appropriations Act for the Department of the Interior and Related Agencies included the following directive for the USGS Facilities program:

"The Senate Appropriations Committee remains concerned about reported poor and unsafe conditions in the research facilities and office buildings at the Patuxent Wildlife Research Center and Patuxent Research Refuge. The Committee expects the Secretary of the Interior to complete a facilities and budget plan by not later than March 1, 2006, which identifies the priorities, schedule, funding requirements, phasing options and agencies responsible for the repair, rehabilitation or replacement of facilities, buildings and associated infrastructure at the Center and Refuge."

USGS continues to work collaboratively with FWS to address the facilities issues at the Patuxent Wildlife Research Center (PWRC). Both bureaus are working together to review options involving new construction rehabilitation of existing facilities, GSA leases, or new construction and relocation.

A complete set of options is expected to be submitted for Departmental review in the second quarter FY 2007. This budget request includes a program increase of \$4.6 million in the Deferred Maintenance and Capital Improvement subactivity for improvements to the utility infrastructure. That, together with FWS requests of \$1.9 million in FY 2007 and \$5 million in FY 2008, will allow the USGS/FWS to complete the upgrade of the utility infrastructure throughout the Refuge.

Workforce Planning

The USGS is working hard to change skill sets to keep pace with changing customer needs, anticipated level budgets, and reduced reimbursable income. The bureau is using creative solutions for rapid changes in technology and workforce flexibility through the use of contractors and term appointments. In some cases, funding freed from salary load will be used to invest in partnerships through grants. However, in some cases the nature of the work requires the use of government employees.

Subactivity Overview

The Facilities Activity comprises three subactivities:

The **Rental Payments** subactivity provides for rental payments to the General Services Administration (GSA), to other Federal agencies, to private lessors, and to cooperators for space holdings nationwide. The USGS occupies a total of 4.3 million square feet of rentable space in about 190 GSA buildings nationwide, making USGS one of the largest users of GSA space within the Department. The USGS acquires space directly at over 100 other sites.

Facilities

The **Operations and Maintenance** subactivity includes the recurring costs of providing for the basic operations and upkeep of facilities and ensuring that they are maintained in compliance with applicable safety and other standards. The USGS has 34 owned installations with 283 owned buildings on approximately 2,100 acres. This includes 9 biological science centers, 8 biological field and research stations, the National Center for Earth Resources Observation Systems (EROS), 9 geomagnetic, seismic and volcano observatories, and 7 other miscellaneous owned properties, such as gauging stations, storage annex, and warehouses. The USGS also owns 8 large research vessels.

The **Deferred Maintenance and Capital Improvement** subactivity funds are used to address the highest priority USGS facility and equipment needs to conform to safety and environmental standards. The current funding level provides for approximately 4.8 percent of the facilities Deferred Maintenance backlog; this includes the one-time program increase of \$4.6 million for the Patuxent Wildlife Research Center. The condition assessment program includes annual surveys and a cyclic process for comprehensive onsite inspections to document deferred maintenance.

Activity: Facilities

Subactivity: Rental Payments

	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Rental Payments (\$000)	71,805	72,388	+1,240	0	73,628	+1,240
<i>Total FTE</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>

Program Overview

The 2008 budget request for the Rental Payments is \$73,628,000 and 0 FTE. The USGS proposes no program changes for this program.

The Rental Payments component of the Facilities Activity funds payments to General Services Administration (GSA), other Federal sources, private lessors, and cooperators for space occupied by the USGS nationwide. The USGS occupies a total of 4.3 million square feet of rentable space in about 190 GSA buildings nationwide, making USGS one of the largest users of GSA space within the Department. The USGS acquires space directly at over 100 other sites. This component funds 80 percent of the appropriated portion of the rental payments. Remaining costs are funded from reimbursables and USGS programs. The USGS has unique facility requirements necessary to support science functions and relies heavily on GSA to meet needs such as providing modern laboratory and other support space. Approximately 90 percent of USGS rental costs for space holdings provided through GSA, 7 percent for cooperative space arrangements, and the remaining rental costs are for other Federal agencies and private lessors.

Use of the USGS Investment Review Board (IRB) — The USGS Investment Review Board reviews major information technology investments. The IRB is chaired by the Deputy Director and is composed of senior managers, including a science discipline Associate Director, a Regional Director, the Geographic Information Officer, Budget Officer, and Chief Financial Officer. In addition to proposed construction investments with a life cycle cost of \$2 million or more, the IRB reviews all space transactions (occupancy agreements, leases, etc.) with a life cycle cost of \$5 million or more. Regional boards review transactions below this threshold.

Business case analysis (BCA) is the bureau's primary review mechanism. With the completion of the draft Strategic Facilities Master Plan, the USGS has established a standard BCA template for bureau-wide use. This template allows all projects presented to the IRB to be reviewed in a consistent manner.

2008 Program Performance

The Rental Payments subactivity provides for rental payments to the General Services Administration (GSA), to other Federal agencies, to private lessors, and to cooperators for space holdings nationwide. The USGS occupies a total of 4.3 million square feet of rentable space in about 190 GSA buildings nationwide, making USGS one of the largest users of GSA space within the Department. Approximately 90 percent of USGS rental costs for space holdings are provided through GSA, 7 percent for cooperative space arrangements, and the remaining rental costs are for other Federal agencies and private lessors.

Space Savings — The Florida Integrated Science Center at Fort Lauderdale continues its planning with NOVA Southeastern University for permanent space on the campus. Current planning calls for a relocation of the Center from its temporary space in later summer 2008.

Program Performance Change — Though the program contributes to the strategic goals of Management Excellence, Advance Modernization/Integration, there are no performance measures specifically linked to this program change.

Activity: Facilities

Subactivity: Operations and Maintenance

	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Operations and Maintenance (\$000)	19,604	19,711	+191	0	19,902	+191
<i>Total FTE</i>	<i>54</i>	<i>54</i>	<i>0</i>	<i>0</i>	<i>54</i>	<i>0</i>

Program Overview

The FY 2008 budget request for the Operations and Maintenance Program is \$19,902,000 and 54 FTE. The USGS proposes no program changes for this program.

The **Operations and Maintenance** subactivity includes the recurring costs of providing for the basic operations and upkeep of facilities and ensuring they are maintained in compliance with applicable safety and other standards. The USGS has 34 owned installations with 283 owned buildings on approximately 2,100 acres. This includes 9 biological science centers, 8 biological field and research stations, the National Center for Earth Resources Observation Systems (EROS), 9 geomagnetic, seismic and volcano observatories, and 7 other miscellaneous owned properties, such as gauging stations, storage annex, and warehouses. The USGS also owns 8 large research vessels.

Use of Cost and Performance Information

The bureau's Facility Energy Program supports the USGS mission by providing leadership, information, support, data analysis, and access to resources to assist in the economical and environmentally sound purchase, use, storage, and control of the energy and water resources at all USGS installations. The Energy Policy Act 2005 established FY 2003 as the new baseline year for measuring energy consumption. USGS current energy consumption is 15% below the new FY 2003 baseline well ahead of the goal scheduled to reach 20% reduction by 2015. To improve the accuracy and consistency of our energy cost and consumption data, the USGS is expanding to bureau-wide our current utility bill analysis contract. This contract provides us detailed energy information via a web-based database. Through the efficient management of energy, the USGS reduces the impact facilities have on the environment. These practices promote responsible use, ensure optimal value, improve operational efficiencies, set a good example for the public, and ensure energy expenditures are optimized.

The Facilities Operations and Maintenance subactivity funds the routine, daily work necessary for the basic operation and upkeep of USGS-owned facilities to ensure that facilities are in compliance with Federal, State, and local standards and to ensure that facilities remain safe for USGS employees working at the facilities, as well as partners and customers visiting the facilities. This subactivity funds the operations and maintenance costs associated with appropriated work. The cost related to reimbursable activities is recovered from reimbursable customers and a small portion is paid by USGS programs. Operations and maintenance functions include ongoing facility support that sustains day-to-day USGS scientific activities at 34 owned installations ranging from major science centers with complex facilities

Facilities

such as laboratories and chemical storage buildings to smaller facilities such as research stations, research vessels, geomagnetic and seismological observatories, and warehouses.

This subactivity provides routine operation and maintenance of large vessels. Large research vessels have characteristics, costs, and operations and maintenance features that coincide with those of USGS facilities. These vessels are mobile installations, meeting the criteria for the Comprehensive Condition Assessment. Vessels must exceed 45 feet in length and perform overnight field research to be classified as facilities. There are currently eight large vessels that support biology research, water resources investigations, and marine geology research; five on the Great Lakes, two in California, and one in Alaska.

Operations of facilities include activities related to costs such as utilities for owned facilities, as well as all utility costs not included in rent:

- Electricity, water, and sewage,
- Fuel: gasoline, propane (vehicles, vessels, and heating), natural gas, diesel, and oil (heating),
- Janitorial services: window cleaning and carpet cleaning,
- Upkeep of grounds: grass mowing, snowplowing, and grounds irrigation,
- Waste management/disposal: refuse collection and sewage effluent pumping,
- Vehicles: tractors and trucks solely operated in direct support of operating the facility (includes rented vehicles, vehicles and owned and leased from GSA),
- Vessels: safe and effective operations and maintenance, apply upkeep standards necessary to realize the anticipated useful life of the fixed asset, provide for salaries and benefits of marine professionals operating the vessel, fuel, docking fees, inspections, minor repairs, cyclic maintenance, and at least one vessel haulout a year, and
- Annual certification for facility systems, such as fire systems, fire extinguishers, back flow preventers, and fume hoods.

Maintenance of facilities involves the upkeep of constructed USGS-owned facilities and structures and capitalized equipment necessary to maintain the useful life of the asset, including preventive maintenance; cyclic maintenance; repairs; rehabilitation; replacement of parts, components, or items of equipment associated with the facility; adjustment, lubrication, and cleaning (non-janitorial) of equipment associated with the facility; periodic inspection; painting; re-roofing; resurfacing; special safety inspections and other actions to assure continuing service and to prevent breakdown; scheduled servicing (such as heating, ventilation, and air conditioning equipment); and maintenance for owned facility-related vehicles.

Salary costs associated with staff that performs operations and maintenance activities are included. USGS staff that perform operations and maintenance are located at the facility they are operating and maintaining. These are primarily USGS-owned facilities, but also include GSA-owned facilities for which GSA has delegated operations and maintenance authority to the USGS (e.g., the National Center) and facilities owned by other agencies or organizations for which the USGS has agreed to cover operations and maintenance expenses in exchange for use of the space (e.g., Patuxent). Staff at these facilities are responsible for the day-to-day operations of the facility and for maintaining it in operating order. This includes such operations

as janitorial services, landscaping, snow removal, operation of the heating and air conditioning system, plumbing, electrical, elevator operations, fire alarm systems, fume hood operations, storage, and removal of hazardous materials, etc. Depending upon the location, some of these functions are carried out by government employees and some via contract.

Staff associated with operations and maintenance program management at the regions and headquarters are funded by the Science Support Activity. Bureau policy for facilities operation and maintenance is established at headquarters. Staff at the regional and headquarters level who perform operations and maintenance program management establish standards for operations and maintenance, develop and implement plans for bureauwide systems (e.g., MAXIMO), develop deferred maintenance plans, develop contracts for Operation and Maintenance services, formulate regional and bureauwide operation and maintenance budgets, respond to departmental and OMB reporting requirements, etc.

Program Performance Change — Though the program contributes to the strategic goals of Management Excellence, Advance Modernization/Integration, there are no performance measures specifically linked to this program change.

2008 Program Performance

Maintenance Management System — The USGS Facilities Maintenance Management System (FMMS) will upgrade from MAXIMO v5.2 to the latest version of MAXIMO, v6.0. This upgrade will meet the Department of Interior's requirement for a Single Platform Maximo (SPM). The next step will be to install condition assessments data into FMMS.

Energy Management — USGS will continue to work to achieve the goals of the Energy Policy Act of 2005 (EPAAct 2005), as measured by the President's Management Agenda (PMA) Scorecard for Energy Management. USGS will sustain the current reduction of 15 percent in energy intensity at all facilities compared with the FY 2003 baseline established by EPAAct 2005. This reduction exceeds the target of a 6 percent reduction in energy consumption by the end of FY 2008. To the extent practical and technically feasible, the USGS will seek to obtain a minimum of 2.5 percent of our electricity from renewable sources. The USGS continues a quarterly review of the advance metering implementation plan. To ensure that advance metering is installed at all facilities where it's feasible, the USGS will continue to update the plan.

This page intentionally left blank

Activity: Facilities

Subactivity: Deferred Maintenance and Capital Improvement

	2006 Actual	2007 CR	2008			Change From 2007 (+/-)
			Fixed Costs & Related Changes (+/-)	Program Changes (+/-)	Budget Request	
Deferred Maintenance & Capital Improvement (\$000)	3,373	3,373	0	+4,650	8,023	+4,650
<i>Total FTE</i>	<i>1</i>	<i>1</i>	<i>0</i>	<i>0</i>	<i>1</i>	<i>0</i>

Summary of 2008 Program Changes for Deferred Maintenance & Capital Improvement

Request Component	(\$000)	FTE
<ul style="list-style-type: none"> Deferred Maintenance & Capital Improvement Patuxent Wildlife Research Center Facilities Improvement 	+4,650	0
TOTAL Program Change	+4,650	0

Justification of 2008 Program Change

The 2008 budget request for the Deferred Maintenance and Capital Improvements Program is \$8,023,000 and 0 FTE, a net program change of +\$4,650,000 and 0 FTE from the 2007 President's Request.

Patuxent Wildlife Research Center Facilities Improvement (+\$4,650,000 / 0 FTE)

The 2008 budget proposes to increase the Deferred Maintenance & Capital Improvement Subactivity by \$4,650,000. USGS and the FWS are jointly proposing to fund, on a roughly equal basis, critical utility infrastructure replacement for their collocated facilities on the Patuxent Research Refuge, Laurel, MD.

The Patuxent Wildlife Research Center (PWRC), located between Baltimore and Washington, D.C., has been in operation since 1936. Prior to the creation of the National Biological Survey (NBS) in 1993, the PWRC and the Patuxent Research Refuge (PRR) were within the Fish and Wildlife Service (FWS). During the existence of the NBS, the PWRC and PRR remained closely aligned. After the transfer of the NBS to the U.S. Geological Survey (USGS) in 1996, the Bureaus agreed in a Memorandum of Agreement to institutionalize their joint commitment to maintain the science and management partnership by building upon their collocation.

Facilities

This proposal responds to language in House Appropriations Committee Report for 2006:

“...The Committee remains concerned about reported poor and unsafe conditions in the research facilities and office buildings at the Patuxent Wildlife Research Center and Patuxent Research Refuge. In the conference report to accompany the fiscal 2004 Interior Appropriations bill (H. Rept. 108-330) and in the Senate report to accompany the fiscal 2005 bill (S. Rept. 108-341), the Committee underscored its expectation that the Fish and Wildlife Service and the U.S. Geological Survey develop a plan and budget for the rehabilitation or replacement of facilities and resolve any jurisdictional issues between the agencies....”

Even prior to the alignment of the research function within the NBS, the deteriorating condition of the facilities was well known. One structure at PRR is over 200 years old, most of the occupied buildings on the site are more than 60 years old, and even the more modern exceed 20 years, creating a significant maintenance challenge.

The facilities issues at Patuxent are significantly more complex than those at other refuges and/or research centers largely as the result of the age of the facilities, the co-located functions, and their separate but interrelated needs. Facility issues facing the USGS and FWS include extensive deferred maintenance, inadequate quarters for temporary staff, unsafe office and laboratory conditions, deteriorating and outdated utilities infrastructure, the need to rehabilitate old structures to meet current safety and health codes, and assure compliance with the applicable State of Maryland historic preservation laws (PRR facilities encompass multiple historic districts), and highly specific requirements to allow continuation of wild animal and endangered species research.

These issues have impacted PWRC science activities. Instances of both loss of power and loss of water supply have necessitated closure of the PWRC facilities on multiple occasions. Continued deterioration of the infrastructure is likely to jeopardize future science efforts due to the otherwise unavoidable need to redirect funds away from science activities to address critical repairs. Additionally, animal care standards must be maintained and the deterioration of facilities potentially jeopardizes the care and safety of several colonies of experimental birds that are managed onsite. Addressing these pressing issues is as challenging as any facilities issue in the Department of the Interior.

Comprehensive condition assessments completed by architecture and engineering firms confirm the current state of decline at these facilities. The Department has established the Facility Condition Index (FCI) as an asset management performance metric. The FCI uses the ratio of deferred maintenance to the current replacement value to quantify condition. On a scale between 0 and 1.0, USGS facilities at Patuxent have a composite FCI rating of 0.49. Based on DOI Asset Management Partnership criteria that will go into affect in 2007, an FCI rating above 0.15 indicates the condition of the facility as poor. Previously, facilities with an FCI rating near 0.5 were recommended for replacement.

Shortly after the realignment of the PWRC with USGS, regional managers in both agencies initiated a joint working group that included on-site participants from both PRR and PWRC to identify needs and compile funding estimates to address a core set of issues that are essential to both agencies.

As a result of a directive included in the 2006 House Appropriations Committee Report, USGS and FWS are developing options to address the facilities and infrastructure issues at the PWRC and the PRR.

