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WATER RESOURCES DIVISION NATIONAL PARK SERVICE NATURAL RESOURCES REPORT NPS/NRWRD/NRR-96/05 The National Park Service Water Resources Division is responsible for providing water resources management policy and guidelines, planning, technical assistance, training, and operational support to units of the National Park System. Program areas include water rights, water resources planning, regulatory guidance and review, hydrology, water quality, watershed management, watershed studies, fishery management, and aquatic ecology.

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WATER RESOURCES DIVISION

National Park Service Fort Collins, CO 80525

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A Word from the Associate Director, Natural Resource Stewardship & Science

By Michael Soukup, Ph.D.

This annual report provides a summary of the significant accomplishments of the Water Resources Division (WRD) of the National Park Service (NPS) in 1995.

WRD responds directly to park technical assistance and advice priorities with respect to the preservation, protection, and management of water and aquatic resources of units of the National Park System. The Division carries out a broad-based water resources support program including water rights; water quality; floodplain management; ground water analysis; watershed and wetlands protection; water resources planning; fishery management; policy, legislative, and regulatory analysis; information management; and training. The Division also provides day-to-day support to parks, clusters, system support offices, field offices, and the Washington office in addressing the myriad of water resources issues and concerns facing NPS. The Division is located in Fort Collins, Colorado, with additional offices in Denver, Colorado and Washington, D.C. The Division also has staff co-located with the U.S. Geological Survey (USGS) in Reston, Virginia, and with the U.S. Fish & Wildlife Service (FWS) in Arlington, Virginia.

The NPS must have the highest level of technical support to accomplish the complicated mission of preserving incredible, and incredibly complex, resources in a changing landscape. Thus, I am extremely pleased with the accomplishments of WRD as reflected in this annual report. These accomplishments are indicative of the professionalism of the Division and the ability of the Division to work with management and staff of parks, clusters, system support offices, field offices, and the Washington office. However, these accomplishments would not have been possible without the continuing cooperation and support provided by all organizational levels and divisions of the NPS. Such collective efforts are essential to the high degree of success required to protect our National Parks and present them to the American public.



Comments from the Division Chief

By Dan B. Kimball

As in previous years, 1995 was a very productive year for the WRD and was characterized by a number of significant accomplishments that are reflected in this annual report. However, in many ways, 1995 was a year of transition as the organizational restructuring of the NPS was implemented and the Division dealt with thrusts to reduce budgets and FTE's of NPS central offices. As such, 1995 was a year of challenges in terms of providing continued Servicewide water resources leadership and extensive technical assistance and advice to parks. As evident in this annual report, WRD was able to achieve several very significant accomplishments in both of these areas in 1995. Some examples of significant accomplishments of the Division this year include the following:

- Consummation of a Reserved Water Rights Compact in the State of Montana for Little Bighorn Battlefield National Monument and Bighorn Canyon National Recreation Area, a favorable court ruling to recognize Federal Reserved water rights in Rocky Mountain National Park, and pivotal advancement of negotiated water rights settlements at Zion and Mesa Verde National Parks.
- Expansion of the operating partnership with the USGS to meet the long-term water quality needs of units of the National Park System by means of USGS's National Water-Quality Assessment Program (NAWQA) (e.g., through joint funding of pilot projects involving ten parks and nine NAWQA study units).
- Advancement at the Departmental level of a risk-based, watershed approach to remediate water quality problems associated with inactive and abandoned mines on federal lands.
- With support of NPS's Servicewide Inventory & Monitoring Program, preparation of 30 park-specific water quality data inventory and analysis reports.
- Major progress in preparing (or assisting in the preparation of) water resources management plans, scoping reports, and issue overviews for more than 20 parks.
- Implementation of a Fishery Management Program (FMP) within WRD to, among other things, assist
 parks in the development of fisheries management plans, expand partnerships with state fisheries managers, and explore the potential of greater fishery-related private-park partnerships.
- Involvement in major water resources issues facing NPS including the development of an Annual Operating Plan for the Colorado River, evaluation of the proposed New World Project near Yellowstone National Park, restoration of the Elwha River in Olympic National Park, final reclamation of a uranium mill tailings site upstream of Canyonlands National Park, and assessment of various NPS water resources issues associated with the implementation of North American Free Trade Agreement (NAFTA) along the U.S./Mexico border.
- Participation on the Ad Hoc Working Group on Natural Resource Management, which was established by NPS Director Kennedy and Assistant Secretary Frampton.
- Significant contributions in restructuring training in NPS by participation on the Servicewide Employee Training & Development Task Force and in developing a new course titled "Fundamentals of Natural Resources for Professionals."

Many of the accomplishments listed above are described in more detail later in this annual report.

Consistent with the tradition of WRD, we are dedicated to providing technical assistance and advice of the highest quality to the parks and also to national leadership on water resources matters that have Servicewide effects on units of the National Park System. I am extremely proud of the hard work and commitment to these goals that are demonstrated on a daily basis by the staff and management of WRD.

Although NPS is going through major changes as a result of restructuring and budget reductions, WRD will endeavor to remain focused on our principal mission, providing technical support to the parks. We will also endeavor to develop and implement new and more innovative, efficient, and cost effective ways to provide support to parks in preserving, protecting, and managing water and aquatic resources of the National Park System.



Washington Program Coordination Office Highlights

By William H. Walker, Jr., Ph.D. Program Coordinator

and

Sharon P. Kliwinski Environmental Protection Specialist

While we continued to represent the NPS and the Division in intergovernmental, interagency, departmental, and bureau-level programs in 1995, the Washington Program Coordination Office staff were very pleased to welcome Mike Soukup as the new Associate Director, Natural Resource Stewardship & Science, and the selection of Abby Miller as the new Deputy Associate Director. With Mike and Abby in place, a major focus for our energies during part of the year was to help refine and implement the changes in Natural Resources organization and function that have resulted from the NPS reorganization and to assist colleagues from satellite offices in their consolidation in the Interior building. Already we have seen positive benefits from having new leadership, fresh ideas, and representatives from each of the Natural Resources divisions working closely together in one place. We look forward to the synergy and cooperation continuing in the future.

During this year, the Washington Program Coordination Office expanded its role as NPS liaison to the USGS's Water Resources Division, and specifically to the USGS National Water-Quality Assessment Program (NAWQA). While the overall objective of the USGS flagship NAWQA program is to measure status and assess trends in the quality of the nation's water, the NPS partnership with USGS and NAWQA is intended to facilitate the establishment of NAWQA data collection locations in as many NPS units as possible. This year WRD and NAWQA were successful in jointly funding pilot projects that involved ten parks and nine NAWQA study units. Individual project objectives were crafted by water-quality specialists in WRD's Water Operations Branch, NAWQA personnel, and park resource managers to generate high quality information for use in park resource management programs as well as data for the NAWQA national assessment. Program Coordination Office staff represented the NPS on NAWQA's Federal Agency Advisory Council, maintained a half-time presence at USGS Headquarters in Reston, Virginia, to encourage USGS scientific assistance to parks, and worked with the NAWQA Ecological Synthesis Team to plan for a comprehensive analysis of the vast amounts of biological information being collected by the NAWQA Program.

Early in 1995, the Intergovernmental Task Force on Monitoring Water Quality (ITFM) completed 3 years of work and issued its third and final report, "The Strategy for Improving Water-Quality Monitoring in the United States," and a supporting volume of technical appendices. The report outlines a strategy for nation-wide water-quality monitoring and suggests technical improvements in monitoring protocols to support sound water resources decision-making at all levels of government and the private sector. The Program Coordination Office represented the NPS as a member of the ITFM and will continue involvement with its successor, the National Water Quality Monitoring Council. If implemented, ITFM recommendations could bring together a vast array of public and private monitoring efforts, poorly coordinated at present, into a cost-effective network providing information to public and private entities managing water resources in the United States.

On Capitol Hill this year, there was little new environmental action and no environmental legislation pertinent to WRD (e.g., the Clean Water Act, Safe Drinking Water Act, or Superfund legislation) were enacted into law.

