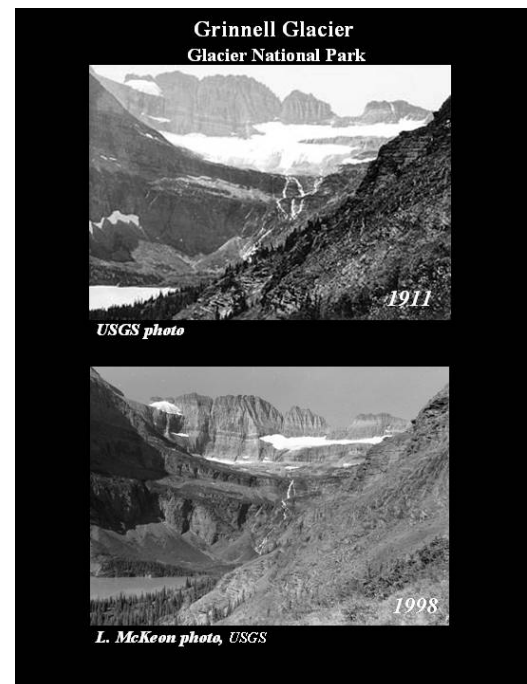


## The Strategic Science Plan *Northern Rocky Mountain Science Center (NOROCK)* 2007-2012

A lot has changed in the northern Rockies over the last 10 years. Unprecedented population growth, the re-emergence of the energy industry, and the increasing demand for water and natural resources is changing the landscape of the Rockies and potentially contributing to accelerated climate change. As we begin to understand the synergistic relationship between climate change and land management practices, the job of resource stewardship becomes increasingly complex. As these challenges emerge, there will be a greater need for high quality, unbiased scientific information to support natural resources management. Likewise, this science based information can be the building blocks for educational materials that emphasize the relationships between landscape practices and the delicate ecosystems and species within the Northern Rockies.

The Northern Rocky Mountain Science Center (NOROCK) is uniquely positioned to provide high quality scientific information in this region. We have a rich history of developing scientific information to support the management of our national parks and federal lands on a variety of issues. We work closely with partners within USGS, federal and state governments, Native American tribes, non-governmental organizations and universities to develop research that directly answers key questions related to ecosystem functions identified by management agencies. As issues surrounding ecosystems of the northern Rockies change and become more complex, we will need to adapt our skills and tools to address them in new and innovative ways.

In an uncertain budget climate, we'll need to work efficiently and more collaboratively to make our dollars go further. The following science plan addresses some of the issues and opportunities. It represents a snapshot in time and is our best guess on how we'll meet these challenges in the current environment and for the near future. As things change, we'll adapt our strategy to meet emerging needs, but we also recognize that our core mission of providing high quality, objective science for natural resource management will remain unchanged.



## Guiding Principles

**Mission** – The mission of the Northern Rocky Mountain Science Center is to produce and disseminate scientific information needed to manage and restore the ecosystems and associated plant and animal communities of the northern Rockies and the western United States.

**Vision** – The Center will generate and communicate scientific information needed to address issues of critical importance to natural resource managers of the region. The Center will be recognized for its ability to anticipate and address key issues effectively through research and information transfer, and for its collaborative approach to problem solving. Whenever feasible, the Center will continue to pursue a network approach to integrated, interdisciplinary science in the USGS, involving other centers in each of the major disciplines in joint scientific ventures.

**Center Values** - Scientists from NOROCK will conduct high quality, scientific investigations and produce unbiased, scientifically sound information for natural resource managers and the general public in a timely manner.

Scientific investigations, human resources actions, and interactions with partners and clients (including development and maintenance of effective working relationships with federal, state, university, Native American tribes and non-governmental partners at the individual and institutional levels) will be conducted in a professional manner with integrity.

NOROCK will promote a healthy, productive work environment for its employees and value the diverse nature of our workforce. We will efficiently use government resources allocated to the Center to achieve results in accordance with our commitment to public service, while maintaining a productive, results-oriented workforce that is prepared, supported and equipped to accomplish the Center mission.

