The National Park Service
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Natural Resource Program Center
Biological Resource Management Division

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Biological Resource Management Division Annual Report Fiscal Year 2003

BRMD assists parks in a variety of wildlife health projects. This elk was collared as part of a cooperative fertility control study at Rocky Mountain National Park.

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Biological Resource Management Division (BRMD) Annual Report – Fiscal Year 2003

Introduction - BRMD Program and Funding Overview

Active natural resource management has become increasingly important to the protection of the natural heritage found within our national parks. To assist parks in addressing current natural resource management issues, the Biological Resource Management Division (BRMD) provides professional, science-based support for invasive species management, terrestrial ecosystem restoration, threatened and endangered species protection, integrated pest management, and wildlife management.

The Natural Resource Challenge Funding (NRCF) for BRMD's work on exotic plant control and strategic biological support totaled $7,929,000 in FY 2003. BRMD activities contributed to programs that met the following two NRCF FY 2003 performance goals: 1alb Disturbed Lands/Exotic Plant Species and 1a2 Threatened and Endangered Species. Funding categories are shown below:

Biological Resources Management Division Funding Categories

FY 2002 Funding Available	5,846,000
Uncontrollable Change to Base (Increase)	13,000
Travel Dollars Reduction (Decrease)	- 30,000
Net Available After Changes to Base	5,829,000
FY 2003 Natural Resource Challenge Funding (Increase)	2,100,000
Total Funding Available in FY 2003	**$7,929,000**

Biological Resource Management Division Program Funding Categories

Exotic Plant Management Teams	5,150,000
Ecological Restoration	425,000
Integrated Pest Management Program	515,000
Endangered Species Program	465,000
Wildlife Program	438,800
Biological Resource Projects-National Level Support	935,200
Total Funding Available in FY 2003	**$7,929,000**

BRMD is comprised of the Exotic Species and Ecological Restoration Branch, which includes the Integrated Pest Management Program, Exotic Plant Management Teams, and the Ecological Restoration Program, and two independent programs, the Endangered Species Program and the Wildlife Program. Additionally, BRMD is responsible for several other programs or activities such as: providing oversight and management for the Natural Resource Preservation Program (NRPP)—a program that supports

servicewide natural resource management projects conducted by park units; providing technical assistance to park units; and collaborating with partners. Finally, BRMD works on the Park Flight Migratory Bird Program that is funded through a cooperative agreement with the University of Arizona.

BRMD is proud of its systematic and nationwide response to the increasing management needs of biological resources on parklands. This report provides highlights of FY 2003 BRMD natural resource efforts in each of the above-mentioned programs or partnerships. Throughout this report exotic species, invasive species, invasive plants, weeds, alien plants, etc. are used interchangeably to describe non-native invasive plants.

Exotic Species and Ecological Restoration Branch

National parks are home to complex native communities of plants and animals that have developed over millions of years. This natural heritage is threatened by the invasion of exotic plants and animals as well as by human-caused disturbances that foster the establishment of exotic species. The introduction of harmful exotic species is an emerging global problem. A recent Cornell University study estimated that invasive plants and animals impact the U.S. economy by $137 billion annually. The Ecological Society of America noted that invasive species contribute to the listing of 35 to 46 percent of all threatened and endangered species. Today, exotic plants infest some 2.6 million acres in the national parks. Control of exotic species is one of most significant land management issues facing national parks.

To address these issues, the three programs (Exotic Plant Management Teams, the Integrated Pest Management Program, and Ecological Restoration) in the Exotic Species and Ecological Restoration Branch focus on invasive species management and native habitat restoration aimed at preserving our natural heritage.

BRMD Collaboration with Partners

BRMD's expertise in invasive species management in natural areas has provided opportunities for collaboration with private and public partners in a variety of venues. A sampling of these collaborations include:

- BRMD staff reviewed and contributed to the Aldo Leopold Wilderness Research Institute (Leopold Institute) study on research priorities for non-native species in wilderness areas. From the study, a document was created to guide scientists (agency, university, or private) conducting or planning to conduct research on non-native species in the wilderness. Included in the study is a list of high-priority research questions that are relevant to understanding and managing non-native plants, animals, and pathogens throughout the wilderness system. The Leopold Institute develops and communicates the knowledge needed to manage wilderness for the protection of unique ecological and social values. In its 1996 Strategic Plan, the Leopold Institute identified non-native species, fire, and recreation as its three highest priority wilderness research issues.

- BRMD, NatureServe, and the Nature Conservancy met to discuss areas for improved collaboration and information sharing and agreed to develop a Memoranda of Understanding to be implemented beginning in FY 2003.

- BRMD staff contributed to a US Forest Service workshop to assist its Research and Development program develop performance goals on invasive species research.

- BRMD, the Public Health Program (PHP), and the Risk Management Division (RMD) co-conducted a workshop to develop a system of standard operating procedures for determining lead responsibilities and responses to zoonotic environmentally transmitted diseases (ZEDs). Managing the risks to resources, employees, visitors, and the environment from disease agents and reservoirs as well as developing control strategies is a shared responsibility of these three programs. As a result of the workshop, a ZED advisory committee has been formed and standard protocols and information are being provided at www.npszed.gov. Workshop participants were also briefed on the Johns Hopkins /Department of Defense early warning system project for bioterrorism focusing on domestic animals and wildlife.

- NPS-Exotic Plant Management Teams collaborated with the Student Conservation Association to build student corps to assist EPMTs in controlling invasive plants. Partnership goals are to build Native Plant Corps that will increase park capacity to control invasive plant and restore native plants and to provide invasive plant management training to young professionals.

Exotic Plant Management Teams (EPMTs)

Funding Allocation: $5,150,000

(For a complete report on EPMT accomplishments, see the EPMT Annual Report - FY 2003.)

Exotic Plant Management Teams (EPMTs), modeled after the coordinated rapid-response approach used in wildland fire fighting, assist parks in combating and controlling exotic plants by providing a highly-trained mobile strike force of plant management specialists. BRMD worked with host parks to establish four EPMTs in FY 2000, five EPMTs and an expansion of the Florida Partnership EPMT in FY 2002 and seven EPMTs in FY 2003. These 16 EPMTs, which serve over 219 parks, have been extolled for their work in controlling nuisance exotic plants.

In FY2003, NPS-EPMTs and the Student Conversation Association entered into a cooperative effort to build student corps to assist EPMTs in controlling invasive plants. As a result, at least four student corps will begin in FY 2004 thus enhancing park capacity.

Ecological Restoration
Funding Allocation: $425,000

BRMD continued to work with specialists from other Natural Resource Program Center (NRPC) Divisions on disturbed lands and other NPS programs to support ecosystem restoration in the context of wildland fire, weed control, contaminants and other resource programs. To highlight FY 2003 program work, this section has been divided into the following categories: fire management, degraded ecosystem restoration, ecosystem management and servicewide projects, project oversight, and biostatisics.