This office continued to represent NPS at the Washington level on the interdepartmental abandoned mine lands (AML) initiative, an innovative, risk-based, watershed approach to the remediation of water-quality

problems from abandoned mines. Representatives from the Department of Interior (DOI) bureaus, the Department of Agriculture, the Environmental Protection Agency (EPA), and WRD's Fort Collins office were deeply involved in planning the AML initiative. However, at the close of the year, it became clear that ultimately the initiative was not likely to be implemented because budget and staffing uncertainties would make it very difficult for the involved agencies to commit to such a comprehensive clean-up program in these times of declining budgets.

The Washington staff continued to coordinate NPS marine debris issues and published the 4th year report of the NPS Marine Debris Monitoring Program. WRD staff also continued to represent NPS on the Eastern Mine Drainage Federal Consortium. WRD joined EPA and other agencies in the Federal Mining Dialog to improve coordination on mining issues through EPA's Hardrock Mining Strategy.

Finally, WRD staff in this office continued to contribute to a number of partnership efforts, representing the Associate Director at activities such as Coastal America, the Chesapeake Bay Program, the Gulf of Mexico Program, and the USGS Ecosystem Program. We also continued to contribute to the effort to restructure training in the Service by assisting the Servicewide Employee Training and Development Strategy Task Force with devising "essential competencies," which will be used in the future to guide the training of all natural resources personnel, and by participating in the refinement of the new "Fundamentals of Natural Resources for Professionals" course to be offered for the first time in 1996.

In summary, in the Washington Program Coordination Office this year, we welcomed new senior managers and were able to expand some NPS partnerships, while also experiencing some disappointment over programs and legislation that were not realized. We could not have gotten stronger support than we received from our WRD colleagues in Colorado, and also from throughout the Service whenever we worked together. We look forward to serving both the Division and the Service in 1996.

PLANNING AND EVALUATION BRANCH HIGHLIGHTS

By Mark Flora, Branch Chief

This has been a year of restructuring and rebuilding for the Planning and Evaluation Branch (PEB). During the year, the Fishery Management Program was transferred from the former Wildlife and Vegetation Division to PEB. The addition of Dr. Frank Panek to the staff will greatly increase WRD's capabilities to integrate a fisheries and aquatic resource management perspective into the more traditional array of services (water resources planning, water quality management, water rights, contaminant assessment, wetlands/floodplain protection, etc.) that have long been provided by WRD. In addition, WRD's water resources planning capabilities, which include assistance to the parks in identifying and assessing water-related issues, developing Water Resources Management Plans (WRMPs), and providing advice and assistance to parks in creating appropriate water-related Resource Management Plan (RMP) project statements, have also been enhanced by the selection of David Vana-Miller to fill a vacancy within the Water Resources Planning Program. His addition essentially doubles the existing program staff and will allow for the 1996 completion of WRMPs for Bandelier National Monument, Timucuan Ecological and Historical Preserve, and Roosevelt-Vanderbilt National Historical Site.

The PEB's capacity to provide park-specific support was also enhanced in 1995 by attracting top-notch detailees including Elaine Furbish (formerly of Assateague Island NS), Tom Bellinger (Bureau of Reclamation), and Mark Chatman (U.S. Bureau of Mines) for temporary assignments with PEB. In addition, PEB benefitted greatly from an experimental Park-WRD partnership, the "hydrological affiliates experiment," which provides support for park-based hydrologists/aquatic resource specialists to assist other NPS units within their areas of expertise. Under this program, David Mott (Buffalo National River) provided water-related planning support to New River Gorge National River/Gauley River National Recreation Area/Bluestone National Scenic River, and Jon Reidel (North Cascades National Park) provided planning assistance to Coulee Dam National Recreation Area. The results of these cooperative efforts will be published in 1996.

During the year, PEB, working cooperatively with park staff and Coperative Park Study Unit (CPSU) cooperators, was able to complete a WRMP at Pecos National Historical Park and a Water Resources Scoping Report (WRSR) at Curecanti National Recreation Area. Four additional WRMPs (Congaree Swamp National Monument, Big Cypress National Park, Big Horn Canyon National Recreation Area, and Big Bend National Park) and one additional WRSR (New River Gorge National River/Gauley River National Recreation Area/ Bluestone National River) reached the external review phase. WRD also provided funding support and technical assistance for the continuing efforts to develop WRMPs at Acadia National Park, Cape Cod National Seashore, Great Sand Dunes National Monument, Big South Fork National River & Recreation Area, Saint Croix National River, Curecanti National Recreation Area, and Santa Monica Mountains National Recreation Area.

PEB staff provided training and/or technical assistance in water resources planning and the development of water-related planning documents for seven NPS units including Great Sand Dunes National Monument, Theodore Roosevelt National Park, Wind Cave National Park, Canyonlands National Park, Zion National Park, Mesa Verde National Park, and Fossil Butte National Monument.

Similarly, 1995 was a very active year for the Division's Wetlands Program. PEB's wetlands staff provided project coordination and product review for 12 ongoing wetlands projects and approved study plans for 5 new wetlands projects at Cape Cod National Seashore, Gulf Islands National Seashore, Dinosaur National Monument, Indiana Dunes National Lakeshore, and Natchez Trace Parkway. Staff also guided the proposal development and funding process for 8 projects scheduled to begin in fiscal year (FY) 96, including "Restoration of Selected Streams and Wetlands Impacted by the Grand Ditch" at Rocky Mountain National Park and "Wetland Mapping for the Upper Kobuk River Watershed" at Gates of the Arctic National Park & Preserve.

Technical assistance to parks was once again a high priority of the Wetlands Program in 1995. Examples of wetlands technical assistance included: (1) regulatory and hydrologic analyses regarding impacts of a proposed housing subdivision on pine savannah wetlands at Gulf Islands National Seashore (the drainage system for the adjacent development was redesigned to protect park wetlands), (2) evaluation of feasibility and impacts of a proposed pond enhancement project at Cape Lookout National Seashore, (3) participation on an assessment team to evaluate the functional condition of riparian resources on Santa Rosa Island, Channel Islands National Park, and (4) provision of advice regarding wetland delineation procedures, restoration needs, and regulatory compliance at Redwood National Park.

Wetlands Program staff were called upon frequently to analyze the effects of proposed federal wetlands legislation on NPS resources. For example, staff prepared an analysis of the effects of H.R. 961 (Amendments to the Clean Water Act) on NPS wetland resources in Alaska. This analysis showed that if H.R. 961 became law, approximately 10 million of the 13 million acres of wetlands in Alaska NPS units would no longer be protected under Section 404 of the Clean Water Act. Wetlands Program staff also responded to a Corps of Engineers proposal to establish a Section 404 "nationwide permit" for single-family home construction with under 1/2 acre of wetland impact, prepared comments on a proposed amendment that would have exempted recreational off-road vehicle (ORV) use from regulation under Section 404, and analyzed impacts of Senate Bill 851 (Wetlands Regulatory Reform Act of 1995) on NPS wetlands protection and management.

The Fishery Management Program had a highly successful year assisting parks with the development of FMPs at Buffalo National River and Pictured Rocks National Lakeshore, continuing to expand its partnerships with State fisheries managers, and in exploring the potential for even greater private-park partnership cooperation through the American Sportfishing Association. A description of the objectives and capabilities of the Fishery Management Program is provided in a following article by Frank Panek.

In 1995, PEB (with the assistance of the Division's other branches) reviewed approximately 200 proposed rules and regulations, environmental compliance documents (Environmental Impact Statements (EISs) and Environmental Assessments (EAs)) and planning documents (General Management Plans (GMPs), Developmental Concept Plans (DCPs), Resources Management Plans (RMPs), etc.) during the year. Written comments pertaining to water-related issues were prepared for approximately 15 percent of the documents that were reviewed. PEB also participated in a number of Departmental and/or Servicewide working groups including representing the NPS on the DOI U.S.-Mexico Shared Water Resources Committee, the Federal Geographic Data Wetlands Subcommittee, the Natural Resource Issue Interpretation Committee, the DOI Recreational Fisheries Stewardship Initiative, and both the International and U.S. Coral Reef Initiative committees.