**Goals** - NOROCK is a federal science organization that provides information from high quality scientific studies to federal and state partners and the public. Goals that guide the direction of the Center are:

- Develop scientific information to address important management issues related to wildlife conservation and the changing landscape of the northern Rockies
- Foster collaboration with other USGS disciplines, federal and state partners, Native American tribes, universities, and non-governmental organizations to deliver high quality, cost-effective, and relevant science



- Encourage learning and exploration into new science areas and explore new and more efficient technologies for understanding natural resource issues

**Guidance** - Center Science is guided by a Board of Directors that includes partners from DOI natural resource agencies and other state and federal agencies. This Board serves in an advisory capacity to provide science direction and feedback on the quality and usefulness of Center products and outreach. This Board of Directors includes members from:

- U.S. Fish and Wildlife Service
- Bureau of Land Management
- National Park Service
- State Game and Fish Agencies
- Montana State University
- U.S. Forest Service
- USGS - Water
- USGS - Bio-regional executive



## Organizing Themes



We have four broad themes that organize our work. These include:

- (1) The conservation needs of wildlife
- (2) The changing landscapes of the northern Rockies and the world
- (3) Modeling and decision support tools for managers
- (4) Technology development and transfer

### The Conservation Needs of Wildlife

The Center has a long history of providing scientific information on important wildlife species ranging from large carnivores to native amphibians. Much of our work has been directed toward supporting the management of federal trust species and other species that may have status under the Endangered Species Act, in addition to providing information on important management species.

#### Scientific Emphasis Areas

***Conservation requirements for large carnivores of the Northern Rocky Mountains*** – Long-term research and monitoring of large carnivores and their habitats addresses priorities of managers in the northern Rockies. Some of these priorities include the population trends of grizzly bears, the status of key grizzly bear foods, causes of mortality, and research to identify new monitoring techniques. Our current work includes grizzly bears and black bears in the Greater Yellowstone and the Northern Continental Divide Ecosystems.

***Conservation requirements for wild ungulates of the Northern Rocky Mountains*** - The Center develops science information on a variety of species that are of broad interest to local, state and federal agencies, tribal governments, non-government organizations, and the public. This research provides insights into the biology and habitat needs of large, free ranging animals such as bison, elk, and antelope that are an important part of the western landscape. The science will inform managers and the public who will ultimately decide how these animals will be managed.

***Understanding the dynamics of amphibian and reptile populations*** - Amphibians and reptiles may provide insights into general ecosystem health due to their close association with various habitats and sensitivity to different environmental stresses. Our current work evaluates the effects of habitat alteration, disease, climate change,

introduced species (especially bullfrogs and fish in the West), contaminants, or combinations of these on native amphibians and reptiles.

***Wildlife disease ecology and wildlife health*** - Much of the interest in disease ecology and wildlife health has been prompted by the emergence, or resurgence, of diseases that move between livestock, wildlife, and/or humans. Almost 75% of all emerging human infectious diseases are sourced from animals and many livestock disease issues are associated with repeated introductions from wildlife species. Center scientists collaborate with a number of partners to study the intimate linkages between animal and human health to help managers answer important questions related to emergence and spread of diseases and their consequences on wildlife and human populations.

***Native fishes of the northern Rockies*** – Native salmonids, specifically trout and grayling populations have declined drastically throughout western North America over the past century as a consequence of habitat degradation and non-native species introductions. Despite substantial activity in recent decades to protect remaining populations and implement restoration activities, efforts are hampered by the lack of holistic, comprehensive assessments of current population status that are necessary to effectively integrate and prioritize management actions. Current research is directed toward understanding life history requirements and how changes in habitat and introduction of non-native species will ultimately influence long-term survival of native fishes.

## The Changing Landscape of the northern Rockies

The landscapes of the northern Rockies are changing rapidly. Climate change, urban development, and land management are all intimately linked to influence current landscape conditions. Center scientists evaluate effects of climate change on glaciers and ecosystems, study consequences of flow regulation on aquatic and riparian resources, and explore the influence of geology and hydrology on the dynamics of wetland ecosystems. In addition, dynamics of vegetation change are explored through studies on effects of ungulate browsing on riparian habitat, plant community succession and invasive species ecology related to energy development, and evaluation of wildfire severity on forest vegetation. The following are current emphasis areas within this theme.



### Scientific Emphasis Areas

***Integrated Science to Understand Lake and Wetland Ecosystems of the Northern Rocky Mountains*** - Wetland research in the Northwest is inexorably tied to water issues, agricultural practices, forestry, grazing, and other land management fields.

