

Appendix A: Biological Resources Management Program Projects

Biological Resources Management Program Projects, FY 2003 Funding

REGION	PARK	PROJECT TITLE	FUNDING
AKR	LACL	Improve a Census Technique for a Harvested Population of Moose	\$ 4,200
AKR	LACL	Assess Dynamics of a Harvested, Low Density Population of Dall Sheep	28,000
AKR	WRST	Determine the Status and Distribution of Mountain Goats	19,000
IMR	BAND	Develop Wilderness Stewardship Plan	20,000
IMR	BAND	Monitor Ecosystem Conditions Baseline Wilderness Plan EIS	16,000
IMR	BIBE	Implement Conservation Agreement for Two Candidate Plant Species	21,000
IMR	CANY	Salt Creek Invertebrates	21,000
IMR	CORO	Conservation and Management of Jaguars, Mountain Lions, and Other Felids	50,000
IMR	CURE	Gunnison Sage Grouse–Habitat Inventory of Surrounding Lands	25,000
IMR	DINO	Assess Impact of Non-native Channel Catfish on Endangered and Sensitive Native Fish in the Yampa River	25,000
IMR	GLAC	Manage Invaders Threatening Glacier's Wilderness	23,000
IMR	GRCA	Declining Northern Leopard Frog Population in the GRCA Eco-region: Rims and River Surveys	31,000
IMR	SAGU	Status Assessment and Management of Lowland Leopard Frogs	19,000
IMR	YELL	Baseline Inventory of Thermophile Biodiversity	25,000
MWR	BADL	Document Location and Distribution of Nine Rare Plant Species	38,000
MWR	BUFF	Assess Roost Habitat Conditions for Three Endangered Bat Species	23,000
MWR	INDU	Develop Database for Sensitive Plants and Orchid Recovery Plan	19,500
MWR	ISRO	Develop Fishery Management Plan	15,000
MWR	PIRO	Evaluation of Seasonal Stream Usage and Interstream Migration by Coaster Brook Trout	17,000
MWR	THRO	Evaluate Critical Resource Threats Using High Resolution Satellite Imagery	20,000
NCR	GWMP	Potential Impacts of Mosquito Control Activities	24,000
NCR	NCRO	Compiling and Analyzing Historical Insect Data for Plummers Island, MD	38,000
NER	CACO	Salt Marsh Restoration at Herring River: Dike Design and Construction at Mill Creek	50,000
NER	DEWA	Assess Long-term Viability of Newly Discovered Bog Turtle Population	28,000
NER	NERI	Determine Status and Trends of New River Mussel Community	39,000
NER	SHEN	Gather Essential Operations Data for Invasive Vegetation Control Decision-making	23,000
NER	UPDE	Determine Minimum Water Flows Required to Sustain Federally Endangered Dwarf Wedge Mussels	50,000
PWR	CRMO	Assessment of Habitat for Sagebrush Steppe Dependent Birds	25,000
PWR	GRBA	Status and Distribution of Rare Plants in Sub-alpine and Alpine habitat	19,000
PWR	HALE	New Alaenui Fence Section	8,000
PWR	HAVO	Investigate Ecological Impacts of the Kalij Pheasants	20,000
PWR	LAME	Development of Comprehensive Invasive Plant Management Plan	15,000
PWR	LAVO	Taxonomic Affinity, Spatial Ecology, and Resource Utilization of Red Fox Population	7,500
PWR	PINN	Assessment of Vascular Plant Communities Before and After Feral Pig Removal	24,000
PWR	PORE	Habitat Assessment of the Federally Endangered Myrtle's Silverspot Butterfly	25,000
PWR	WAPA	Assessing Impacts of a Subsistence Fishery on Coral Reef Resources	35,000
SER	MACA	Recovery and Reintroduction of American Chestnut	26,000
SER	VIIS	Propagation and Reintroduction of <i>Solanum conocarpum</i> , a Critically Rare Shrub	15,000
		Editor for SCC Guidance	4,000
TOTAL			\$ 935,200



Historic Piper Lane at Antietam National Battlefield has been greatly altered by grazing and intrusion by exotic plant species. Natural Resource Challenge funding has enabled resource managers to initiate restoration efforts, which include enhancing native plant propagation and minimizing the effects of grazing. NPS PHOTO

Appendix B: Natural Resource Preservation Program (NRPP) Projects

NRPP Natural Resource Management Fully Funded Projects

PARK	PROJECT TITLE	TOTAL FUNDING	FY 2003 FUNDING
Olympic NP	Evaluate Goat Management	\$ 79,000	\$ 26,000
Petrified Forest NP	Preserve Petrified Wood	168,000	56,000
Glacier Bay NP/Pres	Quantifying Commercial and Sportfish Harvest	160,000	47,000
Congaree Swamp NM	Develop Feral Hog Reduction Plan	43,000	39,000
Grand Teton NP	Monitoring of Wolves	396,000	42,000
Sleeping Bear Dunes NL	Restoration of Biodiversity	364,000	123,000
Great Basin NP	Cutthroat Trout	164,000	36,000
Buffalo National River	Assessment of Fish	405,000	58,000
Point Reyes NS	Coastal Dune Restoration	333,000	116,000
Redwood NP	Remove English Ivy	218,000	66,000
Cape Code NS	Effects of Groundwater	195,000	45,000
Mammoth Cave NP	Restore Habitat for Indiana Bat	245,000	180,000
Western Arctic NP Lands	Assessment of Reindeer Impacts to Lichen Ecosystems	108,000	99,000
Redwood NP	Restoring Lost Man Creek Watershed	900,000	134,000
Biscayne NP	Reverse Declining Population by Fisheries Mgmt Plan	233,000	94,000
Glacier Bay NP/Pres	Backcountry Management Data Collection Analysis	244,000	103,000
Buffalo National River	Delineate Karst Groundwater Recharge Zone	100,000	50,000
Padre Island NS	Assess Impacts on Seagrass Meadow	100,000	50,000
Fire Island NS	Relationships Among Barrier Island Processes	188,000	81,000
TOTAL		\$ 4,643,000	\$ 1,445,000

NRPP Natural Resource Management New and Ongoing Projects*

PARK	PROJECT TITLE	TOTAL FUNDING	FY 2003 FUNDING
Cumberland Island NS	Eradicate Feral Hogs	\$ 171,000	\$ 56,000
Badlands NP	Emergency Salvage of Collection of Fossils	341,000	95,000
Jean Lafitte NHP/Pres	Establish a Biocontrol Program for <i>Salvinia</i>	111,000	37,000
Lake Meredith NRA	Protect Native Habitat by Completing North Boundary Fence	153,000	51,000
Indiana Dunes NL	Restore Biological Resources of the Cowles Bog Wetland	101,000	32,000
Pinnacles NM	Reestablish California Condors	572,000	187,000
Olympic NP	Wilderness Recovery at Boulder Hot Springs	54,000	14,000
Intermountain RO	Initiate IMR Noxious Weed Inventory and Mapping Program	632,000	134,500
Great Basin NP	Wild Cave Inventory and Management	216,000	62,000
Point Reyes NS	Remove Iceplant at Point Reyes Lighthouse Headlands	339,000	113,000
Kalaupapa NHP	Exclude Ungulates from Pu'u Ali'i Plateau	663,000	164,000
Pinnacles NM	Restore Climbing Area	94,000	27,000
Lake Clark NP/Pres	Refine Techniques to Survey Harvested Brown Bear Populations	285,000	75,000
Denali NP/Pres	Determine Baseline Information Along Proposed North Access Corridor	355,000	121,000
Voyageurs NP	Document Changes in Reservoir Management on Mercury Accumulation in Fish and Other Aquatic Ecosystem Components	311,000	102,000
Isle Royale NP	Implement Wilderness Management Plan: Carrying Capacity and Long-term Monitoring	270,000	102,000
Pipe Springs NM	Geologic Mapping and Seismic Profile Investigations	308,000	64,000
Fossil Butte NM	Geological Mapping of Primary Formations	209,000	63,000
Rocky Mountain NP	Restore Glacier Creek Livery and Wetland	\$ 103,000	\$ 14,000

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NRPP Natural Resource Management New and Ongoing Projects* (continued)

PARK	PROJECT TITLE	TOTAL FUNDING	FY 2003 FUNDING
Big Bend NP	Stop Feral Hog Invasion	\$ 130,000	\$ 45,000
National Capital Parks	Dragonflies and Damselflies Likely Affected by WNV Management	63,000	18,000
Wind Cave NP	Monitor for Chronic Wasting Disease	428,000	144,000
Rocky Mountain NP	Implement Interim actions for CWD Management	246,000	160,000
Oregon Caves NM	Complete Cave Restoration	50,000	16,000
Golden Gate NRA	Restore Ft. Baker Mission Blue Butterfly Habitat	632,000	208,000
Capitol Reef NP	Threatened and Endangered Plant Pollinators	151,000	65,000
Glacier NP	Lake McDonald Fishery Management	174,000	52,000
Glacier NP	Assess Wolverine Population	186,000	70,000
Olympic NP	Determine Migratory Pathways, Spawning Areas, and Potential Sources of Threats to Listed Bull Trout	229,000	75,000
Rocky Mountain NP	Implement Invasive Plant Management Plan	150,000	68,000
Mammoth Cave NP	Propagation and Restoration of Endangered Mussels in the Green River	526,000	292,000
Haleakala NP	Prevent <i>Miconia</i> Invasion From Displacing Haleakala Rainforest	878,000	189,000
Channel Islands NP	Reintroduce Island Fox on San Miguel and Santa Rosa Islands	826,000	213,400
George Washington MPkwy	Should We Restore Dike Marsh? A Management Dilemma	159,000	100,000
Lake Meredith NRA	Continue Salt Cedar Control	153,000	51,000
George Washington M Pkwy	Saving the Potomac Gorge Through Partnerships	240,000	80,000
Grand Teton NP	Bison Demographic Monitoring: Disease Surveillance	796,000	280,000
Yellowstone NP	Multi-trophic Level Ecology of Wolves, Elk, and Vegetation	175,000	59,000
Theodore Roosevelt NP	Evaluate Factors Influencing the Distribution and Movement of Elk	162,000	91,000
Biscayne NP	Quantitative Analysis and Scenario Testing of Fisheries Management Alternative	95,000	52,000
Pinnacles NM	Eradicate Feral Pigs	844,000	120,000
New River Gorge NR	Fecal Bacteria Source Tracking	205,000	49,000
Badlands NP	Document Significant Fossil Localities Within the Poleslide Member	290,000	104,000
National Capital Region Parks	Assess Condition and Identify Stressors of Aquatic Resources	248,000	76,000
Assateague Island NS	Evaluate Episodic Water Quality Event in MD/VA Coastal Bay	125,000	68,000
Zion NP	Restore Highly Impacted Backcountry Areas	327,000	106,000
Rocky Mountain NP	Prepare a Situation Assessment for Elk Management Environmental Impact Statement	122,000	68,000
Cuyahoga Valley NP	Control Invasive Plant Species and Sensitive Resource Areas	180,000	83,000
Gateway NRA	Investigation and Restoration of the Jamaica Bay Salt Marsh Ecosystem	524,000	250,000
Pinnacles NM	Protect Dark Night Skies	272,000	54,000
Natural Resource Program Center	Cost-estimate Reviews for NRPP-NRM Projects	N/A	22,800
TOTAL		\$16,015,000	\$ 4,842,700

* A Western Arctic/Noatak lichen inventory, a Western Arctic/Cape Krusenstern heavy metal bioaccumulation assessment, and a Point Reyes National Seashore cape ivy removal project, originally scheduled for FY 2003, were delayed. Funds for the latter two were reprogrammed out of NRPP, and funds for the first were reprogrammed to other NRPP projects.

Research at Rocky Mountain National Park indicates that the relationship between elk and beaver population densities affects the natural condition of the riparian-willow ecosystem.

