

Appendix A

Summary of Water Resources Division Funding

Table A.1. Water Resources Program FY 2011

FY 2010 Allocation	\$12,472,000
Classified Pay Increase	148,000
Net FY 2010 Increase/Decrease	1,250,000
Total Available in FY 2010	13,870,000
FY 2011 Allocation	13,870,000
Classified Pay Increase	0
Net FY 2011 Increase/Decrease	-63,000
Total Available in FY 2011	13,807,000
Change from FY 2010	-\$63,000

Trumpeter swans on Boxley Mill Pond at Buffalo National River (Arkansas). NPS/DALE DOMBROWSKI



Table A.2. Water Resources Program funding by categories FY 2011

Water Resource Projects	\$1,166,130
Water Resource Protection (table A.3)	658,630
Ocean and Coastal Resources (tables A.9 and A.10)	285,000
Legacy High Priority (table A.4)	222,500
Water Quality Vital Signs Monitoring (table A.5)	2,737,900
Natural Resource Condition Assessment (NRCA) Projects	2,335,700
Natural Resource Condition Assessments (table A.6)	2,015,700
NRCA High Priority Water Resource (table A.7)	320,000
Water Resource Protection—Aquatic Resource Professionals (table A.8)	1,327,400
Ocean and Coastal Resources (tables A.9 and A.10)	965,000
Water Resource Technical Assistance (Appendix B)	5,274,870
Total	\$13,807,000

Water Resource Protection

Program Summary

THE NATURAL RESOURCE CHALLENGE resulted in an increase of \$823,000 per year for water resource protection projects beginning in FY 2001. Project funds in FY 2011 were used to collect, process, and analyze streamflow and water level data; monitor post-flooding impacts on sediment and riparian resources; determine environmental flow needs; determine aquifer characteristics; investigate the importance of fresh and brackish water on coral reef ecosystems; and develop engineering data to support a water right application. Results were used to develop water resource protection strategies that were secured through settlement discussions; state or federal regulatory processes (e.g., NEPA, 404 permitting actions, reservoir operations); administrative hearings (e.g., water right protests), and/or state and federal court proceedings (e.g., basin-wide adjudications).

In 2011 the NPS continued to work closely with other federal agencies—including the U.S. Fish and Wildlife Service, the Bureau of Land Management, the Bureau of Reclamation, the U.S. Army Corps of Engineers, and the U.S. Geological Survey—to provide funding and expertise to support water resource investigations that are useful for resolving multi-agency issues in complex water allocation decisions. The NPS also

partnered with state and private entities to increase the effectiveness of its water resource protection funding to improve the likelihood of reaching settlements that protect NPS water resources values while allowing for future water development and economic growth. For example, hydrologic data collected by the NPS for Lake Mead National Recreation Area (Nevada, Arizona); Death Valley National Park (California, Nevada); and Great Basin National Park (Nevada) are shared with the Nevada State Engineer, Nevada water providers, and private developers to develop a better understanding about regional aquifer systems and potential ground water availability in southern Nevada. In addition, data collected at White Sands National Monument (New Mexico) will be shared with military bases and the municipalities of Alamogordo and Tularosa to better understand the potential impacts of groundwater development on the sand dunes.

Results of these investigations must be presented in various legal forums to secure and protect water rights and water-dependent resources. Therefore, a portion of the water resource protection funds supported an attorney from the Office of the Solicitor to provide advice and to represent the NPS in legal proceedings.

Researchers in a spring at Ozark National Scenic Riverways (Missouri). NPS COLLECTION





Exploring Wonder Lake in Denali National Park (Alaska). NPS/KENT MILLER

Table A.3. Water Resource Protection Project funding FY 2011

Park	Region	Project Title	FY 2011 Funding
BIBE	IMR	Hydrologic Data Collection for Rio Grande River	\$20,000
BIBE	IMR	Determination of Outstandingly Remarkable Values	28,000
DINO	IMR	Hydrologic Data Collection for Green and Yampa Rivers	93,120
GRTE	IMR	Engineering Services for Water Rights Change Applications on Spread Creek	2,500
WHSA	IMR	Hydrologic Data Collection for Tularosa Aquifer	75,000
WICA	IMR	Lab Analysis for Cave Evolution Study	15,000
DEVA	PWR	Hydrologic Data Analysis for Devils Hole	30,800
GRBA	PWR	Investigation of Hydrogeology and Hydrologic Data Collection	46,600
KAHO	PWR	Investigation of Hydrology and Water Dependent Values	78,800
LAKE	PWR	Hydrologic Data Collection on Virgin River	5,400
Servicewide		Support to the Office of the Solicitor to Protect/Secure NPS Water Resources	192,750
Servicewide		Support to the U.S. Geological Survey to Process Hydrologic Data	23,760
Servicewide		Technical Support and Assistance for All Projects	46,900
Total			\$658,630