Fire Management

BRMD continued to be an active member of the NPS Fire Ecology Program (FEP) and provided further assistance in the development of the FEP Strategic Plan. BRMD, through the NRPC Fire Technical Advisory Group (FTAG), worked with the NPS Fire Management Program to develop a white paper on NPS Fuels Management Strategies in response to the President's Healthy Forest Initiative (HFI). BRMD represented NPS resource programs in other HFI matters including fuel treatment performance measures and compliance monitoring. BRMD acted as the host for the new Fire Program Liaison to NRPC and the Natural Resource Stewardship and Science (NRSS) program. BRMD and FTAG were significant contributors to the development and implementation of an integrated resource fire-planning workshop held for Colorado Plateau parks.

Degraded Ecosystem Restoration

Technical assistance continued on the Natural Resource Damage Assessment for Morristown National Historic Park and on contaminated sites for Appalachian National Scenic Trail and Cape Krusenstern National Monument. BRMD was part of an NRPC interdisciplinary team to assess numerous disturbed sites at Golden Gate National Recreation Area. Initial assessments of degraded sites were made at Colorado National Monument and Mesa Verde National Park.

The Restoration Ecology Program made its second assessment of restoration issues associated with work done by Exotic Plant Management Teams. Issues affecting the North Coast/Cascades EPMT include types of disturbance, species characteristics, and roles and responsibilities of various park programs to maximize the effectiveness of weed control programs. Ecological restoration projects, such as these, often run greater than one or two years due to funded project overlap, management programs, and long-term planning. Project issues generally addressed include native plant establishment, restoration monitoring, environmental and ecological planning in the face of degrading systems due to invasive species, and soil quality.

Ecosystem Management and Servicewide Projects

BRMD was a sponsor and active developer of the March 2003 Arid Land Restoration Workshop held in Palm Springs, CA. BRMD used the workshop as a forum to collect and assess restoration needs from NPS and southwest arid land parks restoration and revegetation specialists. BRMD worked with the Great Plains Cooperative Education

Study Unit (CESU) to organize a symposium on restoration research in prairie parks for the November 2003 Society for Ecological Restoration Meeting to be held in Austin, TX. Another session is planned between the Midwest Region, NRPC, and the Denver Service Center to identify restoration issues in the Midwest as well as to advertise national programs and expertise to park staff.

Additional work that supported NPS's broader ecosystem management goals included: 1) continued work with Fort Union National Monument and Homestead National Monument to integrate disturbed land restoration planning into broader park desired future condition development and planning efforts, 2) completion of guidelines to parks for evaluating potential impairment of vegetation and ecosystem resources in parks, and 3) completion of support for NPS scientists to participate in and articulate NPS concerns and perspectives to the Sustainable Rangelands Roundtable.

Project Oversight

BRMD provided project oversight (technical guidance and input) on several NRPP and BRMD competitive funding projects for ecosystem management and restoration of the following parks: Sleeping Bear Dunes National Lakeshore, Pictured Rocks National Lakeshore, Cape Hatteras National Seashore, Point Reyes National Seashore, Yellowstone National Park, Canyonlands National Park, Pinnacles National Park, and Olympic National Park.

Biostatistics

A two-year trial project with the University of Wyoming to provide biostatistics support to parks successfully began with projects evaluating the following: designs and analysis for weed monitoring, animal population and disease dynamics, field trial design, dataset analysis, and the quality assurance of third-party analyses provided to parks.

Integrated Pest Management Program
Funding Allocation: $515,000

The Integrated Pest Management (IPM) Program provides policy guidance, technical assistance, and training to reduce the risk from pests and pest management related activities affecting the public, employees, park resources and the environment. IPM assistance is provided to all NPS divisions and all management zones (natural, cultural, developed, special use) that use an IPM approach. In addition to servicewide efforts, IPM Program staff cooperated with other federal, state and private organizations to enhance NPS goals.

Finally, IPM Program staff worked in cooperation with the US Forest Service to provide over $500,000 in Forest Health Program (FHP) grants to parks.

Servicewide Efforts

The IPM program responded to over 100 technical assistance requests submitted by parks and regions through consultations, distributed material, remote consultations on problems, or identification of other experts. In order to enhance technical assistance response, the program contracted with an IPM expert from Pennsylvania State University. The contractor has been a major contributor working with the Concessions Environmental Audit Program to install IPM practices into concessions operations and conducting a review of the IPM training program to ensure it was professional and current. At the request of the Washington Contracting Office, the IPM program staff prepared "boilerplate," low- risk pest management specifications for 1201 I Street, Washington DC.

IPM program staff continued to coordinate actions, guidance, and policy response on the West Nile Virus (WNV). They served as Lead for the WNV Zoonotic Environmental Disease (ZED) Task Force, coordinated preparation of guidance/policy for parks with other members of WNV ZED task force members, and contributed to congressional briefings on WNV. IPM staff participated on the Centers for Disease Control's West Nile Virus State Agency weekly conference calls, keeping the program updated on virus activity and management efforts to promote cooperation between states and parks in managing WNV. BRMD staff attended the first West Nile Virus and Wildlife Health Conference which gathered public health and wildlife health experts together for the first time to discuss WNV and needed research and management strategies.

Cooperative Efforts

Staff from the IPM Program participated in a number of federal working groups in order to coordinate and advance IPM policy and actions within federal agencies. The program is an active member of the newly formed Federal IPM Working Group. Current projects include crafting language for the National IPM Road Map and assisting the Office of Environmental Policy in updating language for the DOI Departmental Manual on pest management. IPM staff also participated in the Invasive Terrestrial Animals and Pathogens (ITAP) Group that provides a forum for coordinating support among member agencies on problems associated with invasive terrestrial animals and pathogens. Federal

agencies, including the NPS, are cooperating toward the creation and formalization of a federal agency pest management certification program as outlined at the Fourth National IPM Symposium. Because of the innovative nature of the program, program staff were invited to make presentations on NPS policy and the principles of IPM at the DOI Conference on the Environment.

NPS employees at a West Nile Virus Risk Management Workshop held at Valley Forge NHP in November 2002

The IPM program coordinated and provided instruction for the 36-hour "NPS IPM Course" with the FWS at the National Conservation Training Center in West Virginia. This was the first joint IPM Principles Course by both NPS and FWS.

Forest Health Management
Projects Funded by the US Forest Service

The nationwide drought of recent years placed stress on forests and, in some cases, increased insect survival. These two trends combine to threaten the health of trees. A major development has been the surge of hemlock woolly adelgids into the southern Appalachians. Park managers responded by submitting fifty percent more proposals in FY 2003 than in FY 2002. Fortunately, the US Forest Service was able to fund 100 percent of the requests providing a total budget of $537,700. Table 1 itemizes the forest health management projects funded by the US Forest Service in FY 2003.

Exotic Hemlock woolly adelgid control by insecticide injection at Shenandoah NP

Table 1. Forest health management projects funded by the US Forest Service in FY 2003.