Managing Park Fisheries: The Role of the Fishery Management Plan

by Frank M. Panek, Ph.D. Fishery Biologist

Aquatic and marine resources are fundamental building blocks of ecosystems and provide many of the essential ecological processes upon which terrestrial ecosystems depend. Yet despite their importance to the overall ecological well-being of many of our National Parks, these resources are poorly inventoried and managed in most units. Over 150 park units support fisheries resources, over 50 of which support a mixed diversity of freshwater, estuarine, and marine resources. Park resources are representative of the full spectrum of fish diversity found in North American aquatic habitats ranging from the clear, cold mountain streams of the Pacific Northwest and the Alaskan Frontier, to the warm waters of the Virgin Island's tropical reefs, and the highly diverse temperate streams of the southern Appalachians. This diversity of resources is likewise threat-ened by the diversity of problems and environmental insults common to all North American fisheries. Loss of habitat, degradation of water quality, introductions of exotic species, poor land-use and watershed planning, introductions of pesticides and other pollutants, and poorly regulated recreational and commercial fishing, all act synergistically to degrade and diminish fisheries diversity and abundance. Unfortunately, many of these insults to park aquatic and marine systems originate from sources outside the national parks or result from the activities of nearly 300 million visitors to the parks each year.

The long-term sustainability of fisheries in the national parks will depend upon the Service's abilities to recognize, evaluate, correct, and monitor these problems. Stated simply - healthy, intact watersheds and ecosystems are essential requirements for the long-term sustainability of park fishery resources. Fisheries resources have been managed in the National Park System since Yellowstone National Park was authorized in 1872, but early management efforts were aimed largely at improving sport and commercial fishing and were often more responsive to the user than to the resource. Overfishing was a common problem, and many of the management strategies employed by NPS resulted in noticeable losses in native fish diversity. In response to these trends, the NPS adopted its first formal fisheries policy in 1936 and focused management actions on the maintenance of sustainable native fisheries.

The Service's present fisheries program, "A Heritage of Fishing," encourages the enjoyment of fishing in naturally functioning aquatic ecosystems characterized by wild native species and habitats. It provides a framework for recreational fishing and management of fishery resources while incorporating the service's fundamental mandate to preserve and restore these fisheries and the ecosystems upon which they depend. It also provides realistic approaches to fisheries management in altered ecosystems such as reservoirs and rivers and streams altered by impoundments, or where native species can no longer persist due to fundamental changes in landscape or water quality.

As a result of our mission and the public's use of these resources, the management of aquatic and fisheries resources in parks can be challenging, complex, and involve an array of biological, ecosystem, social, political and economic issues. For example, there may be multiple stakeholders who view the resource and its management from different philosophical perspectives or there may be the need for consideration of issues beyond the boundaries of the unit. In many park units, NPS does not have exclusive jurisdiction over these resources and must work with State Fish and Wildlife Agencies in the long-term stewardship of its fishery resources. More often than not, state fishing regulations and licensing apply to park fishery resources. As such, it is often difficult to convince state fishery managers that NPS units should be viewed as a "special place" and that management actions and strategies in place elsewhere within their jurisdictions may not be appropriate in a National Park Unit.

Much of this situation results from fundamental differences in fishery management philosophies. In the National Park System, fishery management most often involves manipulating and regulating angler use and behavior to provide a quality experience while minimizing the effects of this visitor use on fish populations and their supporting habitats and ecosystems. Traditional fisheries management, as practiced by most other federal, state, and tribal authorities, often places emphasis on manipulation of fish populations and habitats to provide the optimal level of sustainable fishing. It is inevitable that these two very different resource management paradigms will lead to conflicts.

Establishing partnerships with State managers, even in those park units with exclusive jurisdiction, are important for the long-term management of park fishery resources. Fishery management knows no boundaries and sustainable fish populations and stocks must be managed on watershed or landscape scales. This is particularly true for marine and anadromous fisheries that are often at risk from overharvest and habitat limitations beyond the park boundary. Management of these resources requires planning and coordination with all the parties of interest in the resource. Perhaps one of the most effective tools for accomplishing this goal is the Fishery Management Plan.

The preparation of an FMP should be considered in any park unit in which management of fishery resources requires additional planning and focus beyond that provided in the unit's GMP or RMP. As a result of the recent reorganization, fishery management programs and capabilities have been transferred from the former Wildlife and Vegetation Division to the Water Resources Division. The change creates new opportunities for integrated approaches to managing park fish resources. WRD now has the capability of providing technical assistance in fishery science and management, as well as its more traditional services in water quality assessment and management, water rights, contaminants, and lake and stream habitat assessment and restoration. Our continued affiliation and participation in the Fisheries Administrators Section of the American Fisheries Society provides an avenue for discussion and resolution of management issues with the State Fishery Chiefs.

Last year, assistance was provided to resource managers at Buffalo National River and Pictured Rocks National Lakeshore in developing park FMPs. Development of these plans required the cooperation of Federal and State partners and set new agendas and tasks for the cooperative management of the resources within the context of both NPS and State missions. Technical assistance in the development of similar interagency FMPs is being provided to Saint Croix National Scenic Riverway, Great Smoky Mountains National Park, and Glen Canyon National Recreation Area.

In all of these efforts, establishing and maintaining effective partnerships with research and management cooperators is the key prescription for successful management. To accomplish this goal, WRD staff coordinates with regions and parks to assure both policy compliance and that fisheries management programs are technically adequate and scientifically credible.



Monitoring fish populations and habitat conditions in the Colorado River, Rocky Mountain National Park. (Photo by Daryl Jennings, U.S. Fish and Wildlife Service)

IMMEDIATE FISHERY MANAGEMENT NEEDS

The following lists five of the most common and immediate fishery management needs to be addressed in the development of an FMP.

- 1. Provide basic inventories of park fisheries and aquatic resources and develop monitoring programs.
- 2. Assess the impacts of exotic and non-native fishes on native fish populations and develop restoration or management options.
- 3. Identify and restore depleted fish populations and stocks.
- 4. Monitor and assess the effects of recreational, commercial, and/or subsistence fishing on aquatic or marine resources and develop regulatory strategies for managing these resources.
- 5. Evaluate the influences of external activities and habitat alterations on park fisheries resources and develop management strategies for correcting or mitigating these impacts.



Resource managers at Redwood National Park (REDW) monitor fish populations to restore declining steelhead and salmon populations. Monitoring programs such as this are essential components in any Fishery Management Plan. (Photo by David Anderson, REDW)

Water Resources Management Planning at Big Cypress National Preserve

by David L. Sharrow, Hydrologist

For Big Cypress National Preserve, the development of a WRMP has met several needs. It has given the Preserve an opportunity to step away from the day-to-day crises and examine water management in the Preserve, and to design a framework for the future. The document will be useful to the other water management professionals in south Florida, many of whom wish to build partnerships with the Preserve, but need to know that its water program has a direction and continuity with which they can build a productive relationship. The plan has also given the Preserve a way to express its funding needs so that it can compete effectively for NPS funding, and seek cooperative funding from other agencies.

The management of water has been a contentious issue in south Florida for many decades. Almost every land use development undertaken, from residential, agricultural, and mining, to even roads and groundwater recharge, have required the large scale manipulation of water, usually to the detriment of natural resources. The first canal was dug in 1882, and draining began in a big way by the first two decades of this century. Beginning in the 1940's, the U.S. Army Corps of Engineers and South Florida Water Management District have been managing water deliveries of south Florida, and they, along with the USGS, have been monitoring these deliveries. Everglades National Park has been approaching water management from the resource preservation perspective since its establishment in 1947.

Entering a field filled with these well-established players was difficult, because the Preserve had neither the database, monitoring program, nor professional staff to work effectively in the water management field. During the first 15 years following the establishment of Big Cypress National Preserve, the emphasis for management was land acquisition, establishing a basic work force, and getting a handle on the many nontraditional uses (such as oil and gas operations, hunting, ORV use, and grazing) which Congress permitted to continue in the Preserve. As the management of these issues became somewhat more routine, and water in south Florida became the subject of numerous lawsuits, the Preserve was able to make a case that a permanent water resources staff and program were needed. It helped that the other agencies also recognized that a significant data gap existed within the Preserve's boundary, which reduced their ability to understand the regional hydrology.