Deferred Maintenance and Capital Improvement

Regardless of the longer-term solution chosen, a set of infrastructure upgrades needs to be undertaken in the near term. Sound water supply, wastewater treatment and electrical infrastructure, preferably maintained by the local utility companies, are critical components required to ensure the safe and effective operation of DOI activities at Patuxent, and are integral to both effective reuse of existing structures and all options for new construction which may be part of the longer term improvements at PRR. The 2008 request addresses some of these needs as part of the initial phases of the asset management plan for the PWRC and the PRR.

Despite the maintenance and upkeep that has taken place over the years, the water, sewer, and electrical utilities have completed most of their useable, expected life span. The \$4,650,000 requested for USGS, in combination with \$5,000,000 requested by FWS in 2008 will be used to replace and repair the PRR/PWRC water, sewer, and electrical utility infrastructure and associated sub-systems. This combined funding level would allow replacement of the water and sewer infrastructure for the PRR Central Tract for both USGS and FWS, including connection of public water supply and sewer lines to the Central Tract facilities, the correction of utility deficiencies for the Animal Research areas, (e.g., wells, supply lines, septic fields, storm water drainage) would also be applied to replacement of electrical service lines and related subsystems for both areas.

Program Performance Change

	2004 Actual	2005 Actual	2006 Actual	2007 President's Budget	2008 Base Budget (2007 PB +Fixed Costs)	2008 Plan	Program Change Accruing in 2008	Program Change Accruing In Outyears
					A	B=A+C	C	D
New Capital Improvements Facilities	0	0	0	0	0	1	+1	0
Total Projected Cost	0	0	0	0	0	1	+1	0
Projected cost per capital improvement project	0	0	0	0	0	1	+1	0
Comments	This proposal responds to language in House Appropriations Committee Report for 2006 to support a Joint Capital Improvement Project with Fish and Wildlife Service. This cost represents a portion of the \$5.8 M USGS share of funding needed to connect to public utilities for water, sewer, and electricity.							

Program Overview

The Deferred Maintenance and Capital Improvement subactivity funds are used to address the highest priority USGS facility and equipment needs to conform to safety and environmental standards. The current funding level provides for approximately 4.8 percent of the facilities Deferred Maintenance backlog; this includes the one-time program increase of \$4,650,000 for the Patuxent Wildlife Research Center. The condition assessment program includes annual surveys and a cyclic process for comprehensive onsite inspections to document deferred maintenance.

The USGS is committed to the continual improvement of the stewardship of our assets. The primary goal of our program is to support Management Excellence for the USGS mission delivered through Interior's Resource Protection, Resource Use, and Serving Communities mission areas providing a safe, comfortable, environment for the employee, visitors and contractors at USGS facilities. Improving the maintenance of existing facilities and equipment ensures the health and safety of the public and employees, protects the asset, and ensures compliance with building codes and standards. This program tracks the Facilities Condition, as measured by the Facilities Condition Index (FCI).

Facilities projects reflect the results of comprehensive evaluations conducted by independent architect/engineer firms. These installationwide, building-specific assessments are the linchpin of a program to establish core data on the condition of the USGS constructed assets.

The USGS has stewardship responsibility for unique mission equipment assets such as hazard-warning networks, river cableways, and gauging stations. These require effective maintenance and capital investments to preserve functionality. Projects addressing these assets are included under the Equipment Section of the 5-year Deferred Maintenance and Capital Improvement Plans and Health. These assets are evaluated using the same safety criteria as our constructed real property assets.

For FY 2008, remediation of the most critical health, safety, and resource-protection deficiencies is again the focus of the priority facility projects. Of the \$8.0 million budget request for FY 2008, \$2.02 million is for facility projects, \$0.44 million is for equipment projects, \$0.89 million is for condition assessments, project planning and implementation of the Department's standard Facilities Maintenance Management System, and \$4.6 million is for the Patuxent Wildlife Research Center Facilities Improvement.

2008 Program Performance

The USGS deferred maintenance needs are approximately \$41 million. The USGS addresses the most critical maintenance and capital improvement needs prioritized according to Department's guidelines. The FY 2008 budget request includes a Maintenance and Construction Plan for FY 2008 – 2012 that list the USGS priority deferred maintenance and capital improvement projects. This plan is subject to adjustments in outyears due to funding changes and revised priorities based on comprehensive facility condition assessments, annual condition surveys, and emergency needs.

Deferred Maintenance and Capital Improvement

Facility and Equipment Projects for FY 2008

FY 2008 Deferred Maintenance and Construction Plan

The following table lists, in priority order, the proposed projects to be addressed with FY 2008 Deferred Maintenance funding in USGS:

FY 2008 Facility Projects

<p>Columbia Environmental Research Center</p> <p>\$220,000</p>	<p>Complete Fire Sprinkler System Installation (B200600005) — Deferred maintenance dollars funded the installation of a fire sprinkler system pump, control panel, pump supply piping, and system electrical distribution in the main building (A3) at the Columbia Environmental Research Center in 2005. The funding though was short and the installation of the sprinkler heads and water supply piping from the pump to the heads was not installed. The project needs to be completed to provide the building with a working sprinkler system.</p>
<p>Nevada Elko “H” Facility</p> <p>\$25,000</p>	<p>Demolition of Elko H Building (W20060001NV) — Former office building at the Elko H facility needs to be removed. Structure is in disrepair and back door is broken, thus allowing access. The Condition Assessment report identified possible hidden contamination (Pb paint or asbestos). Septic system in place on property has to be removed. Fuel storage and may also require clean-up.</p>
<p>Leetown Science Center Fish Health Laboratory</p> <p>\$83,000</p>	<p>Upgrade Effluent Treatment and Disinfection System (B2001FH006) — Pathogen-contaminated effluents from the Fish Hatchery are presently treated by chlorination. Additional safeguards and automation are needed to provide for continuous monitoring of chlorine levels and to ensure that the laboratory effluent is pathogen free. New equipment to provide for dosing and an integrated alarm system are needed to safely monitor effluent treatment/disinfection. Cost includes equipment (chlorine monitor) and all cost associated with installation of alarm & other item components (dedicated power and phone lines, computer hook-up, etc.).</p>
<p>Leetown Science Center Fish Health Laboratory</p> <p>\$1,694,640</p>	<p>Replace Sewage Treatment Facility (B200100015) — This project provides for the existing building to be demolished and reconstructed. The building, constructed in 1950, has far exceeded its life expectancy and is in extremely poor condition. Repair costs would exceed replacement costs. The condition of sumps and covers pose both an environmental and safety/health hazard. Electrical system has reached the end of its life. The system is not UL labeled and has no main disconnect. All conduit and enclosures are rusted and corroded. Receptacles are in a wet location and are not GFI protected. In addition, the concrete structures (lift station, sump pit, tanks) inside of the building are deteriorating, causing a safety hazard. The grating over the sump pits, and new controls and panels have been installed to remediate existing conditions until the building is replaced. Suggest that Bureau fund the design phase 2 years in advance to identify project requirements and construction phase cost estimate for subsequent fiscal years budget submission.</p>

Facilities

FY 2008 Equipment Projects

600 sites nationwide \$240,000	Repair or Replace Cablecars (W1998A10000) — Revised load tests reveal that the 600 cablecars in active use nationwide could fail under adverse field conditions such as snagged cables during flood conditions. Depending on their design and condition, remediation will require partial or total replacement of the cablecars. Interim actions have begun where risk is the highest, but all 600 cars will require either retrofit or replacement.
Northern California Seismic Network \$200,000	Replace Network Analog and Microwave Stations (G987160001) — Replace earthquake network stations that provide seismic monitoring and (or) warning for large metropolitan areas. The requested funds would be used to replace existing equipment that has exceeded its expected life and that cannot be expected to operate continuously without increased failure rates. The current equipment, which supports the network, may fail during an emergency, which would limit or possibly prevent adequate response to other Federal agencies, local governments, the private sector, and public needs.
Condition Assessments \$210,000	Condition Assessments/Engineering Support — Funding is proposed to complete condition assessments for the identification of maintenance and capital improvement needs and to provide engineering services support for funded facility projects.
Maintenance Management System \$500,000	Maintenance Management System — Funding is proposed to implement and maintain a maintenance management system that meets bureau reporting and oversight requirements.
Project Planning \$200,000	Funding will be applied toward contract architectural, engineering and design services for complex projects particularly for developing project requirements and budget estimates.

Program Performance Overview Table

Target Codes: SP = Strategic Plan measures PART = PART measures
 TBD = Targets have not yet been developed UNK = Prior year data unavailable
 BUR = Bureau specific measures NA = Long-term target are inappropriate to determine at this time

Type Codes: C = Cumulative Measures A = Annual Measures F = Future Measures

End Outcome Goal 5.2: Management Excellence: Advance Modernization/Integration

End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
Intermediate Outcome Measures and Bureau and PART Outcome Measures									
Facilities Improvement									
Overall condition of buildings and of structures (as measured by the FCI) that are mission critical and mission dependent (as measured by the API), with emphasis on improving the condition of assets with critical health and safety needs (SP)	UNK	UNK	UNK	UNK	UNK	UNK	0.115	0	0.095
Percent change in the Operating Costs (operations and maintenance costs) per square foot of buildings that are "Not-Mission Dependent" as reported in the Federal Real Property Profile (FRPP) in the current fiscal year compared to the previous fiscal year. (SP)	UNK	UNK	UNK	UNK	UNK	UNK	-5%	0	-5%
Percent change in the total number of buildings (office, warehouse, laboratory, and housing) reported as "Under Utilized" or "Not Utilized" in the Federal Real Property Profile (FRPP) in the current fiscal year compared to the previous fiscal year (SP)	UNK	UNK	UNK	UNK	UNK	UNK	-5%	0	-5%

Facilities

End Outcome Measures Intermediate or PART Measures/PART Efficiency or Other Outcome Measures	2004 Actual	2005 Actual	2006 Plan	2006 Actual	2007 President's Budget	2007 Plan	2008 Plan	Change from 2007 Plan to 2008	Long-term Target 2012
Intermediate Outcome Measures and Bureau and PART Outcome Measures									
Facilities Improvement									
Percent of assets targeted for disposal that were disposed (SP)	UNK	UNK	UNK	UNK	UNK	UNK	100%	0	100%
PART Efficiency and Other Output Measures									
# of bureau condition assessments in progress or completed (within a 5-year cycle) (Facilities)	41	9	15	14	24	24	32	+8	32
# of deferred maintenance and capital improvements (cumulative) (Facilities)	36	53	67	63	74	74	84	+10	96
New Capital Improvement Project (Facilities)	NA	NA	NA	NA	NA	NA	1	1	1

Working Capital Fund Overview

The USGS Working Capital Fund (WCF) was established to allow for the efficient financial management of the components listed below. The WCF was made available for expenses necessary for furnishing materials, supplies, equipment, work, and services in support of USGS programs, and as authorized by law, to agencies of the Federal Government and others. The WCF consists of both investment components and fee-for-service components, as follows:

Investment Components

- **Telecommunications Investment** — This component is used for telecommunication hardware, software, facilities, and services. Examples include replacement or expansion of automatic exchange systems and computerized network equipment such as switches, routers, and monitoring systems.
- **Equipment Investment** — This component is used for the acquisition, replacement, and expansion of equipment for USGS programs. Equipment may include, but is not limited to, hydrologic, geologic, and cartographic instruments; laboratory equipment; and computer hardware and software.
- **Facilities Investment** — This component supports facility and space management investment expenses for USGS real property, including owned and leased space. Authorized investment expenses include nonrecurring and emergency repair, relocation of a facility, and facility modernization. The component does not include annual expenses such as rent, day-to-day operating expenses, recurring maintenance, or utilities. The investment component is not used to fund construction of buildings.
- **Publications Investment** — This component is used for the preparation and production of technical publications reporting on the results of scientific data and research. Research projects typically are 3 to 5 years in duration, and planning the medium in which to report results occurs over the life of the project. The Publications Investment Component provides a mechanism for establishing an efficient, effective, and economical means of funding publications costs over the long term.

Fee-for-Service Components

- **National Water Quality Laboratory (NWQL)** — The NWQL is a Fee-for-Service component, conducting chemical analysis of water, sediments, and aquatic tissue for all USGS water district offices and other customers, including other USGS disciplines, other Interior bureaus, and government agencies. The NWQL also does biological classification for these customers. NWQL analyses services are provided on a reimbursable basis, with the price of services calculated to cover direct and indirect costs.
- **USGS Hydrologic Instrumentation Facility (HIF)** — The HIF provides hydrologic instrumentation on a fee-for-service basis. The facility provides its customers with hydrologic instruments that can be rented or purchased, maintains a technical expertise on instrumentation, and tests and evaluates instruments as they become available in the marketplace.

Working Capital Fund

- **Bureau Laboratories** — This component currently includes three laboratories. There are two Eastern Region Water Research Laboratories that perform gaseous dissolved chlorofluorocarbon measurements and isotope-ratio measurements of water, sediments, rocks, and gases for all WRD district offices, other USGS disciplines, and other Federal agencies. The Vancouver Project Office/Cascades Volcano Observatory Sediment Laboratory analyzes suspended sediment, bedload, and bed material collected as part of routine surveillance and special project sampling in the Cascades, routinely processes sediment samples for several WRD offices, and provides analyses for other volcano observatories in Alaska and Hawaii, as well as international projects.
- **National Training Center** — This component conducts fee-for-service USGS training programs. These programs include, but are not limited to, specialized training for USGS employees, cooperators, and international participants in many facets of hydrology, hydraulics, and water resources investigations, as well as computer applications, management and leadership seminars, and various workshops.
- **Drilling** — This component provides drilling services to conduct exploratory drilling for obtaining geologic samples and cores in difficult hydrogeologic environments and the emplacement of sampling devices and sub-surface sensors for hydrologic investigations.
- **GSA Delegated Buildings** — This component is used to manage funds received under the delegated authority for the J.W. Powell Building and Advanced Systems Center in Reston, VA, as provided by section 205(d) of the Federal Property and Administrative Services Act of 1949, as amended. Delegated functions include building operations, maintenance, recurring repairs, minor alterations, historic preservation, concessions, and energy management. Because of the size of the Reston buildings and the need to expend the facility funds in a manner corresponding to GSA's no-year funding (Federal Buildings Fund) mechanisms and the GSA National Capital Region long-range capital improvement plan, no-year funding is a prerequisite to administering the delegation. Public Law 104–208, Section 611, provides that, for the fiscal year ending September 30, 1997, and thereafter, any department or agency that has delegated authority shall retain that portion of the GSA rental payment available for operation, maintenance, and repair of the building, and the funds shall remain available until expended. This WCF component was established to provide us with this no-year flexibility.
- **Enterprise Network Publishing (EPN)** — EPN is a fee-for-service component which provides a bureau-wide publishing approach. It incorporates technological solutions with a flexible, adaptable publishing capability employing a balanced number of Government employees, strategically placed contractor staff, and innovative partnerships supportive of future science directions. Three regional cost centers coordinate production support at Publishing Service Centers across the network. Regional Publishing Managers maintain close ties across regions and to the Publishing Program Manager, thus ensuring workload balancing and optimizing network efficiencies throughout the bureau.

The WCF Investment Components provide a mechanism to assist USGS managers in planning for and acquiring goods and services that are too costly to acquire in a single fiscal year or that, due to the nature of services provided must operate in a multi- as opposed to a single-year basis of funding. Investments are supported by documented investment plans that include estimated acquisition/replacement costs, a schedule of deposits, and approval of the plans, deposits and expenditures by designated USGS officials. WCF Fee-for-Service Components

provide a continuous cycle of client services for fees established in a rate-setting process and, in some cases, with funding provided by appropriated funds. Fees are predicated upon both direct and indirect costs associated with providing the services, including amortization of equipment required to provide the services.

Appropriation Language and Citations

Permanent authority:

1. Provided further, That in fiscal year 1986, and thereafter, all amortization fees resulting from the Geological Survey providing telecommunications services shall be deposited in a special fund to be established on the books of the Treasury and be immediately available for payment of replacement or expansion of telecommunications services, to remain available until expended.
 - **43 U.S.C.50a** This authority established the Telecommunications Amortization Fund, which was displayed as part of the Surveys, Investigations and Research appropriation from FY 1986 through FY 1990. Beginning in FY 1991, the Telecommunications Amortization Fund was merged into the WCF described in the next citation.
2. There is hereby established in the Treasury of the United States a working capital fund to assist in the management of certain support activities of the United States Geological Survey (hereafter referred to as the "Survey"), Department of the Interior. The fund shall be available on and after November 5, 1990, without fiscal year limitation for expenses necessary for furnishing materials, supplies, equipment, work, facilities, and services in support of Survey programs, and, as authorized by law, to agencies of the Federal Government and others. Such expenses may include laboratory modernization and equipment replacement, computer operations, maintenance, and telecommunications services; requirements definition, systems analysis, and design services; acquisition or development of software; systems support services such as implementation assistance, training, and maintenance; acquisition and replacement of computer, publications and scientific instrumentation, telecommunications, and related automatic data processing equipment; and, such other activities as may be approved by the Secretary of the Interior.

There are authorized to be transferred to the fund, at fair and reasonable values at the time of transfer, inventories, equipment, receivables, and other assets, less liabilities, related to the functions to be financed by the fund as determined by the Secretary of the Interior. Provided, That the fund shall be credited with appropriations and other funds of the Survey, and other agencies of the Department of the Interior, other Federal agencies, and other sources, for providing materials, supplies, equipment, work, and other services as authorized by law and such payments may be made in advance or upon performance: Provided further, That charges to users will be at rates approximately equal to the costs of furnishing the materials, supplies, equipment, facilities, and services, including such items as depreciation of equipment and facilities, and accrued annual leave: Provided further, That all existing balances as of November 5, 1990, from amortization fees resulting from the Survey providing telecommunications services and deposited in a special fund established on the books of the Treasury and available for payment of replacement or expansion of telecommunications services as authorized by Public Law 99-190, are hereby transferred to and merged with the working capital fund, to be used for the same purposes as originally authorized. Provided further, That funds that are not necessary to carry out the activities to be financed by the fund, as determined by the Secretary, shall be covered into miscellaneous receipts of the Treasury.