Park	Region	Insect or Disease	Funding
Great Smokies	Southeast	Balsam Woolly Adelgid	9,800
Golden Gate	Pacific West	Sudden Oak Death	3,500
Knife River	Midwest	Fomes Fungus	42,000
Haleakala	Pacific West	Angentine Ant	24,600
Various	National Capital	Dutch Elm	30,000
Knife River	Midwest	Dutch Elm	16,000
Fredericksburg	Northeast	Gypsy Moth	3,800
Various [1]	National Capital	Gypsy Moth	60,000
Blue Ridge	Southeast	Gypsy Moth	138,000
Fredericksburg	Northeast	Hemlock Woolly Adelgid	4,000
Delaware Water Gap	Northeast	Hemlock Woolly Adelgid	40,000
Catoctin	National Capital	Hemlock Woolly Adelgid	20,000
Great Smokies	Southeast	Hemlock Woolly Adelgid	31,000
Shenandoah	Northeast	Hemlock Woolly Adelgid	55,000
Gettysburg	Northeast	Hemlock Woolly Adelgid	5,000
North Cascades	Pacific West	Mistletoe, etc.	35,000
Lake Roosevelt	Pacific West	Western Pine Bark Beetle	20,000
Total Funded			**$537,700**

[1] A multi-agency spray contract was administered by the US Forest Service, so no funds were actually transferred for this project.

Endangered Species Program
Funding Allocation: $465,000

The Endangered Species program, working through regional coordinators, continues to restore and stabilize federally listed species as well as those that are proposed for listing and those that are candidate species. This year's program has focused on helping to make endangered species consultation for park actions a routine practice and providing the opportunity for staff to learn the modern skills of endangered species management.

NPS currently has 349 threatened, endangered, proposed, experimental, managed via conservation agreement and candidate species (Table 2). They are represented in 889 populations in 169 NPS units. Another 246 populations have historically existed in parks, and in many cases could be restored. The status of listed species and the expenditures on them in each park are updated and summarized annually in the endangered species database. While mammals and birds represent only 25% of the listed species in parks (Table 3) they draw a disproportionate amount of the funding, as do populations that parks have classified as stable, increasing or not-at-risk (Figure 1). The database is providing direction to change this trend by providing information that suggests species for new recovery projects funded by the Natural Resource Challenge and other sources.

To aid parks in consultation and restoration, management summaries of all federally listed species that occur in national parks are being prepared in conjunction with Colorado State University through the Colorado Plateau Cooperative Ecosystem Studies Unit. This project is near completion, with drafts of 350 management plans completed. These management plans summarize relevant documents such as recovery plans and discussions with species experts. It is anticipated that these management plans will be completed and edited by Washington and regional staff in the coming year.

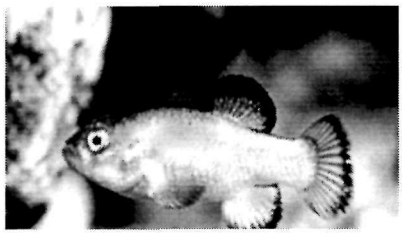
"Scientific Principles and Techniques for Endangered Species Management" was offered for the first time at the Albright Training Center in February 2003. The course was a joint effort with the US Fish and Wildlife Service, with instructors and students coming from both agencies. The one-day course "Modern Genetics for Resource Managers" was held in conjunction with the George Wright Society Meeting. Instructors used examples of studies conducted in national parks to demonstrate how the new molecular methods could answer important population questions.

The Endangered Species Program continued to play a role in negotiating MOUs with other federal agencies as well as drafting internal NPS guidance. The draft Director's Order DO#77-8 on Endangered Species and the accompanying Reference Manual have completed and are awaiting final approval. The Endangered Species Program also has the lead in drafting DO#66 which addresses the release of sensitive information (such as the locations of listed species).

Two Government Accounting Office (GAO) audits have required the attention of BRMD in the past year, one focusing on the Mojave desert tortoise and a second examining endangered species management and agency cooperation at the regional level. In both

cases, BRMD relied heavily on expertise in the parks. GAO investigators were appreciative of the park expertise that was provided.

The program continues to provide technical assistance where there is an endangered species issue. That has included working with the Water Resources Division to provide assistance to Death Valley National Park on Devil's Hole pupfish recovery and North Cascades National Park high lakes fisheries. Because the white-tail deer at Indian Dunes National Lakeshore impact listed plants, the program has been involved in the NEPA review on the park's deer management plan.



Devil's Hole Pupfish

The Endangered Species Program reviews the implementation plans and annual accomplishment reports for the projects funded though the NRPP T&E source and the new Resource Protection source. Projects developed in the past year include restoration of condors at Pinnacles National Monument and silversword at Hawaii Volcanoes National Park; developing biome based resource protection from Shenandoah National Park to Great Smokey Mountains National Park; and introducing a new resource protection curriculum for personnel across the park service.

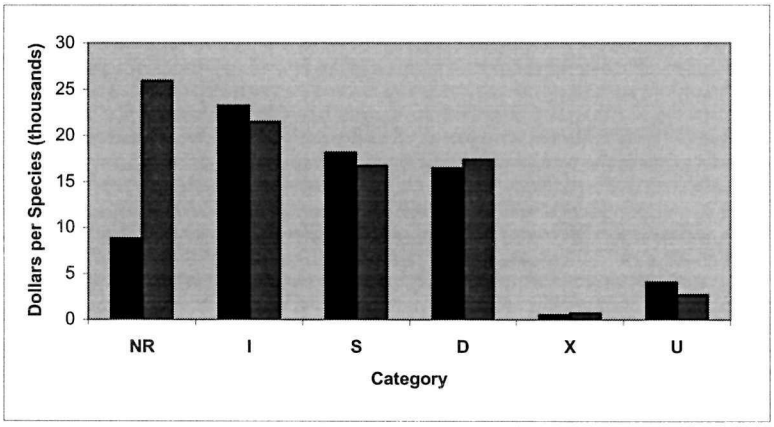
Table 2. The number of endangered, threatened, proposed, and candidate species found in National Park Service units (as of September 30, 2003).

Status	Species
ndangered Species (E)	200
Threatened Species (T)	84
xperimental Populations (EXPN)	3
roposed Species (P)	4
Candidate Species (C)	51
anaged via Conservation Agreement (M)	7

Table 3. The taxonomic affinity of endangered, threatened, proposed, and candidate species found in National Park Service units (as of September 30, 2003).

Taxonomic Group	Species
lants	152
nvertebrates	47
ish	37
mphibians	6
eptiles	18
irds	50
ammals	39

Figure 1. NPS expenditures in 2001(in black) and 2002 (in purple) for species in different trend categories: not-at-risk (NR), increasing (I), stable (S), declining (D), extirpated (X), and unknown (U). Dollars are the amount spent on the populations in each NPS unit where the species occurs, divided by the number of populations.



Wildlife Program
Funding Allocation: $438,800

The BRMD Wildlife Program provides policy guidance, technical assistance, and training to enhance the ability of park staff to meet the increasing demands for professional wildlife management. The Wildlife Program consists of two program areas: Wildlife Management and Wildlife Health. Subject areas that are typically addressed include wildlife health, wildlife restoration, invasive animal species management, wildlife population management, and the identification of wildlife research needs.

Wildlife Management Program

BRMD assisted several parks in evaluating and developing wildlife management actions for critical wildlife issues. This included assisting Channel Islands National Park in developing and implementing aerial capture operations for the removal of Golden Eagles, Big Bend National Park in developing management alternatives for the removal of feral hogs and trespass livestock, and assisting Fossil Butte National Monument in developing management strategies for coyotes and possible transient wolves.