Table A.4. Legacy High Priority Project funding FY 2011

Park	Region	Project Title	FY 2011 Funding
THRO	IMR	Flow Diversion, Drought Stress, and Cottonwood Sex Ratios	\$13,700
WICA	IMR	Black Hills Groundwater Flow Model	15,000
CHIS	PWR	Prisoners Harbor Supplemental Plant Propagation	40,000
GOGA	PWR	Install Water Level Recorders	9,950
Servicewide		Cooperative Fisheries Program	14,250
Servicewide		Water Quality Partnership Investigations	79,600
Servicewide		Dive Safety Program	50,000
Total			\$222,500

Water Quality Vital Signs Monitoring Program

Program Summary



David Bustos, a resource staffer at White Sands National Monument (New Mexico), installs a water level sensor at Lake Lucero as part of an ongoing hydrology study. No water was recorded at the lake in summer 2011. NPS/COLLEEN FILIPPONE

THE NATIONAL PARK SERVICE IS committed to a servicewide and DOI strategic goal to significantly reduce the miles of streams and rivers and acres of lakes and marine areas that do not meet water quality standards. As part of this goal, the NPS is also committed to protecting water quality in parks from future impairment, including waters classified as Outstanding National Resource Waters (ONRW) or state-equivalent listed waters. Additionally, the NPS is committed to working with state Clean Water Act programs, as well as taking appropriate management actions to support the restoration of impaired water bodies in parks to an unimpaired condition. Currently about 195 park units have one or more water bodies that do not meet state water quality standards for one or more pollutants on approximately 7,300 miles (11,746 km) of rivers and streams and 1,467,000 acres (593,695 ha) of lakes, reservoirs, estuaries, and marine areas. Planning and design of the program continues to be implemented in full integration with the NPS Park Vital Signs Monitoring Program. This is because water quality is a key vital sign in determining overall aquatic ecosystem health. In addition, by fully integrating the design of these programs, considerable cost efficiencies have been and will continue to be realized in staffing, planning and design, administration, implementation, data management, and reporting.

Full program funding was allocated to all 32 Park Vital Signs Networks in FY 2011 (table A.5). In addition, funds supported the development of an NPS servicewide water quality data management program within the EPA STORET Data Warehouse. While not shown in table A.5, WRD reallocated 10 work-months involving five division staff to support program administration and the development of program technical guidance, technical protocols, detailed study plan and

Quality Control/Quality Assurance Plan guidance, and database management.

Vital Signs Monitoring Networks In FY 2011, thirty-two Park Vital Signs Monitoring Networks fully committed their water quality funding to compilation of background information, analysis of issues and threats, performance of detailed program planning, and support of synoptic-level field assessments. Five networks initiated field-level monitoring. Network planning approaches included personnel hiring, in-house allocation of staff, university cooperative agreements, and USGS Interagency Agreements. In addition, equipment acquisitions were made. All 32 networks accomplished one or more of the following activities:

- (1) historic data compilations and analyses;
- (2) information on state-listed impaired waters and park “outstanding” waters;
- (3) documentation of significant water quality stressors/threats;
- (4) synoptic inventory studies in support of detailed statistical design;
- (5) database management and GIS support programs;
- (6) development of water quality monitoring protocols; and
- (7) field monitoring.

Servicewide Data Management The Water Resources Division continued to support network water quality monitoring programs by providing national program administration and reporting, establishing baseline inventories and analyses of available water quality data, supporting digitization of legacy data from analog reports and other archival materials, maintaining a servicewide water quality database in the EPA STORET Data Warehouse, and enhancing the transfer of physical, chemical, and biological data from the networks into STORET. Two water quality research associates and a student

worked to support the database development, management, and reporting activities through cooperative agreements with Colorado State University. The servicewide STORET database has served as the starting point for most network water quality data compilation and analysis efforts and also WRD's Baseline Water Quality Data Inventory and Analysis Reports. In addition to data from states and other entities, this archive now hosts approximately 5.9 million results for 5,114 different physical, chemical, or biological characteristics from 48,592 monitoring locations in support of 1,189 different projects conducted in or near 263 units of the National Park System.