P.L. 101-512 Department of the Interior and Related Agencies Appropriations Act, 1991 This authority established a Working Capital Fund account in FY 1991. The Telecommunications Amortization Fund was included as part of the WCF and all balances of the Telecommunications Amortization Fund existing at the end of FY 1990 were transferred to the WCF. These balances were to be used for the same purposes as originally authorized.

P.L. 103-332 Department of the Interior and Related Agencies Appropriations Act, 1995 The amendments that were made in this appropriations act are shown in underline in the second citation shown above. This authority expanded the use of the Working Capital Fund to partially fund laboratory operations and facilities improvements and to acquire and replace publication and scientific instrumentation and laboratory equipment.

Working Capital Fund

United States Geological Survey

Federal Funds

General and special funds:

WORKING CAPITAL FUND

Program and Financing

(in millions of dollars)

Identification Code 14-4556-0-4-306		2006 Actual	2007 Estimate	2008 Estimate
Obligations by program activity:				
09.01	Working Capital Fund	54	63	80
10.00	Total new obligations	54	63	80
Budgetary resources available for obligation:				
21.40	Unobligated balance carried forward, start of year	62	72	68
22.00	New budget authority (gross)	63	59	74
22.10	Resources available from recoveries of prior year			
	Obligations	1	0	0
23.90	Total budgetary resources available for obligation	126	131	142
23.95	Total new obligations	-54	-63	-80
24.40	Unobligated balance carried forward, end of year	72	68	62
New budget authority (gross), detail				
Mandatory:				
69.00	Offsetting collections (cash)	63	59	74
Change in obligated balances:				
72.40	Obligated balance, start of year	18	15	18
73.10	Total new obligations	54	63	80
73.20	Total outlays (gross)	-56	-60	-68
73.45	Recoveries of prior year obligations	-1	0	0
74.40	Obligated balance, end of year	15	18	30
Outlays (gross), detail:				
86.97	Outlays from new mandatory authority	20	27	33
86.98	Outlays from mandatory balances	36	33	35
87.00	Total outlays (gross)	56	60	68
Offsets:				
Against gross budget authority and outlays:				
88.00	Offsetting collections (cash) from:			
	Federal sources	63	59	74
Net budget authority and outlays:				
89.00	Budget authority	0	0	0
90.00	Outlays	-7	1	-6

WORKING CAPITAL FUND

Balance Sheet

(in millions of dollars)

Identification Code 14-4556-0-4-306		2005 Actual	2006 Actual
	ASSETS:		
	Federal assets:		
1101	Fund balances with Treasury	80	87
	Investments in U.S. securities:		
1106	Receivables, net		
1803	Other Federal assets: Property, plant and equipment, net	10	11
1999	Total assets	90	98
	LIABILITIES:		
2101	Federal liabilities: Accounts payable		
2201	Non-Federal liabilities: Accounts payable	5	3
2999	Total liabilities	5	3
	NET POSITION:		
3300	Cumulative results of operations	85	95
3999	Total net position	85	95
4999	Total liabilities and net position	90	98

Working Capital Fund

WORKING CAPITAL FUND

Object Classification

(in millions of dollars)

Identification Code		2006	2007	2008
14-4556-0-4-306		Actual	Estimate	Estimate
Reimbursable obligations:				
Personnel compensation:				
11.1	Full-time permanent	9	10	24
11.3	Other than full-time permanent	1	1	1
11.5	Other personnel compensation	1	0	1
11.9	Total personnel compensation	11	11	26
12.1	Civilian personnel benefits	3	3	7
21.0	Travel and transportation of persons	1	1	1
23.1	Rental payments to GSA	2	2	4
23.2	Rental payments to others	0	0	1
23.3	Communications, utilities, and miscellaneous charges	2	3	
24.0	Printing and reproduction	0	1	1
25.2	Other services	5	6	7
25.3	Other purchases of goods and services from Government	3	6	6
	Accounts			
25.4	Operation and maintenance of facilities	4	4	4
25.7	Operation and maintenance of equipment	2	2	1
26.0	Supplies and materials	3	4	5
31.0	Equipment	17	20	18
41.0	Grants, subsidies, and contributions	1	0	0
99.0	Reimbursable obligations	54	63	80
99.9	Total new obligations	54	63	80

WORKING CAPITAL FUND

Personnel Summary

Identification Code		2006	2007	2008
14-4556-0-4-306		Actual	Estimate	Estimate
Reimbursable:				
2001	Civilian full-time equivalent employment	158	158	347

Summary of Requirements by Object Class

SURVEYS, INVESTIGATIONS, AND RESEARCH

Summary of Requirements by Object Class

(in millions of dollars)

Appropriation: Surveys, Investigations, and Research		2007 Estimate		Fixed Costs & Related Changes		Program Changes		2008 Request	
		FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Object Class		FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Personnel compensation									
11.1	Full-time permanent		401		16		-13		404
11.3	Other than full-time permanent		28		1		0		29
11.5	Other personnel compensation		11		0		0		11
11.8	Special personal services payments		1		0		0		1
	Total personnel compensation	5,301	441	0	17	-110	-13	5,191	445
12.1	Civilian personnel benefits		115		6		-5		116
13.0	Benefits for former personnel		4		0		0		4
21.0	Travel and transportation of persons		25		0		0		25
22.0	Transportation of things		5		0		0		5
23.1	Rental payment to GSA		57		1		0		58
23.2	Rental payments to others		5		0		0		5
23.3	Comm., utilities and misc. charges		17		0		0		17
24.0	Printing and reproduction		2		0		0		2
25.1	Advisory and assistance services		10		0		0		10
25.2	Other services		103		0		4		107
25.3	Other purchases of goods and services from Government accounts		40		0		0		40
25.4	Operation and maintenance of Facilities		5		0		0		5
25.7	Operation and maintenance of Equipment		10		0		0		10
26.0	Supplies and materials		22		0		1		23
31.0	Equipment		34		0		1		35
32.0	Land and structures		1		0		0		1
41.0	Grants, subsidies, and contributions		67		0		0		67
	Total requirements		963		24		-12		975

Note: After the development of the account level FTEs for FY 2008 for the President's Budget Appendix, further refinements to the estimates were made. As a result, the FY 2008 direct FTE level in this presentation does not match and is lower than the FTE level in the Budget Appendix.

This information is displayed in budget authority (not obligations) by object class.

Surveys, Investigations, and Research — Exhibits

SURVEYS, INVESTIGATIONS, AND RESEARCH

Summary of Requirements by Object Class cont'd

(in millions of dollars)

Appropriation: Surveys, Investigations, and Research							
Reimbursable Obligations		2007 Estimate		2008 Request		Increase or Decrease	
		FTE	Amount	FTE	Amount	FTE	Amount
	Personnel compensation						
11.1	Full-time permanent		149		139		-10
11.3	Other than full-time permanent		21		21		0
11.5	Other personnel compensation		4		4		0
	Total personnel compensation	2,758	174	2,542	164	-216	-10
12.1	Civilian personnel benefits		43		41		-2
13.0	Benefits for former personnel		1		1		0
21.0	Travel and transportation of persons		11		11		0
22.0	Transportation of things		4		4		0
23.1	Rental payments to GSA		15		15		0
23.2	Rental payments to others		1		1		0
23.3	Communications, utilities and miscellaneous charges		5		5		0
24.0	Printing and reproduction		1		1		0
25.1	Advisory and assistance services		5		5		0
25.2	Other services		56		59		3
25.3	Other purchases of goods and services from Government accounts		49		55		6
25.4	Operation and maintenance of facilities		1		1		0
25.7	Operation and maintenance of equipment		3		3		0
26.0	Supplies and materials		11		11		0
31.0	Equipment		13		13		0
41.0	Grants, subsidies, and contributions		35		35		0
	Total requirements		428		425		-3

Note: After the development of the account level FTEs for FY 2008 for the President's Budget Appendix, further refinements to the estimates were made. As a result, the FY 2008 reimbursable FTE level in this presentation does not match and is lower than the FTE level in the Budget Appendix.

United States Geological Survey

Federal Funds

General and special funds:

SURVEYS, INVESTIGATIONS, AND RESEARCH

Program and Financing

(in millions of dollars)

Identification Code		2006	2007	2008
14-0804-0-1-306		Actual	Estimate	Estimate
Obligations by program activity:				
Direct program:				
00.01	Geographic Research, Investigations, and Remote Sensing	129	66	75
00.02	Geologic Hazards, Resources, and Processes	245	242	223
00.03	Water Resources Investigations	217	215	213
00.04	Biological Research	178	179	181
00.05	Enterprise Information	46	111	112
00.06	Science Support	69	69	71
00.07	Facilities	93	95	102
09.01	Reimbursable program	439	428	425
10.00	Total new obligations	1,416	1,405	1,402
Budgetary resources available for obligation:				
21.40	Unobligated balance carried forward, start of year	22	27	19
22.00	New budget authority (gross)	1,416	1,397	1,400
22.22	Unobligated balance transferred from other accounts	6	0	0
23.90	Total budgetary resources available for obligation	1,444	1,424	1,419
23.95	Total new obligations	-1,416	-1,405	-1,402
23.98	Unobligated balance expiring or withdrawn	-1	0	0
24.40	Unobligated balance carried forward, end of year	27	19	17
New budget authority (gross), detail:				
Discretionary:				
40.00	Appropriation	976	963	975
40.00	Appropriation – Hurricane Katrina supplemental	15	0	0
40.00	Appropriation – Avian Influenza supplemental	4	0	0
40.35	Appropriation permanently reduced	-14	0	0
41.00	Transferred to other accounts	-4	0	0
43.00	Appropriation (total discretionary)	977	963	975
Spending authority from offsetting collections:				
58.00	Offsetting collections (cash)	310	428	425
58.10	Change in uncollected customer payments from Federal sources (unexpired)	129	0	0
58.90	Spending authority from offsetting collections (total discretionary)	439	428	425
Mandatory:				
62.00	Transferred from other accounts	0	6	0
70.00	Total new budget authority (gross)	1,416	1,397	1,400

Surveys, Investigations, and Research — Exhibits

SURVEYS, INVESTIGATIONS, AND RESEARCH

Program and Financing cont'd

(in millions of dollars)

Identification Code 14-0804-0-1-306		2006 Actual	2007 Estimate	2008 Estimate
	Change in obligated balances:			
72.40	Obligated balance, start of year	97	109	180
73.10	Total new obligations	1,416	1,405	1,402
73.20	Total outlays (gross)	-1,403	-1,334	-1,390
73.40	Adjustments in expired accounts (net)	-1	0	0
74.00	Change in uncollected customer payments from Federal sources (unexpired)	-129	0	0
74.10	Change in uncollected customer payments from Federal Sources (expired)	129	0	0
74.40	Obligated balance, end of year	109	180	192
	Outlays (gross), detail:			
86.90	Outlays from new discretionary authority	1,161	1,225	1,232
86.93	Outlays from discretionary balances	242	103	158
86.97	Outlays from new mandatory authority	0	6	0
87.00	Total outlays (gross)	1,403	1,334	1,390
	Offsets:			
	Against gross budget authority and outlays:			
	Offsetting collections (cash) from:			
88.00	Federal sources	-239	-235	-234
88.40	Non-Federal sources	-196	-193	-191
88.90	Total, offsetting collections (cash)	-435	-428	-425
	Against gross budget authority only:			
88.95	Change in uncollected customer payments from Federal sources (unexpired)	-129	0	0
88.96	Portion of offsetting collections (cash) credited to expired account	125	0	0
	Net budget authority and outlays:			
89.00	Budget authority	977	969	975
90.00	Outlays	968	906	965
95.02	Unpaid obligation, end of year	290		

SURVEYS, INVESTIGATIONS, AND RESEARCH

Object Classification

(in millions of dollars)

Identification Code 14-0804-0-1-306	2006 Actual	2007 Estimate	2008 Estimate
Direct obligations:			
Personnel compensation:			
11.1	409	401	404
11.3	30	28	29
11.5	11	11	11
11.8	1	1	1
11.9	451	441	445
12.1	115	115	116
13.0	5	4	4
21.0	25	25	25
22.0	5	5	5
23.1	56	57	58
23.2	5	5	5
23.3	17	17	17
24.0	2	2	2
25.1	10	10	10
25.2	108	114	109
25.3	41	43	40
25.4	5	5	5
25.7	10	10	10
26.0	21	22	23
31.0	33	34	35
32.0	1	1	1
41.0	67	67	67
99.0	977	977	977

Surveys, Investigations, and Research — Exhibits

SURVEYS, INVESTIGATIONS, AND RESEARCH

Object Classification cont'd

(in millions of dollars)

Identification Code		2006	2007	2008
14-0804-0-1-306		Actual	Estimate	Estimate
Reimbursable obligations:				
Personnel compensation:				
11.1	Full-time permanent	147	149	139
11.3	Other than full-time permanent	20	21	21
11.5	Other personnel compensation	4	4	4
11.9	Total personnel compensation	171	174	164
12.1	Civilian personnel benefits	43	43	41
13.0	Benefits for former personnel	1	1	1
21.0	Travel and transportation of persons	11	11	11
22.0	Transportation of things	4	4	4
23.1	Rental payments to GSA	15	15	15
23.2	Rental payments to others	1	1	1
23.3	Comm., utilities, and miscellaneous charges	5	5	5
24.0	Printing and reproduction	1	1	1
25.1	Advisory and assistance services	5	5	5
25.2	Other services	60	56	59
25.3	Other purchases of goods and services from Government accounts	58	49	55
25.4	Operation and maintenance of facilities	1	1	1
25.7	Operation and maintenance of equipment	3	3	3
26.0	Supplies and materials	12	11	11
31.0	Equipment	13	13	13
41.0	Grants, subsidies, and contributions	35	35	35
99.0	Reimbursable obligations	439	428	425
99.9	Total new obligations	1,416	1,405	1,402

SURVEYS, INVESTIGATIONS, AND RESEARCH

Personnel Summary

Identification Code		2006	2007	2008
14-0804-0-1-306		Actual	Estimate	Estimate
Direct:				
1001	Civilian full-time equivalent employment	5,627	5,301	5,222
Reimbursable:				
2001	Civilian full-time equivalent employment	2,793	2,758	2,550

Note: The FY 2008 FTEs depicted above are a replication of the FTEs shown in the FY 2008 President's Budget Appendix. After the development of the account level FTEs for FY 2008 for the President's Budget Appendix, further refinements to the estimates were made. As a result, the FY 2008 direct and reimbursable FTE levels that appear in other portions of this presentation do not match and are lower than these FTE levels in the Budget Appendix.

This page intentionally left blank.