PHOTO ©RUSS FINLEY/FINLEY-HOLIDAY FILMS



NRPP Threatened and Endangered Species Fully Funded Projects

PARK	PROJECT TITLE	TOTAL FUNDING	FY 2003 FUNDING
Saint Croix NSR	Mussel Communities	\$ 60,000	\$ 20,000
Cape Hatteras NS	Seabeach Amaranth: Habitat Assessment	136,400	33,000
Big Thicket NPres	Reintroduce Texas Trailing Phlox	32,000	32,000
Wind Cave NP	Reintroduction of Black-footed Ferrets	100,000	58,000
Santa Monica Mountains NRA	Recovery of Federally Endangered <i>Pentachaeta</i>	54,000	26,000
TOTAL		\$ 382,400	\$ 169,000

NRPP Threatened and Endangered Species New and Ongoing Projects

PARK	PROJECT TITLE	TOTAL FUNDING	FY 2003 FUNDING
Rocky Mountain NP	Reestablish, Stabilize, and Manage 19 Greenback Cutthroat Trout Populations	\$ 66,000	\$ 16,000
Lake Mead NRA	OHV Damage Control in Desert Tortoise Critical Habitat	150,000	51,000
Pinnacles NM	Reestablish California Red-legged frogs in Bear Gulch Reservoir	103,000	32,000
Chesapeake & Ohio Canal NHP	Recovery of Federally Endangered <i>Harperella</i>	151,000	48,000
Hawaii Volcanoes NP	Complete Reintroduction of Silversword	55,000	30,000
Mammoth Cave NP	Restoration of Echo River Passage	93,000	31,000
Sleeping Bear Dunes NL	Wildlife Management: Piping Plover Preservation	46,000	25,000
Olympic NP	Effectiveness Monitoring Northern Spotted Owl Demographic Rates	112,000	55,000
Haleakala NP	Critical Assessment of Habitat for Releasing Endangered Maui Parrotbill	149,000	75,000
TOTAL		\$ 925,000	\$ 363,000

NRPP Disturbed Lands Restoration Fully Funded Projects

PARK	PROJECT TITLE	TOTAL FUNDING	FY 2003 FUNDING
Fire Islands NS	Plug and Abandon Flowing Water Wells	\$ 76,400	\$ 8,800
Palo Alto Battlefield NHS	Restore Resaca Wetlands	116,900	6,900
Buffalo NR	Develop Strategy for Runoff From Park Roads	96,800	40,200
Mammoth Cave NP	Site Restoration of Wondering Wood Area	119,000	119,000
TOTAL		\$ 303,890	\$ 174,900

NRPP Disturbed Lands Restoration New and Ongoing Projects

PARK	PROJECT TITLE	TOTAL FUNDING	FY 2003 FUNDING
Big Bend NP	Phase 2 Nine Point Draw Watershed Restoration	\$ 236,700	\$ 83,500
Denali N Pres.	Reclamation of Placer-Mined Glacier Creek	200,000	51,000
Lake Mead NRA	OHV Restoration: North Shore/Lakeshore Scenic Drive Areas	250,000	86,100
Lassen Volcanic NP	Restoration of an Abandoned Ski Area	205,000	153,000
Pinnacles NP	Old Pinnacles Road Restoration	250,000	119,700
Rocky Mountain NP	Restore Alpine Sewage Lagoons	82,300	70,300
Timpanogos Cave NM	Restore Natural Cave Drainage	115,000	41,000
Yellowstone NP	Reclaim Three Miles of Abandoned Turbid Lake Road and Reconstruct Turbid Lake Trail	211,500	70,500
TOTAL		\$ 1,550,500	\$ 675,100

NRPP Small Park Projects, FY 2003 (\$999,800)

REGION	FUNDING	NUMBER PARKS	NUMBER PROJECTS
Alaska	\$ 20,000	2	2
Intermountain	289,400	20	24
Midwest	174,000	13	14
National Capital	20,000	2	2
Northeast	128,900	5	5
Pacific West	163,200	10	11
Southeast	204,300	5	11
TOTAL	\$ 999,800	57	69

NRPP Regional Block Allocation Projects, FY 2003 (\$1,400,000)

REGION	FUNDING	NUMBER PARKS	NUMBER PROJECTS
Alaska	\$ 200,000	2	7
Intermountain	200,000	11	12
Midwest	200,000	10	13
National Capital	200,000	10	27
Northeast	200,000	5	7
Pacific West	200,000	7	8
Southeast	200,000	6	7
TOTAL	\$ 1,400,000	51	81

NRPP Small Park Projects Funded in FY 2003

REGION	STATE	PARK	PROJECT TITLE	FUNDING
AKR	AK	Sitka NHP	Conduct Stream Surveys and Water Quality Assessment on Indian River	\$ 10,000
AKR	AK	Klondike Gold Rush NHP	Evaluate Resource Protection at the Historic Town Site of Dyea	10,000
IMR	AZ	Walnut Canyon NM	Assess Breeding and Habitat Status of Mexican Spotted Owl	14,900
IMR	NM	Pecos NHP	Eradicate Exotic Trees	6,000
IMR	WY	Fossil Butte NM	Riparian Restoration	14,000
IMR	WY	Devil's Tower NM	Control Non-native Plants	13,800
IMR	CO	Yucca House NM	Spring Water Source and Quality	10,000
IMR	NM	Aztec Ruins NM	Restore Native Plants to West Ruin	5,400
IMR	TX	San Antonio Missions NHP	Assess Mammals and Inventory of Land Mammals Including Bats	1,700
IMR	AZ	Sunset Crater Volcano NM	Assess Soil Genesis and Disturbance Impacts Within Unique Volcanic Cinder Terrain	4,600
IMR	CO	Colorado NM	Control Non-native Plants and Plan for Revegetation	20,000
IMR	UT	Timpanogos Cave NM	Determine Cave Microbial Diversity	9,900
IMR	AZ	Navajo NM	Repair Monument Boundary Fence Line to Prevent Livestock Intrusion	19,300
IMR	UT	Cedar Breaks NM	Survey Cave Resources	13,400
IMR	AZ	Tonto NM	Document Nuisance Rattlesnake Movements and Behavior	20,000
IMR	UT	Cedar Breaks NM	Suppression of Spruce Bark Beetle Infestation in Developed Areas	5,000
IMR	OK	Washita Battlefield NHS	Manage Non-native Plants in Oldfield Restorations	10,000
IMR	OK	Washita Battlefield NHS	Perform Historical Vegetation Study	10,000
IMR	UT	Timpanogos Cave NM	Develop a Comprehensive Integrated Pest Management Plan	10,000
IMR	AZ	Pipe Spring NM	Restore Native Bunch Grasses	19,700
IMR	TX	Lyndon B Johnson NHP	Provide Game Management Options for the Ranch	12,500
IMR	AZ	Montezuma Castle NM	Develop and Implement Exotic Plant Management Plan	20,000
IMR	MT	Grant-Kohrs Ranch NHS	Fencing Repairs to Improve Resource Management	20,000
IMR	UT	Hovenweep NM	Reestablish Historic Vegetation Long-term Monitoring Plots	8,400
IMR	AZ	Casa Grande Ruins NM	Restore Native Plants Along Park Boundary Fence	12,400
IMR	TX	San Antonio Missions NHP	Assessment of Bird Species—A Parkwide Bird Inventory Including Migratory Birds	8,400
MWR	SD	Jewel Cave NM	Upgrade Cave Survey Equipment	4,900
MWR	NE	Agate Fossil Beds NM	Fossil Locality Evaluations	7,000
MWR	AR	Arkansas Post NM	Ant Diversity	9,700
MWR	NE	Homestead NM of America	Planning and Compliance for Park Trails	11,000
MWR	ND	Fort Union Trading Post NHS	Develop Resource Management Plan With New Guidelines	14,000
MWR	MN	Pipestone NM	Restore Disturbed Lands and Exotic Weed Control	14,700
MWR	NE	Midwest Regional Office	Regional RAMS and PMIS Training and Isle Royale Plant Inventory	22,600
MWR	SD	Mount Rushmore NMem	Implement Pest Management Plan	10,000
MWR	MN	Grand Portage NM	Soil Resource Inventory	19,900
MWR	IA	Effigy Mounds NM	Design Sedimentation Protocol for Sny Magill Creek	20,000
MWR	MO	Wilson's Creek NB	Locate Historic Trees	11,500
MWR	IA	Herbert Hoover NHS	Prairie Restoration Plan	8,000
MWR	OH	Hopewell Culture NHP	Resource Management Plan Scoping Session	\$ 10,700

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NRPP Small Park Projects Funded in FY 2003 (continued)

REGION	STATE	PARK	PROJECT TITLE	FUNDING
MWR	MO	George Washington Carver NM	Special Natural History	\$ 10,000
NCR	VA	George Washington Mem Parkway	Fish Species Inventory—Dyke March on the Potomac River	10,000
NCR	VA	Harpers Ferry NHP	Assessing Aquatic Environmental Associations and Ecological Vulnerability	10,000
NER	MA	Boston Harbor Islands NRA	Boat Wake Impacts and Their Role in Shore Erosion	25,000
NER	MA	Saugus Iron Works NHS	USGS Watershed Assessment	17,800
NER	NJ	Morristown NHP	Develop Forest Management Plan	21,600
NER	PA	Valley Forge NHP	Assess Sediment Pollution in Valley Creek	24,500
NER	VA	Colonial NHP	Develop Shoreline Conservation Mitigation Plans	40,000
PWR	CA	Devils Postpile NM	Meadow Restoration/Wildlife Protection/Interpretation	30,000
PWR	OR	Fort Clatsop N Mem	Tidal Zone Vegetation Survey	17,200
PWR	ID	Hagerman Fossil Beds NM	Acquire Paleontological Reference Materials	7,000
PWR	CA	Muir Woods NM	Decommission Abandoned Road	21,000
PWR	ID	Nez Perce NHP	Remove Non-native Woody Species	23,000
PWR	GU	War in the Pacific NHP	Assess Sedimentation Patterns on Coral Reefs	20,000
PWR	OR	Fort Clatsop N Mem	Eradicate English Ivy and English Holly	14,000
PWR	WA	Whitman Mission NHS	Replace Exotic Grass with Native Grasses	2,000
PWR	CA	Manzanar NHS	Survey Amphibian and Reptile Species	8,000
PWR	CA	Manzanar NHS	Survey Bird Species	10,000
PWR		NP of American Samoa	Resuscitate Weed-infested Rainforest on Mt. Alava	11,000
SER	GA	Chickamauga & Chattanooga NMP	Construct a GIS Database of All Known Water Intakes and Withdrawals	16,500
SER	GA	Chickamauga & Chattanooga NMP	Control Exotic Asian Rice Eel	24,500
SER	NC	Kings Mountain NMP	Inventory and Treat Invasive Exotic Plant Species	19,100
SER	FL	Timucuan E&HPres	Determine Impacts of Power Boats on Tidal Creeks	20,000
SER	GA	Chickamauga & Chattanooga NMP	Document Land Use Easements/Right of Ways	24,000
SER	FL	Timucuan E&HPres	Control Exotic Plants on Newly Acquired Lands	15,000
SER	GA	Chickamauga & Chattanooga NMP	Cooperative Water Quality Project at Local Schools	3,000
SER	FL	Timucuan E&HPres	Investigating Changes in Water Quality at Ft. George	7,000
SER	FL	Timucuan E&HPres	Obtain Historical Aerial Photographs	15,000
SER	NC	Kings Mountain NMP	Provide Term Resource Management Assistance	40,400
SER	TN	Obed W & SR	Exotic Plant Survey and Eradication Project	19,800
TOTAL				\$ 999,800