Current research and development is geared towards helping natural resource managers effectively deal with such topics in relation to wetland dynamics.

***Invasive Species*** - Ecosystem change results from multiple, interacting factors that may be human-influenced such as climate, grazing, fire, flood, and land-use. Non-native species are one factor in ecosystem change that interacts with all other factors. Center scientist utilize these species as model systems for monitoring ecosystem change and forecasting components of ecosystem change such as changes in species composition and structure, which alter habitat and disturbance processes.

***Global change research*** - The Global Change Research Program seeks to understand the effects of climatic variability on the Northern Rocky Mountains, to document and understand climate-driven changes in the regional landscape, and to project future changes.

By integrating available knowledge and information, the Global Change Research Program is able to assist natural resource decision makers. A variety of methods and research strategies have been employed to understand climate related ecosystem processes. Integration with climate change research world-wide has created a program with global significance in understanding effects of global change in mountain



ecosystems. Our projects include the Climate Change in Mountain Ecosystems program as well as projects assessing climate change effects on native salmonids, native ungulates, and the denning times of grizzly bears.

***Landscape changes in browse condition by wild and domestic ungulates*** - The level of browsing by wild and domestic ungulates is an important influence on structural diversity and species composition of plant communities. Over the past several decades, many parts of the northern Rockies have experienced an increase in population of wild ungulates, resulting in browsing levels that prevent young plants from growing through the browse zone. To effectively manage for sustainable habitat requires the ability to detect declines in plant diversity at an early stage. Our research describes the effects of browsing on plant communities and proposes rapid detection methods to measure the response.

**Priority Ecosystem Science - The Greater Yellowstone Ecosystem**  
**Understanding the Effects of Flow Regulation on the Snake River Ecosystem below Jackson Lake: Using Science in an Adaptive Management Framework**

The Snake River hosts world class fishing and its riparian corridor supports abundant flora and fauna that depend on this system for all or part of their life cycle. The Snake River is also a working river, providing irrigation water stored in Jackson Lake for downstream agriculture, as well as recreational boating, rafting and fishing. Our research program integrates monitoring and modeling to support adaptive management of Jackson Lake and associated riparian natural resources by the National Park Service, Bureau of Reclamation and other state and federal agencies, as well as non-governmental organizations and the public.

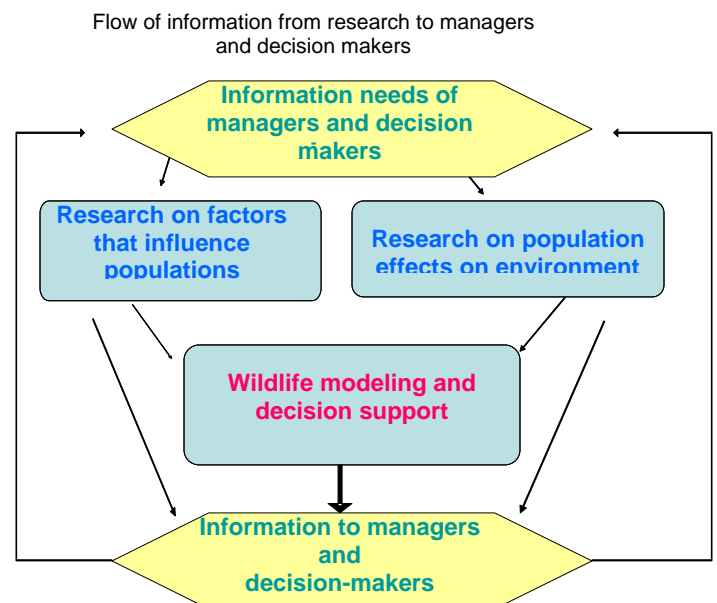
**Post-fire burn assessment by remote sensing on National Park Service lands**

The ecological significance of wildfire is now recognized globally, and needs to monitor and predict variations due to fire are widely accepted. Required levels of information are often difficult to obtain, especially where fire size, remoteness and rugged terrain impede direct observation of burned areas. Thus, land managers increasingly must turn to remote sensing technologies to extend knowledge and quantify the role of fire in today's ecosystems. To those ends, a functional methodology to assess burn impacts is crucial; and our scientists are examining efficient, conventional procedures needed for integrative study.