Funding of U.S. Geological Survey Programs (Obligations)

**Funding of U.S. Geological Survey Programs
(Obligations)**
(in thousands of dollars)

	2006 Actual	2007 Estimate	2008 Estimate
Surveys, Investigations, and Research (SIR)			
Geographic Research, Investigations, and Remote Sensing			
Annual appropriation	121,191	57,090	67,423
No-Year appropriation	8,185	8,681	7,882
Subtotal (appropriation)	129,376	65,771	75,305
<i>Non-Federal (Domestic) sources</i>			
Sale of photos, reproductions, and digital products	6,083	6,083	6,083
Sale of personal property	1	0	0
Optical calibration	594	594	594
Miscellaneous	0	2	2
Subtotal (non-Federal domestic sources)	6,678	6,679	6,679
<i>Non-Federal (Foreign) sources</i>			
Landsat International Ground Station Fees	1,293	1,293	1,293
Miscellaneous	390	390	390
Subtotal (non-Federal foreign sources)	1,683	1,683	1,683
<i>State and local sources</i>			
Unmatched	5,623	551	551
Subtotal (State and local sources)	5,623	551	551
<i>Federal sources</i>			
Agency for International Development	2,864	2,864	2,864
Department of Agriculture	526	255	255
Department of Defense			
Corps of Engineers	536	250	250
National Geospatial-Intelligence Agency	10,688	401	401
Other	424	466	466
Department of Homeland Security			
Federal Emergency Management Agency	795	302	302
Other	3,885	0	0
Department of the Interior			
Bureau of Land Management	788	410	310
Bureau of Reclamation	467	449	449
Fish and Wildlife Service	30	21	21
National Park Service	1,755	949	949
Office of Secretary	3,040	2,708	2,708
Environmental Protection Agency	1,242	481	481
Federal Aviation Administration	30	30	30

Sundry Exhibits

	2006 Actual	2007 Estimate	2008 Estimate
General Services Administration	4	0	0
Health and Human Services	86	86	86
Housing and Urban Development	42	0	0
National Aeronautics and Space Administration	9,597	9,597	9,597
National Science Foundation	52	52	52
Sale of maps, photos, reproductions, and digital products	1,273	1,273	1,273
Remote sensing data purchases	790	350	350
Miscellaneous agencies	80	120	120
Subtotal (Federal sources)	38,994	21,064	20,964
Total: Geographic Research, Investigations, and Remote Sensing	182,354	95,748	105,182

Funding of U.S. Geological Survey Programs (Obligations)

	2006 Actual	2007 Estimate	2008 Estimate
Surveys, Investigations, and Research (SIR)			
Geologic Hazards, Resources, and Processes:			
Annual appropriation	234,977	235,286	222,085
Multi-Year appropriation	8,468	0	0
No-Year appropriation	1,285	1,071	1,000
Subtotal (appropriation)	244,730	236,357	223,085
<i>Non-Federal (Domestic) sources</i>			
Miscellaneous	2,020	2,148	2,197
Subtotal (non-Federal domestic sources)	2,020	2,148	2,197
<i>Non-Federal (Foreign) sources</i>			
Miscellaneous	1,482	5,999	1,481
Subtotal (non-Federal foreign sources)	1,482	5,999	1,481
<i>State and local sources</i>			
Matched	48	48	48
Unmatched	5,271	5,246	5,246
Subtotal (State and local sources)	5,319	5,294	5,294
<i>Federal sources</i>			
Agency for International Development	948	1,432	3,910
Central Intelligence Agency	100	100	100
Department of Agriculture	12	12	12
Department of Commerce			
National Oceanic and Atmospheric Administration	3,647	4,072	4,072
Other	347	393	393
Department of Defense			
Corps of Engineers	960	1,072	1,072
Other	2,460	2,752	2,752
Department of Energy	1,436	1,586	1,586
Department of the Interior			
Bureau of Indian Affairs	75	75	75
Bureau of Land Management	1,314	1,450	1,470
Bureau of Reclamation	88	88	98
Fish and Wildlife Service	56	56	56
Minerals Management Service	40	40	30
National Park Service	675	743	723
Department of State	1,213	1,009	1,645
Department of Veterans Affairs	26	26	26
Environmental Protection Agency	702	769	769
General Services Administration	32	32	32
National Aeronautics and Space Administration	4,572	5,215	5,315
National Science Foundation	1,033	2,086	1,833

Sundry Exhibits

	2006 Actual	2007 Estimate	2008 Estimate
Nuclear Regulatory Commission	51	50	50
Miscellaneous agencies	355	477	476
Subtotal (Federal sources)	20,142	23,535	26,495
Total: Geologic Hazards, Resources, and Processes	273,693	273,333	258,552

Funding of U.S. Geological Survey Programs (Obligations)

	2006 Actual	2007 Estimate	2008 Estimate
Surveys, Investigations, and Research (SIR)			
Water Resources Investigations:			
Annual appropriation	211,362	211,764	212,454
Multi-Year appropriation	1,901	0	0
No-Year appropriation	3,266	3,258	1,000
Subtotal (appropriation)	216,529	215,022	213,454
<i>Non-Federal (Domestic) sources</i>			
Permittees & licensees of the Federal Energy Regulatory Commission	3,515	3,502	3,502
Technology Transfer	619	619	619
Miscellaneous	125	205	125
Subtotal (non-Federal domestic sources)	4,259	4,326	4,246
<i>Non-Federal (Foreign) sources</i>			
Miscellaneous	764	822	822
Subtotal (non-Federal foreign sources)	764	822	822
<i>State and local sources</i>			
Matched	62,833	62,833	62,381
Matched (In-Kind Services – NON ADD)	1,675	1,675	1,675
Unmatched	91,615	91,499	91,948
Subtotal (State and local sources)	154,448	154,332	154,329
<i>Federal sources</i>			
Agency for International Development	366	373	373
Central Intelligence Agency	305	120	31
Department of Agriculture	1,668	1,680	1,680
Department of Commerce			
National Oceanic and Atmospheric Administration	1,635	1,736	1,458
Other	119	86	86
Department of Defense			
Corps of Engineers	27,782	27,228	27,228
Other	10,741	10,525	10,525
Department of Energy			
Bonneville Power Administration	95	95	95
Other	14,390	14,503	15,060
Department of Homeland Security			
Federal Emergency Management Agency	1,281	1,265	1,265
Department of the Interior			
Bureau of Indian Affairs	656	640	640
Bureau of Land Management	5,328	4,775	4,770
Bureau of Reclamation	9,639	9,356	9,356
Fish and Wildlife Service	910	1,056	997
National Park Service	3,778	3,478	3,468
Office of Secretary	258	231	191
Office of Surface Mining	17	17	17
Department of Justice	11	11	11
Department of State	901	777	777

Sundry Exhibits

	2006 Actual	2007 Estimate	2008 Estimate
Department of Transportation	115	115	115
Environmental Protection Agency	9,144	9,163	8,840
Health and Human Services	486	470	470
National Aeronautics and Space Administration	410	406	406
National Science Foundation	85	85	85
Nuclear Regulatory Commission	264	399	264
Tennessee Valley Authority	257	257	257
Miscellaneous agencies	555	546	551
Subtotal (Federal sources)	91,196	89,393	89,016
Total: Water Resources Investigations	467,196	463,895	461,867

Funding of U.S. Geological Survey Programs (Obligations)

	2006 Actual	2007 Estimate	2008 Estimate
Surveys, Investigations, and Research (SIR)			
Biological Research:			
Multi-Year appropriation	177,601	177,568	180,764
No-Year appropriation	108	1,617	0
Subtotal (appropriation)	177,709	179,185	180,764
<i>Non-Federal (Domestic) sources</i>			
Miscellaneous	781	845	846
Subtotal (non-Federal domestic sources)	781	845	846
<i>State and local sources</i>			
Matched	148	148	148
Unmatched	6,354	6,379	6,406
Subtotal (State and local sources)	6,502	6,527	6,554
<i>Federal sources</i>			
Department of Agriculture	1,614	1,585	1,587
Department of Commerce			
National Oceanic and Atmospheric Administration	844	830	831
Department of Defense			
Corps of Engineers	20,164	19,723	19,791
Other	8,679	8,496	8,512
Department of Energy			
Bonneville Power Administration	813	804	811
Other	158	159	160
Department of Homeland Security			
Federal Emergency Management Agency	205	205	205
Department of the Interior			
Bureau of Land Management	5,526	5,440	5,480
Bureau of Reclamation	10,909	10,697	10,781
Fish & Wildlife Service	9,356	9,133	9,156
National Park Service	2,484	2,424	2,432
Office of the Secretary	1,546	1,515	1,515
Department of State	0	40	20
Department of Transportation	243	245	247
Environmental Protection Agency	2,585	2,524	2,525
National Aeronautics and Space Administration	175	176	177
Subtotal (Federal sources)	65,301	63,996	64,230
Total: Biological Research	250,293	250,553	252,394

Sundry Exhibits

	2006 Actual	2007 Estimate	2008 Estimate
Surveys, Investigations, and Research (SIR)			
Enterprise Information:			
Annual appropriation	46,339	110,695	112,120
No-Year appropriation	11	0	0
Subtotal (appropriation)	46,350	110,695	112,120
<i>Non-Federal (Domestic) sources</i>			
Map receipts	3,414	3,299	3,299
Miscellaneous	0	8	8
Subtotal (non-Federal domestic sources)	3,414	3,307	3,307
<i>Non-Federal (Foreign) sources</i>			
Miscellaneous	34	0	0
Subtotal (non-Federal foreign sources)	34	0	0
<i>State and local sources</i>			
Matched	0	285	285
Unmatched	11	4,961	4,961
Subtotal (State and local sources)	11	5,246	5,246
<i>Federal sources</i>			
Central Intelligence Agency	0	120	120
Department of Agriculture	299	160	160
Department of Commerce			
National Oceanic and Atmospheric Administration	60	150	0
Other	150	150	0
Department of Defense			
Corps of Engineers	17	252	252
National Geospatial-Intelligence Agency	0	4,662	4,362
Other	234	53	53
Department of Energy	100	0	0
Department of Homeland Security			
Federal Emergency Management Agency	0	293	293
Other	1,000	115	115
Department of the Interior			
Bureau of Indian Affairs	361	0	0
Bureau of Land Management	2,060	297	297
Fish and Wildlife Service	567	9	9
Minerals Management Service	80	3	3
National Park Service	548	622	622
Office of Secretary	95	447	147
Office of Surface Mining	80	3	3
Department of Justice	100	0	0
Department of Labor	100	0	0
Department of Transportation	150	0	0
Department of Treasury	100	0	0
Environmental Protection Agency	247	1,678	1,479
General Services Administration	106	6	6

Funding of U.S. Geological Survey Programs (Obligations)

	2006 Actual	2007 Estimate	2008 Estimate
Health and Human Services	110	0	0
National Aeronautics and Space Administration	1,088	313	325
National Science Foundation	100	0	0
Enterprise Publishing Network	17,491	19,608	19,608
Sale of maps, photos, reproductions, and digital products	525	525	525
Miscellaneous agencies	18	0	0
Subtotal (Federal sources)	25,786	29,466	28,379
Total: Enterprise Information	75,595	148,714	149,052

Sundry Exhibits

	2006 Actual	2007 Estimate	2008 Estimate
Surveys, Investigations, and Research (SIR)			
Science Support:			
Annual appropriation	69,170	69,302	70,671
No-Year appropriation	38	0	0
Subtotal (appropriation)	69,208	69,302	70,671
<i>Non-Federal (Domestic) sources</i>			
Technology Transfer	42	43	52
Miscellaneous	2	2	2
Subtotal (non-Federal domestic sources)	44	45	54
<i>State and local sources</i>			
Unmatched	518	0	0
Subtotal (State and local sources)	518	0	0
<i>Federal sources</i>			
Department of Commerce	15	20	20
Department of Defense			
Corps of Engineers	103	118	118
Department of Interior			
Bureau of Indian Affairs	63	77	81
Bureau of Land Management	58	26	26
Bureau of Reclamation	2,204	600	500
Minerals Management Service	57	72	75
Office of Secretary			
National Business Center	60	72	75
Other	840	1,412	1,423
National Science Foundation	19	19	19
Subtotal (Federal sources)	3,419	2,416	2,337
Total: Science Support	73,189	71,763	73,062

Funding of U.S. Geological Survey Programs (Obligations)

	2006 Actual	2007 Estimate	2008 Estimate
Surveys, Investigations, and Research (SIR)			
Facilities:			
Annual appropriation	71,789	71,805	73,628
Multi-Year appropriation	20,848	21,082	25,925
No-Year appropriation	181	1,813	2,000
Subtotal (appropriation)	92,818	94,700	101,553
<i>Federal sources</i>			
Central Intelligence Agency	275	280	285
Subtotal (Federal sources)	275	280	285
Total: Facilities	93,093	94,980	101,838
SIR Summary:			
Annual appropriation	754,828	755,942	758,381
Multi-Year appropriation	208,818	198,650	206,689
No-Year appropriation	13,074	16,440	11,882
Non-Federal sources			
Map receipts	3,414	3,299	3,299
Domestic	13,782	14,051	14,030
Foreign	3,963	8,504	3,986
State and local sources	172,421	171,950	171,974
Federal sources	245,113	230,150	231,706
Total: SIR	1,415,413	1,398,986	1,401,947

Sundry Exhibits

	2006 Actual	2007 Estimate	2008 Estimate
Surveys, Investigations, and Research (SIR)			
Contributed Funds:			
Permanent, indefinite appropriation:			
Geographic Research, Investigations, and Remote Sensing	10	10	0
Geologic Hazards, Resources, and Processes	587	253	600
Water Resources Investigations	704	550	155
Biological Research	1,175	729	359
Science Support	6	23	0
Total: Contributed Funds	2,482	1,565	1,114
Operation and Maintenance of Quarters:			
Permanent, indefinite appropriation:			
Geologic Hazards, Resources, and Processes	42	22	40
Biological Research	46	40	66
Total: Operation & Maintenance of Quarters	88	62	106
Working Capital Fund:			
National Water Quality Lab	14,429	14,871	15,613
Hydrologic Instrumentation Facility	15,670	12,244	13,469
Other	23,584	36,103	51,289
Total: Working Capital Fund	53,683	63,218	80,371
Allocations from other Federal Agencies: *			
Department of the Interior: Departmental Offices			
Natural Resource Damage Assessment	1,401	1,000	1,000
US Agency for International Development: Development Assistance	0	5,000	0
Total: Allocations	1,401	6,000	1,000

* Allocations are shown in the year they are received, not when they are obligated.

United States Geological Survey

Trust Funds

CONTRIBUTED FUNDS

Special and Trust Fund Receipts

(in millions of dollars)

Identification Code 14-8562-0-7-306		2006 Actual	2007 Estimate	2008 Estimate
01.00	Balance, start of year	0	0	0
01.99	Balance, start of year	0	0	0
Receipts:				
02.20	Contributed funds, Geological Survey	2	1	1
04.00	Total: Balances and collections	2	1	1
Appropriations:				
05.00	Contributed funds	-2	-1	-1
07.99	Balance, end of year	0	0	0

Program and Financing

(in millions of dollars)

Identification Code 14-8562-0-7-306		2006 Actual	2007 Estimate	2008 Estimate
Obligations by program activity:				
09.01	Donations and contributed funds	2	2	1
10.00	Total new obligations	2	2	1
Budgetary resources available for obligation:				
21.40	Unobligated balance carried forward, start of year	1	1	0
22.00	New budget authority (gross)	2	1	1
23.90	Total budgetary resources available for obligation	3	2	1
23.95	Total new obligations	-2	-2	-1
24.40	Unobligated balance carried forward, end of year	1	0	0
New budget authority (gross), detail:				
Mandatory:				
60.26	Appropriation (trust fund)	2	1	1

Sundry Exhibits

CONTRIBUTED FUNDS

Program and Financing cont'd
(in millions of dollars)

Identification Code 14-8562-0-7-306		2006 Actual	2007 Estimate	2008 Estimate
Change in obligated balances:				
72.40	Obligated balance, start of year	1	0	1
73.10	Total new obligations	2	2	1
73.20	Total outlays (gross)	-3	-1	-1
74.40	Obligated balance, end of year	0	1	1
Outlays (gross), detail:				
86.97	Outlays from new mandatory authority	0	1	1
86.98	Outlays from mandatory balances	3	0	0
87.00	Total outlays (gross)	3	1	1
Net budget authority and outlays:				
89.00	Budget authority	2	1	1
90.00	Outlays	3	1	1
95.02	Unpaid obligation, end of year	0		

Object Classification
(in millions of dollars)

Identification Code 14-8562-0-7-306		2006 Actual	2007 Estimate	2008 Estimate
Direct obligations:				
99.95	Below reporting threshold	2	2	1

Employee Count by Grade (Total Employment)

	2006 Actual	2007 Estimate	2008 Estimate
Executive Level V.....	1	1	1
SES.....	27	30	33
Subtotal.....	28	31	34
SL - 00.....	9	10	12
ST - 00.....	38	40	40
Subtotal.....	47	50	52
GS/GM -15.....	572	552	545
GS/GM -14.....	796	768	758
GS/GM -13.....	1,327	1,281	1,264
GS -12.....	1,564	1,511	1,488
GS -11.....	1,370	1,322	1,305
GS -10.....	16	15	15
GS - 9.....	994	959	947
GS - 8.....	295	285	281
GS -7.....	636	614	606
GS - 6.....	221	213	210
GS - 5.....	290	280	276
GS - 4.....	194	187	185
GS - 3.....	90	87	86
GS - 2.....	47	45	45
GS -1.....	22	21	21
Subtotal.....	8,434	8,140	8,032
Other Pay Schedule Systems.....	243	243	243
Total employment (actual/estimate).....	8,752	8,464	8,361

Mandatory Budget and Offsetting Collection Proposals

The USGS does not have any legislative proposals in the 2008 President's budget that impact receipts or mandatory spending levels.

Program/Project Support of Bureau, Department, and Governmentwide Costs

External Administrative Costs

The Department's Working Capital Fund was established pursuant to 43 U.S.C. 1467, to provide common administrative and support services efficiently and economically at cost. The Fund is a revolving fund, whereby capital is expended to provide services for customers who pay for the services. Customers consist of the Department's bureaus and offices, as well as other Federal agencies. Through the use of centrally provided services, the Department standardized key administrative areas, such as commonly used administrative systems, support services for those located in and around the Main and South Interior building complex, and centrally managed departmental operations that are beneficial to the bureaus and offices.

Centralized billing is used whenever the product or service being provided is not severable or it is inefficient to bill for the exact amount of product or service being procured. Customers are billed each year using a pre-established basis that is adjusted annually to reflect change over time. The following table provides the actual centralized billing to the USGS for FY 2006 and estimates for FY 2007 and 2008. The change between 2007 and 2008 is fully funded through a mixture of uncontrollable and program changes.