Ironically, the Big Cypress Swamp had been somewhat neglected as an area of study because large scale water problems were relatively minor in that area. The Big Cypress National Preserve is one of the few areas where water moves much as it did a century ago. It contains 729,000 acres of wetlands, arranged in a complex mosaic of cypress strands, sloughs, hardwood hammocks, old-growth pineland, and mangrove forests. Hydrologically, the preserve is a major source of water for Everglades National Park, Water Conservation Area 3A and the Fakahatchee Strand State Preserve, and the Ten Thousand Islands. Water management in Big Cypress Preserve can directly affect the well-being of these areas, just as the regional manipulation of water to restore the Everglades could affect the Preserve.

Developing a WRMP has not been an easy task. It was initiated in 1993 at the same time that the Preserve had established its first permanent hydrologist position, and writing the plan was to be one of his/her major responsibilities. As might be expected, if a National Park System unit can build the case necessary to justify one new permanent position, there is bound to be work enough for four, and in the high profile world of south Florida water, very little time was available to work on a large project like a management plan.

In 1994, the approach was shifted to using a contractor to be the primary author of the plan. The Preserve was extraordinarily fortunate to be able obtain the services of Bill Schneider, a retired USGS hydrologist with

30 years of experience in south Florida. Bill had written several scientific and popular articles on Big Cypress Swamp, so he could begin writing without going through a lengthy learning process.

The WRMP for Big Cypress National Preserve differs from plans written for other National Park units in some key areas. The description of the hydrologic environment is very brief, in contrast with plans for other National Park System units where this chapter often makes up a large portion of the document. Use of this approach was based on three things. First, the Preserve staff now includes permanent water resources experts, so literature can be reviewed, data analyzed, and timely resource descriptions can be developed as needed in the future. This contrasts with most National Park System units, where the WRMP represents a one-time opportunity to present the aggregate of knowledge about the water resources of that unit. Secondly, a report by the National Audubon Society, written shortly after establishment of the Preserve, provided an exhaustive compilation of what was known at that time about the water resources of the Preserve. Lastly, the Preserve recognized that it was more important to present a direction for the future of its water resources management program, than an extensive data analysis.

The approach presented in the plan emphasizes five key areas. **Inventory and monitoring** of water resources will always be a major effort in the Preserve, and the plan proposes an examination of the current program, its expansion, and making better use of several external data sources. **Consultation and coordination** with other agencies and tribes will be essential for any effective water program in south Florida, particularly for the National Park System Unit with the smallest budget and staff in the area. Among the plan's recommendations are to ensure that data collected in the preserve is of high quality and distributed widely, and to provide cooperative support to several ongoing or proposed studies and problem assessments. If either of these first areas are to be accomplished effectively, then **data management** must be improved. The plan also addresses several **specific issues** related to water, such as mitigation of the impacts from several canals, roads, and other features; monitoring the impacts of the various land and resource uses in the Preserve; and developing a regulatory baseline so that the non-degradation standards for water quality can be implemented. Long-term **staffing and support** that will be needed to implement the plan were also presented.

Big Cypress National Preserve will probably never have the profile, budget or water resource program of the other players in south Florida; however, through its WRMP, it has presented an effective water management program capable of meeting its internal needs and thus will hopefully receive the benefits of being a contributor in the regional arena.

WATER RIGHTS BRANCH HIGHLIGHTS

By Owen R. Williams, Branch Chief

It is obvious to us all that 1995 was a time of great change for the NPS. You may recall the ancient Chinese curse, "May you live in interesting times." Well, this has been an "interesting" year. We have been struggling with developing new lines of communication, with acting in support of increased field-level decision making, and with trying to maintain Servicewide consistency in water rights matters.

Last year, I began my overview by noting my growing concern about the Water Rights Branch's (WRB's) ability to be effective in the "new NPS." We in the WRB, like everyone else in the Service, are trying to conjure up ways "to do more with less" while simultaneously better serving our many "customers". Like most folks, we are still "hanging in" and maintaining the level of service we have traditionally provided to parks and other organizational levels of the Service. I am hopeful that we can continue to do so.

As the NPS changes, the WRB intends to continue to provide high quality service to park units and the remainder of the Service to protect NPS water rights and water-dependent resource attributes. The fact that NPS's water rights program is viewed by many as a model for other agencies has been evident in inter-bureau/ inter-agency meetings like the one described below. That is both an honor and a burden. If the WRB is to maintain its stature and its usefulness to the Service, it must find ways to continue being effective in the "new NPS." WRB's skilled and committed staff makes it very likely that it will do so, but it will be necessary to develop new working relationships with the field.

The new relationships of which I speak will require a greater involvement of field staff in water rightsrelated work, along with an elevated understanding of the potential problems that attend that work. Park staff will need to be cognizant of the possibility that local decisions may be inconsistent with Service policy and/or law and could conflict with actions taken elsewhere. These relationships will also require WRB to be accessible to field staff and sensitive to on-the-ground issues and time frames.

We all attempt to avoid "crisis management" and the "new NPS" should help in that regard. With more decisions being made at the park level, it may be possible for WRB to get involved with water rights (water quantity) issues before they become crises. For example, WRB is finishing investigations of the potential for impacts from nearby ground water withdrawals to park water-related resources (maritime forest areas) at Cape Hatteras National Seashore. Using park, University, State, and WRD staff, WRB undertook a significant research effort that helped the above parties, plus a local water utility, assess the potential impacts of ground water development upon natural resources at the park. In addition to helping resolve a water rights issue, this information is adding to the park's science program and underpinning certain management decisions.

Last year, WRB didn't have the same "big ticket" successes (e.g., the Montana Compact) that we had the year before. A second Compact for the remaining two Montana park units having Federal Reserved Water Rights (Little Bighorn Battlefield National Monument and Bighorn Canyon National Recreation Area) was signed early in FY95. However, the work was largely completed during FY94. Similarly, Colorado's Water Court for Division I ruled favorably on Federal Reserved Rights for Rocky Mountain National Park (ROMO) in early FY95, but that work too, much of it done by the staff at ROMO, was mostly completed in FY94.

Other than the "big ticket items," the Branch was very active in numerous water rights issues - from applications protests to active participation in adjudications and negotiations.

One item worthy of note is the First Instream Flow Quantification Training Session held last Fall in Boulder. The training session, cum workshop, was sponsored by the Washington, D.C. Office of the Solicitor and, in actuality, was a follow-up to the First Instream Flow Needs Assessment Workshop held in 1994, at Estes Park, Colorado. That session, sponsored by the National Biological Service (NBS) and WRB, was very successful, but not nearly as successful as the one in Boulder. The involvement and participation of the Solicitor, John Leshey, and key staff from the various Offices of the Solicitor (as well as from the U.S. Forest Service, the Bureau of Land Management, the Bureau of Indian Affairs, the Agriculture Office of General Counsel, the Department of Justice, and NPS) added greatly to its value. The Solicitor agreed with the participants that similar sessions should be repeated on a regular basis to develop both strategy and a coherent Federal approach to protecting instream flow on Federal land.

Once again, I must recognize WRB's continuing progress in studies and field data collection around the country. These activities provide direct support to both litigation and negotiation. Studies are underway in park units in California, Colorado, Hawaii, North Carolina, Nevada, Oregon, and Utah. We expect that this work, carried out both by contractors and in-house staff, will continue to be essential for the protection of park water-dependent resources.

Another noteworthy item for FY95 was the December 1994, decision of the Ninth Circuit of the U.S. Court of Appeals in U.S. v. Oregon (44 F.3d 758 (9th Cir. 1994)). In this case, the State of Oregon held that its State-based administrative hearing process met the general adjudication requirements of the McCarran Amendment (43 USC § 666), even though the proceedings were not "judicial" in the usual sense of the term. The Court of Appeals was not persuaded by U.S. arguments that the Federal Government could not receive a fair hearing with the State serving as both the trier of fact and party with an interest in the outcome of the proceedings.

The U.S. chose not to appeal the decision and thus risk an adverse ruling by the U.S. Supreme Court. The decision, I am told, is technically limited to the jurisdiction of the Ninth Circuit. However, the Klamath Tribe did file for review by the U.S. Supreme Court and was denied *certiorari*. This action by the Supreme Court may signal the potential for broad application of the decision (i.e., beyond the jurisdiction of the Ninth Circuit.)