BRMD conducted six training classes in Aerial Capture, Eradication, and Tagging of Animals (ACETA); three in the Alaska Region (multi-park); two in Yellowstone National Park (Northern Yellowstone Wolf Team and the Elk Calf Capture Team); and one for the Channel Island Golden Eagle Capture Project. Assistance, guidance, and review of and/or developing ACETA operational plans, conducting ACETA operations, and ACETA training requirements was provided to: the US Fish and Wildlife Service; State of Utah, Wildlife Resources Division; State of Hawaii, Division of Forestry and Wildlife; and several national park units.

The BRMD Wildlife Biologist continues to serve as Chairperson for the Interagency Helicopter Operations Sub-Committee for ACETA and as a member of the US Department of Interior's Committee for developing policy and standards for the use of firearms by non-law enforcement personnel. In addition, the biologist is working with Grand Canyon National Park's Wildlife Program on the evaluation of "green" bullet technology (non-toxic-non lead) for wildlife management programs.

Wildlife Capture (Shared between Wildlife Health and Wildlife Management)

BRMD provided technical assistance to parks via consultation, training, and fieldwork on wildlife capture and field anesthesia. Three wildlife anesthesia training classes were provided to park staff in FY 2003. Field anesthesia training was held for the Alaska Region and at Rocky Mountain National Park and Yellowstone National Park for area NPS units. Additionally, technical assistance for animal capture or field anesthesia was provided on site to seven parks (Rocky Mountain National Park, Wind Cave National Park, Curecanti National Recreation Area, Glacier National Park, Great Smokey Mountains National Park, Mesa Verde National Park, and Channel Islands National Park).

Wildlife Health Program

The BRMD's Wildlife Health Program provided policy guidance, technical assistance, and training to enhance the ability of park staff to meet the increasing demands of wildlife health issues including field anesthesia, sample collection and diagnostics, disease management, fertility control, and the identification of wildlife health research needs.

Veterinary Diagnostics and Disease Management

Veterinary diagnostic services for wildlife are an important component of ecosystem health management. The BRMD has teamed with the USGS National Wildlife Health Center (NWHC), and through a CESU agreement, with Colorado State University Veterinary Diagnostic Laboratory (CSUVDL) to provide veterinary diagnostic services to NPS units. Surveillance for emerging diseases, such as chronic wasting disease of deer and elk, as well as the more common diseases provides managers with valuable information to address wildlife health and public health concerns. Consultation on wildlife health issues and general diagnostic services provided expanded markedly this fiscal year. Over 120 diagnostic submissions were processed by CSUVDL this fiscal year. In addition to diagnostic services, information was provided to parks on request on such issues as wildlife-domestic animal disease interactions, specific diseases, disease risks associated with translocation of wildlife, disease sampling protocols, and animal welfare concerns such as methods for euthanasia.

Chronic wasting disease (CWD) continued as a priority wildlife health issue this fiscal year. A chronic wasting disease coordinator was hired through a task agreement with CSUVDL. The CWD coordinator contributed significantly to technical assistance to parks, particularly for Rocky Mountain and Wind Cave National Parks, however, training and consultation was also provided to numerous other NPS units as well as White Sands Missile Range. Training on CWD was provided at three locations to participants from about 10 NPS units. The BRMD continued interagency interactions via the CWD Implementation Team, state wildlife agencies, USGS, Food and Drug Administration, and Environmental Protection Agency and provided input on Department of the Interior comments on several Congressional bills addressing CWD. BRMD assisted the USGS NWHC in planning and implementing a workshop on planning CWD surveillance and co-authored the guidance document that resulted from the workshop. The BRMD also hosted an NPS Policy Review meeting on issues related to CWD surveillance and management. Items identified at the meeting will be used as guidance for several important BRMD activities in the coming year.

Dr. Jenny Powers and Rocky Mountain National Park staff examine an anesthetized deer prior to tonsillar biopsy for CWD surveillance

Wildlife Health Investigations and Information Dissemination

Veterinary support and project collaboration was provided on several investigations on wildlife health topics of importance to parks. Improved methodology for wildlife population control by non-lethal means is a growing need of wildlife management agencies and parks. The BRMD collaborated with the Colorado Division of Wildlife on fertility control work in captive cervids and in elk at Rocky Mountain National Park. A scientific article titled "Effects of GnRH agonist (leuprolide) on reproduction and behaviour in female wapiti (Cervus elaphus nelsoni" by Baker, Wild, and et al. was published in *Reproduction Supplement* (vol. 60, 2002). The BRMD also continued assistance with safety evaluation of brucellosis vaccine RB51 in pronghorn and continued collaboration with CSU scientists on CWD studies.

Dissemination of scientific information on issues related to wildlife health is an important component of the wildlife health program. The BRMD chaired a session on wildlife health at the 2003 George Wright Society (GWS) meeting. The session marked the first time that reports on wildlife health were presented at the GWS. Papers on wildlife health topics were also presented at other scientific meetings and published in the Journal of Wildlife Diseases, NPS Natural Resource Year in Review, and Park Science.

The BRMD hosted other workshops and meetings on wildlife health issues. A workshop on the management of microbes in the context on the NPS mission brought together a diverse group of scientists to review the state of the science and to discuss the biological practicality of, and possible alternatives to, using native vs. exotic status as a primary decision-making tool for determining NPS management actions regarding microbes. A draft report from the meeting is currently in review. The BRMD continued taking a lead role in organizing the Ballistics Consortium. The objective of the consortium is to improve remote delivery of biologics to wildlife with the most immediate need being delivery of Brucella vaccine to bison at Yellowstone National Park. The wildlife health program also participated in the meeting to address coordination of BRMD with the Public Health Program and Risk Management Program of the NPS. The resulting Zoonotic and Environmentally-Transmitted Diseases Group includes wildlife health as one component. Several documents by the group, including one on West Nile virus, have been finalized or are in progress by the group.

Advanced studies students were involved in two BRMD wildlife health projects. A veterinary preceptor (senior veterinary student) prepared a technical review for Yellowstone National Park on a new test, the Florescent Polarization Assay, for diagnosing brucellosis in bison. A PhD student was recruited by Cornell University in cooperation with BRMD to investigate the human dimensions of white-tailed deer management in NPS units in the eastern United States. A Student Career Education Program (SCEP) position will be pursued for the student in the coming year.

Park Flight Migratory Bird Program

Funded Through a Cooperative Agreement with the University of Arizona Since FY 2001

The Park Flight Migratory Bird Program (Park Flight) works to protect shared migratory bird species and their habitats in both U.S. and Latin American national parks and protected areas. The program develops bird conservation and education projects and creates opportunities for technical exchange and cooperation. Park Flight is a partnership between NPS, National Park Foundation, American Airlines, National Fish and Wildlife Foundation, U.S. Agency for International Development, and the University of Arizona. The program is made possible through the generous support of American Airlines, the NPS Natural Resource Challenge, and the Park Flight partners. The University of Arizona Desert Southwest CESU and BRMD provide technical direction.

In FY 2003, Park Flight provided continuation grants for a third year of funding for seven bird conservation and education projects in 13 U.S. national parks and in protected areas in Guatemala, El Salvador, Nicaragua, Honduras, Panama, and Mexico. The program was also expanded to include a new project in Alaska and in South America (Argentina). As part of the FY 2003 Park Flight technical exchange effort, four international interns from Mexico and Panama assisted with monitoring and educational efforts at North Cascades National Park, Point Reyes National Seashore, Golden Gate National Recreation Area, and Cuyahoga Valley National Park. These technical exchanges were coordinated through the NPS Office of International Affairs International Volunteers in Parks program.