NRPP Regional Block Allocation Projects Funded in FY 2003

REGION	STATE	PARK	PROJECT TITLE	FUNDING
AKR	AK	Alaska SO	Alaska Regional Bear Management Initiative	\$ 40,000
AKR	AK	Alaska SO	Host Alaska Science Symposium	10,000
AKR	AK	Alaska SO	Initiate Publication to Promote and Publicize Science in Alaska Parks	25,000
AKR	AK	Alaska SO	Create Public Outreach Materials for Ecological Tour of Alaska	30,000
AKR	AK	Alaska SO	Develop Web-based Curriculum Project on the Culture of Wilderness	30,000
AKR	AK	Yukon Charlie Rivers NPres	Final Synthesis Study—Effectiveness of Mitigation	58,100
AKR	AK	Wrangell-St Elias NP & Pres	Communicate Resource Findings With the Public	6,900
IMR	AZ	Grand Canyon NP	Resident Eagle Inventory: Emphasis on Declining Golden Eagles	20,000
IMR	CO	Florissant Fossil Beds NM	Collect and Propagate Native Seed	5,700
IMR	WY/ MT	Yellowstone NP	Restoration Stream Flow Allocation to Protect Native Fish	17,000
IMR	CO	Florissant Fossil Beds NM	Control Four Species of Noxious Weeds	13,400
IMR	AZ	Wupatki NM	Assessment of Juniper Woodland Succession	19,800
IMR	TX	San Antonio Missions NHP	Controlling Exotic Plant Species in Mission Labores Area	20,000
IMR	AZ	Southern Arizona Group	Monitoring avian migration	20,000
IMR	UT	Bryce Canyon NP	Soundscape Monitoring	20,000
IMR	TX	Lake Meredith NRA	Complete Urban Interface Boundary Fence	20,000
IMR	UT	Timpanogos Cave NM	Assess Water Quality and Air Mass Movements in the Cave System	20,000
IMR	CO	Curecanti NRA	Determine Lamb Productivity and Survival as a Factor Limiting Bighorn Sheep Sustainability	18,000
IMR	CO	Colorado NM	Conduct Paleontological Inventory in Partnership with Museum of Western Colorado	6,100
MWR	MI	Pictured Rocks NL	Black Bear Ecology in Relation to Consumptive and Non-consumptive Human Use	24,000
MWR	SD	Wind Cave NP	Drafting Quadrangles Maps	8,300
MWR	MI	Isle Royale NP	Develop a Strategy to Prevent or Mitigate a Zebra Mussel Infestation	16,700
MWR	WI	Saint Croix NSR	Sampling for Pesticides in Listed Mussel Habitats	18,000
MWR	WI	Saint Croix NSR	Evaluate Air Pollution Effects on Lichens of the Riverway	21,800
MWR	MN	Voyagers NP	Estimate Summer Use	24,800
MWR	SD	Wind Cave NP	Cave and Karst Inventory	6,900
MWR	AR	Buffalo NR	Control Exotic Species/Feral Swine	21,800
MWR	NE	Missouri NRR	Zoological Survey	9,500
MWR	SD	Jewel Cave NP	Impact of Wildfire on Composition, Abundance, and Distribution of Exotic Plants	16,800
MWR	NE	Scotts Bluff NM	Restore Native Prairie Species	15,700
MWR	MI	Isle Royale NP	Assess Threats to New Plant Species/Resurvey Rare Plant Plots	5,700
MWR	MN	Mississippi NR & NRA	Identify Open Space and Habitat Opportunities	10,000
NCR	NCR	National Capital Regional Office	Building a Vegetation Classification for the Region	24,900
NCR	VA	Manassas NBP	Classification and Mapping of Forested Natural Communities	3,800
NCR	MD	Chesapeake & Ohio Canal NHP	Evaluate Impacts of White-tailed Deer	10,000
NCR	NCR	National Capital Central	Restoration of Ecological Balance in Constitution Gardens Lake	8,900
NCR	VA	George Washington M Pkwy	Classification of Ecological Communities in Potomac Gorge Section	10,000
NCR	WV	Harpers Ferry NHP	Butterfly Inventory	\$ 2,800

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NRPP Regional Block Allocation Projects Funded in FY 2003 (continued)

REGION	STATE	PARK	PROJECT TITLE	FUNDING
NCR	NCR	National Capital Central	Installation of Pollinator-friendly Plant Communities	\$ 6,000
NCR	VA	Prince William FP	West Nile Virus Monitoring	8,000
NCR	VA	George Washington MPkwy	Subterranean Explorations: Groundwater Amphipods	9,600
NCR	NCR	National Capital East	Aquatic Beetle Inventory of Piscataway and Fort Washington Parks	5,000
NCR	NCR	National Capital East	Bee Inventory of Piscataway and Fort Washington Parks	5,000
NCR	VA	Prince William FP	Survey for the Small Whorled <i>Pogonia</i> , a Threatened and Endangered Plant	9,700
NCR	MD	Chesapeake and Ohio Canal NHP	Provide River Navigation Services and GPS Mapping for Potomac Gorge Wetlands Study	2,200
NCR	NCR	National Capital Central	Bat Inventory	7,800
NCR	VA	George Washington MPkwy	Protecting the Parkway's Piedmont Streams Through Surface Water Quality Monitoring	6,200
NCR	VA	Prince William FP	Initiate a Vegetation Monitoring Program	9,700
NCR	WV	Harpers Ferry NHP	Hack Support for Peregrine Falcons	3,900
NCR	MD	Chesapeake and Ohio Canal NHP	Monitor West Nile Virus	8,000
NCR	DC	Rock Creek Park	Inventory of the Vascular Flora of Glover Archibold and Palisades Parks	6,000
NCR	MD	Catoctin Mountain Park	Control Invasive Exotic Plants	9,400
NCR	MD	Monocacy NB	Conduct Rare, Threatened, and Endangered Species Survey on the Thomas Farm	4,000
NCR	MD	Chesapeake and Ohio Canal NHP	Inventory Exotic Plants for Suppression Program	1,500
NCR	DC	Rock Creek Park	Restoring Meadows	5,900
NCR	MD	Antietam NB	Rehabilitation of Disturbed Areas	10,000
NCR	MD	Antietam NB	Wildlife Education Outreach	3,600
NCR	VA	Manassas NBP	Analysis and Interpretation of White-tailed Deer Enclosure Data	6,000
NCR	NCR	National Capital Regional Office	Fostering Natural Resource Stewardship	12,100
NER	NY	Fire Island NS	White-tailed Deer Monitoring	25,000
NER	NY	Gateway NRA	Prepare Environmental Assessment for Experimental Restoration of Salt Marsh in Jamaica Bay	75,000
NER	MD	Assateague Island NS	Estimate Nitrate Load in Stream-flow Discharge to Chincoteague Bay	42,200
NER	PA	Delaware Water Gap NRA	Restore Wood Turtle Habitat	8,400
NER	PA	Delaware Water Gap NRA	Hemlock Woolly Adelgid Bio-control Monitoring	5,000
NER	VA	Shenandoah NP	Control Oriental Bittersweet	22,000
NER	MD	Assateague Island NS	Assess Vegetation Impacts of Non-native Sika Deer	22,400
PWR	CA	Golden Gate NRA	Restore Fort Funston Habitat	17,400
PWR	CA	Pinnacles NM	Yellow Star Thistle Control	25,000
PWR	CA	Point Reyes NS	Preserve Federally Endangered <i>Sonoma alopecurus</i>	25,000
PWR	CA	Point Reyes NS	Protect/Restore Degraded Natural Resources in Pastoral Zone	25,000
PWR	CA	Santa Monica Mountains NRA	Abundance/Distribution of Small Mammals	25,000
PWR	CA	Sequoia-Kings Canyon NP	Distribution/Association of Fishers/Rare Forest Carnivores	25,000
PWR	CA	Sequoia-Kings Canyon NP and Yosemite NP	Inventory of Karst Fauna	32,600
PWR	CA	Whiskeytown NRA	Survey and Map Exotic Plants	25,000
SER	TN	Great Smoky Mountains NP	Inventory American Chestnut Trees to Assess Restoration Potential	\$ 20,000

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Eastern red bats were captured at Franklin Delano Roosevelt Memorial as part of a study to identify bat species and sensitive roosting areas within the National Capital Parks-Central area. Objectives of the project include increased public awareness and development of management plans to protect bats that may roost in major memorials.

NPS PHOTO



NRPP Regional Block Allocation Projects Funded in FY 2003 (continued)

REGION	STATE	PARK	PROJECT TITLE	FUNDING
SER	SC	Congaree Swamp NM	Conduct Acoustic Monitoring for Endangered Bird, Amphibian Calls, and Aircraft Overflights	\$ 35,600
SER	LA	Lean Lafitte NHP & Pres	Quantify Deer Population and Develop a Hunting Management Plan for the Barataria Preserve	45,000
SER	KY	Mammoth Cave NP	Restoration of Abandoned Oil/Gas Well Roads	35,000
SER	FL	Gulf Islands NS	Determine Concentrations of Mercury Compounds in Fish, Water, and Sediment	24,000
SER	VI	Virgin Islands NP	Determine Endangered St. Thomas Prickly-ash Population, Distribution, Status, and Trends	25,000
SER	TN	Great Smoky Mountains NP	Hemlock Woolly Adelgid Beetle Predator Survey	15,400
TOTAL				\$ 1,400,000

NRPP Special Alaska Projects Funded in FY 2003

PROJECT TITLE	FUNDING
Identify Levels and Dynamics of Subsistence Resources Harvests for Buckland, Alaska	\$ 60,000
Document Cape Krusenstern Muskoxen Range Use and Develop Muskoxen Public Information Site	32,600
Escapement, Population Structure, Genetics, and Morphology of Sockeye Salmon Within Aniakchak	126,700
Identify Marine Bird Distribution and Evaluate Visitor Impacts	160,700
Prepare a Management and Monitoring Plan Based on Visitor Experience and Resource Protection (VERP)	39,700
Nutritional and Contaminant Assessment of Lynx and Snowshoe Hare in the Brooks Range near Wiseman, Alaska	48,450
Determine the Status of Steller Sea Lions in Wrangell-St. Elias National Park and Preserve	11,250
Investigate Limnological Conditions in Tanada Lake Affecting Sockeye Salmon Production	17,750
TOTAL	\$ 497,150

**NPS-USGS Biological Resources Division, Park-Oriented Biological Support
Summary of Progress Made for Projects Funded in FY 2003**

PROJECT TITLE

FY 2003 REPORT

Integrating Beaver, Water, and Willow in the SAVANNA Model at Rocky Mountain National Park

FY 03 results included completing the computer program and user code as the final beaver submodel of the SAVANNA ecological model for Rocky Mountain National Park and preparing two draft scientific papers. Model results showed that when elk density reached a threshold of about 40-60 elk/km², then asymmetrical competition between elk and beaver excluded beaver and the natural riparian-willow ecosystem collapsed. FY 2004 plans include presenting the beaver-willow model to park staff in a seminar format and submitting the modeling results for journal publication.

Ecological Integrity of McDonald Watershed, Glacier National Park: Biotic Indicators of Water Quality Impairment at the Reconstruction of Going-to-the-Sun Road

The assessment of ecological integrity analyzed macroinvertebrate communities along the elevational and longitudinal gradient of McDonald Creek and established a "reference-condition" for biomonitoring studies using multivariate approaches to assessing water quality impairment. This reference condition will permit assessing potentially impacted sites that may occur during Sun Road reconstruction. The next step will be to complete the final report.

A Decision Support System for the Saint Croix National Scenic River

National Park Service staff required an easy, but accurate, system to enter data about plants and animals in the Riverway to ensure data consistency among studies. Using these criteria, the park developed a relational, Access database on unionid mussels, rare plants, and rare animals in the Riverway. This database contains data entry screens with drop-down menus to reduce errors associated with data entry conducted by multiple individuals, and to ensure that each individual enters the same type of data. Database users can search and output information from the Access database into GIS to perform more detailed spatial analyses that will ultimately aid in decision making in the Riverway. This work is now completed.

Bighorn Sheep in Great Basin National Park: An Assessment of Population Status, Limiting Factors and Potential Enhancement Alternatives

Field work was completed. A panel of scientists visited the park to review background information on vegetation and the existing bighorn sheep population and to evaluate the quality of available habitats. A draft report was completed and will be finalized in early FY 2004.

Determine Wind Erosion Rates to Support Protection of Natural and Cultural Resources at Bandelier National Monument, New Mexico

This project provides technical assistance to Bandelier National Monument on the effects of accelerated soil erosion on natural and cultural resources. Water erosion is known to be a major problem, but wind erosion rates have been unexamined. In late FY 2002 the park established an array of 28 wind erosion samplers to collect wind-borne particles in a circular pattern in the midst of a Bandelier watershed where water erosion has been studied for 10 years. In FY 2003 the park collected samples weekly or bimonthly, developing a baseline on the magnitude and variability of wind-driven erosion. Staff will continue to collect data in FY 2004 to further determine patterns and trends of wind-borne erosion. In FY 2004 staff will summarize their findings to date to inform an ongoing EIS for ecological restoration activities at Bandelier.

Develop and Populate an Avifauna Database at Mesa Verde National Park

More than 10,000 individual reference sources on the bird fauna of Mesa Verde National Park, including published and unpublished reports, various counts, field notes, and wildlife record cards, have been gathered. Approximately 40 percent of this information has been entered into an Access database that follows NPS format. Park staff have been very supportive and interested. We have begun synthesizing data in relation to species and habitat to provide a comprehensive overview of bird occurrence, distribution, and population trends at Mesa Verde National Park.

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**NPS-USGS Biological Resources Division, Park-Oriented Biological Support
Summary of Progress Made for Projects Funded in FY 2003 (continued)**

PROJECT TITLE

FY 2003 REPORT

Development of a Model to Evaluate Impacts of Fuels Reduction/Prescribed Fire in Pinyon-juniper Habitats on Avian Communities Within Colorado Plateau National Parks (19 parks)

A review of all published and non-published works associated with breeding birds from Zion National Park was completed. Updated species lists are being developed of all birds that have been reported within mature, mid-aged, and young-aged pinyon-juniper habitat in the park; next, resident, migrant, and vagrant nonbreeding species lists will be developed. Historical accounts have been compiled of information on population dynamics of breeding species within the park. All areas of each pinyon-juniper vegetation type scheduled for fuels reduction have been visited. Because habitat to be burned in Zion does not include mid-aged habitats, permanent transects established prior to the proposed fuels reduction have been stratified by only mature and young vegetation types. Coordination with park staff and utilization of available park GIS vegetation data themes will permit future correlation of vegetation and avian population transect data with other biotic and abiotic parameters. Initial avian surveys conducted at permanent transects collected baseline data prior to the fuels reduction effort. Oral reports were given to Zion staff in both 2002 and 2003 and to other Colorado Plateau parks in 2003. Geographic information data themes of pinyon-juniper habitat have been done for four parks.