Much effort went into enhancing NPSTORET, a series of Microsoft Access-based templates for entering, managing, reporting, and analyzing water quality data (projects, stations, metadata, and results) in a STORET-compatible format. NPSTORET also includes import routines to allow users to import their own data or stations as well as data and stations from the three major national water quality databases. Additional capabilities added to NPSTORET v.1.83 this year included (1) new graphics options on the Reports & Statistics template including scatterplots, frequency bar, frequency line, and catch-per-unit effort graphs; (2) enhancements to water quality standards including screening by filtered fractions, the ability to enter a maximum hardness value for hardness-dependent criteria, and export of the computations used in a standards analysis; (3) improved form resizing/scaling depending on a user's screen resolution; (4) user-customizable logos for forms and

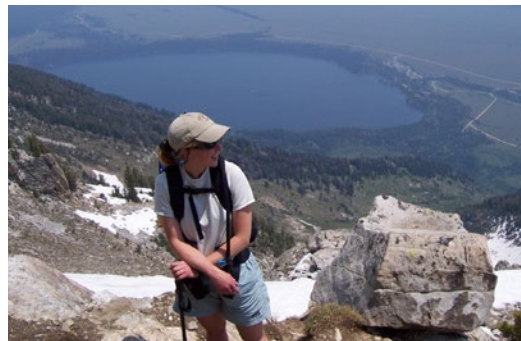
reports; (5) new characteristics, permitted values, activity types, lab remark codes, and statistic types; and (6) functionality in both 32 and 64-bit Access 2010 and Windows 7. Many other minor bells and whistles were added at the request of users.

WRD staff continued to help facilitate stewardship of the National Hydrography Dataset (NHD) in sub-basins containing NPS lands. Staff also continued to enhance the Hydrographic and Impairment Statistics Database which contains hydrographic statistics and Clean Water Act 303(d)-listed water resource impairment data for all parks based on the NHD. The Intranet website for distributing this information was moved to the Internet, underwent servicewide review and comment, and was significantly enhanced.

Continuously monitored water resource data was a significant focus area in 2011. WRD installed a servicewide five-concurrent-user network license for Aquarius Workstation v.2.6 and the Aquarius Database and initiated the development of a schema for documenting and storing water quality and quantity data collected continuously or near-continuously (i.e. hourly or every 15 minutes). This system was subsequently upgraded to the new Aquarius v.3.0 and Aquarius Server. Learning materials were prepared to assist NPS staff on how to access and use the system. Work continues on melding Aquarius with a metabase to document sensors, instruments, service, and calibrations.

A replacement database—EarthSoft's EQuIS system—for WRD's distributed EPA STORET Database was procured. During 2012 the 5.9 million discrete NPS water quality monitoring results will be migrated from distributed STORET to EQuIS, and data flows will be established into EQuIS from NPSTORET and a to-be-specified electronic data deliverable format to allow parks and networks to readily upload their data to EQuIS and have it transferred to the EPA's STORET Data Warehouse.

Hiker on the Apex Trail, Teewinot, at Grand Teton National Park (Wyoming). NPS/K. FINCH





Inside the Lens Room of Loggerhead Key Lighthouse, Dry Tortugas National Park (Florida). NPS/ KIMBERLY ROPP

Table A.5. Allocation of Water Quality Park Vital Signs Monitoring funding FY 2011

Network	Region	Number of Affected Park Units	FY 2011 Funding
Arctic	Alaska	5	\$144,100
Central Alaska	Alaska	5	94,200
Southeast Alaska	Alaska	3	40,400
Southwest Alaska	Alaska	5	133,600
Chihuahuan	Intermountain	6	70,200
Greater Yellowstone	Intermountain	3	68,200
Northern Colorado Plateau	Intermountain	16	103,700
Rocky Mountain	Intermountain	6	58,600
Sonoran Desert	Intermountain	11	61,500
Southern Colorado Plateau	Intermountain	19	119,100
Southern Plains	Intermountain	10	27,900
Great Lakes	Midwest	9	118,200
Heartland	Midwest	15	78,800
Northern Great Plains	Midwest	13	77,900
National Capital	National Capital	11	68,200
Eastern Rivers and Mountains	Northeast	9	60,600
Mid-Atlantic	Northeast	11	42,300
Northeast Coastal and Barrier	Northeast	8	86,500
Northeast Temperate	Northeast	10	57,700
Klamath	Pacific West	6	73,000
Mediterranean Coast	Pacific West	3	73,000
Mojave Desert	Pacific West	6	76,900
North Coast and Cascades	Pacific West	7	78,800
Pacific Islands	Pacific West	9	145,100
San Francisco Bay	Pacific West	6	67,200
Sierra Nevada	Pacific West	3	60,600
Upper Columbian Basin	Pacific West	8	48,000
Appalachian Highlands	Southeast	4	67,200
Cumberland-Piedmont	Southeast	14	56,700
Gulf Coast	Southeast	8	85,500
South Florida-Caribbean	Southeast	6	141,300
Southeast Coast	Southeast	17	116,300
Total FY 2011 Network Monitoring	Seven NPS Regions	272	\$2,601,300
Service-wide Data Management			136,600
Grand Total			\$2,737,900