Carol Beidleman, Professor Fernando Villaseñor Gómez and Aida Hernández Fernández, at the Park Flight grantee workshop in Honduras

The Park Flight Program held its second grantee workshop in FY 2003 in Pico Bonito National Park in Honduras. The goal of the workshop was to improve knowledge and coordination of migratory bird monitoring programs in U.S. national parks and counterpart protected areas of the Mesoamerican region, and to help integrate monitoring and education efforts. It also provided an opportunity for Park Flight grantees from the U.S. and Mesoamerica to build relationships for collaboration on migratory bird conservation efforts.

Presentations on Park Flight were given at the University of Arizona in Tucson, Pan American Roundtable in Washington, D.C., in a plenary with agency directors at the CESU Network meeting in Washington, D.C., and at the Biennial George Wright Society Conference in San Diego. Articles on Park Flight were featured in the *NPS Natural Resource Year in Review - 2002*. The DOI Assistant Secretary for Fish and Wildlife and Parks, Craig Manson, made a site visit to the Park Flight project at Point Reyes National Seashore.

Park Flight assisted with continued efforts in drafting the US Fish and Wildlife Service Memorandum of Understanding required by Executive Order 13186 on the responsibilities of federal agencies to protect migratory birds. NPS also contributed to the efforts of Partners in Flight and the North American Bird Conservation Initiative, by attending and presenting at national and international meetings, chairing the Partners in Flight Federal Agency Committee, and supporting and distributing International Migratory Bird Day materials.

Biological Resource Projects – National Level Support
Funding Allocation: $935,200

BRMD competitive funds are used for biological resource projects that address issues facing various park units and benefit multiple partners. These projects address a myriad of resource management needs for aquatic or terrestrial plants and animals throughout NPS. In FY 2003, 39 projects were funded in 35 parks for a total funding of $935,200. See Table 4 for an itemization of these projects. Projects highlights for those projects that have been fully funded follow the table.

Table 4. Listing of Biological Resource Projects including region, park, project title, and FY 2003 funding allocation.

Region	Park	Project Title	FY2003 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	Determining 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 9 rare plant species	38,000
MWR	BUFF	Assess roost habitat conditions for 3 endangered bat species	23,000

Region	Park	Project Title	FY2003 Funding
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 re-introduction of American Chestnut	26,000
SER	VIIS	Propagation and reintroduction of Solanum conocarpum, a critically rare shrub	15,000
		Editor for SCC guidance	4,000

Determining the Status and Distribution of Mountain Goats in Wrangell-St. Elias National Park and Preserve

This project was designed to gather baseline information on the status and distribution of mountain goats within the park. Surveys were scheduled for late August prior to snowfall. Bad weather severely limited the available days for survey and thus only two count areas could be surveyed prior to the fall snows when the detectability of mountain goats would be dramatically reduced. One additional survey area, contracted with Alaska Department of Fish and Game (ADFG), is still scheduled.

Two aerial surveys were completed in the southern Wrangell Mountain Range where most harvest occurs. A total of 199 goats (160 adults, 39 kids) were observed during the two surveys. Group size, classification (adults, kids), and GPS locations were collected and entered into a computer database. Dall sheep (206) were counted and locations collected, but were not classified. All information will be maintained in a georeferenced database and will be provided to ADFG. Surveys along the southern Chugach Mountain Range will be performed by local ADFG personnel when survey conditions improve.

Develop Wilderness Stewardship Plan at Bandelier National Monument

The purpose of this project was to review and analyze datasets from projects scattered across the park and compile them into a compatible framework. In some cases, datasets were resampled to provide more current data for analysis in support of a wilderness management plan.

During the past 15 years numerous datasets have been developed to document baseline conditions, monitor trends, assess impacts, and evaluate the ecological effects of actual/ proposed management action/inaction. Most of these research and monitoring initiatives were established with focused objectives and collected data for only limited timeframes.

During this project, selected datasets were utilized to develop a current and integrated baseline of information on wilderness ecosystem health (including cultural resource status) in support of a wilderness plan and associated Environmental Impact Statement (EIS). An existing array of permanent sample points across a range of plant communities, elevations, topographic positions, and treatments provide a virtual monitoring network at Bandelier National Monument. Summary reports and graphics were developed for each separate dataset to present an overview of current conditions and trends and evaluate utility of the dataset for future monitoring efforts.

Monitor Ecosystem Conditions Baseline Wilderness Plan EIS at Bandelier National Monument

The purpose of this project was to monitor the Ecosystem Conditions Baseline Wilderness Plan EIS at Bandelier National Monument. Work for the final year of funding included partial completion of Phase I of National Environmental Policy Act (NEPA) compliance on the Ecological Restoration Plan/EIS. The planner attended meetings with local tribal governments, prepared meeting newsletters and meeting

notices, prepared for and will conduct two alternative scoping public meetings to be held in November 2003, and worked with a NEPA contractor to further refine and develop alternatives for the EIS. Technician work included review, compilation, and analysis of datasets to develop baseline information on wilderness ecosystem health (including cultural resource status) in support of an ecological restoration plan and EIS. Summary reports and graphics were developed for each separate dataset to present an overview of current conditions and trends and evaluate utility of the dataset for future monitoring efforts. Project milestones for FY 2003 include: completion of an internal scoping report, publication of the Notice of Intent in the *Federal Register (April 2003)*, completion or scheduled completion of four issue and alternative public scoping meetings (June and November 2003), draft completion of Chapter 1-EIS, and refinement and additional work on Chapter 2-EIS Alternatives.

Implement Conservation Agreement for Two Candidate Plant Species at Big Bend National Park

The purpose of this project was to protect two Candidate plant species by developing predictive habitat models and formulating conservation management plans. The work was completed by NPS in cooperation with the US Fish and Wildlife Service, the Texas Dept. of Parks and Wildlife, and Texas State University. Major accomplishments include: the establishment of permanent monitoring plots, analysis of recruitment and mortality patterns over the past 11 years, and the preparation of site protection and habitat improvement plans for Guadalupe fescue. A major finding of this project was that although seeding prolifically in good years, the seed bank of Guadalupe fescue is very short lived and soil surface treatments may be necessary to ensure recruitment. Persistence of this species in the last decade has been due more to survival of existing plants rather than recruitment of new individuals. Many of the existing plants are 10 years old or more and may be nearing the end of their life cycle. Active habitat improvement measures are planned to ensure the persistence of these rare species.

Salt Creek Invertebrates at Canyonlands National Park

The purpose of this project was to evaluate sampling methods for effectiveness of collecting taxa that hold promise as monitoring indicators. The initial data being evaluated was gathered from Grand Staircase-Escalante National Monument. Temperature and precipitation data for sites in Salt Creek were collected in FY 2001 and FY 2002.Work last winter concentrated on sorting as many samples as possible, completing the assignment of ants to morphospecies (individuals whose taxon is indeterminant at the time), combining the limited Salt Creek reference collection with the greater reference collection, and identifying additional invertebrates from Salt Creek samples to morphospecies. The fieldwork for this project was completed over the past two years and has led to a number of continuing invertebrate projects in the Salt Creek drainage. All collections are finished and data is being analyzed and summarized. A final report is near completion and should be ready in February 2004.