In any case, NPS and other Federal agencies can anticipate more administrative "adjudications," instead of the hitherto typical court-based law suits. This will likely mean an increase in workload for attorneys in the Office of the Solicitor who have traditionally handled "administrative" hearings while Department of Justice attorneys handled "litigation." It may also mean an increase in adjudication activity as State Engineers, or their equivalents, initiate adjudications with the staffs and procedures they currently use for applications, protests, etc. Such a course of action might be cost effective from the State's perspective.

As was the case last year, this year has been productive for the protection of NPS water rights; I believe 1996 will be as productive. I've said it before, but it bears repeating - the NPS in general, and I in particular, are fortunate to have at our service the staff of the Water Resources Division. It is because of their professionalism and dedication that the NPS water resources protection program is successful.

The following are two articles that address two water rights activities. One describes a study at Black Canyon of the Gunnison National Monument undertaken in support of NPS's quantification of its Federal reserved water rights. The study, by NBS researchers, examined the relation between extant canyon bottom woody vegetation and historic river flows. The objective was to characterize the factors responsible for vegetation establishment. The science used here may be of interest to the reader because it is dynamically evolving.

The second article deals with the practical matter of participating in State administrative hearings with the objective of protecting NPS water rights and water-related attributes from injury induced by extra-park water development activities. Participation in these proceedings is difficult, time consuming, necessary, and on the increase. The reader should take note of the ramifications of these proceedings for a disparate set of participants from multiple NPS and DOI organizational units.

As to the future, I strongly encourage field managers to call upon WRB (or the Office of the Solicitor) whenever water rights (water quantity) issues arise. As the "new NPS" evolves, the need for increasingly effective communications will likely grow. At the risk of being repetitive, I must warn of the potential for pitfalls if we in WRB and park staff fail to monitor and address water rights issues in a timely manner. Having said that, I want to recognize the assistance this branch has received from park management and staff. Cooperation and direct assistance have been exceptional and of critical importance to NPS's success in water rights protection.



Hearings before the Nevada State Engineer Concerning Water Right Applications of the Moapa Valley Water District

Example of National Park Service Participation in a State Administrative Proceeding

By Alice Johns, Hydrologist and Paul Christensen, Hydrologist

BACKGROUND

The Moapa Valley Water District (MVWD) filed applications in 1990 and 1992 to withdraw eight cubicfeet per second (cfs) from a well located near Moapa, Nevada, about 50 miles northeast of Las Vegas. The MVWD was seeking additional water to meet the future water-supply demands of its service area. The well taps a regional aquifer that is the principal source of the water issuing from the Muddy River springs. These perennial springs supply most of the discharge of the Muddy River.

The Muddy River flows into the northwestern part of Lake Mead National Recreation Area (LAME). About 27 miles southeast of MVWD's well, the river enters LAME. NPS has a right to use water from the Muddy River for irrigation within LAME on the state-operated Overton Wildlife Management Area. In addition, NPS has rights to water issuing from several regional springs in the Overton Arm area of LAME, including Rogers and Bluepoint springs. Part of the ground water issuing from these springs is thought to originate in the Muddy River springs area. The springs are the only known habitat of a relict leopard frog, *Rana onca*, which was thought to be extinct until recently rediscovered at the springs.

The discharge of the Muddy River has been decreasing over the last 30 years, probably because of existing ground water withdrawals and surface-water diversions. The WRB determined through hydrologic analyses that the appropriations proposed by MVWD could further reduce the discharge of the Muddy River, injuring NPS's water right, and possibly that of the springs at LAME. In addition, the rights to the surface water of Muddy River and its sources of supply have been adjudicated, and there did not appear to be any water available for appropriation.

With the concurrence of LAME management, WRB filed protests to MVWD's applications with the Nevada State Engineer. The FWS and the Nevada Power Company (NPC) also protested. FWS was concerned about reductions in flow of the Muddy River springs and the associated habitat of the Moapa dace. NPC was concerned about impacts to their wellfield just down gradient from MVWD's well.

PREPARATIONS FOR HEARING AND SETTLEMENT NEGOTIATIONS

In early 1994, WRB initiated a more thorough evaluation of water rights and the hydrology of the Muddy River area to determine the room available for negotiation and to structure the technical case for a hearing, if settlement of the protest could not achieved. WRB and LAME staff also made a field reconnaissance of the Muddy River valley, the Muddy River springs, and LAME springs. In spring 1994, the Nevada State Engineer requested that MVWD conduct a 120-day aquifer test and submit reports on the test to his office and to the protestants. At that time, the Nevada State Engineer also informed MVWD and the protestants that a hearing would be scheduled after the test results were provided to the parties. MVWD provided a report of the 120-day pump test in summer 1994. The MVWD contacted NPS to explore the possibility of a negotiated settlement.

The NPS and FWS requested assistance from the Solicitor's Office, and an attorney, Mr. Steve Palmer, was assigned to the case. At Mr. Palmer's request, the Federal agencies provided summaries of their technical concerns. Mr. Palmer summarized the concerns in a letter to MVWD, noting that the concerns could probably not be resolved short of a hearing. The protestants were unable to reach settlements with MVWD.

In late December 1994, the Nevada State Engineer notified the applicant and the protestants that a hearing would be held late in January 1995 in Las Vegas, and ordered that the parties exchange lists of exhibits and witnesses. Up to this point, WRB, on behalf of LAME, had been handling most communications between the applicant and NPS, between NPS and FWS, and coordination with legal counsel. LAME'S review and approval of material compiled by WRD consumed considerable park staff time. And, with the hearing looming, commitments of time and resources grew substantially.

LAME and WRB staff submitted draft lists of witnesses and exhibits to Mr. Palmer, who submitted the final consolidated list to the parties. Exhibits for NPS included, for example, (1) curricula vitae for each witness, (2) proclamations and acts of Congress regarding the establishment of the NPS and LAME, (3) documentation of NPS water rights and water-related resources (such as the frog), and (4) descriptions of the hydrologic system, availability of water, and potential effects to NPS water rights.

On several occasions, the Solicitor, NPS, and FWS met to outline the technical case and prepare testimony to address the State Engineer's criteria established in Nevada statutes for determining whether or not to grant the applications. The criteria are threefold: (1) availability of water for appropriation, (2) potential injury to existing rights, and (3) public interest.

HEARING

The hearing was presided over by a hearing officer and assistants from the Nevada State Engineer's office, commenced in late January, and ended in mid-February. A court reporter transcribed the hearing, and the parties shared the cost of the transcription on a pro-rata basis. Each party was represented by an attorney. The hearing lasted six days in total and resulted in about 1,300 transcribed pages.

The NPC presented its case first, the FWS second, the NPS third, and MVWD last. Each witness was questioned by his or her attorney (direct examination) and was then subjected to cross-examination by the other parties' attorneys, re-direct examination, re-cross examination, followed by questions from the hearing officer and assistants. On a few occasions, cross and re-direct and re-cross examination of the protestants' witnesses lasted several hours.

NPC presented testimony regarding its need for water to produce electricity, water rights, monitoring programs, the hydrologic system, and availability of water. FWS presented testimony regarding general FWS mandates, Moapa National Wildlife Refuge, the Moapa dace and other fish species, fish habitat, the Endangered Species Act, and FWS's concerns about the proposed appropriations reducing and/or eliminating fish habitat and populations. An FWS expert also testified regarding the relict leopard frog. Staff from the Overton Wildlife Management Area presented testimony regarding the use of the wildlife management area and the shortages of water in the Muddy River for irrigating the management area.

LAME staff presented testimony regarding the location of LAME, general NPS mandates, the NPS's role in the management of the wildlife management area, LAME mandates, and springs and associated resources.

WRB staff presented testimony regarding NPS water rights and water resources, the hydrologic system, lack of water available for appropriation, and injury to NPS water rights.

MVWD presented testimony regarding (1) its service area, need for additional water, water development in the Moapa area, and the hydrologic system; and (2) its contention that water is available for appropriation. After MVWD concluded its testimony, the parties called rebuttal witnesses for additional testimony. Because the hearing was running behind schedule, the hearing officer ordered that closing statements be submitted, in writing, by late March.

After receiving the transcripts of the hearing, NPS assisted Mr. Palmer in preparing the closing statement. Mr. Palmer's statement concluded that the applications should only be approved if there is water available for appropriation, and if approved, a monitoring plan with an early warning system should be required of MVWD to ensure that senior rights and resources of the agencies are protected.