Natural Resource Condition Assessments

Program Summary

NATURAL RESOURCE CONDITION Assessments (NRCAs) evaluate and report on current conditions, critical data gaps, and selected threat and stressor influences for a subset of important park natural resources. These are multi-disciplinary studies that rely on existing data and expertise from a variety of NPS and non-NPS sources. Focal study resources and indicators are selected on a park-by-park basis through

consideration of park resources and enabling legislation (what are this park's most important natural resources?) and currently available data and expertise (what can be evaluated at this time?). Science-based information delivered in NRCAs is designed to help park managers in their ongoing efforts to take an integrated and strategic approach to resource planning and decision making.



Aquatic ecologist Amy Larsen prepares to deploy a YSI, Inc., multiparameter probe at a small lake in Wrangell–St. Elias National Park & Preserve (Alaska). NPS/ HEIDI KRISTENSON

During 2011 NRCAs were completed and published for 19 park units, and new projects were initiated for an additional 25 park units. Additional program information and completed reports can be found at www.nature.nps.gov/water/nrca/index.cfm

Table A.6. NPS units with NRCA projects in FY 2011 and the organizations performing the assessments

Region	Park	State	Agency, Cooperator/Partner, or Contractor	FY 2011 Funding
AKR	KATM	AK	Pacific Northwest CESU/ Saint Mary's University of Minnesota	\$101,000
	ANIA	AK		
	ALAG	AK		
	Multiple Parks		Regional Office project support	60,300
IMR	BAND	NM	U.S. Geological Survey Fort Collins Science Center; Colorado Plateau CESU/Museum of Northern Arizona; NPS Northern and Southern Colorado Plateau Networks	167,000
	BLCA	CO		
	CURE	CO		
	PETR	NM		
	ZION	UT		
	BIBE	TX	Pacific Northwest CESU/Saint Mary's University of Minnesota	115,000
	GUMO	TX		
	BICA	MT, WY	Pacific Northwest CESU/Saint Mary's University of Minnesota; NPS Greater Yellowstone Inventory & Monitoring Network	38,700
	LIBI	MT	Rocky Mountain CESU/Utah State University; University of Colorado; Colorado State University; NPS Southern Plains Inventory & Monitoring Network; NPS Rocky Mountain Inventory & Monitoring Network	60,056
	SAND	CO		
	WABA	OK		
	PAIS	TX	Pacific Northwest CESU/Saint Mary's University of Minnesota	15,000
	PAAL	TX		
	Multiple Parks		Regional Office Geographic Information Systems (GIS) and other project support	67,544

Table A.6 continued

Region Park		State	Agency, Cooperator/Partner, or Contractor	FY 2011 Funding
MWR	GRPO	MN	Great Lakes Northern Forest CESU/ University of Wisconsin–Stevens Point	\$302,000
	MISS SACN	MN MN, WI		
NCR	CATO	MD	Chesapeake Watershed CESU/University of Maryland; NPS National Capital Inventory & Monitoring Network	74,000
	CHOH	MD, WV, DC		
	Multiple Parks		Regional Office project support	6,700
NER	BOWA	VA	Chesapeake Watershed CESU/ University of Richmond	84,962
	PETE	VA		
	FRSP	VA	Chesapeake Watershed CESU/ Pennsylvania State University	56,136
	Multiple Parks		Regional Office project support	100,902
PWR	CRLA	OR	Pacific Northwest CESU/Southern Oregon University	25,000
	LAVO LABE	CA CA		
	DEVA	CA, NV	California CESU/University of California–Davis	275,000
	JOTR	CA		
	LAKE	NV, AZ		
	MANZ	CA		
	MOJA	CA		
	PARA	AZ		
	HAVO	HI	Fung Associates	42,250
	MORA	WA	U.S. Geological Survey Forest and Rangeland Ecosystem Center	75,000
	NOCA	WA		
	YOSE	CA	Yosemite National Park	20,000
	Multiple Parks		Regional Office project support	6,450

Parks Climate Challenge participants snorkel on Ross Lake to conduct a fish survey, North Cascades National Park Complex (Washington). NORTH CASCADES INSTITUTE/BENJ DRUMMOND



Table A.6 continued

Region Park		State	Agency, Cooperator/Partner, or Contractor	FY 2011 Funding
SER	BICY	FL	NPS South Florida/Caribbean Network	\$26,678
	EVER	FL		
	CAHA	NC	Piedmont–South Atlantic Coast CESU/ North Carolina State University	92,122
	CALO	NC		
	CHAT	GA		
	CONG	SC		
	CUIS	GA		
	HOBE	AL		
	KEMO	GA		
	MOCR	NC		
	OCMU	GA		
	TIMU	FL		
	CARL	NC	Southern Appalachian CESU/ University of Western Carolina	123,000
	Multiple Parks		Regional Office project support	80,900
Total				\$2,015,700