Conservation and Management of Jaguars, Mountain Lions, and Other Felids in Four Southern Arizona Parks

The purpose of this project was to develop conservation and management of felids in Coronado National Memorial, Chiricahua National Monument, Fort Bowie National Historic Site, and Saguaro National Park All aspects of field operations should be fully implemented by December 2003. A minimum of four infrared-triggered cameras have been deployed per park unit. Hair snares are deployed at each park unit except Saguaro National Park. Scats of both large and small cats—probably mountain lion and bobcat respectively—have been collected. Several scats from Saguaro National Park have been analyzed in the genetics lab and DNA has been extracted from most samples.

Status Assessment and Management of Lowland Leopard Frogs at Saguaro National Park

The purpose of this project is to provide a framework for management that ensures the persistence of lowland leopard Frogs in the Rincon Mountain District of Saguaro National Park. This species currently persists in several small, isolated populations in the park, but the basic information necessary for their successful conservation and management was lacking. Objectives are to complete a parkwide inventory, identify specific threats and movement corridors, develop a habitat model, and make recommendations for management and recovery of this species. The University of Arizona, through a cooperative agreement with the Sonoran Desert Cooperative Ecosystem Study Unit, is completing the work. Major findings thus far include discovery of this species in several previously undocumented locations and insight into habitat needs that will help guide management decisions.

Develop Database for Sensitive Plants and Orchid Recovery Plan at Indiana Dunes National Lakeshore

The purpose of this project was to develop electronic information retrieval software (database) for the tracking of high-risk plant species. Baseline data and other known information such as monitoring histories and species locations were entered into the database. Habitat favorable for orchids was searched, seeds were collected, and plants were propagated. An inventory for sensitive plants was conducted in the park's easternmost unit and in thirty wetlands in the western section of the park.

The database was developed using MSAccess. Background information (family, life form, wetland indicator, etc), park locations, and monitoring history are given for each species. Background information for 236 species (140 state-listed species, 96 park-sensitive species) was entered into the database. Maps showing various species locations, some dating to the early 80's, were inventoried; polygons standardized; and a system linking database information to GIS developed. Twenty-one state listed species and park rare species were inventoried in the Tamack unit and compared to early 1990 data: 10 species populations were stable, 9 species populations have declined, and 2 species could not be located. However, four other species not reported in 1990 were present in FY 2003. Reports pertaining to rare species inventory in the Miller unit will be forthcoming

in December 2003. Successful hand pollination of rare orchids at the park combined with orchid pollinator investigations suggest that the lack of natural fruit set of these orchids may be related to the absence of pollinators. The project coordinator was successful in germinating seed of *Cypripedium acule* but not seed of three other orchid species. Out planting of *C. acule* plantlets will be attempted in spring 2004.

Develop Fishery Management Plan Isle Royale National Park

The purpose of this project was to develop a Fishery Management Plan for Isle Royale National Park. The primary approach for developing this plan was to have the project co-led by a US Fish and Wildlife Service fish biologist and Isle Royale National Park staff. An agency/tribal/park staff/academia scoping session was held in April 2002 to introduce the project and obtain input on a range of topics e.g., jurisdictional matters, resource issues and threats, and information/data needs associated with the plan. During FY 2003, draft reports of the plan were generated and reviewed by the interagency team. The project experienced delays due to the significant amount of raw data from historic surveys that required entry and analysis. The new completion target date for when the report will be ready for public review is Spring 2004.

Evaluation of Seasonal Stream Usage and Interstream Migration by Coaster Brook Trout at Pictured Rocks National Lakeshore

The purpose of this study was to evaluate seasonal stream usage and instream migration by Coaster Brook Trout. Frequency systems, which detect movement of fish tagged with a Passive Integrated Transponder (PIT), were installed in three streams at Pictured Rocks National Lakeshore in May 2003. Monitoring of the systems, uploading of data, and battery replacement occurred on a regular schedule. Periodic surveys of fish community composition were conducted with a backpack electro-shocking unit. Sixty wild resident trout and 20 previously stocked, fin-clipped Coaster Brook Trout have been PIT-tagged to-date with this method. Condition factor (sturdiness factor) data of these fish were collected. On September 26, 2003, approximately 35,000 hatchery-raised fall fingerling Coaster Brook Trout were stocked in the three streams. Of these, 480 were PIT-tagged at the hatchery the week prior to stocking. Mortality of PIT-tagged Coaster Brook Trout was approximately 48% by the time stocking occurred. Movements of PIT-tagged fish continue to be monitored on a regular basis. Solar power grids will be installed in November 2003 to power frequency systems during winter months at remote stations.

Potential Impacts of Mosquito Control Activities at George Washington Memorial Parkway

The Laboratory of Entomology and Biodiversity at Georgetown University (Lab) continues to identify arthropods that have been collected in Dyke Marsh Wildlife Preserve, VA. Over 5,000 arthropod species may be present in this location. To provide information about these arthropods (useful in managing them in the Preserve which is threatened by erosion, pollution, and possible mosquito control with insecticides) and inform others of these important ecosystem members, the Lab produced the Arthropods of Dyke Marsh Wildlife Preserve Database (ADMWPD).

The ADMWPD includes for each species or morphospecies (individuals whose taxon is indeterminant at the time and when something is available but not known) a taxonomic position, genus name, species name, species author, record date, record source, taxon identifier, image, and abundance in the Preserve. Thus far, the database includes over 1,000 species and morphospecies. The Lab will continue to identify hundreds of species still in samples and hundreds from the Preserve that are not yet known. This new information will be entered into the database.

Salt Marsh Restoration at Herring River: Dike Design and Construction at Mill Creek at Cape Cod National Seashore

A Cooperative Agreement has been established with the Coastal America Foundation (CAF) for the overall Herring River Estuarine Restoration Project. FY2003 funding for Mill Creek dike design will be transferred to CAF to contract engineering, topographic survey, final dike construction drawings and environmental permitting. Cape Cod National Seashore staff will cooperate with CAF's contractor(s) to produce the necessary field data and permit documentation over the next six months.

Determine Status and Trends of New River Mussel Community at New River Gorge National River

The purpose of this project was to determine the status and trends of a New River mussel community at New River Gorge National River. A cooperative agreement between the park and Marshall University was modified to include this project. The New River above Kanawha Falls has only seven confirmed native species, while the Kanawha River below the falls has over 30 confirmed species. Declining status and imperilment of mussels nationwide, unknown risks from exotic species [the Asiatic clam (*Corbicula fluminea*) is already established but the zebra mussel (*Dreissena polymorpha*) remains unreported], lack of reliable data less than 20 years old, and questionable status of some species from earlier surveys has made examining this indicator resource an important objective.

Preliminary surveys of over 20 sites yielded over 1,700 individuals. Each site was "GPSed" and each species was photographed. As of October 2003, no new species have been found nor have questionable records from historic surveys been confirmed. Some interesting distributional relationships were noted, however. For example, immediately below Bluestone Dam (upstream end of the park) the pistolgrip (*Tritogonia verrucosa*) is predominant. Less than one mile downstream, the mucket (*Actinonaias carinata*) becomes dominant. These surveys led to the selection of some sites for more in-depth analysis.