**Modeling complex systems and decision support - An emerging need**

Wildlife species assessments synthesize data from many sources that may use different methods, have different data, and often encompass multiple time periods. Tools are needed to integrate multiple-species and habitat information to determine ecological effects of land management on both public and private lands. Increasing pressure of land development on private lands, expanding energy production, and continued commodity extraction on world class wildlife resources requires more complicated analyses to identify potential consequences and trade-offs of management alternatives. Center



scientists are looking to develop systems-based ecological models for key regions of the northern Rockies, conduct simulation experiments using the models and develop decision support tools for managers to identify potential tradeoffs from management alternatives. Modeling will identify multi-scale information on ecological responses to management and identify ways to optimize the choice and spatial arrangement of management to assist with ecosystem decision-making.. While statistical models assist with determining population trends in distribution and abundance of various species by helping to determine the potential for disease spread and transmission, and forecasting long-term patterns for ungulate species, decision support systems are relatively new techniques to use information from research studies to develop models that reflect a particular ecosystem or species of interest. Model inputs can be adjusted to fit management goals or environmental conditions to display effects on the system so that managers can weigh tradeoffs of different management options.

### Scientific Emphasis Areas

***Identification of Bird Migration Events in NEXRAD Data*** - Management agencies often do not have adequate data to delineate when the greatest number of birds are migrating, or the quantitative data to map the most important migration areas. The Northwest is important to shorebirds, waterfowl, and other wetland birds due to the presence of high quality habitats. Our goal is to be able to distinguish between precipitation and birds in NEXRAD weather radar data and apply the tools (algorithms) for all existing NEXRAD data to develop a landscape model of when birds migrate across the Northwest and what areas are most heavily used.

***Risk Assessment and Decision Support System for Wildlife Friendly Wind Power*** - Wind energy development is emerging as one of the fastest growing and controversial issues facing the U.S. Fish and Wildlife Service (USFWS) due to the federal responsibility for migratory bird management and the public's growing perception of wind energy's detrimental effects on birds. The long term objectives of Center research are to develop a three dimensional conceptual model of how birds use the landscape, collect data to validate that model (before wind energy development), and then use a decision-support system to evaluate effects of the wind energy project after development.

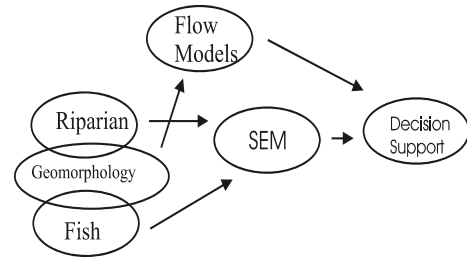


***Landscape-level models to assess risk to important wildlife species*** - Tools are needed to integrate multiple-species/habitat information to determine ecological effects of land management on both public and private lands in two important areas of the northern Rockies, the Rocky Mountain Front and northern Great Plains sage/steppe. The region is currently managed primarily for agricultural production, big game hunting, and outdoor recreation. In addition, surrounding private lands are under increasing pressure for development associated with increased human population. These areas are also



home to endangered predators such as grizzly bears and wolves, important management species such as sage grouse, trumpeter swans and ungulates, and represent diverse ecosystem. Center objectives are to (1) develop and validate a systems ecological model for key regions of the northern Rockies, (2) conduct simulation experiments and test hypotheses using the model, and (3) use research products for development of decision support tools for managers.

***Decision support systems to evaluate flow regime tradeoff in the Upper Snake River*** - Management of water flows from Jackson Lake dam has potential to affect riparian plant, wildlife, and fishery communities. As a consequence, flow from the dam is a major concern for managers within Grand Teton National Park and potential for conflict among the various interests of stakeholder groups is high. Center scientists will use structural equation modeling methods (SEM) (Pugesek et al. 2003) to generate causal models of the structure and function of aquatic and riparian ecosystems and use model results within decision support systems. Model parameters can be modified by user inputs and the system-wide consequences evaluated by the user.



## Technology Development and Transfer

Research results must be shared in a timely fashion and in a manner that is most useful to our customers – land managers and the public. In the past, scientists have viewed the publication of a paper or the presentation of research at a conference as the primary means of technology transfer. However, these methods only reach a specific niche within the scientific community and do not serve the educational needs of our audience. In addition, managers do not have access to technical journals or need further help to apply new methods or analysis techniques.