RULING

The State Engineer issued a ruling in October 1995, approving the applications, subject to a monitoring plan to be prepared by MVWD and agreed upon by the parties. However, MVWD was not allowed to increase its overall appropriation in the area. In other words, its withdrawals from the well, in combination with its existing appropriations, could not exceed the amount already allotted through its existing appropriations. The parties, by law, had 30 days to review the ruling and determine whether or not to file an appeal to the State Engineer's ruling.

WRB, with LAME's concurrence, recommended to Mr. Palmer that the ruling not be appealed. However, several concerns were identified by NPS, FWS, and Mr. Palmer. Mr. Palmer transmitted a letter to the State Engineer to document the concerns and seek clarification. A response to the letter has not yet been received.

MONITORING PLAN

Following the ruling, MVWD prepared a monitoring plan and distributed the same to the protestants for review. NPS reviewed the plan and submitted comments to MVWD. The State Engineer submitted the revised plan to the protestants for additional review. NPS submitted comments to the State Engineer. According to the plan, an annual monitoring report will be prepared by MVWD and submitted to the protestants for review. The final plan has not yet been received.

EPILOGUE

The MVWD case provides an example of a state administrative water right hearing involving several parties. A substantial commitment of time and resources by NPS was required to (1) file protests, (2) review technical information and negotiate with the applicant, (3) prepare for and participate in the hearing, and (4) review the State Engineer's ruling and MVWD's monitoring plan. In addition, NPS will have a continuing obligation to review the annual monitoring.

As the population of the arid West continues to grow, so will competition for scarce water supplies and the potential for out-of-park water withdrawals to affect park water rights and water resources. This same scenario could replay at LAME, or at any number of other parks whose water resources are susceptible to diminishment by out-of-park water withdrawals or surface water diversions. The cost to NPS to protect its water rights and related resources will, in turn, increase. A greater commitment of resources from the Office of the Solicitor to assist NPS will also be required.

While the effort required to participate in a state administrative proceeding is substantial, the consequences of not participating are substantial as well. NPS cannot, in most instances, await the arrival of the

impact before taking action. For example, ground water withdrawals at points distant from a park unit could, in time, reduce spring discharge and the availability of ground water for evapotranspiration within a park unit. A long time, however, would pass before changes attributable to pumping occur.

Once these effects are observed, simply turning off the pumping would not immediately restore the conditions that existed prior to pumping. Reductions would continue for some time before recovery begins. In the meantime, NPS's water rights and water-related resources could be injured. Injury to some water-related resources could be irreversible. Further, by waiting until "after the fact," the NPS would likely carry the burden to prove the cause of the impact and seek a change in the status quo in order to protect its water rights and water-related resources-a daunting and expensive task in most instances.

STREAMFLOW AND RIPARIAN VEGETATION ALONG THE GUNNISON RIVER - BLACK CANYON OF THE GUNNISON NATIONAL MONUMENT

By Mark Wondzell, Hydrologist

Black Canyon of the Gunnison National Monument (BLCA) was established in 1933 to preserve the spectacular canyon formed by the Gunnison River. This park, which encompasses the twelve most impressive miles of the 53-mile Black Canyon, is home to one of the steepest, narrowest canyons in the country. Rim elevations exceed 8,000 feet, and canyon walls, which in places are only 1,300 feet apart, plunge 2,200 vertical feet to the river below. Access through the canyon is extremely difficult and arduous; rock piles, scree slopes, and boulders litter the canyon floor making travel by foot or water craft nearly impossible. Early explorers considered the canyon "inaccessible," and it wasn't until 1901 that the first recorded trip through the canyon was completed -- taking two men 9 days to travel 33 miles. Photographs from early expeditions through the Black Canyon (e.g., Kolb expedition in 1916, Walker expedition in 1934) depict the canyon as barren, inhospitable, and largely devoid of vegetation. Today, however, much of the canyon floor has been colonized by woody riparian vegetation; debris flow deposits and channel banks and bars support both native (e.g., box elder [*Acer negundo*]) and exotic (e.g., saltcedar [*Tamarix ramosissima*]) species of riparian vegetation.

Encroachment of woody vegetation on depositional surfaces throughout the mainstem canyon threatens to modify historically barren landscapes and alter the canyon's dramatic setting. Flow regulation by upstream reservoirs (Taylor Park, Blue Mesa, Morrow Point, and Crystal reservoirs) during the past 25-30 years is believed to be largely responsible for the dramatic increase in both woody and herbaceous riparian vegetation (Lichvar, 1987; Auble, Friedman, and Scott. 1991). Reservoir operations have decreased the magnitude and frequency of spring floods and augmented summer and winter low flows, thus essentially eliminating scouring flows and drought conditions that limited or restricted vegetation establishment during the pre-reservoir period (Auble, Friedman, and Scott. 1991). The elimination or reduction of high scouring flows has increased the occurrence and stability of depositional features such as sediment bars and debris fans. These depositional features serve as ideal germination and establishment sites for many woody riparian species. Once vegetation becomes established, the stream power and shear stress associated with reduced spring flows is insufficient to scour and uproot newly established seedlings. Consequently vegetation establishment is occurring in areas that in the past would not have supported vegetation.

In 1994, WRD contracted scientists from the NBS to identify and characterize the specific hydrologic conditions responsible for germination and establishment of woody riparian plants along the mainstem of the Gunnison River within BLCA. Rather than conducting long-term monitoring to assess the effectiveness of various flow regimes at removing vegetation, the NBS scientists sampled existing vegetation to establish a relation between plant establishment and specific past flow events (either high or low flow events). Age estimates of woody vegetation growing along streambanks and bars provided the basis for identifying those years in which successful riparian vegetation establishment occurred. By correlating tree age (i.e., date of initial establishment) to dates of specific flow events identified in the flow record from a nearby stream gage, they will be able to characterize various aspects of the historic hydrograph that allowed vegetation establishment to occur and to identify the sequence of flows necessary to scour existing vegetation and preclude future vegetation establishment.

Final analyses have yet to be completed; however, preliminary results from this and earlier studies suggest that the establishment and persistence of woody vegetation is determined largely by the sequence of flows rather than any specific measure of the fraction of time that a point on the canyon floor is inundated (i.e., inundation duration). By contrast, earlier studies by these same NBS scientists (Auble, Friedman, and Scott. 1991) have shown that the distribution of <u>herbaceous</u> vegetation is controlled largely by inundation duration. In this earlier study, Auble, Friedman, and Scott (1991) found box elder and saltcedar, the two most abundant riparian tree species within the inner canyon, to be distributed in distinct size/age classes within well-defined elevational zones. The current distribution of box elder seedlings, saplings, and trees along the canyon bottom appears to correlate to periods of extended low flow (1987-1990), a spring flood in 1984, and closure of upstream reservoirs about 1965, respectively. Apparently, the extended low flow period and lack of high flows in the late 1980's created conditions suitable for box elder germination and establishment on surfaces that would otherwise have been kept free of vegetation by peak flows similar to the flow that occurred in 1984.

Results from the 1994 study, combined with information from ongoing sediment mobility studies within the canyon, will enable NBS scientists to estimate the water depth and slope necessary to mobilize sediment particles and thus remove trees from specific channel positions. This information will allow park managers to determine the flows necessary to remove existing or newly established box elder seedlings and saplings and thus maintain and protect the spectacular scenery of Black Canyon of the Gunnison National Monument.

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WATER OPERATIONS BRANCH HIGHLIGHTS

By William L. Jackson, Ph.D Branch Chief

The Water Operations Branch (WOB) continued, in 1995, to provide Servicewide guidance, technical assistance, and special project support in two program areas: hydrology and water quality.

The cornerstone of the Hydrology Program remained direct on-the-ground technical support to parks in the areas of floodplain analysis and compliance, fluvial geomorphology and stream restoration, regulated river management, ground water analysis, and watershed management. Approximately 90 technical assistance issues were addressed in roughly 58 units of the National Park System. Examples of Hydrology Program activities in parks included: analysis of potential hydrogeologic impacts from the proposed New World Mine near Yellowstone National Park; analysis of possible sedimentation impacts associated with the removal of the Mirror Lake Dam in Yosemite National Park; assistance in development of a new water supply at Lyndon Johnson National Historical Park; development of a "mixing cell" computer model to predict the effects of dam removal on downstream suspended sediment concentrations in the Elwha River at Olympic National Park; floodplain analysis for Fort Necessity National Battlefield; assessment of flood and debris flow impacts at Shenandoah National Park; development of a plan for the modification of a hazardous dam and preservation of an associated wetland at Santa Monica Mountains National Recreation Area; and preparation of a report on local hydrogeology and potential threats to ground water resources at Gulf Islands National Seashore. In addition, WOB was actively involved in planning for the 1996 beach/habitat-building flood release from Glen Canyon Dam.