Determine Minimum Water Flows Required to Sustain Federally Endangered Dwarf Wedge Mussels at Upper Delaware Scenic and Recreational River

The purpose of this project is to determine minimum water flows required to sustain a recently discovered population of endangered dwarf wedge mussels (*Alasmidonta heterodon*). Specific objectives of the project are to: 1) determine the relationship between water flow recorded at operational USGS gauge stations in the upper Delaware

River and water flow, depth, and surface coverage at three known dwarf wedge mussel locations within the Upper Delaware Scenic and Recreational River, 2) determine the influence of upstream water discharge source on water temperature profiles at Dwarf Wedge mussel locations in the upper Delaware River, and 3) determine freshwater mussel response to dewatering events by season. These objectives have not been accomplished due to delayed obligation of funds for the project. Site visits and a scoping meeting was held in August 2003. Fieldwork to install reference benchmarks is planned for fall 2003. Fieldwork to install staff gauges, install temperature probes, conduct cross section profiles of the riverbed, and collect/analyze data is scheduled for spring, summer, and fall 2004.

Assessment of Habitat for Sagebrush Steppe Dependent Birds at Craters of the Moon National Monument

This project expands an ongoing interagency project to identify new National Park System lands that have not yet been surveyed. Specific objectives of the project are to: 1) Survey a representative sample of shrubsteppe habitats for shrubsteppe birds with an emphasis on Species at Risk (sage grouse, loggerhead shrike, brewer's sparrow, sage sparrow) and BLM listed Species of Special Concern (the previous four plus sage thrasher and gray flycatcher); 2) Obtain quantitative estimates of habitat attributes at the sample locations. Attributes measured include: shrub, grass, and forb cover; species composition; age class definition for woody plants; non-vegetative cover; or other structural characteristics; 3) Identify habitats with the highest numbers of the Special Status shrubsteppe bird species (which will be used as an indication of viability); 4) describe the habitats needed on shrubsteppe lands in Idaho to provide viable populations of these species.

This project was initiated through a cooperative agreement with the Boise State University (Idaho Bird Observatory) who is a partner in the Great Basin Cooperative Ecosystem Studies Unit (CESU). The late release of funds in FY 2003 precluded completion of the fieldwork during the 2003 season. A task agreement was completed and the funds obligated in FY 2003. Fieldwork will be completed in FY 2004 and a final report is due in early FY 2005.

Development of Comprehensive Invasive Plant Management Plan at Lake Mead National Recreation Area

The purpose of this project is to develop an invasive plant management plan for the Lake Mead National Recreation Area. The plan is an important document that will guide the park for many years in the chronic battle against invasive plants. The plan provides the framework for a working philosophy that emphasizes prevention and early treatment of invasive plants. In the plan, sources of invasives are discussed and a detailed plan of action that outlines methods to prevent invasive plant introductions and spread as well as

treat existing invasives is presented. A large portion of the shoreline, developed areas, and primary vector areas of Lake Mead have been surveyed, mapped, and incipient populations of invasive plants treated. An aquatic plant survey has been started and will be ongoing. It is expected that the plan will have a completed compliance review by May, 2004.

Taxonomic Affinity, Spatial Ecology and Resource Utilization of Red Fox Population at Lassen Volcanic National Park

Lassen Volcanic National Park resource managers are challenged by the fact that the local red fox population may be either a state-threatened native species or a troublesome exotic. The purpose of the project was to fund two critical steps in a broader, multi-year research program on the red foxes that involves multiple state and federal partners. The funds were used for preliminary genetic comparison of the Lassen foxes with other California populations to determine whether the foxes are native or exotic. Funds were also used for 15 key months of ecological fieldwork on the Lassen red fox population including telemetry on radio-collared animals, photostations to determine regional distribution, diet content analysis, and reproductive characteristics.

The genetic results to-date are inconclusive in part because the Lassen population is so small that it might represent a single family unit, thereby violating the statistical assumptions of the comparisons with other populations. To rectify this problem, given that no additional samples are expected from the Lassen area, more exhaustive sampling of other red fox populations in California is underway and completion is expected within the next year. The ecological study, the first ever conducted on mountain red fox in California, revealed that red foxes are relatively rare in the Lassen area, have extremely large seasonal home ranges, provide little evidence of reproduction, and have a surprising dependence on scavenged deer carcasses for winter food. Because of their extensive seasonal movements, effective management will require partnership with other federal, state and private landowners in the area. Complete analysis of both genetic and ecological data is underway as part of a PhD dissertation at the University of California at Berkeley and will be completed by December 2004. The full results will be provided to the National Park Service upon completion and will be published in the appropriate scientific literature.

Habitat Assessment of the Federally Endangered Myrtle's Silverspot Butterfly at Point Reyes National Seashore

The purpose of this project was to assess the habitat of the federally endangered myrtle's silverspot butterfly at Point Reyes Nation Seashore. Vegetation surveys examined the density of nectar sources and larval host plants in grazed and ungrazed areas of the Seashore. Density estimates on all known and suspected nectar sources was collected. High school interns (Pacific Coast Learning Center) were partnered with project staff to collect surveys. This proved to be an excellent match for all involved. An MSAccess database was created and all project data was entered and error checked. GIS layers were created for all vegetation transects and butterfly transects and occurrences. The Project Leader is currently analyzing the first year of data to look at effects of grazing.

Work was done with San Francisco State and Stanford University partners in designing butterfly monitoring transects to capture a relative abundance and distribution which could then be compared with past surveys. A position was established to conduct butterfly monitoring. In the past, long travel times and variable weather conditions hampered Stanford's butterfly monitoring efforts. By hiring on-site staff it was possible to quickly take advantage of good monitoring weather. The efforts were extremely successful; butterfly surveys added species to the list of the known nectar sources and expanded the known range of the butterfly. In addition, daily butterfly counts were relatively high compared with past years.

Bio-techs looked at the larval host plant and the butterfly populations in preparation for a long-term monitoring program. For larval host plant (*Viola adunca*) populations, they searched within the butterfly's range for violet populations and mapped and estimated aerial extent and density of each population. Current project activities include setting up permanent butterfly survey transects and mapping high quality habitat and non-native grass and ice plant removal areas. All of these components will feed into the monitoring and management plan to be developed.

Assessing Impacts of a Subsistence Fishery on Coral Reef Resources at War in the Pacific National Historical Park

The purpose of this project is to assess the impacts of subsistence fishing on the coral reef resources. This work will include fisherman surveys to determine the composition and amount of catch, population estimates of common fishery species, a market survey to determine if the catch from the park is being sold in local markets, and a tracking study to determine fish movement across the park boundary. The expected completion date of this project is September 2005.

Propagation and Reintroduction of Solanum Conocarpum, a Critically Rare Shrub at Virgin Islands National Park

This one-year project was initiated to establish five new populations (50 seedlings each) of *Solanum conocarpum* in the vicinity of the Estate Lameshur population (but removed a safe distance to avoid potential contamination with microorganisms). Propagules were grown primarily from seed and then planted last fall during the rainy season. Survivors were tallied and height growth measured at four-month intervals. Observations and documentation of flower visitation by potential pollinators, if and when it occurs, will be made at the existing Lameshur individual. This project was conducted with the University of the Virgin Islands through the South Florida/Caribbean CESU. The cooperator is currently starting propagation material and initiating genetic sampling.