Loop Road reflections at Big Cypress National Preserve (Florida).
NPS/KIMBERLY ROPP



NRCA High Priority Project Funding

Project Summary



The Green River from Harpers Corner Trail in Dinosaur National Monument (Colorado, Utah). NPS COLLECTION

Table A.7. NRCA High Priority Water Resource Project funding FY 2011

Region	Park	State	Project Title	FY 2011 Funding
IMR	DINO	CO, UT	Evaluation of Yampa River Flow and Sediment Regimes to Assist Protection of River-Dependent Resource Attributes	\$35,000
NER	SAIR	MA	Saugus River <i>E. coli</i> Monitoring	22,700
PWR	KAHO	HI	Development of an Environmental Assessment and Eradication Plan to Remove Tilapia from Ponds and Wetlands at National Parks on Island of Hawaii: KAHO and other Sites of Concern	63,000
	NEPE	ID	Hydrological Analysis and Pilot Restoration Project for Weippe Prairie	26,200
	YOSE	CA	Wawona Meadow Wetland Restoration Storm Repair Request	53,000
Servicewide	Multiple Parks		EarthSoft Environmental Quality Information System Acquisition	96,650
		Other Projects	General project support	23,450
Total				\$320,000

Evaluation of Yampa River Flow and Sediment Regimes to Assist Protection of River-Dependent Resource Attributes, Dinosaur National Monument (Colorado, Utah)

High Priority Project Funding \$35,000

The Yampa River is under ever-increasing threats of water development to support extraction of nearby oil and gas resources and potential transbasin export to satisfy municipal and industrial needs in eastern Colorado. As a result, Dinosaur is interested in (1) identifying minimum streamflows that maintain existing water-related resources, conditions, and processes; and (2) developing technical information to predict and quantify the response of these resources

and processes to altered streamflows.

Under separate agreements, Dinosaur and WRD funded scientists from the USGS (2011, \$45,000); Utah State University (2011, \$45,000); and Colorado State University (2012, \$45,000 anticipated) to identify instream flow needs to support and maintain existing conditions of sediment transport and channel form, riparian plants, and endangered fish. These efforts are ongoing and in various stages of completion. This project will synthesize the results of these separate efforts into a single integrated flow prescription for the Yampa River through Dinosaur, to be delivered in 2014. Primary work to date has included literature reviews, site visits, and discussions with other principal investigators.

Hydrological Analysis and Pilot Restoration Project for Weippe Prairie, Nez Perce National Historical Park (Idaho)

High Priority Project Funding \$26,200
NEPE Funding \$15,000

Extensive ditching at Weippe Prairie has drained habitat for camas lily (*Camassia quamash*), a species that is a key cultural resource and an important ecological component of the unit's wetland communities. It was during the camas harvest in 1805 that members of the Lewis and Clark expedition first encountered the Nez Perce people at Weippe Prairie. The Nez Perce provided the expedition party with camas bulbs and other food to eat at a time when game was very scarce and food had become a serious problem. Today, camas populations are well below their historic numbers at many locations, and hydrologic modification (drainage) is known to be a significant factor in this decline. This project was designed to (1) install a hydrologic monitoring network to characterize existing hydrology, including effects of ditches; (2) study relationships between camas populations and hydrologic regimes in unaltered "reference" sites and in sites affected by drainage; and (3) implement and evaluate a pilot restoration (ditch plugging) project and recommend larger scale restoration as appropriate.

During the summer of 2011, several key projects steps were implemented. Detailed topographic data was collected for the

southern portion of the unit, including reference sites and a drained site being considered for the pilot restoration. These data will be merged with LIDAR data available for the entire unit to produce a topographic map. A network of shallow observation wells, piezometers, and staff gauges was installed in the pilot study area and in other parts of Weippe Prairie. All were surveyed to a common datum to support analysis of drainage effects and study of plant community-water table-topography relationships. "Existing condition" hydrologic data will be collected and analyzed during summer 2012, and a pilot restoration (ditch plugging) is planned for autumn 2012. Post-restoration data will be collected and analyzed in 2013, and a final report will be prepared by December 2013.