In June, WOB hydrologists were called to Rocky Mountain National Park to assess a potential breach of a "natural" dam on the Fall River, which was created by a recent debris flow on the Roaring Fork River. The assessment resulted in an emergency action to avoid a potentially hazardous situation. The following article by Brian Cluer, Gary Smillie, and Mike Martin further describes this issue.

Water Quality Program activities in 1995 were divided almost evenly between direct park technical assistance and in-house projects of Servicewide scope and significance. Staff assisted on approximately 70 park technical and water quality compliance issues in over 50 parks.

Examples of Water Quality Program activities in parks included: analysis of contamination issues downstream from a uranium tailings pile on the Colorado River near Canyonlands National Park; completion of a report on bacteria contamination in Lake Powell at Glen Canyon National Recreation Area; assistance to Isle Royal National Park in designing a zooplankton and contaminants monitoring program; assistance to Colonial National Historical Park and Padre Island National Seashore in evaluating technical aspects of hydrocarbon contamination of ground water; and technical leadership in the design and implementation of a contracted study to characterize and remediate acid mine drainage at Big South Fork National River. In addition, staff were actively involved in designing and implementing an interdisciplinary/interagency team assessment of stream riparian conditions at Channel Islands National Park. The assessment, which is described in the following article by Gary Rosenlieb, Joel Wagner, and me, was designed to help the park respond to water quality issues stemming from livestock grazing.

The Water Quality Program's Servicewide database project produced 30 park-specific water quality data inventory and analysis reports. This brings to 60 the number of parks that now have a completed water quality database, an overall assessment of the status of park water quality, and an assessment of additional water quality data needs. As part of this effort, a number of park-based data sets were uploaded into the EPA STORET national database.

This year also represented the first full year of water quality monitoring in parks under the cooperative program established between the WRD and the USGS NAWQA Program. Eight park-based studies are now fully operational under this program. A draft summary of program technical accomplishments is available from WRD, and we are actively pursuing options for expanding this program in future years.

Finally, this year saw some staff changes within the Branch. Bill Werrell, hydrogeologist, transferred to Death Valley National Park at the start of the year; Jacquie Nolan, cartographer, transferred to George Washington Memorial Parkway; and Linda Gurunlian, secretary, left the NPS. In January 1996, John Benham, a hydrogeologist from the Bureau of Mines, joined our staff. John has considerable experience in ground water modeling and ground water contamination issues related to mining. He will be working with both our hydrology and water-quality programs.

In all, 1995 continued to be a year of organizational change in the NPS. However, by continuing to work directly with park staff in addressing water resources issues and information needs, our professional staff has remained focused and very productive. It is my sincere belief that the National Park System has benefited by their efforts.



Emergency Measures to Assess and Safeguard an Imminent Dam Failure: Rocky Mountain National Park

By Brian L. Cluer, Hydrologist Gary M. Smillie, Hydrologist

and

Mike W. Martin, Hydrologic Technician

Rocky Mountain National Park contains a number of water development structures, most of which were constructed prior to establishing the park in 1915. A low head earthen fill dam at Lawn Lake high in the head-waters of the Roaring Fork of Fall River was one such structure. Shortly after an annual safety inspection in 1982, seepage and piping began around the outlet works and on July 15, 1982, Lawn Lake Dam failed. The catastrophic release of a large volume of water descended the steep Roaring Fork channel, entraining loose soil, alluvium, and debris. The mixed debris was transported to the mouth of the Roaring Fork canyon where it created a debris fan that dammed Fall River, resulting in a shallow lake and wetland that was named Fan Lake. An outlet channel from Fan Lake developed along the distal margins of the debris fan, where it remained stationary and stable until 1995. The dam failure resulted in three deaths and millions of dollars damage in nearby Estes Park, Colorado. The debris fan and Fan Lake became an interesting and popular interpretive feature in Rocky Mountain National Park.

High runoff in 1995 resulted in the largest Roaring Fork flows since 1982. The high flows transported additional coarse materials to the fan and reworked the Roaring Fork's channel across the fan. A new channel developed, which elevated the Fan Lake outlet and added the Roaring Forks' flow to Fan Lake. These events caused the combined flow of Fall River and the Roaring Fork to exit Fan Lake through a previously unoccupied drainage divide consisting of deep, well developed soil. Erosion of the new outlet channel was observed by park staff who began monitoring its progression.

On July 17, 1995, WOB was asked by park natural resources staff to inspect the situation at Fan Lake. Reconnaissance on July 18 confirmed that a steep headcut had formed in the new outlet channel and that the stream was rapidly down cutting through the deep soil divide that served, along with the fan, to contain Fan Lake. A clear potential existed for the divide to be completely breached, which would result in the rapid release of water from Fan Lake and create a possible flooding hazard downstream and in Estes Park. On July 19, a WOB crew surveyed Fan Lake bathymetry and details of the eroding channel. The resulting topographic map and volume calculations revealed that approximately 70 acre-feet of water were impounded behind the rapidly eroding dam. The lake bed elevation and morphology showed that most of the impounded water would be released when channel erosion progressed to a critical point. Dam failure was imminent. It was realized during the survey that a well-developed sod grass layer on the deep soil was the major factor controlling erosion of the new channel. The sod layer extended to the lake shoreline, which was only about 15 feet from the headcut on July 19. On July 20, WOB staff alerted park staff to the magnitude of the imminent dam failure and estimated that flood hazard conditions existed in the vicinity of Fan Lake and along the stream channel downstream from the fan.

Several alternative actions were discussed. The park chose to excavate a new outlet channel across the margins of the debris fan, in roughly the same location as the pre-1995 outlet channel. The new channel was excavated on July 22. This action stopped flow in the eroding channel, temporarily stabilizing the lake elevation and virtually eliminating the downstream flood hazard until more permanent steps could be taken.

The excavated emergency release channel was located at the margins of the debris fan, because sediment materials that would form the channel bed were coarse enough to resist rapid downcutting, such as was occur-

ring through the deep soil divide. However, the location of the excavated channel at the margins of a debris fan meant that it was susceptible to future debris fan reworking and aggradation. Thus, the emergency action was not considered to be an adequate long-term solution to the situation.

Rocky Mountain National Park presently is evaluating more permanent alternatives for the management of Fall River upstream from its confluence with Roaring Fork. More permanent remedial actions likely will be implemented in the spring of 1996. The close collaboration between WRD and park staff, and the rapid response to the situation, resulted in a potentially dangerous situation being averted.



Photograph of Roaring Fork fan area and Fan Lake on Fall River, July 1995. Lake outlet was along the fan edge in foreground until high flows in 1995 created a new outlet (mid-ground).



Photograph of new eroding channel showing deep soil development and protective sod grass covering.

ASSESSING FUNCTIONALITY IN RIPARIAN-WETLAND AREAS

by Gary Rosenlieb, Hydrologist

Joel Wagner, Hydrologist

Bill Jackson, Branch Chief

Introduction

The many benefits of maintaining healthy riparian-wetland systems have been well documented in the natural resources literature. Healthy riparian systems improve water quality primarily by decreasing sediment transport, rebuilding and replenishing floodplains, reducing streambank erosion, retaining soil moisture, and supporting the development of diverse floral and faunal communities. Riparian areas are also magnets for many competing uses that can conflict with resource protection. Domestic livestock congregate in riparian-wetland areas for forage, water, and shade, streams are dammed or diverted for various uses, and visitors utilize riparian areas for fishing, hiking, boating, and other recreational pursuits.