Research in Support of Endangered Kemp's Ridley Sea Turtles at Padre Island National Seashore

Documented 19 Kemp's Ridley sea turtle nests along the Texas coast during 2003. Nesting turtles included one associated with an experiment to establish a secondary nesting colony and two other head-started turtles. Hatchling emergence was about 85 percent. Collected blood and tissue samples for later DNA analyses.

Estimating Black Bear Abundance in Great Smoky Mountains National Park Using DNA Extracted from Hair Samples

More than 1,300 DNA samples were collected from 65 sites in Great Smoky Mountains National Park during 10 weekly sampling periods. Microsatellite DNA analysis is being performed on 250 randomly selected samples. Bear population abundance and density will be determined based on capture histories derived from the DNA samples. Results will be combined with a second year of DNA sampling in 2004 to establish protocols for a long-term black bear population monitoring program.

Testing and Evaluation of Remote Sensing Methods for Estimating Refuge Characteristics of Karst Wetlands (Everglades National Park)

The project goal is to determine the feasibility of estimating density of solution holes by aerial imagery. Digital imagery of transects in Everglades National Park was captured by aerial overflights during the 2003 dry season. The images were orthorectified and post-processed. While successful identification of vegetation-free limestone areas was possible, conditions were too dry to pick up any water/shadow in the holes themselves. As an alternative, a search is underway of historic archives for imagery from wetter periods that might provide distinction between open limestone area vs. limestone with solution hole. The possibility that all visible open areas may be depressions will be tested by ground-truthing. A high-resolution camera purchased at year's end will provide a very high-resolution foundation for rectification of, and change detection from, imagery to be collected in the future when ground conditions are more suitable for analysis of the holes. In FY 2004 transect overflights will be conducted to collect images when conditions are optimal, and a final report of the data will be prepared.

Distribution, Population Dynamics, and Herbivory Impacts of a Pioneering Elk Herd on Chaco Culture National Historic Park

Four cow and seven bull elk were radio-collared in April 2003. Cow elk averaged 6.2 percent body fat in April 2003, the highest end-of-winter fat levels seen in monitoring of more than 10 elk populations throughout western North America. The majority of bull elk captured on the park dispersed off the park onto adjacent Tribal and Bureau of Land Management holdings. Cow elk captured on the park remained on or adjacent to the Park. Elk locations were entered into a GIS database for analysis of elk use areas. Elk will be captured again in December 2003 to increase sample sizes of resident adult females.

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NPS-USGS Biological Resources Division, Park-Oriented Biological Support
Summary of Progress Made for Projects Funded in FY 2003 (continued)

PROJECT TITLE	FY 2003 REPORT
Effects of Suspended Load on Stream Biota (Redwood National Park)	More than 400 suspended sediment samples were collected in four streams. Lab analysis is completed for turbidity, particle size distribution, and organic/inorganic composition. Fish feeding behavior and benthic macroinvertebrates were sampled under eight different flow conditions in four streams. Statistical analysis is now under way, and invertebrate identification must be completed. A final report on the effects of suspended sediment loads on stream biota will be issued in 2004.
The Importance of Walnut Canyon National Monument as Habitat for Cougars (<i>Puma concolor</i>) in an Urban Interface Environment	Four cougars were marked and monitored a total of 503 animal-days, producing a total of more than 900 successive movements. The marked cougars rarely crossed paved highways, exhibited selection for rough terrain, often used areas near (less than one mile) urban areas, and increased their use of protected areas with advent of the big game hunting season. Twenty-five recorded kills included four coyotes and one bobcat. A one-year continuation proposal was submitted to a private foundation and a three-year proposal was submitted to the research NRPP. The work involved eight students and 16 volunteers. Talks were given at two conferences, and two posters were presented at one conference. Capture of two additional animals, monitoring, and GIS development will continue through FY 2004 along with report preparation and development of future research plans.
Gaining Baseline Data on State-listed Lake Sturgeon (<i>Acipenser fulvescens</i>) and Their Spawning Habitat Across the International Boundary Between Minnesota and Ontario (Voyageurs National Park)	In May and June 2003, radio/acoustic tags were implanted in an additional 20 lake sturgeon. Aerial and boat tracking of those fish and the 13 tagged in Fall 2002 was conducted weekly throughout the summer and early fall. Some fish moved extensively, while others remained in a relatively small area throughout the summer. Tracking of fish will continue in the spring and summer of 2004 with emphasis on identification and characterization of areas apparently being used for spawning. A final report will be completed by the winter of 2004-05.
Technical Assistance in Determining Size and Composition of Non-native and Native Ungulate Populations at Point Reyes National Seashore	Completed a peer reviewed study plan with a focus on the population of fallow deer (<i>Dama dama</i>), the more abundant of the two non-native deer species. Captured fallow deer from November 2002 through October 2003 using aerial net-gunning (37 animals) and modified Clover traps (five animals). Fitted captured animals with radio-collars and collected biological samples (an incisor, blood, and feces) before release to assess age and reproductive and disease status. Instrumented animals have been located from the ground bimonthly. Completed an aerial census of the seashore's fallow deer in January 2003. At that time, all visible fallow deer were counted from the air, and instrumented animals were located both from the air and on the ground. Obtained both average group size and a Lincoln-Petersen index using the detectability of instrumented animals as a correction factor. The first-year estimate for the Seashore fallow deer population was 859 animals (90% CI = 547-1170). This estimate, as well as herd composition data collected using telemetry, has been included in the park's Exotic Deer Management Plan Environmental Impact Statement, to be released in draft form January 2004. A second aerial census is scheduled for January 2004 to secure a population estimate with a narrower confidence band.
Vegetation Classification and Mapping Tools for National Parks: Demonstration Products for Voyageurs National Park	Research and analysis of the USGS-NPS Vegetation Mapping Program's vegetation sampling data initiated in FY 2003 will be concluded early in FY 2004. Results will be incorporated into both a vegetation field key and a scientific journal article regarding plant communities at Voyageurs National Park. For the field key, an outline and page format for each plant community were derived and representative ground photos for each plant community were identified and selected. In FY 2004 all graphical and manuscript pieces will be compiled, analysis will be completed, and the scientific article will be drafted and submitted for journal publication. A journal article regarding photointerpretation

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**NPS-USGS Biological Resources Division, Park-Oriented Biological Support
Summary of Progress Made for Projects Funded in FY 2003 (continued)**

PROJECT TITLE

FY 2003 REPORT

Vegetation Classification and Mapping Tools for National Parks: Demonstration Products for Voyageurs National Park (continued from previous page)

methods for mapping plant communities at Voyageurs National Park drafted in FY 2003 will be finalized and submitted in FY 2004. The article presents the importance of collaboration between ecologists and mappers for developing quality vegetation map products. An outline and page format for the Resource Application report booklet was derived so each resource application page contains four sections: Introduction, Application, Results, and Graphics. The report booklet will be finalized and prepared for publication in FY 2004. Demonstrations of the vegetation field key tool and resource applications using the USGS-NPS Vegetation Mapping Program's vegetation map, were presented at the 2003 George Wright Society Biennial Conference.

Baseline Monitoring of Floodplain Vegetation and Geomorphology Prior to Dam Removal, Elwha River, Olympic National Park

Six cross-valley transects were sampled within Olympic National Park in Summer 2003: three in the "control" reach in Geyser Valley (upstream of Glines Canyon Dam), and three in the reach between the two dams on the Elwha River. Transect topography was surveyed; vegetation patch types and geomorphic surfaces were identified; vegetation plots were established; tree, shrub and herbaceous vegetation was sampled; and up to 12 more transect locations for future sampling were identified. FY 2003 results included topographic cross-sections for the six transects; tree ages, tree density, cover, and basal area by species; shrub species composition and cover; herbaceous species composition and cover; and dominant sediment particle sizes within the vegetation plots. In FY 2004 all remaining field data collection will be conducted, including parallel sampling to that conducted in FY 2003 along up to 12 more transects (three more in Geyser Valley, three more between the dams, and six below both dams). Data entry and preliminary data analysis will also occur in FY 2004. Final data analysis and report preparation will extend into FY 2005.

Protecting Ecological Resources at Acadia National Park Through Landscape Scale Conservation and Easement Planning

The principal investigators obtained relevant biological inventories from park staff to incorporate into the decision support process. The investigators also met with park staff and the Maine Land Trust to obtain their input. The park asked USGS to also include boundary decisions currently being discussed by the park as well as prioritizing lands for conservation easements. The principal investigators met with USGS personnel developing the vegetation classification for Acadia NP to incorporate vegetation data into the modeling process. A preliminary decision tree structure has been developed and discussed with park staff.

Water Developments in Theodore Roosevelt National Park, North Dakota: Implications for Ungulates and Herbivory

Developed portable videography units that resolve many problems associated with using cameras for vertebrate monitoring. Deployed seven units at water developments and monitored ungulate use from June through September. Developed a vegetation sampling protocol and collected data on plant community composition in the vicinity of water developments. Data collection will continue, and data processing will begin during FY 2004.

Impact of Stocking Non-indigenous Salmonids on a Federally Endangered Freshwater Mussel Within the Delaware Water Gap NRA

The project study plan was approved in May 2002. Field work needs to be conducted during the winter and early spring. No work was conducted during the winter of 2002-2003 because the principal investigator changed jobs, and too much rain caused poor field study conditions.

Evaluating the Impacts of White-tailed Deer (*Odocoileus virginicus*) on Vegetation Within Pea Ridge National Military Park

Twenty deer exclosures were constructed within the park between January and March 2003. Vegetation data on all 53 deer browse plots and the 20 deer exclosure plots were collected in August 2003. All vegetation data have been entered into a database and error checked. The field work has been completed. During FY 2004, data will be analyzed, a report will be prepared for park management, and a journal manuscript will be prepared for submission.

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**NPS-USGS Biological Resources Division, Park-Oriented Biological Support
Summary of Progress Made for Projects Funded in FY 2003 (continued)**

PROJECT TITLE

FY 2003 REPORT

Development of Parasite Risk Assessment and Control Strategies for Captive Breeding of Island Fox (*Urocyon littoralis*) at Channel Islands National Park

From November 2002 to July 2003 an intensive parasite monitoring project was instituted for each park captive fox breeding facility. The College of Veterinary Medicine at the University of Tennessee analyzed fecal samples using multiple parasite identification and quantification procedures to produce a complete picture of the parasites impacting the foxes. In June 2003 the Island Fox Parasite Working Group met a second time to review the draft parasite risk assessment and control plan developed in 2002 in light of the parasite monitoring project results. Currently the Parasite Working Group is revising and proofreading the Parasite Risk Assessment and Control Report in preparation for submission of a final draft.

Habitat Requirements of the Endangered California Freshwater Shrimp (*Syncares pacifica*) in Streams on the Point Reyes National Seashore and Golden Gate National Recreation Area

California freshwater shrimp were sampled using a combination of methods on four occasions (February, May, August, and November 2003) from 16 sites in Lagunitas Creek and four sites in Olema Creek, a small tributary of Lagunitas Creek. Shrimp were detected in Lagunitas Creek at no more than 13 sites on any given sample trip. Shrimp have not been caught in Olema Creek. Water quality and other habitat variables from each site were measured, and fish were sampled for gut contents. Preliminary observations indicate that shrimp typically inhabit submerged substrates such as root hairs of riparian vegetation where water current velocities are low or nonexistent. Gut contents of native sculpins (*Cottus* spp.) yielded evidence of predation on shrimp. Three additional sampling trips are scheduled for 2004 (February, May, and August).