Sundry Exhibits

**FY 2008 WORKING CAPITAL FUND
CENTRALIZED BILLING
U.S. GEOLOGICAL SURVEY**

(dollars in thousands)

Activity/Office	FY 2006 Actual	FY 2007 Estimate	FY 2008 Estimate
Other OS Activities			
Invasive Species Program	196.0	195.9	206.6
Invasive Species DOI Coordinator	32.0	32.4	34.6
Secretary's Immediate Office	228.0	228.3	241.2
Alaska Field Office	10.9	11.1	11.8
Secretary's Immediate Office	10.9	11.1	11.8
Alaska Resources Library and Information Services	166.4	166.4	166.4
Secretary's Immediate Office	166.4	166.4	166.4
Document Management Unit	5.7	20.7	0.1
Office of the Executive Secretariat	5.7	20.7	0.1
Departmental News and Information	21.8	29.7	0.0
Departmental Newsletter	68.6	41.0	0.0
Hispanic Media Outreach	22.9	24.3	0.0
Departmental Communications Office	0.0	0.0	89.3
Office of Communications	113.2	95.0	89.3
Southern Nevada Water Coordinator	41.2	43.2	39.0
Policy, Management and Budget	41.2	43.2	39.0
Electronic Records Management (ERM)	0.0	0.0	139.8
Office of Executive Secretariat	0.0	0.0	139.8
Financial Management Training	27.4	30.2	0.0
Travel Management Center	44.8	45.6	48.7
Office of Financial Management	72.2	75.8	48.7
Activity Based Costing/Management	141.6	141.6	127.3
Office of Financial Management	141.6	141.6	127.3
Quarters Program, Space Mgmt Initiative, and Interior Collections	0.6	2.3	2.4
Interior Collections Management System (ICMS)	0.0	3.0	2.5
DOI Space Management Initiative	32.8	31.5	32.9
Renewable Energy Certificates	0.0	0.0	23.7
Office of Property and Acquisition Management	33.3	36.8	61.6
Planning and Performance Management	171.2	177.9	162.6
Office of Planning and Performance Mgmt	171.2	177.9	162.6
Center for Competitive Sourcing Excellence	49.7	62.6	78.6
Office of Competitive Sourcing	49.7	62.6	78.6
DOI wide OWCP Coordination	0.0	9.1	9.3
Partnership Coordination	19.2	12.7	12.7
CLC – Human Resources	5.0	5.0	4.2
OPM Federal Employment Services	20.3	51.9	51.9
OS-HSPD12 (e-Authentication)	223.2	125.8	125.8
Office of Human Resources	267.5	204.6	204.0
Special Emphasis Program/ EEO Complaints Tracking Sys	4.9	4.9	4.9
EEO Complaints Tracking System	0.0	0.0	3.0
Office of Civil Rights	4.9	4.9	8.0
Occupational Health and Safety	103.6	105.7	105.9
Health & Safety Training initiative	25.6	25.5	24.1
SMIS	72.0	74.2	73.6
Office of Occupational Health and Safety	201.3	205.4	203.6

Program/Project Support of Bureau, Department, and Governmentwide Costs

**FY 2008 WORKING CAPITAL FUND
CENTRALIZED BILLING
U.S. GEOLOGICAL SURVEY**

(dollars in thousands)

Activity/Office	FY 2006 Actual	FY 2007 Estimate	FY 2008 Estimate
Classified Information Facility	44.6	66.3	39.5
Emergency Preparedness	120.8	126.1	162.1
Law Enforcement Coordination and Training	46.3	47.1	68.1
<u>Watch Office</u>	<u>138.3</u>	<u>144.6</u>	<u>146.7</u>
Office of Law Enforcement and Security	350.0	384.2	416.4
IT Security	467.7	262.9	266.6
IT Security & Accreditation	430.6	430.6	430.6
Information Technology Architecture	508.9	477.2	503.1
Capital Planning	131.6	160.5	195.4
Enterprise Resource Management	0.0	33.8	50.0
<u>Data Resource Management Program</u>	<u>39.3</u>	<u>22.1</u>	<u>22.1</u>
Office of the Chief Information Officer	1,578.1	1,387.2	1,467.9
DOI-wide Telecommunications Initiatives			
Frequency Management Support	218.4	103.1	99.1
Messaging	0.0	326.1	0.0
Enterprise Services Network (ESN)	1,333.0	5,255.2	4,656.2
ESN – Program Change	1,229.4	0.0	0.0
<u>Active Directory</u>	<u>153.4</u>	<u>153.4</u>	<u>162.6</u>
Office of the Chief Information Officer	2,934.2	5,837.8	4,918.0
Web & Internal/External Comm	79.5	74.1	72.5
GPEA	50.2	7.0	7.0
<u>DOI FOIA Tracking and Reporting System</u>	<u>49.2</u>	<u>8.5</u>	<u>9.3</u>
Office of the Chief Information Officer	178.9	89.6	88.9
Ethics Training	6.6	6.6	6.1
ALLEX Database	3.0	3.0	3.0
FOIA Appeals	0.0	10.5	10.5
Solicitor	9.6	20.2	19.6
CFO Financial Statement Audit	565.9	597.9	558.6
Departmentwide Activities	565.9	597.9	558.6
E Government Initiatives	369.2	369.2	460.4
<u>Volunteer.gov</u>	<u>13.1</u>	<u>13.1</u>	<u>13.1</u>
Office of Planning and Performance Mgmt	382.3	382.3	473.4
CPIC	0.0	14.8	16.1
Coop ECO Study Units (CESU)	73.4	73.4	73.4
Glen Canyon Adaptive Management Plan	94.9	99.7	104.7
DOI Geographic Info Mgmt EGIM	80.3	230.8	224.0
SBA Certifications	0.4	0.5	0.9
NTIA Spectrum Management	501.2	191.2	190.2
<u>Contingency Reserve</u>	<u>9.4</u>	<u>9.4</u>	<u>18.7</u>
Departmentwide Activities	759.6	619.8	627.9
FBMS Program Change	0.0	0.0	1,972.0
FBMS Redirection from Enterprise Messaging System	0.0	0.0	326.1
Central Services	0.0	0.0	2,298.1
Subtotal Other OS Activities	8,265.9	10,793.4	12,450.8

Sundry Exhibits

**FY 2008 WORKING CAPITAL FUND
CENTRALIZED BILLING
U.S. GEOLOGICAL SURVEY**
(dollars in thousands)

Activity/Office	FY 2006 Actual	FY 2007 Estimate	FY 2008 Estimate
National Business Center			
Cultural Resources & Events Management	50.9	58.9	57.9
Partnership Schools & Commemorative Programs	3.3	3.7	3.8
Departmental Museum	189.1	187.2	190.4
Departmental Library	329.2	329.5	337.6
Learning and Performance Center Management	48.5	81.3	80.6
SESCDP & Other Leadership Programs	72.6	24.9	24.0
Washington Learning & Performance Center	48.1	63.1	75.6
Albuquerque Learning & Performance Center	8.4	7.0	6.5
Anchorage Learning & Performance Center	9.4	8.9	8.3
Denver Learning & Performance Center	85.9	81.5	82.2
On-Line Learning	61.2	58.4	44.8
Financial Management Training	0.0	0.0	31.7
NBC Human Capital Directorate	906.6	904.3	943.4
Desktop Services	21.1	21.3	22.0
Telecommunications Services	7.2	7.4	7.6
Voice/data switching	1.8	1.8	1.9
Integrated Digital Voice Communications System	2.0	2.8	3.4
Information Mgt. – FOIA and Records Management	57.9	59.6	61.3
NBC IT Security Improvement Plan	0.0	381.5	311.2
NBC Information Technology Directorate	89.9	474.5	407.4
FPPS - Application Management Office	140.8	0.0	0.0
FPPS – Payroll Operations	813.0	0.0	0.0
FPPS – Payroll Systems	941.1	0.0	0.0
FPPS/Employee Express – O&M	0.0	1,895.4	1,960.2
HR LOB W2 Surcharge	0.0	0.0	124.5
NBC FPPS Directorate	1,894.9	1,895.4	2,084.7
Interior Complex Management and Services	3.1	3.1	3.3
Family Support Room	0.1	0.1	0.1
Moving Services	0.9	0.7	0.7
Shipping and Receiving	1.5	1.6	1.6
Space Management Services	0.6	0.7	0.8
Drug testing - intra department	2.8	3.4	7.2
Security	20.1	21.0	22.6
Accessible Technology Center	40.5	40.7	40.0
Federal Executive Board	32.3	32.8	32.4
Health Unit	0.8	1.0	1.1
Blue Pages	83.1	87.3	96.9
Mail Policy	42.3	41.4	41.0
Mail and Messenger Services	73.6	78.2	15.1
Special Events Services	0.0	7.3	7.4
NBC Administrative Operations Directorate	301.8	319.3	270.3
Financial Systems (inc Hyperion)	2,506.2	2,464.5	2,527.1
IDEAS	378.2	378.2	387.9
Quarters Program	0.7	0.8	0.8
NBC Budget and Finance	2,885.1	2,843.5	2,915.9
Aviation Services	159.6	164.5	84.4
NBC Aviation Management Directorate	159.6	164.5	84.4
Subtotal National Business Center	6,238.0	6,601.7	6,706.1
TOTAL	14,503.9	17,395.0	19,156.8

Program/Project Support of Bureau, Department, and Governmentwide Costs

Direct billing is used whenever the product or service provided is again severable, but is sold through a time and materials reimbursable support agreement or similar contractual arrangement. The following tables provide the actual direct and reimbursable collections from USGS for FY 2006, and estimated billings and collections for FY 2007 and 2008.

**FY 2008 WORKING CAPITAL FUND
DIRECT BILLING
U.S. GEOLOGICAL SURVEY**
(dollars in thousands)

Activity/Office	FY 2006 Actual	FY 2007 Estimate	FY 2008 Estimate
Other OS Activities			
Departmental Direction Activity Coordination			
Financial and Business Management System (FBMS)			
Management and Coordination Initiatives			
OEPC – 516 DM Chapters	3.0	3.0	0.0
Census – Single Audit Clearing House	1.1	0.0	0.0
A & E Contract Work	2.1	0.0	0.0
Departmental Medals	16.5	16.5	16.5
OPM Leadership 360 Assessment	7.8	0.0	0.0
CLC/LDR September	8.5	8.5	8.5
Human Capital Conf – Sept 2006	3.8	13.6	0.0
Classification Appeals	1.3	1.3	1.3
DOI Learn	21.1	0.0	0.0
EEO Training	0.4	0.4	0.4
EEO Investigations	17.7	17.5	17.5
OLES Conference	0.3	0.0	0.0
Management and Coordination Initiatives	<u>83.6</u>	<u>60.8</u>	<u>44.2</u>
HSPD-12	0.0	922.1	786.1
HSPD-12	0.0	922.1	786.1
Information Resources Initiatives			
Oracle License & Support Contract	15.7	1,819.5	906.9
Microsoft Enterprise Licenses	2,476.5	1,685.0	1,342.4
Anti-Virus Software Licenses	105.5	127.2	105.4
IT Security – Reimb	1.0	0.0	0.0
Popkin System Architect Licenses	1.3	2.0	2.9
IT Security Certification & Accreditation	54.6	159.2	0.0
Karta GoLearn Licenses	4.5	4.5	4.5
OCIO Conference – Reno NV	15.2	0.0	0.0
Information Resources Initiatives	<u>2,674.3</u>	<u>3,797.4</u>	<u>2,362.3</u>
ESN	1,403.7	2,376.0	2,526.1
Enterprise Services Network (ESN)	<u>1,403.7</u>	<u>2,376.0</u>	<u>2,526.1</u>
Central Services			
OIG Hurricane Response and Recovery Oversight	30.5	0.0	0.0
FY 2006 KPMG Audit	125.7	18.3	0.0
FY 2007 KPMG Audit	0.0	124.3	18.3
Federal FSA Program	266.9	159.5	159.5
Central Services	<u>423.1</u>	<u>302.1</u>	<u>177.7</u>
Subtotal Other OS Activities	<u>4,584.7</u>	<u>7,458.4</u>	<u>5,896.4</u>

Sundry Exhibits

**FY 2008 WORKING CAPITAL FUND
DIRECT BILLING
U.S. GEOLOGICAL SURVEY**
(dollars in thousands)

Activity/Office	FY 2006 Actual	FY 2007 Estimate	FY 2008 Estimate
National Business Center			
Training Services			
Career, Balance & Diversity Forums	4.9	2.2	4.0
Denver Forums	7.0	3.5	3.3
Washington Learning & Performance Center	26.1	5.1	5.1
Albuquerque Learning & Performance Center	2.0	0.0	0.0
Anchorage Learning & Performance Center	4.4	0.0	4.5
Denver Learning & Performance Center	11.6	0.0	0.0
Online Learning	13.1	13.1	13.1
NBC Human Capital Directorate	69.0	23.9	30.0
Information Technology Directorate			
Enterprise Infrastructure	186.1	0.0	0.0
Technology Services	0.7	1.0	1.0
NBC – IT	186.7	1.0	1.0
Human Resources Management			
FPPS – Application Management Office	618.0	4.1	4.2
FPPS – Payroll Systems	0	302.7	355.8
NBC - E-payroll	618.0	306.8	360.0
DOI Support Services			
Facilities Reimbursable Services	0.0	1.2	1.2
Building Alteration Services	0.1	0.0	0.0
Reimbursable Moving Services	0.3	0.0	0.0
Creative Communications	0.2	62.4	70.3
Reimbursable ATC Services	0.0	0.4	0.3
Reimbursable Mail Services	0.0	7.5	9.5
Postage	6.5	0.0	0.0
Family Support Room	0.0	0.0	0.0
NBC - Administrative Operations	7.1	71.5	81.3
Financial Management Services			
IDEAS	126.0	121.7	121.7
Financial Systems	69.1	0.0	0.0
NBC Financial Management Services	195.1	121.7	121.7
Subtotal National Business Center	1,075.9	524.8	594.0
TOTAL	5,660.6	7,983.3	6,490.4

Program/Project Support of Bureau, Department, and Governmentwide Costs

Payments to other Federal agencies include the following:

	2007 Budget	2007 Revised *	2008 Fixed Costs Change
Worker's Compensation Payments	\$2,892	\$2,892	-\$102

The adjustment is for actual charges through June 2006, in the costs of compensating injured employees and dependents of employees who suffered accidental deaths while on duty. Costs for 2008 will reimburse the Department of Labor, Federal Employees Compensation Fund, pursuant to 5 U.S.C. 8147(b) as amended by Public Law 94-273.

	2007 Budget	2007 Revised	2008 Change
Unemployment Compensation Payments	\$732	\$732	-\$19

The adjustment is for estimated changes in the costs of unemployment compensation claims to be paid to the Department of Labor, Federal Employees Compensation Account, in the Unemployment Trust Fund, pursuant to Public Law 96-499

	2007 Budget	2007 Revised	2008 Change
Rental Payments to GSA and Others	\$61,647	\$61,647	+\$1,240

The adjustment is for changes in the costs payable to General Service Administration (GSA) and others resulting from changes in rates for office and non-office space as estimated by GSA, as well as the rental costs of other currently occupied space. These costs include building security, in the case of GSA space, these are paid to DHS. Costs of mandatory office relocations, i.e., relocations in cases where due to external events there is no alternative but to vacate the currently occupied space, are also included.

(*Since no 2007 appropriation has been enacted, 2007 Revised Estimates assume enactment of the 2007 President's Budget. Other revisions have been made for changes in the estimates.)

Internal Bureau Overhead/Cost Allocation Methodology

The USGS manages overhead/administrative costs at two levels—the bureau and science center. Bureau-level costs include headquarters and regional support for executive, managerial, supervisory, administrative, and financial functions and related bureauwide systems. At the bureau level, funding appropriated to the Science Support and Enterprise Information budget activities pays the bureauwide overhead costs in the same proportion as appropriated funding is to total funding. For this reason, bureauwide overhead costs collected on reimbursable support agreements are deposited within the Science Support and Enterprise Information program areas, as well.

The USGS charges a bureau overhead rate (12 percent in FY 2007 and FY 2008) on reimbursable work from non-Interior customers to cover their share of bureau-level costs. In some cases, the USGS does apply reduced or special rates when it can be demonstrated that indirect costs are substantially and consistently less than the norm and the amount collected covers the full costs, such as with pass-through funding where the Survey does not perform any of the actual work. The following table shows the funding available to the Science Support and Enterprise Information programs, including the anticipated overhead collections to pay for bureauwide costs.

Sundry Exhibits

(Dollars in thousands)

Source of Funding	FY 2008 Appropriation	FY 2008 Bureau Overhead Distribution	FY 2008 Total
Science Support Budget Activity	70,671	29,969	100,640
Enterprise Information Budget Activity	112,120	8,453	120,573
Total Funding	182,791	38,421	221,212

At the science center level, because there is not an appropriated funding source to pay the local overhead (common services) costs, both the appropriated and reimbursable funding are assessed a percentage to cover their share of science center level costs. Science center common services costs include center costs that are not directly attributable to a specific activity or project, such as managerial, supervisory, administrative, and financial functions and related systems, as well as costs incidental to providing services and products, such as postage, training, miscellaneous supplies and materials, etc. The cost during FY 2006, for the local overhead, totaled \$144 million from both appropriated and reimbursable funds.

In recognition of the USGS role as the science bureau for the Department of the Interior, the USGS is continuing to give Department bureaus and offices a "preferred" customer rate on overhead charges for a significant portion of reimbursable work, to the extent that matching funds are available within the USGS budget. The maximum rate that cost centers may charge other Department bureaus for common services and bureau costs combined remains 15 percent net. In FY 2008, of the 15 percent, 7.5 percent is applied to bureau costs, and the remaining 7.5 percent is applied to common services costs. Cost centers must fund the common services costs not recovered (e.g., the difference between the cost center's standard common services costs and the 7.5 percent) from USGS appropriated funds. In FY 2005, the bureau began a glide path to share the combined 15 percent overhead more equitably. Under this distribution, the cost centers are required to fund a lesser amount from science program funds and the bureau is required to use a greater proportion of science support funding for the total bureau overhead costs. In this way, the USGS is partnering on the science needs of Interior from both the bureau and cost centers.