Repair of Storm Damage, Wawona Meadow Restoration Project, Yosemite National Park (California)

High Priority Project Funding \$53,000

In late winter/early spring 2011, the Wawona area in Yosemite National Park experienced a substantial rain event that began to compromise a recently completed wetland meadow restoration project. The restoration project entailed filling a ditch that had formed in a wet meadow and lowered the local water table. The ditch had been filled to grade and the water table responded as expected, rising in elevation to near surface levels. However, native vegetation had not yet become established and the characteristic root mat was not in place to provide soil stability. During the rain event, some of the fill eroded out of the recently restored ditch, and there was great concern that the process would continue and all of the restoration work would be compromised. Consequently, a proposal for funding to facilitate structural repairs using "soft" treatments such as coir (coconut fiber) logs and mats was submitted and approved. WRD provided funding and repair work was completed in FY 2011.

Young humpback chub leave the bucket and begin to explore their new home in Shinumo Creek, Grand Canyon National Park (Arizona). NPS/MELISSA TRAMMELL



EarthSoft Environmental Quality Information System Acquisition

High Priority Project Funding \$96,650

In 2011 WRD acquired a new database system—EarthSoft’s Environmental Quality Information System (EQuIS)—to replace the STORET database system distributed by the EPA. WRD has used STORET to archive physical, chemical, and biological water quality data from projects conducted by parks, Vital Signs Monitoring Networks, contractors, and cooperators of the EPA’s STORET Data Warehouse (www.epa.gov/storet/) over the last decade. EPA support for the distributed STORET system ceased in 2009 when EPA adopted the Water Quality Exchange (WQX) format as the sole method for uploading data to the STORET Data Warehouse. EQuIS will provide the same basic functionality (data consistency, aggregation, and transfer to STORET) as

EPA-distributed STORET but will also provide many new features including the WQX schema; the ability to transmit data automatically to the EPA’s national STORET Data Warehouse on a weekly basis; support for groundwater and geotechnical data; automated data quality assurance/control; and integration with a diverse array of GIS, statistical, graphical, and analytical software.

EQuIS has been installed on an NRSS server. Work will be ongoing during 2012, in concert with EarthSoft, to migrate the significant NPS STORET database to EQuIS; to define, adapt, or adopt a new electronic data deliverable specification that is compatible with EQuIS; and to develop a standard operating procedure for parks, networks, and other users to upload data to the system and use its significant processing capabilities.

Paul Atkinson, Yukon–Charley IT specialist, deploys a Wildlife Acoustics sound monitor next to a lake in Wrangell–St. Elias National Park & Preserve (Alaska). The device monitors bird and wood frog activity as part of the Central Alaska Network’s lake monitoring effort. NPS/HEIDI KRISTENSON



Table A.8. Water Resource Protection—Aquatic Resource Professionals staffing

Region Duty Station		Discipline	Geographic Focus Area
AKR	YUCH	Aquatic Ecologist	Central and Northwest Alaska Network Parks
AKR	LACL	Fisheries Biologist	Southwest and Southeast Alaska Network Parks
IMR	Utah State Coord Office	Fisheries Biologist	Upper Colorado River Basin Parks
IMR/ MWR	Sonoran Desert Network	Groundwater Hydrologist	Texas, Arkansas, and Oklahoma Parks
MWR	SACN	Aquatic Ecologist	Great Lakes Network Parks
MWR	ISRO	Fisheries Biologist	Great Lakes Network Parks
NER/ NCR	Center for Urban Ecology	Aquatic Ecologist	National Capital Region and Virginia Parks
NER	DEWA	Hydrologist	Eastern Rivers and Mountains/Northeast Coastal and Barrier Network Parks
NER	FIIS	Marine Ecologist	Northeast Temperate/Northeast Coastal and Barrier Network Parks
PWR	PORE	Aquatic Ecologist	San Francisco Bay/Sierra Nevada/Klamath/Mediterranean Coast Network Parks
PWR	MORA	Geomorphologist	North Coast and Cascades/Klamath Network Parks
PWR	LAKE	Groundwater Hydrologist	Mojave Desert Network Parks
SER	CHAT	Fisheries Biologist	Southeast Coast/Gulf Coast/Appalachian Highlands/Cumberland–Piedmont Network Parks
SER	CHAT	Wetlands Ecologist	Southeast Coast/Gulf Coast/Appalachian Highlands/Cumberland–Piedmont Network Parks

Lake Tuendae at Zzyzx Desert Studies Center, Mojave National Preserve (California). NPS/ANNE MAASBERG



Ocean and Coastal Resources Program

Program Summary



Race Point at Cape Cod National Seashore, Providence, Massachusetts. NPS COLLECTION

THE NATIONAL PARK SYSTEM contains over 80 ocean, coastal, and Great Lakes parks across 22 states and four territories. The parks conserve over 11,000 miles (17,700 km) of coast and 2.5 million acres (1 million ha) of ocean, coastal, and Great Lakes waters, including coral reefs, kelp forests, glaciers, estuaries, beaches, wetlands, historic forts, and shipwrecks. They attract over 86 million recreation visits each

year and generate \$6 billion in economic benefits to local communities. Managers of ocean and coastal parks are confronted with multiple threats to natural and cultural resources from inside and outside of their park boundaries. Resource managers need better information about the condition of submerged resources for making decisions, working with other agencies, and communicating with the public.