BRMD Technical Assistance
Funded Through Individual BRMD Programs and Projects

BRMD technical assistance, which is available to all parks, is the heart of BRMD and NPS Natural Resource Program Center (NRPC) operations. By providing technical assistance, NRPC scientists from a variety of BRMD programs not only share their expertise with parks, but also maintain and improve their own professional status. It allows for information sharing and adds "real-world" context to the development of national programs and policies. Table 5 identifies all technical assistance requests received in FY 2003.

Table 5. BRMD technical assistance requests received in FY 2003.

Region	Park	Topic	BRMD Contact	Status
AKR	AKR	Provide Basic Filed Anesthesia Training	Coffey	accomplished
IMR	BRCA	Identify Utah Prairie Dog Research Needs	Dratch Mehrhoff	delayed to 2004
IMR	BRCA	Raptor Monitoring Project	Coffey	accomplished
IMR	CAVE	Measure Pesticide Levels in Bats & Cave Swallows	Wild	no submission
IMR	CAVE	Necropsy & Sample Collection and Training for Wildlife Pathology	Wild	not accomplished
IMR	COLM	Assess Impacts of alternatives for park Fire Management Plan	Eckert	on-going
IMR	CURE	Provide Veterinary Assistance for Capture and Sampling of Bighorn Sheep	Wild	accomplished
IMR	GLAC	Provide Veterinary Assistance for Capture and Sampling of Bighorn Sheep	Wild	accomplished
IMR	GLCA	Aquatic Nuisance Species Rapid Response Plan	Drees	on-going
IMR	GLCA	Environmental Assessment for Experimental Bonytail Chub Pop	Dratch	not accomplished
IMR	GRCA	Analysis of Genetic Data Collected in GRCA Mt. Lion Study	Dratch	on-going
IMR	GRCA	Contaminant Analysis of Condor Habitat	Wild	no submission
IMR	GRCA	Develop Long-Term Monitoring for Exotic Plants	Cacek	not accomplished
IMR	GRTE	Bison-Elk Management Plan/EIS	Wild	accomplished
IMR	GUMO	Elk Herd Assessment & Management Plan Development	Coffey	accomplished
IMR	MEVE	Evaluate Methods & Results to Mitigate Wildfire Impacts	Eckert	accomplished
IMR	MEVE	Review Funding Proposal for a Mexican Spotted Owl Survey	Dratch	accomplished
IMR	MEVE	T&E Analysis in Fire Management Plan	Mehrhoff	on-going
IMR	MEVE	Technical Review of Weed Management Plan	Cacek	not accomplished
IMR	PAIS	Management of T&E Species	Dratch	on-going
IMR	ROMO	Assist with CWD Surveillance and Staff Training	Wild	accomplished

Region	Park	Topic	BRMD Contact	Status
IMR	YELL	Technical Workshop for Wolverines, Lynx.& Snowshoe Hares	Dratch	not accomplished
IMR	YELL	Vet. Preceptorship - Assess Florescent Polarization Assay	Wild	accomplished
IMR	YELL	Workshop on Development of Remote Ballistic Vaccine	Wild	accomplished
IMR	YELL	Provide Basic Field Anesthesia Training	Coffey	accomplished
IMR	ZION	Design Long-term Monitoring for Small Mammals & Veg	Eckert	accomplished
MWR	BADL	Review Draft Weed Management Plan/EA	Cacek	not accomplished
MWR	HOME	Fire History of Woodlands	Eckert	on-going
MWR	SLBE	American Crow Mgt at Dimmick's Point, N. Manitou Island	Dratch	not accomplished
MWR	WICA	Monitor for Chronic Wasting Disease	Wild	accomplished
NCR	PRWI	Pyrite Mine Site Reclamation Evaluation	Eckert	on-going
NCR	PRWI	Greenwood Mine Site, Asphalt Plant Reclamation Evaluation	Eckert	on-going
NER	COLO	LTEM, Research for T&E Bald Eagles, Sensitive Joint Vetch	Mehrhoff	accomplished
NER	SHEN	Wildlife Immobilization Procedures	Wild	no submission
PWR	CABR	Restoration Around the Historic Old Point Loma Lighthouse	Eckert	accomplished
PWR	CABR	Review of Herpetological Surveys in Coastal Sage Scrub	Eckert	accomplished
PWR	DEVA	Loss of genetic info in refugium populations/Devil's hole pupfish	Dratch	accomplished
PWR	DEVA	Vernal Springs Endemic Invertebrates	Mehrhoff	not accomplished
PWR	GOGA	Assess & Mgt Public Health Threat Assoc. w/ Western Gulls	Wild	delayed to FY2004
PWR	GOGA	Restoration of Environmental Remediation Sites (also GRD)	Eckert	accomplished
PWR	PORE	Determining Size and Composition of Deer Populations	Eckert	accomplished
PWR	PORE	Western Snowy Plover Protection and Predator Management	Dratch	not accomplished
PWR	REDW	Elk Population Assessment	Wild	accomplished
PWR	WHIS	Develop Conservation Agreement for Puccinellia howellii	Mehrhoff	on-going
PWR	YOSE	Resource Stewardship and Protection Curriculum	Dratch	accomplished
PWR	YOSE	Review Draft T&E Species Compliance Strategy	Dratch	on-going
SER	EVER	Multivariate methods workshop	Eckert	on-going
SER	GUIS	Conservation Genetics in Habitat Restoration Activities	Dratch	not accomplished
SER	GUIS	Develop Management Vision for Live Oak Forest	Eckert	delayed to 2004
SER	NATR	Protecting (surveillance) Critical Habitat of the Gray Bat	Dratch	not accomplished

Natural Resource Preservation Program (NRPP)

(For a complete report on the administration of the NRPP, see the NRPP Annual Report FY 2003.)

BRMD provides oversight and management for the Natural Resource Preservation Program (NRPP), a program that supports servicewide natural resource management projects conducted by park units. In FY2003, BRMD provided oversight for $12,678,000 in NRPP servicewide programs. Of the funds, ten-percent were available for unspecified servicewide natural resource management projects, while the remaining ninety-percent targeted specific needs and are generally distributed to Natural Resource Management, Small Park, Disturbed Land Restoration, Threatened and Endangered Species, Regional Block Allocation, and USGS/BRD Technical Assistance projects.

As part of NRPP oversight, BRMD administers the NRPP-Threatened and Endangered Species and the NRPP-Natural Resource Management programs. Fourteen NRPP-Threatened and Endangered Species projects were funded at $532,000, and seventy-one NRPP–Natural Resource Management projects were funded at $6,287,700 in FY 2003. Administration of NRPP includes sponsoring the review/ ranking panels for these two programs once per year, tracking and recording implementation plans, drafting annual accomplishment and completion reports, and preparing funding advice memos upon completion of program requirements. Finally, BRMD prepares the comprehensive annual report on NRPP fiscal year funding for submission to Congress.