- The Chief Financial Officer establishes the USGS bureau special rate for each fiscal year. The special rate for FY 2007 is 3 percent. Cost centers do not charge more than the bureau special rate for facilities-related costs or their standard common services rate when funding is approved for a bureau-level special rate. Special rates are applied under the following circumstances.
- A bureau special rate of 3 percent net is applied to cover reduced administrative costs when the USGS receives funds from a non-USGS organization and awards a grant to a third-party entity.
- A bureau special rate of 3 percent net is applied to cover reduced administrative costs when the USGS receives funds from one or more non-USGS organizations to support, under USGS leadership, a strategic science objective which includes the USGS passing through funds to one or more third party entities.
- A bureau special rate of 3 percent net is applied to cover reduced administrative costs when the USGS receives funds from a non-USGS organization for the purpose of the

Program/Project Support of Bureau, Department, and Governmentwide Costs

customer acquiring services through the Cartographic Services or the Remotely Sensed Data Contracts. The special rate helps encourage other Federal agencies to use these contracts for cartographic services and remotely sensed data, rather than establishing and managing their own contracts, and ensures greater data consistency through the use of common service providers.

- A bureau special rate of 3 percent net is applied to cover reduced administrative costs when the USGS receives funds from a non-USGS organization for the purpose of passing through the customer's funds to State and local governments for the direct purchase of geospatial data.
- Biology Cooperative Research Units (CRUs) are supported by a three-way partnership including the USGS, a State, and a university. The academic institutions where CRUs are collocated provide significant administrative support. In recognition of the direct services support received from the non-USGS partners, CRUs only recover one-half of the bureau rate (6 percent) normally recovered from reimbursable customers or partners.

This page intentionally left blank.

Authorizations

43 U.S.C. 31 et seq. Organic Act of March 3, 1879, as amended, establishes the United States Geological Survey. Provides, among other matters, that the USGS is directed to classify the public lands and examine the geological structure, mineral resources, and products within and outside the national domain. Establishes the Office of the Director of the United States Geological Survey under the Department of the Interior. The Director is appointed by the President by and with the advice and consent of the Senate. P.L. 102–285, Sec. 10(a) establishes the official name as United States Geological Survey.

U.S. Code Citations

Title 2 – The Congress

2 U.S.C. 681–688 Congressional Budget and Impoundment Control Act of 1974 (P.L. 93–344). Describes the general Federal budget process, including rescissions, reservations, and deferrals of budget authority.

Title 5 – Government Organization and Employees

5 U.S.C. Includes personnel matters (classification, pay rates, benefits, etc.), the Freedom of Information Act (P.L. 89–554), the Privacy Act, the Computer Matching and Privacy Act (P.L. 93–579), the Federal Employees Pay Comparability Act, and other issues related to general Federal functions and employment. The Appendices to Title 5 include the Federal Advisory Committee Act (FACA) of 1972, Inspector General mandates, and other matters that include Federal entities such as the USGS.

Title 7 – Agriculture

7 U.S.C. 136 Federal Environmental Pesticide Control Act of 1972 (P.L. 92–516). Amends the program established by the Federal Insecticide, Fungicide and Rodenticide Control Act of 1947 (P.L. 80–102) for controlling the sale and distribution of "economic poisons." The law requires registration of pesticides to avoid unreasonable adverse effects to humans or the environment.

7 U.S.C. 2201 Department of Agriculture Organic Act of 1956 (P.L. 86–509). Requires the Secretary of Agriculture to obtain the advice of the Secretary of the Interior as to whether certain lands that are being patented, disposed of, or exchanged are mineral in character.

7 U.S.C. 2204(b) Rural Development Policy Act of 1980 (P.L. 96–355). Authorizes the Secretary of Agriculture to enter cooperative agreements with other Federal agencies and other organizations concerning water management for rural areas.

Title 15 – Commerce and Trade

15 U.S.C. 631, 631(a) Small Business Act (P.L. 85–536). Fosters the economic interests of small businesses and sets forth procedures. Encourages Federal agencies to use small businesses and women-owned businesses for services and other contracted activities.

Authorizations

15 U.S.C. 2901–2908 National Climate Program Act of 1978 (P.L. 95–367). Establishes a national climate program to assist the Nation and the world in understanding and responding to natural and human-induced climate processes and their known and potential effects. The Department of the Interior has a mandated role in this Program.

15 U.S.C. 2921, 2931–2938, 2951–2953 Global Change Research Act of 1990 (P.L. 101–606). Establishes the United States Global Change Research Program aimed at understanding and responding to global change, including the cumulative effects of human activities and natural processes on the environment, to promote discussions toward international protocols in global change research, and for other purposes.

15 U.S.C. 5631–5633, 5641, 5651–5658 Land Remote Sensing Policy Act of 1992 (P.L. 102–555). Enables the United States to maintain leadership in land remote sensing by providing data continuity for the Landsat program. Assigns responsibility for the "National Satellite Land Remote Sensing Data Archive" to the Department of the Interior. Authorizes and encourages the Department of the Interior and other Federal agencies to carry out research and development programs in applications of these data and makes Landsat data available to the public.

Title 16 – Conservation

16 U.S.C. 1–4, 17(j), 18(f), 431–433, 461–467 National Park Service Organic Act of 1916. Parts of Title 16, Conservation, as amended and supplemented, apply to the USGS. Notably, the Outdoor Recreation Act of 1936 authorizes the Secretary of the Interior to sponsor, engage in, and assist in research relating to outdoor recreation, directly or by contract or cooperative agreements, and make payments for such purposes; undertake studies and assemble information concerning outdoor recreation; and cooperate with educational institutions and others to assist in establishing education programs and activities and to encourage public use and benefits from outdoor recreation.

16 U.S.C. 661 et seq. Fish and Wildlife Coordination Act of 1934. Authorizes the Secretary of the Interior to prepare plans to protect wildlife resources, to conduct surveys on public lands, and to accept funds or lands for related purposes; authorizes the investigation and reporting of proposed Federal actions that affect the development, protection, rearing, and stocking of all species of wildlife and their habitat in controlling losses, minimizing damages, and providing recommendations to minimize impacts on fish and wildlife resources.

16 U.S.C. 668(dd) National Wildlife Refuge System Improvement Act of 1997 (P.L. 105–57) amends the National Wildlife Refuge System Administration Act of 1966 to improve the management of the National Wildlife Refuge System, and for other purposes.

16 U.S.C. 703–712 Migratory Bird Treaty Act of 1918, as amended. Implements four international treaties that individually affect migratory birds common to the United States, Canada, Mexico, Japan, and the former Soviet Union. Establishes Federal responsibility for protection and management of migratory and nongame birds, including the establishment of season length based on scientific information relative to zones of temperature, distribution, abundance, breeding habits and times and lines of migratory flight of migratory birds. Establishes the Secretary of the Interior's responsibility for bag limits and other hunting regulations and issuance of permits to band, possess, or otherwise make use of migratory birds.

16 U.S.C. 715–715(a) Migratory Bird Conservation Act of 1900, as amended. Establishes the Migratory Bird Conservation Commission; authorizes the Secretary of the Interior to conduct investigations and publish documents related to North American birds.

16 U.S.C. 742(a) et seq. Fish and Wildlife Act of 1956. Authorizes the Secretary of the Interior to conduct investigations, prepare and disseminate information, and make periodic reports to the public regarding the availability and abundance and the biological requirements of fish and wildlife resources; provides a comprehensive national fish and wildlife policy and authorizes the Secretary of the Interior to take steps required for the development, management, advancement, conservation, and protection of fisheries and wildlife resources through research, acquisition of refuge lands, development of existing facilities, and other means. P.L. 86–686 authorized the Secretary of the Interior to continue to enter into cooperative agreements with colleges and universities, State fish and game departments, and nonprofit organizations for the purpose of developing adequate, coordinated, cooperative research and training programs for fish and wildlife resources.

16 U.S.C. 742(l) Fish and Wildlife Improvement Act of 1978, as amended by P.L. 95–616. Authorizes the Secretary of the Interior to establish, conduct, and assist with national training programs for State fish and wildlife law enforcement personnel and funding for research and development of new or improved methods to support fish and wildlife law enforcement.

16 U.S.C. 797(c) Following language supports Appropriations language "and Federal Energy Regulatory Commission licensees." States that, "To cooperate with the executive departments and other agencies of States or National Governments in such investigations; and for such purposes the several departments and agencies of the National Government are authorized and directed upon the request of the commission, to furnish such records, papers and information in their possession as may be requested by the commission, and temporarily to detail to the commission such officers or experts as may be necessary in such investigations."

16 U.S.C. 931–939(c) Great Lakes Fishery Act of 1956. Implements the Convention on Great Lakes Fisheries between the United States and Canada; authorizes construction, operation, and maintenance of sea lamprey control works; sets forth procedures for coordination and consultation with States and other Federal agencies; and establishes the Great Lakes Fisheries Commission.

16 U.S.C. 1131, 1133 Wilderness Act of 1964 (P.L. 88–577), as amended. Requires the USGS to assess the mineral resources of each area proposed or established as wilderness. The studies are to be on a planned and recurring basis. The original series of studies has been completed, and no recurring studies have been requested or funded.

16 U.S.C. 1361 et seq. Marine Mammal Protection Act of 1972 (P.L. 92–522), as amended. Establishes a responsibility to conserve marine mammals with management authority vested in the Department of the Interior for the sea otter, walrus, polar bear, dugong, and manatee.

16 U.S.C. 1451 et seq. Coastal Zone Management Act Amendments of 1976 (P.L. 94–370). Provides that each department, agency, and instrumentality of the Executive Branch of the Federal Government may assist the Secretary of Commerce, on a reimbursable basis or otherwise, in carrying out research and technical assistance for coastal zone management.

16 U.S.C. 1531 et seq. Endangered Species Act of 1973 (P.L. 93–205), as amended. Provides for the conservation of threatened and endangered species of fish, wildlife, and plants, and

Authorizations

authorizes establishment of cooperative agreements and grants-in-aid to States that establish and maintain active and adequate programs for endangered and threatened wildlife and plants.

16 U.S.C. 1604 Forest and Rangeland Renewable Resources Planning Act of 1974 (P.L. 93–378), as amended by the National Forest Management Act of 1976. The USGS is a party in an interagency agreement with the Forest Service to assess the mineral resources of National Forests.

16 U.S.C. 2801 et seq. National Aquaculture Act of 1980 (P.L. 96–362). Directs the Secretary of the Interior to participate in the development of a National Aquaculture Development Plan and authorizes research, development, and other activities to encourage the development of aquaculture in the United States.

16 U.S.C. 3141 et seq. Alaska National Interest Lands Conservation Act of 1980 (P.L. 96–487). Designates certain public lands in Alaska as units of the National Park, National Wildlife Refuge, Wild and Scenic Rivers, National Wilderness Preservation and National Forest Systems, resulting in general expansion of all systems and provided comprehensive management guidance for all public lands in Alaska. Section **3141** requires the Secretary of the Interior to assess the oil and gas potential of Federal lands (other than submerged lands on the Outer continental Shelf) in Alaska north of 68 degrees north latitude and east of the western boundary of the National Petroleum Reserve–Alaska (NPRA), other than lands included in the NPRA and in conservation system units established by the Act. Also authorizes the Secretary of the Interior to initiate and carry out a study of all Federal lands in designated areas of Alaska; the study is to assess the potential oil and gas resources of these lands; review the wilderness characteristics; and study the wildlife resources of these lands. Section **3142** provides for a comprehensive and continuing inventory and assessment of the fish and wildlife resources of the coastal plain of the Arctic National Wildlife Refuge. Also states that the USGS "has made and may be called upon to make water studies pertinent to implementation of the Act." Section **3148** authorizes the Secretary to conduct studies, or collect and analyze information obtained by permittees, of the oil and gas potential of non-North Slope Federal lands and environmental characteristics and wildlife resources that would be affected by the exploration for and development of such oil and gas. Section **3150** requires that the Secretary of the Interior assess the oil, gas, and other mineral potential on all public lands in the State of Alaska to expand the database with respect to the mineral potential of such lands. This responsibility has been delegated to the USGS. Section **3151** requires an annual minerals report be presented to Congress; the preparation of this report was delegated to the USGS. The annual reporting requirement was terminated, effective May 15, 2000, pursuant to section 3003 of P.L. 104–66, as amended.

16 U.S.C. 3501 et seq. Coastal Barrier Resources Act of 1982 (P.L. 97–348), as amended. Designates various underdeveloped coastal barrier islands depicted by specific maps for inclusions in the Coastal Barrier Resource System. Coastal Barrier Resources Reauthorization Act of 2000 (P.L. 106–514) reauthorizes and amends the Coastal Barrier Resources Act of 1999. Section **6** authorizes cooperative efforts between the Secretary of the Interior and the Director of FEMA to provide existing digital spatial data, including digital orthophotos, and shoreline, elevation, and bathymetric data of the John H. Chafee Coastal Barrier Resource System maps. If data do not exist to carry out this pilot project, the USGS, in cooperation with other Federal agencies, as appropriate, will obtain and provide the data required to the Secretary. In addition, all data used or created to carry out this section shall comply with the National Spatial Data Infrastructure established by Executive Order 12906 (59 Fed. Reg. 17671

(April 13, 1994)); and any other standards established by the Federal Geographic Data Committee established by Office of Management and Budget Circular A-16.

16 U.S.C. 4701 et seq. Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (P.L. 101-646). Establishes a Federal program to prevent introduction and control the spread of introduced aquatic nuisance species.

Title 22 – Foreign Relations and Intercourse

22 U.S.C. 3201 et seq. Nuclear Non-Proliferation Act of 1978 (P.L. 95-242). Provides that under Title V, United States Assistance to Developing Countries, the USGS assists, through the State Department and the Agency for International Development, in evaluation of nuclear facilities sites in other countries.

Title 25 – Indians

25 U.S.C. 450 et seq. Tribal Self-Governance Act of 1994 (P.L. 103-413). The USGS participates in the Tribal Self-Governance Program by identifying USGS activities that may be available for tribal operation under the Self-Governance Act. The USGS discusses programs and activities with interested tribal governments.

Title 29 – Labor

29 U.S.C. 651 Occupational Safety and Health Act of 1970 (P.L. 91-596). Provides criteria "... to assure so far as possible every working man and woman in the Nation safe and healthful working conditions"

Title 30 – Mineral Lands and Mining

30 U.S.C. 1, 3 Section 1 describes the establishment of the Bureau of Mines in 1910 (named changed to United States Bureau of Mines by P.L. 102-285) and the 1995 transfer of its functions to various Federal agencies. Section 3 describes the duties of the USBM, some of which were transferred to the USGS, as stated in the following language (also cited in Appropriations language) "... to inquire into the economic conditions affecting ... the mining, quarrying, metallurgical, and other mineral industries ... to investigate the mineral fuels and unfinished mineral products belonging to, or for the use of, the United States, ... and to disseminate information concerning these subjects"

30 U.S.C. 21(a) Mining and Minerals Policy Act of 1970 (P.L. 91-631). Emphasizes Department of the Interior responsibility for assessing the mineral resources of the Nation.

30 U.S.C. 201-209 Federal Coal Leasing Amendments Act of 1976 (P.L. 94-377). Provides that no lease sale may be held on Federal lands unless the lands containing the coal deposits have been included in a comprehensive land-use plan. Provides that the Secretary is authorized and directed to conduct a comprehensive exploratory program designed to obtain sufficient data and information to evaluate the extent, location, and potential for developing the known recoverable coal resources within the coal lands. The USGS provides data and information from coal research and field investigations, which are useful to the BLM to meet the requirements of the coal leasing program. Further, the Secretary, (**Sec. 208-1(b)**) through the USGS, "... is authorized to conduct seismic, geophysical, geochemical, or stratigraphic drilling,

Authorizations

or to contract for or purchase the results of such exploratory activities from commercial or other sources which may be needed to implement the ..." exploratory program.

30 U.S.C. 641 (P.L. 85–701) Following language supports Appropriations language "administer the minerals exploration program." Provides that, "The Secretary of the Interior is hereby authorized and directed, in order to provide for discovery of additional domestic mineral reserves, to establish and maintain a program for exploration by private industry within the United States, territories and possessions for such minerals, excluding organic fuels, as he shall from time to time designate, and to provide Federal financial assistance on a participating basis for that purpose."

30 U.S.C. 1026 Geothermal Steam Act Amendments of 1988 (P.L. 100–443). Section **6** requires the Secretary of the Interior to (1) maintain a monitoring program for significant thermal features within units of the National Park System and (2) establish a research program to collect and assess data on the geothermal resources within units of the National Park System with significant thermal features in cooperation with the USGS. Section **8** requires the USGS to conduct a study of the impact of present geothermal development in the vicinity of Yellowstone National Park on the thermal features within the park.

30 U.S.C. 1028 Energy Policy Act of 1992. Directs the Secretary of the Interior, through the USGS and in consultation with the Secretary of Energy, to establish a cooperative government-private sector program with respect to hot dry rock geothermal energy resources on public lands. Supports recurring assessments of the undiscovered oil and gas resources of the United States. (Amended by 42 U.S.C. 15801. See below.)

30 U.S.C. 1101, 1121, 1123 Geothermal Energy Research, Development, and Demonstration Act of 1974 (P.L. 93–410). Provides that the Department of the Interior is responsible for the evaluation and assessment of the geothermal resource base and the development of exploration technologies. The Chairman, acting through the USGS and other appropriate agencies, shall develop and carry out a plan for the inventorying of all forms of geothermal resources of Federal lands; conduct regional surveys; publish and make available maps, reports, and other documents developed from the surveys; and participate with non-Federal entities in research to develop, improve, and test technologies for the discovery and evaluation of geothermal resources.

30 U.S.C. 1201–1202, 1211 Surface Mining Control and Reclamation Act of 1977 (P.L. 95–87), as amended. Establishes the Office of Surface Mining Reclamation and Enforcement (OSM). OSM depends in part upon the USGS for a determination of the probable hydrologic consequences of mining and reclamation operations.