Table A.9. Ocean and Coastal Resources Program budget summary

Total Available in FY 2010	\$1,250,000
Net FY 2010 Decrease	0
Adjustments	0
Total Available in FY 2011	\$1,250,000
Change from FY 2010	0

Created in 2007, the Ocean and Coastal Resources Program was funded for the first time in FY 2010. The program adopted strategies from the 2006 Ocean Park Stewardship Action Plan and regional strategic plans for ocean and coastal park stewardship. The program focuses on increasing NPS organizational and technical capacity to address ocean and coastal issues and working through partnerships with state and federal agencies and local organiza-

tions to better understand and manage submerged resources. Technical specialists have been hired in the Southeast, Pacific West, and Alaska Regions, and project funds were distributed through the competitive Servicewide Comprehensive Call. Projects were selected based on their ability to strengthen the science-based foundation for managing and conserving ocean and coastal resources and to help park managers better understand the human role in these ecosystems.

Table A.10. Ocean and Coastal Resources Program funding by categories

Servicewide Comprehensive Call and other Projects	285,000
Field-based Technical Specialists	400,000
NRSS-based Technical Specialists	367,500
Natural Resource Stewardship and Science overhead (10%)	125,000
NPS Dive Program	50,000
Program Administration	22,500
Total Available in FY 2011	1,250,000

Ocean and Coastal Resources Program

Project Summaries



Lake Michigan in winter at Indiana Dunes National Lakeshore (Indiana). NPS/E. HERTEL

Ecological Links between Virgin Islands Coral Reef National Monument and Virgin Islands National Park (Virgin Islands): Management to Halt the Crisis of Low Reef Fish Population

Funding \$37,000

PMIS Number 118794

Parks Affected Virgin Islands Coral Reef National Monument and Virgin Islands National Park (Virgin Islands)

Project Description The links between these two Caribbean NPS units and among various habitats in both units are being investigated by studying the movements of fish species in different trophic groups. Information on fish movement into and out of the park units will identify resources and movement pathways over various temporal and spatial scales. Fish will be tagged with sonic tags and their movements monitored by submerged acoustic receivers. The data will be used to develop ecosystem management strategies.

Significance The marine resources within Virgin Islands Coral Reef are poorly documented and the degree of connectivity to Virgin Islands and adjacent waters is unknown. Reef populations surrounding Virgin Islands Coral Reef are depleted and coral reefs have been lost in part due to reduced abundance of herbivorous fish that keep algae from smothering the reefs.

Managing Marine Ecosystem Responses to Increasing Nutrients

Funding \$83,000 (FY10: \$84,000; FY12: \$83,000)

PMIS Number 146912

Parks Affected Kaloko-Honokōhau National Historical Park and Kalaupapa National Historical Park (Hawaii)

Project Description Recent investigations at Kaloko-Honokōhau demonstrated that large volumes of nutrient-laden freshwater are discharged to marine coastal areas via groundwater which increases the potential for nuisance algal growth that adversely affects coral reefs. Herbivory may control some of the increased algal growth, but large herbivores have been greatly reduced by intensive fishing. This project examines the response of algae to nutrient inputs, the effects of herbivores on algal growth, the influence of herbivore abundance and biomass on algal and coral composition, and the potential for managing herbivores to reduce algal biomass and improve coral reef health. The project compares impacts at Kaloko-Honokōhau, an increasingly urbanized park, and Kalaupapa, a relatively remote park with a large herbivore biomass and intact trophic structure.

Significance This partnership among Kaloko-Honokōhau, Kalaupapa, University of Hawaii, and Scripps Institute of Oceanography examines the potential impact of increasing coastal development on the health of coral reef ecosystems.

Investigations of the Links Between Toxic Red Tides, Hydrodynamics, and Groundwater Nutrient Fluxes at Cape Cod National Seashore (Massachusetts)

Funding \$92,000 (FY10: \$301,000)

PMIS Number N/A

Parks Affected Cape Cod National Seashore (Massachusetts)



Barefoot on the beach at Redwood National and State Parks (California). NPS COLLECTION

Project Description Harmful algal blooms, commonly known as red tides, cause devastating impacts to local economies, public health, and ecosystems. The most serious and widespread manifestation is paralytic shellfish poisoning (PSP), a syndrome caused by human ingestion of shellfish that accumulate toxins from dinoflagellates. Cape Cod has had annual episodes of red tides since the 1970s. The characteristics of the PSP at Cape Cod have changed over the last two decades, in some cases resulting in shellfishing closures (and loss of jobs) for several months. This project is investigating the dynamics of anthropogenic nutrient discharges and harmful algal blooms and will produce tools to assist park managers in developing management policies for nutrient control and remediation.