Research organizations benefit by having individuals who can bridge the gaps between research and management, and the scientific and non-science communities. As retirements and transfer of personnel occur, we intend to fill two key positions that will act as “boundary spanners”. These positions will be 9 factor scientists with duties in research and specifically in technology development and transfer. These individuals will be responsible for conducting field assistance trips, conduct technical workshops and training, and do outreach with our management partners and the public.

## Center Challenges and Opportunities



### Core capabilities

It is important for the Center to maintain core capabilities to address the most significant elements of its mission. Priorities for Center research in the biological discipline, based on our staff capabilities, national program priorities, partner needs and scientific trends, are projected to focus mainly on the four thematic areas outlined above.

The Center's workforce currently includes scientific capabilities in the disciplines or fields of climate change research, herpetology, wildlife population ecology, plant community ecology, fisheries, terrestrial invasive species, wildlife health and statistics. As new opportunities emerge, the Center will build additional capabilities in landscape modeling, climate modeling, and technology transfer.

### Challenges and responses

If the Center is to meet its mission and achieve its goals, certain challenges must be overcome:

- *Long-term development of scientific staff* – Maintaining a productive, results-oriented workforce that is prepared, supported and equipped to accomplish the Center mission requires attention to recruitment and retention of individuals with suitable education and experience. In addition, provision of training, support in the form of administrative assistance, funding to enable the workforce to conduct science, and adequate office and laboratory facilities and equipment are essential. The basic elements are people, funds, and facilities. The Workforce Plan will guide Center management concerning people as a critical element of the overall Center strategy.
- *FTE for positions* – Emphasis will be on recruiting one or more research scientists to enhance core capabilities and then develop our technology transfer capability. The Center's workforce will be stationed at Bozeman, Missoula Jackson, Wyoming, and West Glacier, Montana. Additional temporary or permanent duty stations will be considered only in accordance with regional policy and the Center's mission, goals and guiding principles.
- *Funding for research* – Funding will remain a major challenge, given the recent trend in Federal appropriations and the likelihood that discretionary domestic spending reductions will affect not only the USGS but also its partners. Rising costs of doing business in USGS will compound difficulties in securing both appropriated (SIR) and reimbursable funds from traditional sources. To sustain its mission, the Center will need to contain fixed costs, market core capabilities in ways that are

consistent with Center goals and guiding principles, and develop new stakeholder relationships.

- *Facilities* – The Center will be relocating to new space on the campus of Montana State University in 2009. This will expand our laboratory and Geographic Information System capabilities so that we can explore new work avenues. We will continue to occupy space provided by the U.S. Forest Service, the National Park Service, and the USFWS National Elk Refuge. Recent improvements in Center space associated with Glacier National Park have markedly improved conditions there.
- *Managing administrative workload* – An ever-increasing administrative workload is imposed on the Center by the USGS. Reducing this workload is beyond the Center's control. In response, the Center will ensure that its administrative staff is prepared to deal with the workload and to support scientists and other staff in handling tasks that cannot be centralized in the administrative office. The Center will remain engaged with the Regional and Headquarters offices in discussing ways to ensure that administration supports science rather than the other way around.
- *Programmatic support for integrated science* – NOROCK was established as the first integrated science center in the USGS, but barriers and lack of commitment in the bureau prevented the Center from realizing this goal. The Center will continue to pursue opportunities for integrated, interdisciplinary science within the constraints of the USGS, and will continue to advocate changes in USGS management to reduce programmatic barriers. Recent examples of integrated science include research on the effects of oil brine on prairie pothole wetlands in NE Montana with the Montana Water Science Center, North Dakota Water Science Center, Geology Division and the Northern Prairie Wildlife Research Center.

## Stakeholders

The Center operates through a network of relationships with partners and clients, including those who collaborate in conducting scientific work and those who use its results in managing natural resources. The foundation for stakeholder relationships is at the individual level where Center scientists collaborate with scientists and managers to conduct and deliver science. Pursuit of these entrepreneurial efforts is a key to the Center's future success.