30 U.S.C. 1419 et seq. Deep Seabed Hard Mineral Resources Act of 1980 (P.L. 96–283). Provides authorization for conducting a continuing program of ocean research that "shall include the development, acceleration, and expansion, as appropriate, of the studies of the ecological, geological, and physical aspects of the deep seabed in general areas of the ocean where exploration and commercial development are likely to occur" The USGS, based on expertise developed in regional offshore geologic investigations, provides geological and mineral resource expertise in responding to the requirements of the Act.

30 U.S.C 1601 et seq. National Materials and Minerals Policy, Research and Development Act of 1980 (P.L. 96–479). Reemphasizes the responsibility of the Department of the Interior to assess the mineral resources of the Nation.

30 U.S.C. 1901–1902 Methane Hydrate Research and Development Act of 2000 (P.L. 106–193). Authorizes appropriations for the establishment of a methane hydrate research and development program within the DOE. The DOE is directed to carry out this program in consultation with the U.S. Navy, USGS, Minerals Management Service, and NSF, through grants, contracts, and cooperative agreements with universities and industrial enterprises. Provides for the study of the use of methane hydrate as a source of energy. Sunsets the methane hydrate research and development program at the end of FY 2005.

Title 31 – Money and Finance

31 U.S.C. 501, 901–903 Chief Financial Officers (CFO) Act of 1990 (P.L. 101–576). Section **501** refers to findings and purpose for the CFO Act. Sections **901–903** provide for establishment of a CFO in each agency, describe the authority and functions of agency CFOs, and provide for the establishment of agency Deputy CFOs.

31 U.S.C. 1535 Economy Act of 1932, as amended. Authorizes any agency to obtain goods and services from and reimburse any other agency if certain criteria are met.

31 U.S.C. 3302 (P.L. 97–258) The custody and possession of public money by Federal officials is dealt with in this section.

31 U.S.C. 3501 et seq. Budget Accounting and Procedures Act of 1950. Federal Managers' Financial Integrity Act of 1982 (P.L. 97–255).

31 U.S.C. 3512 Federal Financial Management Improvement Act of 1996 (P.L. 104–208). Provides for the implementation of financial management systems that comply with Federal financial management systems requirements, applicable Federal accounting standards, and the U.S. Government Standard General Ledger at the transaction level.

31 U.S.C. 3701–3720(e) Debt Collection Improvement Act of 1996. Maximizes collections of delinquent debts owed to the Federal Government; describes policies and requirements.

31 U.S.C. 3901–3907 Prompt Payment Act of 1982 (P.L. 97–177), as amended. Requires Federal agencies to pay interest penalties on overdue payments to businesses for property or services, and requires the Office of Management and Budget to prescribe regulations to implement provisions of the act and subsequent amendments.

31 U.S.C. 6301–6308 Federal Grant and Cooperative Agreement Act of 1978 (P.L. 95–224). Provides criteria for distinguishing between contract, grant, and cooperative agreement relationships and provides discretionary authority to vest title to equipment or other tangible personal property purchased with contract, grant, or cooperative agreement funds in nonprofit research or higher education institutions.

31 U.S.C. 7501 Single Audit Act of 1984 (P.L. 98–502), as amended. Provides for audits of Federal awards administered by non-Federal entities.

31 U.S.C. 9701 Independent Office Appropriations Act of 1952 (P.L. 97–258); Title 5, Fees and charges for Government services and things of value. Encourages Federal services and products ("things of value") to be as financially self-sustaining as possible. Authorizes costs to

Authorizations

be charged for Federal services and products based on the costs to the Government, the value of the service or thing to the recipient, and the public policy or interest served.

Title 33 – Navigation and Navigable Waters

33 U.S.C. 883(a) Great Lakes Shoreline Mapping Act of 1987 (P.L. 100–220). Section **3202(a)** requires that the Director of the National Oceanic and Atmospheric Administration "... in consultation with the Director of the United States Geological Survey, shall submit to the Congress a plan for preparing maps of the shoreline of the Great Lakes under section 3203." Section **3203** requires that "... subject to authorization and appropriation of funds, the Director, in consultation with the Director of the United States Geological Survey, shall prepare maps of the shoreline areas of the Great Lakes."

33 U.S.C. 1251–1274, 2901 Federal Water Pollution Control Act Amendments of 1972 (P.L. 92–500), Clean Water Act of 1977 (P.L. 95–217), and Water Quality Act of 1987 (P.L. 100–4), authorize extensive water quality planning, studies, and monitoring under the direction primarily of the EPA. Section **1254** authorizes the Administrator of the EPA to establish national programs for the prevention, reduction, and elimination of pollution including the establishment of a water quality surveillance system for the purpose of monitoring the quality of the navigable waters and ground waters, utilizing the resources of the USGS and others. The USGS is called upon to participate in many of these activities, partly by the EPA and partly by State agencies in the Federal-State Cooperative Program [now called the Cooperative Water Program]. The Act of 1987 includes water quality work in Chesapeake Bay, the Great Lakes, Estuary and Clean Lakes Programs, and studies of water pollution problems in aquifers. Estuaries and Clean Waters Act of 2000. Amends the Federal Water Pollution and Control Act (commonly known as the Clean Water Act) to include authorization for the following: Title I, Estuary Restoration; Title II, Chesapeake Bay Restoration; Title III, National Estuary Program; Title IV, Long Island Sound Restoration; Title V, Lake Pontchartrain Basin Restoration; Title VI, Alternative Water Sources; Title VII, Clean Lakes; and Title VIII, Tijuana River Valley Estuary and Beach Cleanup. (The Clean Water Act charges States and Tribes with setting specific water-quality criteria appropriate for their waters and for developing pollution control programs to meet the criteria. States and Tribes utilize USGS hydrologic data collection and monitoring to help meet Clean Water Act requirements. The USGS also is a key Federal partner in both the Chesapeake Bay Program and the National Estuary Program.)

33 U.S.C. 1271 Water Resources Development Act of 1992 (P.L. 102–580). Establishes a National Contaminated Sediment Task Force, with USGS as a member, to conduct a comprehensive national survey of aquatic sediment quality.

33 U.S.C. 2201 et seq. Water Resources Development Act of 1990 (P.L. 101–640). Authorizes a program for planning, construction, and evaluation of measures for fish and wildlife habitat rehabilitation and enhancement; cooperative effort and mutual assistance for use, protection, growth, and development of the Upper Mississippi River system; implementation of a long-term resource monitoring program; and implementation of a computerized inventory and analysis system.

33 U.S.C. 2701, 2761 Oil Pollution Act of 1990 (P.L. 101–380). Section **2761** authorizes the establishment of an Interagency Coordinating Committee on Oil Pollution Research, of which the Department of the Interior is a member, to develop a plan for the implementation of the oil pollution research, development, and demonstration program.

Title 40 – Public Buildings, Property, and Works

40 U.S.C. 471 Federal Property and Administrative Services Act of 1949 (P.L. 103–355). Provides for management, utilization, and disposal of government property.

40 U.S.C. 601 Public Buildings Amendment Act of 1972 (P.L. 922–313). Prohibits construction of buildings except by the Administrator of General Services.

40 U.S.C. 606 Public Buildings Act of 1959 (P.L. 86–249). Establishes criteria for the approval of proposed construction, alteration, acquisition, and lease of public buildings by Congress, over a designated threshold of cost.

40 U.S.C. 1401 Clinger-Cohen Act (P.L. 104–106), formerly known as the Information Technology Management Reform Act of 1996, along with the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.). Provides the opportunity to improve significantly the way the Federal Government acquires and manages information technology. Agencies have the clear authority and responsibility to make measurable improvements in mission performance and service delivery to the public through the strategic application of information technology. Executive Order 13011, July 16, 1996, provides policy and procedures regarding implementation of this Act.

Title 41 – Public Contracts

41 U.S.C. 251 et seq. Competition in Contracting Act of 1984 (P.L. 98–369). Provides direction regarding agency procurements, including support for small businesses, acquisition thresholds regarding soliciting bids, etc.

41 U.S.C. 433 Federal Acquisition Reform Act of 1996 (P.L. 104–106). Mandates the continued career development and training of the acquisition workforce.

41 U.S.C. 601–613 Contract Disputes Act of 1978 (P.L. 95–563). Describes procedures regarding the resolution of contract disputes.

Title 42 – The Public Health and Welfare

42 U.S.C. 300(f) et seq. Safe Drinking Water Act Amendments of 1996 (P.L. 104–182). Authorizes research "... relating to the causes, ... treatment, ... prevention of ... impairments of man resulting directly or indirectly from contaminants in water, or to the provision of a dependably safe supply of drinking water" The USGS and EPA have an interagency agreement covering aquifer studies conducted by the USGS relating to sole source aquifers.

42 U.S.C. 2021(b) et seq. Low-Level Radioactive Waste Policy Act of 1980(P.L. 96–573). Requires intra-State or regional arrangements for disposal of low-level radioactive waste by July 1986. The USGS provides geohydrologic research and technology to Federal and State agencies developing plans for low-level waste management. The amending Act of 1985 included approval of seven interstate compacts.

42 U.S.C. 2210(b) Nuclear Regulatory Commission Authorization Act (P.L. 97–415). Requires the Secretary of Energy to monitor and report to the President and Congress on the viability of the domestic uranium industry. Under a Memorandum of Understanding between the

Authorizations

Department of Energy and the Department of the Interior, the USGS provides information on domestic uranium resources to the Energy Information Agency.

42 U.S.C. 4321, 4331 National Environmental Policy Act of 1969 (P.L. 91–190), as amended. Requires prior-to-action determination that any major Federal action will not have a significantly adverse effect upon the environment. The USGS is called upon to provide technical review or inputs to resource-related actions proposed by other Federal agencies.

42 U.S.C. 5121, 5132 Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1974 (P.L. 93–288). States that "The President shall ensure that all appropriate Federal agencies are prepared to issue warnings of disasters to State and local officials." In addition, "The President shall direct appropriate Federal agencies to provide technical assistance to State and local governments to insure that timely and effective disaster warning is provided."

42 U.S.C. 5845(c) Energy Reorganization Act of 1974 (P.L. 93–438). Directs all other Federal agencies to "... (2) ... furnish to the (Nuclear Regulatory) Commission ... such research services ... for the performance of its functions; and (3) consult and cooperate with the Commission on research development matters of mutual interest and provide such information and physical access to its facilities as will assist the Commission in acquiring the expertise necessary to perform its licensing and related regulatory functions." The USGS conducts geological mapping in areas where nuclear reactor construction is anticipated and conducts investigations of geologic processes that could imperil the safe operation of the reactors or other critical energy facilities.

42 U.S.C. 6217 Energy Act of 2000 (P.L. 106–469). Extends energy conservation programs under the Energy Policy and Conservation Act through FY 2003. Specifically for the USGS, Section **604**, "Scientific Inventory of Oil and Gas Reserves," instructs the Secretary of the Interior, in consultation with the Secretaries of Agriculture and Energy, to conduct and update regularly an inventory of all onshore Federal lands. The inventory will identify (1) USGS reserve estimates of the oil and gas resources underlying these lands, (2) restrictions or impediments to development of such resources, and (3) furnish such inventory data to the House Committee on Resources and the Senate Committee on Energy and Natural Resources. Authorizes appropriations as necessary for implementation.

42 U.S.C. 6901 et seq. Resource Conservation and Recovery Act of 1976 and Hazardous and Solid Waste Amendments of 1984 (P.L. 94–580). Requires the EPA to promulgate guidelines and regulations for identification and management of solid waste, including disposal. The expertise of the USGS is a present and potential source of assistance to the EPA in defining and predicting the hydrologic effects of waste disposal.

42 U.S.C. 7401, 7418, 7470 Clean Air Act of 1977 (P.L. 95–95), as amended. Requires Federal facilities to comply with air quality standards to the same extent as non-governmental entities. Establishes requirements to prevent significant deterioration of air quality and to preserve air quality in national parks, national wilderness areas, national monuments and national seashores.

42 U.S.C. 7701 et seq. Earthquake Hazards Reduction Act of 1977 (P.L. 95–124). Sets as a national goal the reduction in the risks of life and property from future earthquakes in the United States through the establishment and maintenance of a balanced earthquake program encompassing prediction and hazard assessment research, seismic monitoring and information dissemination. Subsequent public laws established a National Earthquake Hazards Reduction

Program, of which the USGS is a part. P.L. 96–472 authorizes the establishment of a National Earthquake Prediction Evaluation Council. P.L. 101–614 (National Earthquake Hazards Reduction Program Reauthorization Act), P.L. 105–47, and P.L. 106–503 (Earthquake Hazards Reduction Authorization Act of 2000) reauthorize the 1977 Act, repeal some sections, and add new language in some sections including the establishment of an Advanced National Seismic Research and Monitoring System.

42 U.S.C. 8901 et seq. Acid Precipitation Act of 1980 (P.L. 96–294). Authorizes an "Acid Precipitation Program and Carbon Dioxide Study," including the establishment of an Acid Precipitation Task Force (of which the Department of the Interior is a member) and a comprehensive 10-year research program. Title IX of the Clean Air Act Amendments of 1990 (P.L. 101–549) calls for continuation of the National Acid Precipitation Assessment Program (NAPAP) established under the Acid Precipitation Act of 1980. The USGS is an active participant in the research program and coordinates interagency monitoring of precipitation chemistry. The USGS National Coal Resources Data System was named by the EPA as the official database for information on coal quality. The EPA, utility companies, and coal mining industries use the database to estimate the amount of air pollution derived from coal combustion. The USGS is a participant in studies of acid precipitation as a result of prior work in this field.

42 U.S.C. 9601 et seq. Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) (P.L. 96–510). Establishes a Hazardous Substance Superfund (26 U.S.C. 9507) to help finance the massive cleanup programs needed at sites that are heavily contaminated with toxic wastes. The USGS is called upon by the EPA and State agencies to investigate and determine the extent of contamination and remedial measures at some of these sites.

42 U.S.C. 10101 et seq. Nuclear Waste Policy Act of 1982 (P.L. 97–425). Defines the DOE as lead agency with responsibility for siting, building, and operating high-level radioactive waste repositories. Requires participation by the USGS in a consultative and review role to the DOE. The Nuclear Waste Policy Amendments Act of 1987 (Title V of the Omnibus Budget Reconciliation Act of 1987) identifies Yucca Mountain, NV, as the first site to be studied to ascertain suitability for disposal of high level nuclear waste. The 1987 Act provides that the DOE conduct a survey of potentially suitable sites for a monitored retrievable storage facility.

42 U.S.C. 10301 et seq. Water Resources Development Act of 1986 (P.L. 99–662). Amends the Water Resources Research Act of 1984 (P.L. 98–242) by adding a new Title III, "Ogallala Aquifer Research and Development." P.L. 104–147 amends the Water Resources Research Act of 1984 to extend authorization of appropriations through FY 2000. P.L. 106–374 amends the act to extend authorization of appropriations through FY 2005. P.L. 109–471 amends the act to extend authorization of appropriations through FY 2010. The Water Resources Research Act of 1984, as amended, provides for water resources research, information transfer, and student training in grants and contract programs that will assist the Nation and the States in augmenting their science and technology to discover practical solutions to water shortage and quality deterioration problems. Establishes a Federal-State partnership in water resources research, education, and information transfer through a matching grant program that authorizes State Water Resources Research Institutes at land grant universities across the Nation.

42 U.S.C. 15801 Energy Policy Act of 2005 (Public Law 109–58). Sets forth an energy research and development program covering (1) energy efficiency, (2) renewable energy, (3) oil and gas, (4) coal, (5) Indian energy, (6) nuclear matters and security, (7) vehicles and motor fuels,

Authorizations

including ethanol, (8) hydrogen, (9) electricity, (10) energy tax incentives, (11) hydropower and geothermal energy, and (12) climate change technology. Sec. **226** requires the Secretary of the Interior, acting through the Director of the U.S. Geological Survey and in cooperation with the States, to submit to Congress an update of the 1978 Assessment of Geothermal Resources. Sec. **351** (National Geological and Geophysical Data Preservation Program Act of 2005) instructs the Secretary to implement a National Geological and Geophysical Data Preservation Program, including establishment of a data archive system. Authorizes appropriations for FY 2006–10. Sec. **369** (Oil Shale, Tar Sands, and Other Strategic Unconventional Fuels Act of 2005) declares that it is the policy of the United States that U.S. oil shale, tar sands, and other unconventional fuels are strategically important domestic resources that should be developed to reduce the growing U.S. dependence on politically and economically unstable sources of foreign oil imports. Sec. **374** amends federal law governing the reservation of federal mineral rights in the conveyance of certain lands to Livingston Parish, Louisiana. Sec. **388** amends the Outer Continental Shelf Lands Act to authorize the Secretary of the Interior to grant, on either a competitive or noncompetitive basis, a lease, easement, or right-of-way on the outer Continental Shelf for activities not otherwise authorized under specified laws, if those activities (1) support exploration, development, production, transportation, or storage of oil, natural gas, (2) produce or support production, transportation, or transmission of energy from sources other than oil and gas, or (3) use, for energy-related or marine-related purposes, facilities currently or previously used for activities authorized under this Act, unless prohibited by moratorium. Sec. **437** instructs the Secretary of the Interior to review and report to Congress on coal assessments and other available data to identify (1) Federal lands, other than National Park lands, with coal resources available for development, (2) the extent and nature of any restrictions or impediments to the development of coal resources on such lands, and (3) resources of compliant coal and supercompliant coal. Sec. **965** instructs the Secretary of the Interior to report biennially to Congress on the latest estimates of natural gas and oil reserves, reserves growth, and undiscovered resources in Federal and State waters off the coast of Louisiana, Texas, Alabama, and Mississippi. Sec. **968** amends the Methane Hydrate Research and Development Act of 2000 to revise the methane hydrate research and development program. Sec. **999(b)** confers upon the Secretary ultimate responsibility and oversight of all aspects of Ultra-deepwater and Unconventional Natural Gas and Other Petroleum Resources (Sec. 999A) which directs the Secretary of Energy (Secretary) to (1) implement a program of research and commercial application of technologies for ultra-deepwater and unconventional natural gas and other petroleum resource exploration and production, and (2) increase the supply of natural gas and other petroleum resources through reducing the cost and increasing the efficiency of exploration and production.