Assessing the Risk of Aerially Borne Pesticides to Declining Amphibian Species in the National Parks of the Sierra Nevada Mountains, California (Sequoia/Kings Canyon, Yosemite, and Lassen Volcanic National Parks)

The Pacific chorus frog (*Pseudacris regilla*) was used as a surrogate species to test effects of atmospherically transported pesticides on declining amphibian species in the Sierra Nevada Mountains. Field translocation experiments conducted in three national parks in California examined differences among two impacted sites and a reference site. A laboratory experiment conducted in Spring 2003 attempted to replicate, in a controlled environment, pesticide exposure effects seen in the field. Egg masses of *P. regilla* collected at Point Reyes National Seashore (containing approximately 480 embryos) were shipped overnight to the Patuxent Wildlife Research Center. Upon arrival, egg masses were held in environmental chambers until hatching. After hatching, 6 tadpoles (pre-Gosner stage 25) were placed per 8-liter pesticide-spiked aquarium for a total of 80 aquaria and 480 tadpoles. *P. regilla* tadpoles were exposed for 10 weeks to one of three dosage levels of malathion, chlorpyrifos, diazinon; to a mixture of the three; or to acetone and blank controls. Animals were weighed and staged at 28 days and again at the end of the experiment when snout-vent-length and proximal joint measurements were taken. Samples are stored at -80° C awaiting tissue, cholinesterase, and DNA analyses. Survivorship, growth, time to metamorphosis (or Gosner Stage 41-45), and percent malformations are being determined relative to pesticide exposure.

Evaluation of Canid Scents as a Management Tool to Reduce Mammal Predation on Piping Plover Nests in Coastal Barrier Parks (Gateway National Recreation Area and Cape Cod, Cape Hatteras, Cape Lookout, and Fire Island National Seashores)

Experiments to evaluate the use of natural predator odors in deterring red foxes and other medium-sized mammals from predated piping plover nests were undertaken at all five sites. Work was terminated in October when Hurricane Isabel washed out all sampling stations. Data are now being compiled and organized for analysis and a report is expected by summer 2004.

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Canyonlands National Park received Natural Resource Challenge funding to study amphibian habitat in Salt Creek. Strings of Woodhouse toad eggs were placed in pools (left) and counted after vehicle drive-throughs at 5 mph. Counts were also conducted in pools closed to vehicles. A count done 24 hours later showed that fewer eggs remained in pools where vehicles had driven (right).

NPS PHOTOS



**NPS-USGS Biological Resources Division, Park-Oriented Biological Support
Summary of Progress Made for Projects Funded in FY 2003 (continued)**

PROJECT TITLE

FY 2003 REPORT

Southern Colorado Plateau Park Network: Vegetation Mapping Needs Assessment (19 parks)

At the request of the Southern Colorado Plateau network, the project was refocused to develop more specific information for three parks for which the network planned to initiate vegetation mapping work in late FY 2003 and FY 2004. Initial work for Canyon de Chelly National Monument, Mesa Verde National Park, and Petrified Forest National Park identified existing plot data, vegetation maps, aerial photography, and vegetation literature. A detailed work plan for vegetation mapping within each park was developed that included identification, description, and assignment of mapping tasks; cost estimates; and a projected work schedule. A scoping meeting was held at each park to initiate vegetation mapping activities and to get each park's input on the work plan and schedule. A field plot sampling plan was developed for Petrified Forest NP, and field data collection and data compilation of field measurements was accomplished.

Determining Rates and Causes of Summer Elk Calf Mortality in Yellowstone National Park

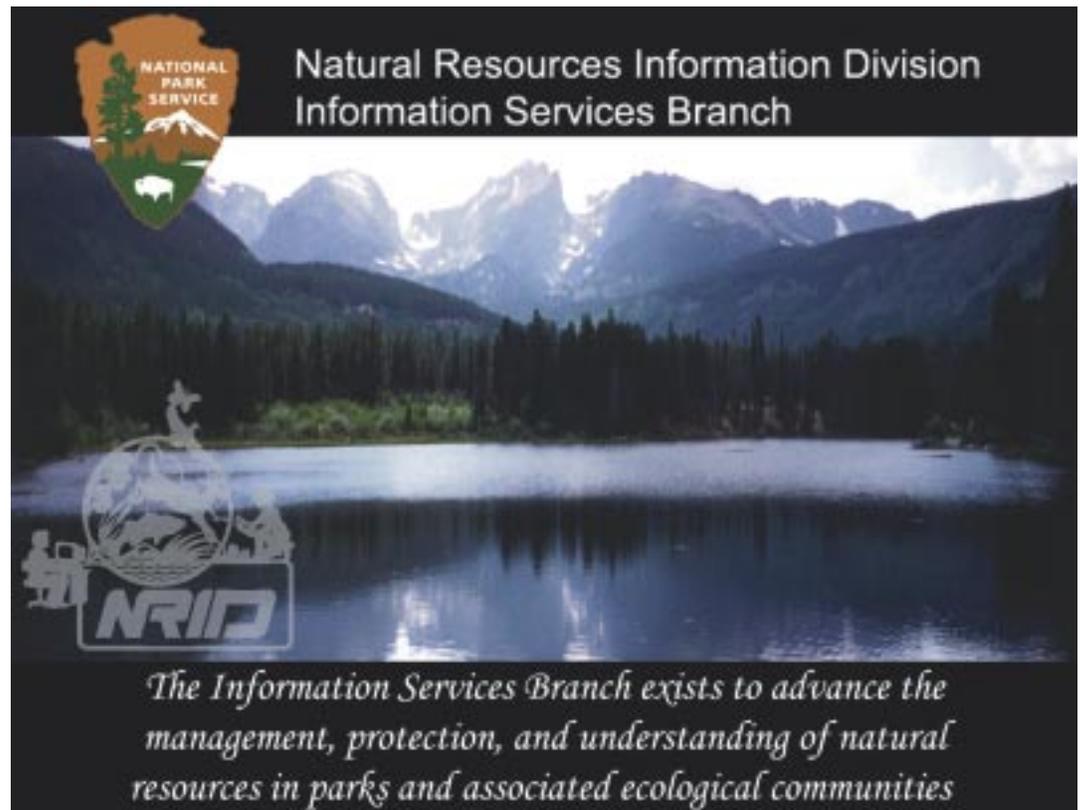
Fifty-one newborn elk calves in Yellowstone's Northern Range were outfitted with mortality-sensing transmitters, weighed, examined, and sampled for blood. As of September 30, preliminary indications indicate that bears killed 19 (37%); wolves, 5 (10%); coyotes 3 (6%); other predators, 2 (4%); bears or wolves, 2 (4%); and other causes, 3 (6%). The survival rate was 33 percent. Blood parameters are being analyzed. Calves will be monitored for cause of death through May 2004.

Amphibian Habitat Fragmentation in Salt Creek, Canyonlands National Park: Implications for Reproduction and Distribution

Bufo woodhousii (Woodhouse toad) eggs were placed in pools in the road and closed-road sections. Pools in the road were driven through once at a speed of about 8 km hr⁻¹ (5 mph) and remaining eggs counted. Eggs were counted again after 24 hours in both open-road and closed-road pools. Significantly fewer eggs remained in pools that had been driven through, and even fewer remained after a day. There was no difference in closed-road pools in number of eggs after 24 hours. Pitfall traps and visual encounter surveys along transects in open-, closed-, and no-road segments were also conducted May-July and September. Very few amphibians were seen; populations in all areas appear to be greatly reduced by drought conditions over the past five years.

Various hardware and database systems for all NPS natural resource programs are maintained by the Natural Resources Information Division. A significant effort to improve the Division's website, NatureNet, was completed in 2003.

NPS GRAPHIC



NRPP Servicewide Projects Funded in FY 2003

EXPENDITURES	FUNDING
Recurring Funding Expenditures	
Director's Natural Resource Awards	\$ 50,000
Support for Professional Meetings (Society for Ecological Restoration, Natural Area Association, George Wright Society)	30,000
Natural Resource Publications	108,000
TOTAL	\$ 188,000
Servicewide Database Initiatives Expenditures	
Research Permitting and Reporting System (RPRS)	\$ 78,000
Natural Resource Management Assessment Program (NR-MAP)	30,000
TOTAL	\$ 108,000
Special Projects Expenditures	
Coordination of CESU Network	\$ 107,800
WACAP Snow Sampling	26,200
Peer Review Sensitivity of Plants	5,000
Acoustical Data Collection	100,000
Museum of Natural History/Center for Biodiversity and Conservation	10,000
World Heritage Meeting	5,000
Vulnerable Coastal and Glacial Resources	184,000
Natural Resource Laureate Program	50,000
Prototype Natural Resource Information Synthesis	133,000
Scientific Publications	13,000
Marine Protection Cooperation	4,000
TOTAL	\$ 638,000
Reprogrammed	\$ 292,000
TOTAL	\$ 934,000



New surveillance techniques are being tested at Capitol Reef National Park to protect endangered cacti that have been advertised for sale on the Internet.

PHOTO © RUSS FINLEY/FINLEY-HOLIDAY FILMS

Appendix C: Resource Protection Program Projects

Resource Protection Fully Funded Projects

PARK	PROJECT TITLE	TOTAL FUNDING	FY 2003 FUNDING
Mount Rainier NP	Evaluate Potential for and Extent of Legal and Illegal Mushroom Harvest in Park	\$ 24,000	\$ 24,000
TOTAL		\$ 24,000	\$ 24,000

Resource Protection New and Ongoing Projects

PARK	PROJECT TITLE	TOTAL FUNDING	FY 2003 FUNDING
Yosemite NP	Resource Stewardship and Protection Curriculum—Phase 2	\$ 125,000	\$ 105,000
Shenandoah NP	Develop and Test Biome Level Protection Model—Phase 2	150,000	106,000
Capitol Reef NP	Establish Procedures for Use of Surveillance Systems to Protect Rare Cacti From Illegal Collecting	115,000	65,000
TOTAL		\$ 390,000	\$ 276,000



Using coordinates provided by USGS, a GIS specialist navigated to a water gauge at Zion National Park, where a new GPS reading was taken and added to the park's water resources GIS layer. NPS PHOTO

Appendix D: Water Resource Protection Projects and Aquatic Resource Specialist Positions

Water Resource Protection Projects, FY 2003 Funding

PARK	REGION	PROJECT TITLE	FUNDING
ALL	ALL	Support to the Office of the Solicitor	\$ 164,500
AZ Parks	IMR	Hydrologic Data Collection in Support of the Adjudication of the Little Colorado River Basin in Arizona	20,900
BLCA	IMR	Participation in the Adjudication of Colorado Water Div. #4	13,000
CAVE	IMR	Hydrologic Investigation, Restore Streamflow	21,100
CHIC	IMR	Hydrologic Data Collection, Participation in State Administrative Process	111,000
GRCA	IMR	Groundwater Study, Spring Protection	65,500
MEVE	IMR	Implementation of Water Rights Decree	1,200
MOCA	IMR	Hydrologic Data Collection in Support of the Adjudication of the Verde River Basin in Arizona	43,900
MT Parks	IMR	Implementation of the Montana-NPS Compact	1,800
SAGU	IMR	Investigation of Hydrology and Water Related Values	145,900
UT Parks	IMR	Participation in the Adjudication of Various Areas in Utah	3,000
BUFF	MWR	Investigation of Hydrology and Water Related Values	80,000
SLBE	MWR	Hydrologic Data Collection, Crystal River	13,000
THRO	MWR	Investigation of Hydrology and Water Related Values	11,500
CRLA	PWR	Assessment of Feasibility and Cost, Improve Priority Date	18,800
DEVA	PWR	Devil's Hole and Spring Flow Monitoring, Groundwater Study, Participation in Groundwater Model Development	105,100
GRBA	PWR	Assessment of Hydrologic Conditions and Vulnerability of Park Streams to Groundwater Development	40,000
LAME	PWR	Spring Flow Monitoring, Participation in Cooperative Aquifer Stress Test, Groundwater Model Development	329,000
OBRI	SER	Stream Flow Monitoring, Investigation of Hydrology and Water Related Values	73,600
ALL	ALL	Technical and Administrative Support to All Projects	66,200
TOTAL			\$ 1,329.00