The Center's major institutional stakeholders currently include the National Park Service, U.S. Fish and Wildlife Service, Bureau of Land Management, U.S. Forest Service, wildlife management agencies of Idaho, Montana and Wyoming, and Montana State University. The Center has specific commitments to maintain stakeholder relationships with Glacier, Grand Teton and Yellowstone National Parks, the Interagency Grizzly Bear Committee, the National Wildlife Refuge System in the Mountain-Prairie Region, the Greater Yellowstone Interagency Brucellosis Committee, the Aldo Leopold Wilderness Research Institute, the USGS Montana Mapping Partnership Office, the NPS Greater Yellowstone Inventory & Monitoring Network, the Rocky Mountains Cooperative Ecosystem Studies Unit, the Big Sky Institute, the Greater Yellowstone Coordinating Committee, the

Northern Yellowstone Cooperative Wildlife Working Group, the Shoshone Tribe, Salish Kootenai Tribes, the Blackfoot Tribe, the National Partnership for the Management of Wild and Native Coldwater Fisheries, and the Greater Yellowstone Trumpeter Swan Working Group.

Identifying agencies and institutions that should be stakeholders, and developing and maintaining relationships with them are vital elements of the strategic plan. Future stakeholders might include other federal or state agencies, non-governmental organizations or academic institutions with which new scientific programs or new applications of existing programs could develop in fields such as agriculture, water resources, transportation, medicine, or technology. Maintaining an active network of professional contacts through participation in conferences and other exchanges will enable Center staff to recognize and capitalize on these opportunities.



## Appendix 1. Linkages to DOI and USGS Programs and Strategies

### Facing Tomorrow's Challenges - The USGS Science Strategy for 2007-2017

In response to the rapidly changing science needs of the United States, the USGS has developed a plan to address six key challenges facing the nation over the next 10 years. While somewhat broad in nature, these challenges set the stage for science directions within the agency. There are four strategic elements that are particularly relevant to the Center science strategy:

- (1) **Understanding Ecosystems and Predicting Ecosystem Change**
- (2) **Climate Variability and Change**
- (3) **The Role of Environment and Wildlife in Human Health**
- (4) **A Water Census of the United States.**



A number of Center research areas are particularly well matched to these themes. For example, almost all of our research can be categorized as contributing to the understanding of ecosystems and predicting ecosystem change. Our research also contributes and is relevant to a number of the other areas. These include the following research themes.

### **(1) Understanding Ecosystems and Predicting Ecosystem Change**

- Conservation requirements for large carnivores of the Northern Rocky Mountains
- Conservation requirements for wild ungulates of the Northern Rocky Mountains
- Wildlife disease ecology and wildlife health
- Native salmonids of the northern Rockies
- Landscape changes in browse condition by wild and domestic ungulates
- Global change research
- Understanding the dynamics of amphibian and reptile populations
- Priority Ecosystem Science - The Greater Yellowstone Ecosystem
- Invasive Species
- Integrated Science to Understand Lake and Wetland Ecosystems of the Northern Rocky Mountains
- Identification of Bird Migration Events in NEXRAD Data
- Risk Assessment and Decision Support System for Wildlife Friendly Wind Power
- Landscape-level models to assess risk to important wildlife species
- Post-fire burn assessment by remote sensing on National Park Service lands

### **(2) Climate variability and change**

- Global change research -
- Conservation requirements for large carnivores of the Northern Rocky Mountains
- Conservation requirements for wild ungulates of the Northern Rocky Mountains---
- Understanding the dynamics of amphibian and reptile populations
- Wildlife disease ecology and wildlife health
- Native salmonids of the northern Rockies
- Priority Ecosystem Science - The Greater Yellowstone Ecosystem
- Invasive Species
- Integrated Science to Understand Lake and Wetland Ecosystems of the Northern Rocky Mountains
- Landscape-level models to assess risk to important wildlife species

### **(3) The role of environment and wildlife in human health**

- Conservation requirements for wild ungulates of the Northern Rocky Mountains
- Understanding the dynamics of amphibian and reptile populations
- Wildlife disease ecology and wildlife health
- Native salmonids of the northern Rockies
- Landscape-level models to assess risk to important wildlife species

#### (4) A Water Census of the United States

- Native salmonids of the northern Rockies
- Priority Ecosystem Science - The Greater Yellowstone Ecosystem
- Integrated Science to Understand Lake and Wetland Ecosystems of the Northern Rocky Mountains

### Linkages to Current USGS National Program Goals

The Northern Rocky Mountain Science Center addresses local, regional, national, and global scientific needs for natural resource management. The Center's scientific goals directly support the USGS National Program Goals in the following areas:

#### **USGS PROGRAM: Terrestrial, Freshwater, and Marine Ecosystems**

*Goal: Develop and evaluate inventory and monitoring methods, protocols, experimental designs, analytic tools, models, and technologies to measure biological status and trends.*

- Understanding the dynamics of amphibian and reptile populations (3214A80)

*Goal: Quantify and understand factors influencing patterns of temporal and spatial variability in key ecosystem components.*

- Global change research (3213B74)
- Priority Ecosystem Science - The Greater Yellowstone Ecosystem (834899I)
- Integrated Science to Understand Lake and Wetland Ecosystems of the Northern Rocky Mountains (834899M)

*Goal: Develop indexes of ecosystem sensitivity to change and vulnerability to potential stressors, and tools to predict ecosystem responses to environmental change.*

- Global change research (3213B74)
- Priority Ecosystem Science - The Greater Yellowstone Ecosystem (834899I)
- Post-fire burn assessment by remote sensing on National Park Service lands (83499KR)

*Goal: Devise a restoration and adaptive management framework for impaired ecosystems.*

- Priority Ecosystem Science - The Greater Yellowstone Ecosystem (834899I)
- Integrated Science to Understand Lake and Wetland Ecosystems of the Northern Rocky Mountains (834899M)

**USGS PROGRAM: Invasive Species:**

*Goal: Expand research to support prevention and control of invasive species.*

- Invasive Species (8664BET)
- Invasive Species (89280FC)

**USGS PROGRAM: Status and Trends of Biological Resources:**

*Goal: Develop advanced techniques to monitor land surface change and ecosystem structure and function, in a spatially explicit fashion.*

- Understanding the dynamics of amphibian and reptile populations (3214A80)
- Post-fire burn assessment by remote sensing on National Park Service lands (83499KR)

*Goal: Develop and evaluate inventory and monitoring methods, protocols, experimental designs, analytic tools, models, and technologies to measure biological status and trends.*

- Understanding the dynamics of amphibian and reptile populations (3214A80)

**USGS PROGRAM: Wildlife: Terrestrial and Endangered Resources:**

*Goal: Provide Tools and Techniques for effective science-based management, such as predictive models, decision support systems, and expert systems.*

- Conservation requirements for large carnivores of the Northern Rocky Mountains (834899H)
- Conservation requirements for wild ungulates of the Northern Rocky Mountains (834899H)
- Wildlife disease ecology and wildlife health (834899H)
- Native salmonids of the northern Rockies
- Landscape changes in browse condition by wild and domestic ungulates (83489JI)

*Goal 4: Institute an Adaptive Science Approach to Support the Adaptive Management of Terrestrial Plants and Wildlife and to Provide Technical Assistance to Natural Resource Managers. Engage USGS partners in defining high priority research needs for wildlife conservation and work closely with these partners to identify urgent wildlife issues, conduct effective research,*

*and deliver timely results and technical assistance for natural resource management and decision making.*

- Conservation requirements for large carnivores of the Northern Rocky Mountains (834899H)
- Conservation requirements for wild ungulates of the Northern Rocky Mountains (834899H)
- Wildlife disease ecology and wildlife health (834899H)
- Native salmonids of the northern Rockies
- Landscape changes in browse condition by wild and domestic ungulates (83489JI)

*Goal 5: Enhance USGS Wildlife Research to Meet Emerging and Future Issues. Build additional capabilities, expertise, and capacity in the WTER Program to meet the emerging needs of USGS partners as wildlife issues take on new importance in today's society.*

- Conservation requirements for large carnivores of the Northern Rocky Mountains (834899H)
- Conservation requirements for wild ungulates of the Northern Rocky Mountains (834899H)
- Wildlife disease ecology and wildlife health (834899H)
- Native salmonids of the northern Rockies
- Landscape changes in browse condition by wild and domestic ungulates (83489JI)

### **USGS PROGRAM: Biological Informatics**

*Goal: Apply innovative technologies and best practices to improve the collection, description and dissemination of biological information to our customers. Provide tools and techniques for effective science.*

- The Center addresses this goal with the Mountain Prairies Information Network

### **Other USGS PROGRAMS: Other National Programs and Initiatives**

Additionally the Center participates in National projects and projects conducted through other disciplines at the National level that include: Amphibian Research and Monitoring Initiative (ARMI), Global Climate Change program (GCC), Science Support Program (SSP), and Park Oriented Biological Studies (POBS).