Significance This partnership among NPS, Woods Hole Oceanographic Institution, and USGS will increase public knowledge of the need to protect and restore habitats for migratory birds, horseshoe crabs, seagrasses, shellfish, fish, and crustaceans.

Compilation of an Accurate and Contemporary Digital Shoreline for Alaska Coastal Parks

Funding \$21,000 (FY10: \$40,000)

PMIS Number 156683

Parks Affected Aniakchak National Monument & Preserve, Bering Land Bridge National Preserve, Cape Krusenstern National Monument, Glacier Bay National Park & Preserve, Katmai National Park & Preserve, Kenai Fjords National Park, Klondike Gold-rush National Historical Park, Lake Clark National Park & Preserve, Sitka National Historical Park, and Wrangell–St. Elias National Park & Preserve (Alaska)

Project Description Coastal parks in Alaska lack an accurate, consistent, and standardized digital marine shoreline referenced to a known local tidal stage or a vertical tidal

datum referenced to Mean High Water (MHW). Park boundaries in Alaska are generally based on MHW or Mean Lower Low Water (MLLW). The National Hydrographic Dataset (NHD) lacks a consistent tidal datum reference, but it is the recognized source for hydrographic data and contains features for Alaska parks derived from 1950s USGS topographical shoreline data sets (prior to the 1964 earthquake and isostatic rebound). This project uses the best available federal shoreline delineations of MHW or HWL and will integrate them into the NHD.

Significance The project will produce a shoreline data set for 10 Alaska coastal parks of immediate use to resource managers, collaborators, and the public.

Legal and Regulatory Assistance on Ocean and Coastal Issues Faced by the National Park System

Funding \$52,000

PMIS Number N/A

Parks Affected Eighty-four ocean and coastal parks in 22 states and four territories.

Project Description An important component of increasing NPS technical capacity is the description and analysis of NPS jurisdiction, authorities, and remedies. The number of ocean and coastal legal and regulatory issues warranting research and analysis outpaces the in-house capability of the ocean and coastal resources program. A contract was awarded to conduct research and develop a reference (guidance) manual on recreational and commercial fishing in ocean and coastal parks.

Significance The fishing reference manual will be used by parks and other NPS offices to increase awareness of authorities available to manage recreational and commercial fishing within park boundaries.

USGS–NPS Water Quality Partnership Program

New Projects for FY 2012



Sandhill cranes at Great Sand Dunes National Park & Preserve (Colorado). NPS COLLECTION

IN 1998 THE NPS AND USGS INITIATED the Water Quality Partnership Program with support from the Environmental Protection Agency’s Clean Water Action Plan. In 2011 eight projects were selected for funding beginning in 2012. To date, 163 partnership projects have been initiated in 110 parks.

The program supports a range of scientific activities focused on providing park resource managers with data and information necessary to make scientifically defensible management and policy decisions. These activities range in scope from basic and technical assistance to fixed-station monitoring to intensive/synoptic projects.

Table A.11. NPS–USGS Water Quality Partnership Project allocation FY 2012

Region	Park	State	Project Title	FY 2012 Allocation
IMR	ROMO	CO	Occurrence, Sources, and Potential for Biodegradation of Endocrine Disrupting Chemicals in Rocky Mountain NP	\$100,530
MWR	CUVA	OH	Development of a Model for Predicting Recreational Water Quality of the Cuyahoga River in Cuyahoga Valley based on Real-Time Turbidity and State Data	50,000
	HOSP	AR	Assessment of Water Quality Trends in the Hot Springs of Hot Springs NP	48,220
	ISRO	MI	Determination of Algal Toxin Concentration in Surface Water at ISRO, SLBE, and PIRO	50,000
	SLBE	MI		
	PIRO	MI		
	SACN	MI, WI	Climate in Lake St. Croix–Saint Croix National Scenic Riverway	99,170
	VOYA	MN	Assessment of Changes in Trophic State in Voyageurs NP Lakes after Implementation of a Revised Water Level Management Plan	50,000
NER	ACAD	ME	Assessment of the Use of Buffered Zero-Valent Iron Amendments for Reduction of Mercury Methylation in Wetland Sediments at Acadia NP	100,000
	DEWA	PA, NJ	Install Four Continuous Water Quality Monitors near Delaware River Basin Marcellus Shale Development	49,920
Total				\$547,840