Water Resources Division Competitive Projects, Final-Year Funded Projects

PARK	REGION	PROJECT TITLE	FUNDING
GRTE	IMR	Baseline Water Quality Parameters/Land Use Characteristics of Five Snake River Headwater Tributaries	\$ 29,400
ISRO	MWR	Develop Water Resources Management Plan	25,000
SACN	MWR	Historical Trends in Phosphorous Loading from Permitted Point Source Discharges	25,000
CATO	NCR	Evaluate Water Quality for all Park Streams	14,000
ACAD	NER	Assess Current and Historic Atmospheric Deposition of Toxic Contaminants	49,000
DEWA	NER	Develop Groundwater Monitoring	41,000
MORR	NER	Distribution of Consumer Chemical Tracers to Evaluate Potential Septic System Sources of Fecal Bacterial Contamination	42,500
LAVO	PWR	Restoration of Drakesbad Meadow	25,000
MOJA	PWR	Perform Baseline Hydrologic and Biologic Inventory of Wetlands	25,000
OLYM	PWR	Analyze Channel Dynamics on the Hoh and Quinault Rivers to Protect Fish and Aquatic Resources	15,000
OLYM	PWR	Lake Ozette Tributary Sediment Sources, Transport, Potential, and Control	50,000
PORE	PWR	Hydrologic and Ecological Impacts of Commercial Oyster Framing on the Biota of Drakes Estero	25,000
REDW	PWR	Evaluate Watershed and Stream Channel Conditions Related to Disturbance History and Coho Habitat in Mill Creek	20,700
REDW	PWR	Install Streamflow Gaging Station on Prairie Creek	14,700
BISC	SER	Develop Waterflow Needs in Biscayne NP Using Adjacent Coastal Wetlands Indicators	72,300
CANA	SER	Develop Water Quality Monitoring Program	50,000
MOCR	SER	Restore Native Vegetation to Savannah Wetland	18,200
TOTAL			\$ 940,700

Water Resources Division Competitive Projects, Continuing Projects, FY 2003

PARK	REGION	PROJECT TITLE	FUNDING
WRST	AKR	Investigate Liminological Conditions in Tanada Lake Affecting Sockeye Salmon Production	\$ 17,300
CURE	IMR	Data Collection & Analysis of Required Water Quality Parameters; Outstanding Waters Designation	49,800
PEFO	IMR	Stream and Riparian Characterization and Analysis	26,800
WABA	IMR	Conduct Riparian Corridor Restoration Study at Washita Battlefield NHS	49,500
BUFF	MWR	Characterization of Macroinvertebrate Community and Drift in a Tributary of BUFF, Prior to Damming	19,200
BUFF	MWR	Ground and Surface Water Interactions of the Buffalo NR	42,500
BUFF	MWR	Inventory and Assess Springs and Perennial Streams Buffalo NR	50,000
ISRO	MWR	Assess Hydrocarbon Pollution Threats to Park Waters	49,500
SACN	MWR	Determine Groundwater Impacts to the St. Croix NSR	40,000
SACN	MWR	Classify Critical Aquatic Habitat for the St. Croix NSR	45,200
NCRO	NCR	Capture and Assess Stream Health in Highly Fragmented Parks	52,200
CACO	NER	Management of Dune Slack Wetlands	16,000
CACO	NER	Pilgrim Lake Dynamics	50,000
DEWA	NER	Regional Point Source Management to Support Special Protection Water Quality Regulations	50,000
GOGA	PWR	Plan Rodeo Lagoon Watershed Wetland Riparian Habitat Restoration	43,500
GRBA	PWR	Aquatic Survey and Condition Assessment of GRBA	58,500
HAFO	PWR	Water Quality Impacts to the Snake River from Landslides	25,000
PORE	PWR	Enhanced Wetlands Mapping for Tomales Bay Watershed	47,600
PORE	PWR	Restoration of Horseshoe Pond to Coastal Lagoon	62,500
REDW	PWR	Evaluate Stream Temperature Regimes for Juvenile Coho	29,100
BISC	SER	Identify Restoration, Reservations and Minimum Flows and Level Targets for Biscayne NP	50,000
MACA	SER	Develop Water Resource Management Plan	25,000
TOTAL			\$ 940,700

Aquatic Resource Specialists, FY 2002 and FY 2003 Funded Positions

REGION	DUTY STATION/DISCIPLINE	STATUS*
AKR	YUCH/Aquatic Ecologist	FY 02 funded and filled
AKR	LACL/Fishery Biologist	FY 02 funded and filled
IMR	UT State Coord Office/ Fishery Biologist	FY 02 funded and filled
IMR	Sonoran Desert Network/ Groundwater Hydrologist	FY 02 funded and filled
IMR	GRTE/Hydrologist	FY 02 funded; to be filled in FY 04
IMR/MWR	CHIC/Groundwater Hydrologist	FY 03 funded; to be filled in FY 04
MWR	SACN/Aquatic Ecologist	FY 02 funded and filled
MWR	ISRO/Fishery Biologist	FY 02 funded and filled
NER/NCR	Center for Urban Ecology/ Aquatic Ecologist	FY 02 funded and filled
NER	DEWA/Hydrologist	FY 02 funded and filled
NER	FIIS/Marine Ecologist	FY 03 funded; to be filled in FY 04
PWR	PORE/Aquatic Ecologist	FY 02 funded and filled
PWR	MORA/Geomorphologist	FY 02 funded and filled
PWR	LAME/Groundwater Hydrologist	FY 03 funded; to be filled in FY 04
SER	CHAT/Fishery Biologist	FY 02 funded and filled
SER	CHAT/Wetlands Ecologist	FY 02 funded and filled

* The recruitment process did not allow for the FY 2003-funded positions to be filled in the fiscal year. Additionally, one position funded in FY 2002, the Intermountain Region hydrologist at Grand Teton NP, will not be filled until FY 2004. Therefore, lapsed funding was incurred. The lapsed funding was used at the regional level to support park water resource management issues.

Watershed Condition Assessment Program, FY 2003

PROGRAM ELEMENT	FUNDING
Watershed Condition Assessment Methods Compendium	\$ 250,000
Water Resources Competitive Project Program	1,102,700
NPS-USGS Water Quality Assessment Partnership Program	365,000
WRD Watershed Condition Assessment–Critical Projects	500,000
Coastal Parks Phase I Watershed Condition Assessments	289,000
Marine Science Advisor	170,000
Other (including development of data systems)	189,000
TOTAL	\$ 2,865,700

Watershed Condition Assessment Critical Projects, FY 2003 Funding

REGION/STATE	PARK	PROJECT TITLE	FUNDING
PW/CA	WHIS	Sampling Water and Sediments for Contaminants: Supplemental Assistance for a Cooperative Project	\$ 24,000
PW/IM	GLCA/	Development of a Comprehensive Water Quality	75,000
NV, AZ, UT	LAME	Monitoring Plan for Glen Canyon and Lake Mead NRAs	
PW/NV	GRBA	Susceptibility of Great Basin NP Resources to Groundwater Withdrawals in Cross-Boundary Ground-Watersheds	164,000
SE/FL	BISC	Groundwater Characterization and Assessment of Contaminants in Marine Areas of Biscayne NP	75,000
SE/SC	COSW	Effects of Modified Dam Operations and Run-of-River Flow in the Congaree River to Floodplain Hydrology	68,500
Western States	SEKI/ ROMO	Assessing Airborne Contaminants in Water, Fish, and Sediment in Western U.S. Parks	93,500
TOTAL			\$ 500,000



A field plot sampling plan was developed for Petrified Forest National Park, and field data collection and data compilation of field measurements was accomplished.

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Appendix E: Cooperative Ecosystem Studies Unit (CESU) Projects Supported With Natural Resource Challenge Funding

Alaska Region - North and West Alaska Cooperative Ecosystem Studies Unit

PARK	PROJECT TITLE	COST	R, TA, E	FUNDING
No challenge funding				

Intermountain Region - Colorado Plateau Cooperative Ecosystem Studies Unit

PARK	PROJECT TITLE	COST	R, TA, E	FUNDING
DINO	Stratigraphy and Dating of the Lower Cretaceous Cedar Mountain Formation	\$ 8,000	R	
GLCA	Plesiosaur Excavation and Late Cretaceous Paleontological Research	15,000	R	
PEFO	Revised Geologic Assessment of Sonsela Sandstone	13,000	R	
ARCH	<i>Lomatium latilobum</i> Monitoring	13,000	TA	
COLM	Inventory of Exotic Plants and Development of Long-Term Strategies for Control	15,000	TA	
MEVE	Population Status Survey for Schmoll's Milkvetch	15,000	TA	
TICA	Controlling Invasive Plants	10,000	TA	
ZION	Upgrade Stream Gauge on the East Fork of the Virgin River	7,000	TA	
ZION	Restore Natural Riparian Function on the Virgin River	3,000	TA	
MULTI	Haskell Indian Nations College Fieldwork	\$ 15,000	E	
TOTAL				\$ 114,100

Intermountain Region - Desert Southwest Cooperative Ecosystem Studies Unit

PARK	PROJECT TITLE	COST	R, TA, E	FUNDING
CHIR	Bat Species Diversity Study	\$ 4,400	R	
CORO	Food Resources and Winter Avian Abundance	5,000	R	
GUMO	Red Squirrel Survey	4,200	R	
TUMA	Kino Fruit Trees (Phase 1)	5,000	R	
MULTI	Hummingbird Monitoring Network Field Sites (JOTR, TUMA, CORO, CHIR)	26,300	R	
MULTI	Arizona-Sonora Avian Monitoring Program (FOBO and two Mexican sites in Sister Park)	8,000		
MULTI	Use of Remote Sensing to Quantify Border Impacts (CORO, ORPI)	9,000	R	
MULTI	CESU Assistant Research Scientist Position	35,000	R	
CAVO	Erosion Control and Restoration	10,200	TA	
MOJA	Workshop on Mohave Tui Chub Recovery Plan	4,500	TA	
PAAL	Mesquite Eradication	4,800	TA	
PAIS	Printing of Shoreline Trash Study	7,000	TA	
MULTI	Mission Parks Initiative (Phase 2) (TUMA, PECO, SAPU, SAAN)	5,000	TA	
	Printing CESU Brochure (Sonoran Institute)	600	TA	
ORPI	A Field Guide to Sonoran Desert Pollinators	5,000	E	
SPCO	PBS Program on El Camino Real Adentro	4,500	E	
MULTI	Hummingbird Monitoring Network Website (JOTR, TUMA, CORO, CHIR)	\$ 3,000	E	
TOTAL				\$ 141,500

Intermountain Region - Rocky Mountains Cooperative Ecosystem Studies Unit

PARK	PROJECT TITLE	COST	R, TA, E	FUNDING
BLCA/CURE	Determine Bighorn Sheep Lamb Productivity	\$ 10,000	R	
GLAC	Survey of Fish Populations along the Going-to-the-Sun Road	10,000	R	
GRTE	Pronghorn Migration Corridors	10,000	R	
FOLA	Conservation of Historic Structures and Weed Control	10,000	R	
YELL	Snowshoe Hare Distribution and Abundance	10,000	R	
ROMO	Herbivory by Biological Control Agents on Toadflax	5,330	R	
BICA	Bighorn Sheep Distribution and Abundance	9,580	R	
MULTI	Wilderness Travel Simulation Modeling	10,000	R	
GRTE	Restoration of Snake River Riparian Habitat	5,000	TA	
ROMO	Certification of Vascular Plant Lists	10,000	TA	
GRKO	Weed Control in Irrigated Pastures	5,000	TA	
BEOL	Vegetation Management Planning	4,000	TA	
BLCA/CURE	Natural Resource Interns	5,000	TA	
GLAC	Herbarium and Database Organization	2,100	TA	
FLFO	Paleontology Database and Web Site	1,975	TA	
BLCA/CURE	Staff Training in Biostatistics	2,475	E	
GLAC	Research Learning Center–Workshop	2,500	E	
ROMO	Research Learning Center–Workshop	2,500	E	
YELL	Workshop on Management of Grizzly Bears	2,500	E	
GLAC	Salish Kootenai College NR Intern	5,400	E	
GRKO	Curriculum Development and Teacher Training	2,500	E	
GRSA	Video on Dunes Parks	2,500	E	
GLAC	Bull Trout Education Brochure	2,500	E	
MULTI	Weed Text Book for NPS units	4,000	E	
MULTI	Wilderness Management Workshop	2,500	E	
MULTI	NR Managers Annual Meeting	\$ 6,125	E	
TOTAL				\$ 143,485

Midwest Region - Great Lakes-Northern Forest Cooperative Ecosystem Studies Unit

PARK	PROJECT TITLE	COST	R, TA, E	FUNDING
NIOB	Effects of Red Cedar Removal on Bird Populations in Upland Habitats of Niobrara Valley (administered through Great Plains CESU)	\$ 35,000	R	
EFMO	Baseline Information for Dousman Creek– Yellow River Project	1,000	R	
ISRO/KEWE	Geographic Information Systems Project Support	30,000	TA	
MULTI	Identify Research, Technical Assistance, and Education Needs in National Parks in the Great Lakes-Northern Forest Biogeographic Region	17,000	TA	
VOYA	Publication: Aquatic Synthesis of Voyageurs NP	1,000	TA	
	NPS contribution for initial award to Upper and Middle Mississippi Valley CESU	\$ 10,000		
TOTAL				\$ 94,000