Title 43 – Public Lands

43 U.S.C. 31 et seq. Organic Act of March 3, 1879, as amended, establishes the United States Geological Survey. Provides, among other matters, that the USGS is directed to classify the public lands and examine the geological structure, mineral resources, and products within and outside the national domain. Establishes the Office of the Director of the United States Geological Survey under the Department of the Interior. The Director is appointed by the President by and with the advice and consent of the Senate. P.L. 102–285, Sec. 10(a) establishes the official name as the United States Geological Survey.

Particularly: Section **4** of the Continental Scientific Drilling and Exploration Act of 1988. Requires that "The Secretary of the Department of Energy, the Secretary of the Department of the Interior through the United States Geological Survey, and the Director of the National

Science Foundation assure an effective, cooperative effort in furtherance of the Continental Scientific Drilling Program of the United States."

And: Section **31(a-h)**. National Geologic Mapping Act of 1992. Establishes in the USGS a National Cooperative Geologic Mapping Program. States "The objectives of the geologic mapping program shall include (1) determining the Nation's geologic framework through systematic development of geologic maps at scales appropriate to the geologic setting and the perceived applications, such maps to be contributed to the national geologic map database; (2) development of a complementary national geophysical-map database, geochemical-map database, and a geochronologic and paleontologic database that provide value-added descriptive and interpretive information to the geologic-map database; (3) application of cost-effective mapping techniques that assemble, produce, translate and disseminate geologic-map information and that render such information of greater application and benefit to the public; and (4) development of public awareness for the role and application of geologic-map information to the resolution of national issues of land use management."

Section **31(g)** requires the Secretary of the Interior to provide biennial reports on the status of the program, progress in developing the national geologic map database, and any recommendations the Secretary may have for legislative or other action to achieve the purposes of the Act to the Committee on Resources of the House of Representatives and the Committee on Energy and Natural Resources of the Senate. The Act was reauthorized in 1997 (P.L. 105-36) and 1999 (P.L. 106-148). **31(i)** Requires the National Academy of Sciences to review and report on the resource research activities of the USGS. **31(j)** FY 1997 Omnibus Appropriations Act. Requires that, beginning in FY 1998 and once every five years thereafter, the National Academy of Sciences shall review and report on the biological research activity of the USGS.

43 U.S.C. 32 Authorizes the Secretary of the Interior to authorize one of the geologists to act as Director of the USGS in his/her absence.

43 U.S.C. 34 States that the scientific employees of the USGS shall be selected by the Director, subject to the approval of the Secretary of the Interior exclusively for their qualifications as professional experts.

43 U.S.C. 36 Authorizes the purchase of professional and scientific books and periodicals needed for statistical purposes by the scientific divisions of the USGS and that the purchases may be paid for out of appropriations made for the USGS. **36(a)** The Director of the USGS is authorized "... to acquire for the United States, by gift or devise, scientific or technical books, manuscripts, maps, and related materials, and to deposit the same in the library of the United States Geological Survey for reference and use as authorized by law." **36(b)** "The Secretary of the Interior may, on behalf of the United States and for the use by the United States Geological Survey in gaging streams and underground water resources, acquire lands by donation or when funds have been appropriated by Congress by purchase or condemnation" Following language supports Administrative Provisions language "acquisition of lands for gauging stations and observation wells" Provides that, "The Secretary of the Interior may, on behalf of the United States and for the use by the Geological Survey in gaging streams and underground water resources, acquire lands by donation or when funds have been appropriated by Congress by purchase or condemnation" **36(c)** Acceptance of contributions from public and private sources; cooperation with other agencies in prosecution of projects. States that "In fiscal year 1987 and thereafter the United States Geological Survey is authorized to accept lands, buildings, equipment, and other contributions from public and private sources and to prosecute projects in cooperation with other agencies, Federal, State, or private."

Authorizations

43 U.S.C. 38 Topographic surveys; marking elevations. Provides for the establishment and location of permanent benchmarks used in the making of topographic surveys.

43 U.S.C. 41 Publications and reports; preparation and sale. Provides for the publication of geological and economic maps, illustrating the resources and classification of the lands, and reports upon general and economic geology and paleontology. Provides for the scientific exchange and sale of such published material.

43 U.S.C. 42 et seq. Distribution of maps and atlases, etc. Authorizes and directs the Director of the USGS, upon the approval of the Secretary of the Interior, to distribute topographic and geologic maps and atlases of the United States. The prices and regulations are to be fixed by the Director with the approval of the Secretary. Provides that copies of each map or atlas, not to exceed five hundred, shall be distributed gratuitously among foreign governments, departments of our own Government, literary and scientific associations, and to educational institutions or libraries. States that "In fiscal year 1984 and thereafter, all receipts from the sale of maps sold or stored by the United States Geological Survey shall be available for map printing and distribution to supplement funds otherwise available, to remain available until expended."

43 U.S.C. 43 Copies to Senators, Representatives and Delegates. Provides that one copy of each map and atlas shall be sent to each Senator, Representative, and Delegate in Congress, if published within his term, and that a second copy be placed at the disposal of each.

43 U.S.C. 44 Sale of transfers or copies of data. Provides that the USGS may furnish copies of maps to any person, concern, institution, State, or foreign government.

43 U.S.C. 45 Production and sale of copies of photographs and records; disposition of receipts. Authorizes the USGS to produce and sell on a reimbursable basis, copies of aerial or other photographs, mosaics, and other official records. Discusses the disposition of the receipts from those sales.

43 U.S.C. 49 Extension of cooperative work to Puerto Rico. Authorizes the USGS to conduct topographic and geological surveys and investigations relating to mineral and water resources in Puerto Rico.

43 U.S.C. 50 [Codifies the USGS portion of Interior appropriations acts (public laws)] Provides that the share of the USGS in any topographic mapping or water resources investigations carried on in cooperation with any State or municipality shall not exceed 50 percent of the cost thereof. **50(a)** supports Appropriations language: "Provided further, that in fiscal year 1984 and thereafter, all receipts from the sale of maps sold or stored by the Geological Survey shall be available for map printing and distribution to supplement funds otherwise available, to remain available until expended." With the establishment of the Working Capital Fund (WCF) in FY 1991, the Telecommunications Amortization Fund account and its end of year FY 1990 balances were included in the WCF. **50(b)** Recording of obligations against accounts receivable and crediting of amounts received; work involving cooperation with State, Territory, etc. "Before, on, and after October 18, 1986, in carrying out work involving cooperation with any State, Territory, possession, or political subdivision thereof, the United States Geological Survey may, notwithstanding any other provision of law, record obligations against accounts receivable from any such entities and shall credit amounts received from such entities to this appropriation." (Note U.S.C. states that "this appropriation" refers to USGS annual appropriation as contained in the Department of the Interior and Related Agencies

Appropriations Act.) Following language supports Appropriations language "Provided further, that, heretofore and hereafter, in carrying out work involving cooperation with any State, Territory, possession, or political subdivision thereof, the Geological Survey may, notwithstanding any other provisions of law, record obligations against accounts receivable from any such entities and shall credit amounts received from such entities to this appropriation."

50(c) Payment of costs incidental to utilization of services of volunteers. "Appropriations herein and on and after December 22, 1987, made shall be available for paying costs incidental to the utilization of services contributed by individuals who serve without compensation as volunteers in aid of work of the United States Geological Survey, and ... Survey officials may authorize either direct procurement of or reimbursement for expenses incidental to the effective use of volunteers such as, but not limited to, training, transportation, lodging, subsistence, equipment, and supplies: Provided further, That provision for such expenses or services is in accord with volunteer or cooperative agreements made with such individuals, private organizations, educational institutions, or State or local government." **50(d)** Services of students or recent graduates (P.L. 105–83). "The United States Geological Survey may on and after November 19, 1999, contract directly with individuals or indirectly with institutions or nonprofit organizations, without regard to section 5 of title 41, for the temporary or intermittent services of students or recent graduates, who shall be considered employees for the purposes of chapters 57 and 81 of title 5, relating to compensation for travel and work injuries, and chapter 171 of title 28, relating to tort claims, but shall not be considered to be Federal employees for any other purposes."

43 U.S.C. 50–1 Funds for mapping and investigations considered intragovernmental funds. "Beginning October 1, 1990, and thereafter, funds received from any State, territory, possession, country, international organization, or political subdivision thereof, for topographic, geologic, or water resources mapping or investigations involving cooperation with such an entity shall be considered as intragovernmental funds as defined in the publication titled 'A Glossary of Terms Used in the Federal Budget Process.'"

43 U.S.C. 364 et seq. Establishes the Board on Geographic Names (1947) to provide for uniformity in geographic nomenclature and orthography throughout the Federal Government and to promulgate in the name of the Board decisions with respect to geographic names and principles of geographic nomenclature and orthography.

43 U.S.C. 371 Reclamation Projects Authorization and Adjustment Act of 1992. Public Law 104–46 amends the 1992 law to add Section **3001**, "Western Water Policy Review Act of 1992." Directs the President to undertake a comprehensive review of Federal activities in the 19 western States that directly or indirectly affect the allocation and use of resources, whether surface or subsurface. The Secretary of the Interior, "... given ... responsibilities for ... investigations and reviews into ground water resources through the Geologic Survey (now United States Geological Survey) ..." and the Secretary of the Army "have the resources to assist in a comprehensive review"

43 U.S.C. 1331 et seq. Outer Continental Shelf (OCS) Lands Act. Authorizes the Secretary of the Interior to prescribe rules and regulations to provide for the prevention of waste and conservation of the natural resources of the OCS; to conduct geological and geophysical explorations of the OCS; directs the Secretary of the Interior to conduct a study of any region in any gas and oil lease sale to obtain information necessary for assessment and management of environmental impacts on human, marine and coastal areas which may be affected by oil and gas development on such areas.

Authorizations

43 U.S.C. 1801 et seq. OCS Lands Act Amendments of 1978. Provides for management of oil and natural gas in the OCS and for other purposes. The Minerals Management Service is responsible for carrying out all functions in direct support of management of the OCS program. The USGS provides indirect support to the Department's management activities through the basic mission to examine the geological structure, mineral resources, and products of the national domain, which, offshore, includes the EEZ.

Title 44 – Public Printing and Documents

44 U.S.C. 1318 Classes and sizes of publications; report of mineral resources; number of copies; reprints; distribution. Provides for publication, by the Geological Survey, of various reports, including a report of mineral resources of the United States, bulletins and professional papers, and monographs. Also specifies, in some instances, numbers of copies to be printed and the distribution thereof.

44 U.S.C. 1319 Specific appropriations required for monographs and bulletins. Scientific reports known as monographs and bulletins of the USGS may not be published until specific, detailed estimates, and specific appropriations based on these estimates, are made for them.

44 U.S.C. 1320 Distribution of publications to public libraries. The Director of the USGS shall distribute to public libraries that have not already received them, copies of sale publications on hand at the expiration of 5 years after date of delivery to the Survey document room, excepting a reserve number not to exceed two hundred copies.

44 U.S.C. 1903 Distribution of publications to depositories; notice to Government components; cost of printing and binding. Upon request of the Superintendent of Documents, components of the Government ordering the printing of publications shall either increase or decrease the number of copies of publications furnished for distribution to designated depository libraries and State libraries so that the number of copies delivered to the Superintendent of Documents is equal to the number of libraries on the list.

44 U.S.C. 3105–3107, 3301–3324 Federal Records Act, as amended. Establishes procedures for records management by Federal agencies, including disposal of records.

44 U.S.C. 3501 Paperwork Reduction Act of 1995. Establishes policies regarding Federal information, including minimizing the paperwork burden for all persons and organizations.

44 U.S.C. 3504 Government Paperwork Elimination Act of 1998, included as Title XVII of the Omnibus Consolidated and Emergency Supplemental Appropriations Act of 1999. Provides for the development of procedures for use and acceptance of electronic signatures by executive agencies.

Title 50 – War and National Defense

50 U.S.C. 98 et seq. Strategic and Critical Materials Stock Piling Act of 1946 as amended by the Revision Act of 1979. Supports the USGS programs for assessment of domestic minerals, especially for strategic and critical minerals, to complement the Federal mineral stockpile program. Section **98(g)** following language supports Appropriations language "and to conduct inquiries into the economic conditions affecting mining and materials processing industries ... and related purposes as authorized by law and to publish and disseminate data" Provides

for scientific, technologic, and economic investigations concerning the development, mining, preparation, treatment, and utilization of ore and other mineral substances.

Public Law Citations

P.L. 81–82, P.L. 82–231 Arkansas River Compact and Yellowstone River Compact, respectively. Congress has granted consent to many interstate water compacts. For such compacts, the USGS provides administrative support for the Federal representative, usually appointed by the President. Also, the USGS collects hydrologic data for 25 interstate compacts. The data collection is supported partly by the Federal Program and partly by the Water Resources Investigations Activity.

P.L. 93–322 (June 30, 1974, 88 Stat 276) Special Energy Research and Development Appropriation Act of 1975. Provides funds "for energy research and development activities of certain departments" The USGS water resources investigations in coal hydrology support that legislation.

P.L. 106–291 FY 2001 Interior and Related Agencies Appropriations Act. Supports Appropriations language "of which () shall be available until September 30, (), for the operation and maintenance of facilities and deferred maintenance"

P.L. 106–498 Klamath Basin Water Supply Enhancement Act of 2000. Authorizes the Bureau of Reclamation to conduct feasibility studies to augment water supplies for the Klamath Project, Oregon and California, and for other purposes. The Secretary of the Interior is directed to complete ongoing hydrologic surveys in the Klamath River Basin that are currently being conducted by the USGS. Since 1992, USGS scientists have been conducting hydrological and biological research on many of the factors affecting Klamath Basin water resources. These studies include water-quality and quantity issues, endangered species and other fishery issues, and decreased water supply to wetland areas in National Wildlife Refuges.

P.L. 106–541 Water Resources Development Act of 2000. Authorizes appropriations to the Secretary of the Army for the conservation and development of water and related resources to construct various projects for improvements to rivers and harbors of the United States, and for other purposes. Sections of interest to the USGS: Section **403** (33 U.S.C. 652) Upper Mississippi River Basin Sediment and Nutrient Study. Section **509**, CALFED Bay-Delta Program Assistance, California. Section **542**, Lake Champlain Watershed, New York and Vermont. Section **601**, Comprehensive Everglades Restoration Plan. Section **701**, Missouri River Valley, Missouri (Missouri River Valley Improvement Act).

P.L. 107–347 E-Government Act of 2002. Establishes a broad framework of measures that require using Internet-based information technology to enhance citizen access to Government information and services. Title III, the Federal Information Security Management Act of 2002, lays out a framework for ensuring the effectiveness of information security controls over information resources that support Federal operations and assets and for other purposes.

P.L. 108–7 Consolidated Appropriations Resolution, 2003. Following language included in Administrative Provisions of the USGS part of the public law: "Provided further, that notwithstanding the provisions of the Federal Grant and Cooperative Agreement Act of 1977 (31 U.S.C. 6301–6308), the United States Geological Survey is authorized to continue existing, and hereafter, to enter into new cooperative agreements directed towards a particular cooperator, in

Authorizations

support of joint research and data collection activities with Federal, State, and academic partners funded by appropriations herein, including those that provide for space in cooperator facilities."

P.L. 108–360 Earthquake Hazards Reduction Authorization Act of 2004. Authorizes appropriations through fiscal year 2009 and establishes an Interagency Coordinating Committee on Earthquake Hazards Reduction, of which the USGS is a member.

P.L. 108–447 Consolidated Appropriations Act of 2005. Division E contains the Department of the Interior and Related Agencies Appropriations Act, 2005. Following language is included: "of which \$1,600,000 shall be available until expended for the deferred maintenance and capital improvement projects that exceed \$100,000 in cost...."

P.L. 109–54 Department of the Interior, Environment, and Related Agencies Appropriations Act, 2006. See 43 U.S.C. 50, where the USGS portion of Interior appropriations acts is codified.

P.L. 109–448 United States-Mexico Transboundary Aquifer Assessment Act. Section 4 establishes a United States-Mexico transboundary aquifer assessment program to characterize, map, and model groundwater resources along the border. Describes as the program's objectives to (1) develop an integrated approach to assess transboundary groundwater resources, including identifying fresh and saline aquifers, prioritizing the aquifers for further analysis, and creating a geographic information system database for each priority aquifer, (2) expand existing agreements between the U.S. Geological Survey, the Border States (Arizona, California, New Mexico, and Texas), the Water Resources Research Institutes, and appropriate U.S. and Mexican authorities to conduct joint scientific investigations and archive and share relevant data, and (3) produce scientific products for each priority aquifer to provide water managers and natural resource agencies with necessary information.