Midwest Region - Great Plains Cooperative Ecosystem Studies Unit

PARK	PROJECT TITLE	COST	R, TA, E	FUNDING
CAVO/ FOUN/LAMR MULTI	Noxious Weeds Inventory and Mapping at Capulin Volcano NM, Fort Union NM, and Lake Meredith NRA	\$ 28,493	TA	
MULTI	Develop a Research and Technical Assistance Needs Catalog for National Parks in the Great Plains	10,000	TA	
MULTI	Grant Writing Training for Resource Managers	\$ 5,094	E	
TOTAL				<u>\$ 43,587</u>

Midwest Region - Upper and Middle Mississippi Valley Cooperative Ecosystem Studies Unit

PARK	PROJECT TITLE	COST	R, TA, E	FUNDING
No challenge funding				

National Capital Region - Chesapeake Watershed Cooperative Ecosystem Studies Unit

PARK	PROJECT TITLE	COST	R, TA, E	FUNDING
CHOH	Effects of Aluminum on Benthos of the Potomac River	\$ 40,000	R	
TOTAL				<u>\$ 40,000</u>

Northeast Region - North Atlantic Coast Cooperative Ecosystem Studies Unit

PARK	PROJECT TITLE	COST	R, TA, E	FUNDING
CACO/FIIS/ GATE/ASIS	Creation of a GIS-Based Automated Coastal Change Analysis Toolbox	\$ 18,687	R	
CACO/FIIS	Feasibility of Sampling Surf-Zone Fishes in NS Waters	47,195	R	
BOHA	Analysis of Shoreline Process, Boston Harbor Islands	7,495	R	
Service-wide	Support of Scientific Sessions and Special Publications Honoring Dr. James Allen (former NPS and USGS Coastal Geomorphologist)	8,000	TA	
GATE	Conduct Topographic Survey and Establish Volume Data for Marsh Restoration at Jamaica Bay	4,755	TA	
NER	North Atlantic Coast CESU operations	\$ 18,975	TA	
TOTAL				<u>\$ 105,107</u>

Pacific West Region - Californian Cooperative Ecosystem Studies Unit

PARK	PROJECT TITLE	COST	R, TA, E	FUNDING
No challenge funding				

Pacific West Region - Great Basin Cooperative Ecosystem Studies Unit

PARK	PROJECT TITLE	COST	R, TA, E	FUNDING
JODA	Study of Bat Roots in the John Day Fossil Beds NM	\$ 30,900	R	
YOSE	National Register Documentation	6,000	TA	
MOJN	Website Development for the Mojave Inventory and Monitoring Network	6,000		
GRBA	Baseline Assessment of the Inventory of Bird Species at Great Basin National Park and update of the NPS Species Database	3,800	TA	
MOJN	MS Access and ArcView training for Mojave Inventory and Monitoring Network	\$ 2,000	E	
TOTAL				<u>\$ 48,700</u>

Pacific West Region - Pacific Northwest Cooperative Ecosystem Studies Unit

PARK	PROJECT TITLE	COST	R, TA, E	FUNDING
FOVA	Lead isotope and Trace Element Analysis of 19th-Century Lead Artifacts Recovered from Lewis and Clark, Hudson's Bay Company, and U.S. Army sites of the Pacific Northwest	\$ 2,850	R	
OLYM	Hypospectral Imaging Acquisition and Analysis of the Elwah River Corridor	25,000		
CCSO	Administrative Support for NPS Research Coordinator Including the Production of PNW CESU Newsletter, Maintaining NPS Information on the PNW CESU Website, Charges for Peer Review, Small Technical Assistance Efforts, and Administrative Assistance at the UW	\$ 25,150		
TOTAL				<u>\$ 53,000</u>

Southeast Region - Gulf Coast Cooperative Ecosystem Studies Unit

PARK	PROJECT TITLE	COST	R, TA, E	FUNDING
MULTI	Gulf Coast Workshop for All Units	\$ 31,000	TA	
MULTI	Student Intern for All Gulf Coast Units	\$ 6,500	TA	
TOTAL				<u>\$ 37,500</u>

Southeast Region - Piedmont-South Atlantic Coast Cooperative Ecosystem Studies Unit

PARK	PROJECT TITLE	COST	R, TA, E	FUNDING
No challenge funding				

GPS coordinates are collected by a Geoscientist-in-the-Park to define the location of a survey marker in Cumberland Island National Seashore as part of a coastal geology study sponsored by the Geological Society of America.

USGS PHOTO BY ELIZABETH PENDLETON



Southeast Region - South Florida/Caribbean Cooperative Ecosystem Studies Unit

PARK	PROJECT TITLE	COST	R, TA, E	FUNDING
GUIS	Santa Rosa Beach Mouse Use of Hurricane-Fragmented Landscape	\$ 22,000	R	
TOTAL				\$ 22,000

Southeast Region - Southern Appalachian Mountains Cooperative Ecosystem Studies Unit

PARK	PROJECT TITLE	COST	R, TA, E	FUNDING
COSW	Inventory and Mapping of Carolina Bogmint	\$ 12,456	R	
DESO	Natural Resource Baseline Inventory (administered through South Florida-Caribbean CESU)	6,945	R	
BISO	Allegheny Woodrat Inventory	4,028	TA	
HOBE	Natural Resource Assessment of the Park	3,500	TA	
HOBE	Technical Assistance with GIS Database	2,000	TA	
CARL	Oral History Interviews	4,025	TA	
BLRI	Update Natural Resources Geographic Information System	\$ 10,000	TA	



Moose graze in a shallow stream at Grand Teton National Park.

PHOTO © RUSS FINLEY/FINLEY-HOLIDAY FILMS

Appendix F: Parks Included in the NPS Inventory and Monitoring Program (With Acronyms)

NPS Inventory and Monitoring Program Parks With Acronyms

CODE	PARK NAME	REGION	STATE
ABLI	Abraham Lincoln Birthplace National Historic Site	Southeast	KY
ACAD	Acadia National Park	Northeast	ME
AGFO	Agate Fossil Beds National Monument	Midwest	NE
ALAG	Alagnak Wild River	Alaska	AK
ALFL	Alibates Flint Quarries National Monument	Intermountain	TX
ALPO	Allegheny Portage Railroad National Historic Site	Northeast	PA
AMIS	Amistad National Recreation Area	Intermountain	TX
AMME	American Memorial Park	Pacific West	CM
ANIA	Aniakchak National Monument and Preserve	Alaska	AK
ANTI	Antietam National Battlefield	National Capital	MD
APCO	Appomattox Court House National Historical Park	Northeast	VA
APIS	Apostle Islands National Lakeshore	Midwest	WI
APPA	Appalachian National Scenic Trail	Multi	
ARCH	Arches National Park	Intermountain	UT
ARPO	Arkansas Post National Memorial	Midwest	AR
ASIS	Assateague Island National Seashore	Northeast	MD
AZRU	Aztec Ruins National Monument	Intermountain	NM
BADL	Badlands National Park	Midwest	SD
BAND	Bandelier National Monument	Intermountain	NM
BELA	Bering Land Bridge National Preserve	Alaska	AK
BEOL	Bent's Old Fort National Historic Site	Intermountain	CO
BIBE	Big Bend National Park	Intermountain	TX
BICA	Bighorn Canyon National Recreation Area	Intermountain	MT
BICY	Big Cypress National Preserve	Southeast	FL
BIHO	Big Hole National Battlefield	Pacific West	MT
BISC	Biscayne National Park	Southeast	FL
BISO	Big South Fork National River & Recreation Area	Southeast	TN
BITH	Big Thicket National Preserve	Intermountain	TX
BLCA	Black Canyon of the Gunnison National Park	Intermountain	CO
BLRI	Blue Ridge Parkway	Southeast	NC
BLUE	Bluestone National Scenic River	Northeast	WV
BOHA	Boston Harbor Islands National Recreation Area	Northeast	MA
BOWA	Booker T. Washington National Monument	Northeast	VA
BRCA	Bryce Canyon National Park	Intermountain	UT
BUFF	Buffalo National River	Midwest	AR
BUIS	Buck Island Reef National Monument	Southeast	VI
CABR	Cabrillo National Monument	Pacific West	CA
CACH	Canyon de Chelly National Monument	Intermountain	AZ
CACO	Cape Cod National Seashore	Northeast	MA
CAGR	Casa Grande Ruins National Monument	Intermountain	AZ
CAHA	Cape Hatteras National Seashore	Southeast	NC
CAKR	Cape Krusenstern National Monument	Alaska	AK
CALO	Cape Lookout National Seashore	Southeast	NC
CANA	Canaveral National Seashore	Southeast	FL
CANY	Canyonlands National Park	Intermountain	UT
CARE	Capitol Reef National Park	Intermountain	UT
CARL	Carl Sandburg Home National Historic Site	Southeast	NC
CASA	Castillo de San Marcos National Monument	Southeast	FL
CATO	Catoctin Mountain Park	National Capital	MD
CAVE	Carlsbad Caverns National Park	Intermountain	NM
CAVO	Capulin Volcano National Monument	Intermountain	NM
CEBR	Cedar Breaks National Monument	Intermountain	UT
CHAT	Chattahoochee River National Recreation Area	Southeast	GA
CHCH	Chickamauga / Chatanooga National Military Park	Southeast	GA
CHCU	Chaco Culture National Historical Park	Intermountain	NM
CHIC	Chickasaw National Recreation Area	Intermountain	OK
CHIR	Chiricahua National Monument	Intermountain	AZ
CHIS	Channel Islands National Park	Pacific West	CA

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NPS Inventory and Monitoring Program Parks With Acronyms (continued)

CODE	PARK NAME	REGION	STATE
CHOH	Chesapeake & Ohio Canal National Historical Park	National Capital	MD
CIRO	City of Rocks National Reserve	Pacific West	ID
COLM	Colorado National Monument	Intermountain	CO
COLO	Colonial National Historical Park	Northeast	VA
CORO	Coronado National Memorial	Intermountain	AZ
COSW	Congaree Swamp National Monument	Southeast	SC
COWP	Cowpens National Battlefield	Southeast	SC
CRLA	Crater Lake National Park	Pacific West	OR
CRMO	Craters of the Moon National Monument	Pacific West	ID
CUGA	Cumberland Gap National Historical Park	Southeast	KY
CUIS	Cumberland Island National Seashore	Southeast	GA
CURE	Curecanti National Recreation Area	Intermountain	CO
CUVA	Cuyahoga Valley National Recreation Area	Midwest	OH
DENA	Denali National Park and Preserve	Alaska	AK
DEPO	Devil's Postpile National Monument	Pacific West	CA
DETO	Devils Tower National Monument	Intermountain	WY
DEVA	Death Valley National Park	Pacific West	CA
DEWA	Delaware Water Gap National Recreation Area	Northeast	PA
DINO	Dinosaur National Monument	Intermountain	CO
DRTO	Dry Tortugas National Park	Southeast	FL
EBLA	Ebey's Landing National Historical Reserve	Pacific West	WA
EFMO	Effigy Mounds National Monument	Midwest	IA
EISE	Eisenhower National Historic Site	Northeast	PA
ELMA	El Malpais National Monument	Intermountain	NM
ELMO	El Morro National Monument	Intermountain	NM
EVER	Everglades National Park	Southeast	FL
FIIS	Fire Island National Seashore	Northeast	NY
FLFO	Florissant Fossil Beds National Monument	Intermountain	CO
FOBO	Fort Bowie National Historic Site	Intermountain	AZ
FOBU	Fossil Butte National Monument	Intermountain	WY
FOCA	Fort Caroline National Monument	Southeast	FL
FOCL	Fort Clatsop National Memorial	Pacific West	OR
FODA	Fort Davis National Historic Site	Intermountain	TX
FODO	Fort Donelson National Battlefield	Southeast	TN
FOFR	Fort Frederica National Monument	Southeast	GA
FOLA	Fort Laramie National Historic Site	Intermountain	WY
FOLS	Fort Larned National Historic Site	Midwest	KS
FOMA	Fort Matanzas National Monument	Southeast	FL
FONE	Fort Necessity National Battlefield	Northeast	PA
FOPO	Fort Point National Historic Site	Pacific West	CA
FOPU	Fort Pulaski National Monument	Southeast	GA
FOSC	Fort Scott National Historic Site	Midwest	KS
FOSU	Fort Sumter / Fort Moultrie National Monument	Southeast	SC
FOUN	Fort Union National Monument	Intermountain	NM
FOUS	Fort Union Trading Post National Historic Site	Midwest	ND
FOVA	Fort Vancouver National Historic Site	Pacific West	WA
FRHI	Friendship Hill National Historic Site	Northeast	PA
FRSP	Fredericksburg Spotsylvania National Military Park	Northeast	VA
GAAR	Gates of the Arctic National Park and Preserve	Alaska	AK
GARI	Gauley River National Recreation Area	Northeast	WV
GATE	Gateway National Recreation Area	Northeast	NY
GETT	Gettysburg National Military Park	Northeast	PA
GEWA	George Washington Birthplace National Monument	Northeast	VA
GICL	Gila Cliff Dwellings National Monument	Intermountain	NM
GLAC	Glacier National Park	Intermountain	MT
GLBA	Glacier Bay National Park and Preserve	Alaska	AK
GLCA	Glen Canyon National Recreation Area	Intermountain	UT
GOGA	Golden Gate National Recreation Area	Pacific West	CA
GOSP	Golden Spike National Historic Site	Intermountain	UT
GRBA	Great Basin National Park	Pacific West	NV
GRCA	Grand Canyon National Park	Intermountain	AZ
GREE	Greenbelt Park	National Capital	MD
GRKO	Grant-Kohrs Ranch National Historic Site	Intermountain	MT

(continued on next page)

NPS Inventory and Monitoring Program Parks With Acronyms (continued)

CODE	PARK NAME	REGION	STATE
GRPO	Grand Portage National Monument	Midwest	MN
GRSA	Great Sand Dunes National Park	Intermountain	CO
GRSM	Great Smoky Mountains National Park	Southeast	TN
GRTE	Grand Teton National Park	Intermountain	WY
GUCO	Guilford Courthouse National Military Park	Southeast	NC
GUIS	Gulf Islands National Seashore	Southeast	FL/MS
GUMO	Guadalupe Mountains National Park	Intermountain	TX
GWCA	George Washington Carver National Monument	Midwest	MO
GWMP	George Washington Memorial Parkway	National Capital	VA
HAFE	Harpers Ferry National Historical Park	National Capital	WV
HAFO	Hagerman Fossil Beds National Monument	Pacific West	ID
HALE	Haleakala National Park	Pacific West	HI
HAVO	Hawaii Volcanoes National Park	Pacific West	HI
HEHO	Herbert Hoover National Historic Site	Midwest	IA
HOBE	Horseshoe Bend National Military Park	Southeast	AL
HOCU	Hopewell Culture National Historical Park	Midwest	OH
HOFU	Hopewell Furnace National Historic Site	Northeast	PA
HOME	Homestead National Monument of America	Midwest	NE
HOSP	Hot Springs National Park	Midwest	AR
HOVE	Hovenweep National Monument	Intermountain	CO
HUTR	Hubbell Trading Post National Historic Site	Intermountain	AZ
INDU	Indiana Dunes National Lakeshore	Midwest	IN
ISRO	Isle Royale National Park	Midwest	MI
JECA	Jewel Cave National Monument	Midwest	SD
JELA	Jean LaFitte National Historical Park & Preserve	Southeast	LA
JODA	John Day Fossil Beds National Monument	Pacific West	OR
JOFL	Johnstown Flood National Memorial	Northeast	PA
JOMU	John Muir National Historic Site	Pacific West	CA
JOTR	Joshua Tree National Park	Pacific West	CA
KAHO	Kaloko Honokohau National Historical Park	Pacific West	HI
KALA	Kalaupapa National Historical Park	Pacific West	HI
KATM	Katmai National Park and Preserve	Alaska	AK
KEFJ	Kenai Fjords National Park	Alaska	AK
KEMO	Kennesaw Mountain National Battlefield	Southeast	GA
KIMO	Kings Mountain National Military Park	Southeast	SC
KLGO	Klondike Gold Rush National Historical Park	Alaska	AK
KNRI	Knife River Indian Villages National Historic Site	Midwest	ND
KOVA	Kobuk Valley National Park	Alaska	AK
LABE	Lava Beds National Monument	Pacific West	CA
LACL	Lake Clark National Park and Preserve	Alaska	AK
LAME	Lake Mead National Recreation Area	Pacific West	NV
LAMR	Lake Meredith National Recreation Area	Intermountain	TX
LARO	Lake Roosevelt National Recreation Area	Pacific West	WA
LAVO	Lassen Volcanic National Park	Pacific West	CA
LIBI	Little Bighorn Battlefield National Monument	Intermountain	MT
LIBO	Lincoln Boyhood National Memorial	Midwest	IN
LIRI	Little River Canyon National Preserve	Southeast	AL
LYJO	Lyndon B. Johnson National Historical Park	Intermountain	TX
MABI	Marsh-Billings-Rockefeller National Historical Park	Northeast	VT
MACA	Mammoth Cave National Park	Southeast	KY
MANA	Manassas National Battlefield Park	National Capital	VA
MANZ	Manzanar National Historic Site	Pacific West	CA
MEVE	Mesa Verde National Park	Intermountain	CO
MIMA	Minute Man National Historical Park	Northeast	MA
MISS	Mississippi Nat'l River and Recreation Area	Midwest	MN
MNRR	Missouri National Recreational River	Midwest	NE
MOCA	Montezuma Castle National Monument	Intermountain	AZ
MOCR	Moore's Creek National Battlefield	Southeast	NC
MOJA	Mojave National Preserve	Pacific West	CA
MONO	Monocacy National Battlefield	National Capital	MD
MORA	Mount Rainier National Park	Pacific West	WA
MORR	Morristown National Historical Park	Northeast	NJ
MORU	Mount Rushmore National Memorial	Midwest	SD

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NPS Inventory and Monitoring Program Parks With Acronyms (continued)

CODE	PARK NAME	REGION	STATE
MUWO	Muir Woods National Monument	Pacific West	CA
NABR	Natural Bridges National Monument	Intermountain	UT
NACE	National Capital Parks East	National Capital	DC
NATR	Natchez Trace Parkway	Southeast	MS
NAVA	Navajo National Monument	Intermountain	AZ
NEPE	Nez Perce National Historical Park	Pacific West	ID
NERI	New River Gorge National River	Northeast	WV
NIOB	Niobrara National Scenic Riverway	Midwest	NE
NISI	Ninety Six National Historic Site	Southeast	SC
NOAT	Noatak National Preserve	Alaska	AK
NOCA	North Cascades National Park	Pacific West	WA
NPSA	National Park of American Samoa	Pacific West	HI
OBRI	Obed Wild and Scenic River	Southeast	TN
OCMU	Ocmulgee National Monument	Southeast	GA
OLYM	Olympic National Park	Pacific West	WA
ORCA	Oregon Caves National Monument	Pacific West	OR
ORPI	Organ Pipe Cactus National Monument	Intermountain	AZ
OZAR	Ozark National Scenic Riverways	Midwest	MO
PAAL	Palo Alto Battlefield National Historic Site	Intermountain	TX
PAIS	Padre Island National Seashore	Intermountain	TX
PECO	Pecos National Historical Park	Intermountain	NM
PEFO	Petrified Forest National Park	Intermountain	AZ
PERI	Pea Ridge National Military Park	Midwest	AR
PETE	Petersburg National Battlefield	Northeast	VA
PETR	Petroglyph National Monument	Intermountain	NM
PINN	Pinnacles National Monument	Pacific West	CA
PIPE	Pipestone National Monument	Midwest	MN
PIRO	Pictured Rocks National Lakeshore	Midwest	MI
PISP	Pipe Spring National Monument	Intermountain	AZ
PORE	Point Reyes National Seashore	Pacific West	CA
PRWI	Prince William Forest Park	National Capital	VA
PUHE	Puukohola Heiau National Historic Site	Pacific West	HI
PUHO	Pu'uhonua o Honaunau National Historical Park	Pacific West	HI
RABR	Rainbow Bridge National Monument	Intermountain	UT
REDW	Redwood National Park	Pacific West	CA
RICH	Richmond National Battlefield Park	Northeast	VA
ROCR	Rock Creek Park	National Capital	DC
ROMO	Rocky Mountain National Park	Intermountain	CO
ROVA	Roosevelt-Vanderbilt National Historic Site	Northeast	NY
RUCA	Russell Cave National Monument	Southeast	AL
SAAN	San Antonio Missions National Historical Park	Intermountain	TX
SACN	Saint Croix National Scenic Riverway	Midwest	WI
SAGA	Saint-Gaudens National Historic Site	Northeast	NH
SAGU	Saguaro National Park	Intermountain	AZ
SAHI	Sagamore Hill National Historic Site	Northeast	NY
SAIR	Saugus Iron Works National Historic Site	Northeast	MA
SAJH	San Juan Island National Historical Park	Pacific West	WA
SAMO	Santa Monica Mountains National Recreation Area	Pacific West	CA
SAPU	Salinas Pueblo Missions National Monument	Intermountain	NM
SARA	Saratoga National Historical Park	Northeast	NY
SCBL	Scotts Bluff National Monument	Midwest	NE
SEKI	Sequoia-Kings Canyon National Park	Pacific West	CA
SHEN	Shenandoah National Park	Northeast	VA
SHIL	Shiloh National Military Park	Southeast	TN
SITK	Sitka National Historic Park	Alaska	AK
SLBE	Sleeping Bear Dunes National Lakeshore	Midwest	MI
STRI	Stones River National Battlefield	Southeast	TN
SUCR	Sunset Crater Volcano National Monument	Intermountain	AZ
TAPR	Tallgrass Prairie National Preserve	Midwest	KS
THRO	Theodore Roosevelt National Park	Midwest	ND
THST	Thomas Stone National Historic Site	Northeast	MD
TICA	Timpanogas Cave National Monument	Intermountain	UT
TIMU	Timucuan Ecological and Historic Reserve	Southeast	FL

(continued on next page)

A biologist monitors the status of Palmer's agave plants in long-term plots at Coronado National Memorial. The primary food source for endangered lesser long-nosed bats, more than 100 agaves were relocated in preparation for the construction of a vehicle barrier along the the park boundary. NPS PHOTO



NPS Inventory and Monitoring Program Parks With Acronyms (continued)

CODE	PARK NAME	REGION	STATE
TONT	Tonto National Monument	Intermountain	AZ
TUMA	Tumacacori National Historical Park	Intermountain	
TUZI	Tuzigoot National Monument	Intermountain	AZ
UPDE	Upper Delaware Scenic & Recreational River	Northeast	PA
VAFO	Valley Forge National Historical Park	Northeast	PA
VICK	Vicksburg National Military Park	Southeast	MS
VIIS	Virgin Islands National Park	Southeast	VI
VOYA	Voyageurs National Park	Midwest	MN
WABA	Washita Battlefield National Historic Site	Intermountain	OK
WACA	Walnut Canyon National Monument	Intermountain	AZ
WAPA	War in the Pacific National Historical Park	Pacific West	GU
WEFA	Weir Farm National Historic Site	Northeast	CT
WHIS	Whiskeytown National Recreation Area	Pacific West	CA
WHMI	Whitman Mission National Historic Site	Pacific West	WA
WHSA	White Sands National Monument	Intermountain	NM
WICA	Wind Cave National Park	Midwest	SD
WICR	Wilson's Creek National Battlefield	Midwest	MO
WOTR	Wolf Trap Farm Park	National Capital	
WRST	Wrangell St. Elias National Park and Preserve	Alaska	AK
WUPA	Wupatki National Monument	Intermountain	AZ
YELL	Yellowstone National Park	Intermountain	WY
YOSE	Yosemite National Park	Pacific West	CA
YUCH	Yukon-Charley Rivers National Preserve	Alaska	AK
YUHO	Yucca House National Monument	Intermountain	CO
ZION	Zion National Park	Intermountain	UT



An evening bat flight occurs as the sun sets in Carlsbad Caverns National Park, one of six NPS units in the Chihuahuan Desert Vital Signs Monitoring Network.

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The National Park Service cares for special places saved by the American people so that all may experience our heritage.



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The mission of the Department of the Interior is to protect and provide access to our nation's natural and cultural heritage and honor our trust responsibilities to tribes. We:

- encourage and provide for the appropriate management, preservation, and operation of the nation's public lands and natural resources for use and enjoyment both now and in the future;
- carry out related scientific research and investigations in support of these objectives;
- develop and use resources in an environmentally sound manner, and provide an equitable return on these resources to the American taxpayer; and
- carry out trust responsibilities of the U.S. Government with respect to American Indians and Alaska Natives.



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The National Park Service is a bureau within the Department of the Interior. We preserve unimpaired the natural and cultural resources and values of the National Park System for the enjoyment, education, and inspiration of this and future generations. We also cooperate with partners to extend the benefits of natural and cultural resource conservation and outdoor recreation throughout this country and the world.



Natural Resource Stewardship and Science
1201 I Street NW
Eleventh Floor
Washington, DC 20005