To properly manage these important resources, park managers must be able to assess riparian-wetland conditions and take steps to resolve any problems. All too often, however, when we are asked to assess the condition or overall health of our riparian areas, we are at a loss to respond with much more than "they look OK to me" or "they look terrible," without a strong rationale for either conclusion. Given our critical role in the conservation of soil, water, vegetation, and wildlife resources, it is essential that natural resource managers have proper tools to evaluate the health of the riparian systems under NPS stewardship, especially when multiple competing uses are present.

Process for Assessing Proper Functioning Condition

A riparian-wetland assessment tool developed recently by the Bureau of Land Management (BLM) for use on their western rangelands and forests was used by WRD staff in 1995 to evaluate riparian conditions in two national parks. This method, called the "Process for Assessing Proper Functioning Condition," is keyed to an interdisciplinary team assessment of riparian area "functionality" rather than a costly, intensive data collection effort. The goal is rapid assessment, which can be applied over large areas relatively quickly. It may be used as a "triage method," which can help separate areas that are functioning well from those in need of more intensive evaluation and management.

The functioning condition of a riparian area refers to the stability of the physical system, which in turn is dictated by the interaction of geology, soil, water, and vegetation. A healthy or stable riparian-wetland area is in dynamic equilibrium with its streamflow forces and channel processes. In a healthy system, the channel adjusts in slope and form to handle larger runoff events with limited perturbation of the channel and associated riparian-wetland plant communities.

It is important to note that evaluation of functional condition is not simply an assessment of the ecological status or seral stage of the vegetation community. Rather, it is based upon the concept that in order to manage for such things as potential natural vegetative communities, it is first necessary to have the basic elements of

and

physical habitat in place and functioning properly. For example, a system recovering from a recent fire can be in an early successional stage but it may still be in properly functioning condition.

Based on assessments of hydrologic, vegetative, and erosional attributes (Table 1) of the riparian area, the method assigns one of the following functionality ratings to a riparian-wetland area:

Proper Functioning Condition: Riparian-wetland areas are functioning properly when adequate vegetation, landform, or large woody debris are present to: (1) dissipate stream energy associated with high waterflows, thereby reducing erosion and improving water quality; (2) filter sediment, capture bedload, and aid floodplain development; (3) improve flood-water retention and ground water recharge; (4) develop root masses that stabilize stream banks against cutting action; (5) develop diverse ponding and channel characteristics to provide habitat and the water depths, durations temperature regimes, and substrates necessary for fish production, waterfowl breeding, and other uses; and (6) support greater biodiversity. Similar factors are assessed when evaluating "lentic" (standing water) wetland areas as explained in DOI-Bureau of Land Management (1994).

Functional - At Risk: Riparian-wetland areas that are in functional condition but an existing soil, water, or vegetation attribute makes them susceptible to degradation. For example, a stream reach whose upper watershed is being overgrazed may have the attributes of a properly functioning system, but it may be poised to suffer severe erosion in a future large storm due to artificially increased runoff upstream.

Nonfunctional: Riparian-wetland areas that clearly are not providing adequate vegetation, landform, or large woody debris to dissipate stream energy associated with high flows and thus are not reducing erosion, improving water quality, etc., as listed above. The absence of certain physical attributes, such as a floodplain where one should be, are indicators of nonfunctioning conditions.

Hydrologic, vegetative, and erosional attributes that are evaluated for riparian-wetland functionality.

HYDROLOGIC

Floodplain inundated in "relatively frequent" events (1-3 years)

Active/stable beaver dams

Sinuosity, width/depth ratio, and gradient are in balance with the landscape setting (i.e., landform, geology, and bioclimatic region)

Riparian zone is widening

Upland watershed not contributing to riparian degradation

VEGETATIVE

Diverse age structure of vegetation

Diverse composition of vegetation

Species present indicate maintenance of riparian soil moisture characteristics

Streambank vegetation is comprised of those plants or plant communities that have root masses capable of withstanding high streamflow events

Riparian plants exhibit high vigor

Adequate vegetative cover present to protect banks and dissipate energy during high flows

Plant communities in the riparian area are an adequate source of coarse and/or large woody debris

EROSION DEPOSITION

Floodplain and channel characteristics (i.e., rocks, coarse and/or large woody debris) adequate to dissipate energy

Point bars are revegetating

Lateral stream movement is associated with natural sinuosity

System is vertically stable

Stream is in balance with the water and sediment being supplied by the watershed (i.e., no excessive erosion or deposition)

Riparian Functionality in the National Parks

In 1995, staff from the WRD, in cooperation with the BLM, U.S. Forest Service, and staffs of Channel Islands National Park (CHIS) and Great Basin National Park (GRBA), utilized the Process for Assessing Proper Functioning Condition to evaluate the functionality of riparian areas on Santa Rosa Island in CHIS and the Lehman, Snake, and Baker Creek drainages in GRBA. These parks provided an ideal testing ground for the assessment process in that they represent differing physiographic and climatic provinces (Southern California coastal zone at Santa Rosa Island as opposed to the montaine basin-range province at GRBA). In addition, both parks are grazed by domestic cattle. Santa Rosa Island is subject to continuous year-long grazing, while a seasonal rest-rotation grazing system is employed at GRBA.

Riparian functionality in both parks was assessed by an interdisciplinary team consisting of a hydrologist/ geomorphologist, botanist, water quality specialist, wetland scientist, and a range management specialist. Examples of "properly functioning condition," "functional - at risk," and "nonfunctional" riparian areas in these parks are provided below.

Santa Rosa Island - Cañada Lobos

Properly Functioning Condition

Cañada Lobos, located within a cattle exclosure, represents a riparian-wetland area that was rated to be in "proper functioning condition" by the interdisciplinary team. The riparian area contains a diverse and vigorous herbaceous and woody vegetative community that protects the banks by dissipating stream energy associated with floodflows, thereby reducing erosion and improving water quality. The herbaceous plant community, consisting primarily of Mexican rush and saltgrass, has developed root masses that have stabilized the stream vertically and horizontally, filtered sediment, and captured and retained bedloads that aid floodplain development. The process has created diverse channel characteristics and promotes greater biodiversity.



Cañada Lobos (CHIS)

Santa Rosa Island - Windmill Canyon

Functional - At Risk

This segment of Windmill Canyon is grazed by horses but not cattle. The establishment of willow provides the capability to dissipate some stream energies and trap sediment that aids in floodplain development and improves floodwater retention. However, in spite of the presence of some attributes of functionality, this segment was rated as "functional - at risk" because certain vegetative and hydrologic attributes make it susceptible to degradation. For example, herbaceous bank cover is completely lacking, thus making the bank more susceptible to erosion and lateral cutting. The transport of large quantities of bed and suspended sediment loads to the segment from unprotected upper watersheds also prevents this stream segment from obtaining full proper functionality.



Windmill Canyon (CHIS)

Santa Rosa Island - Old Ranch Canyon

Nonfunctional

Old Ranch Canyon, subject to continuous year-long cattle grazing, is a "nonfunctional" riparian-wetland area. Neither adequate vegetation nor appropriate landform is present to dissipate stream energies associated with high flows. During floods, the stream channel migrates, erosion continues, sediment is not filtered, water quality is altered, and floodwater retention and ground water recharge are limited. The channel is not providing ponding or channel characteristics that provide habitat conditions necessary for enhancing biodiversity.



Old Ranch Canyon (CHIS)
Great Basin National Park - Lower Snake Creek

Functional - At Risk

Karst geology and hydrology as well as diversion by man are important features that dictate the "functional - at risk" rating for this riparian reach. Prior to the diversion activity, upper Snake Creek lost almost all of its flow to the karstic aquifer that underlies downstream portions of the creek. In order to "harvest" additional water from the drainage, local irrigators constructed a pipeline to divert water from upper Snake Creek, by-pass the karst area, and then release it to lower Snake Creek for transport to the irrigator's land. The diversion has most likely impacted the lower reach by increasing flood flows in a channel that had evolved in response to smaller flows. The photo below shows one of several headcuts observed in lower Snake Creek which, though temporarily stabilized by woody debris, could continue cutting in response to large flows. The headcuts are lowering the base level of the channel by 2 to 3 feet in some areas. As a result, woody and herbaceous riparian-wetland vegetation in these segments are in a downward trend.



Lower Snake Creek (GRBA)

Support Provided to Regions, Parks, and Other National Park Service Organizational Units

ALASKA FIELD AREA



Planning and Evaluation Branch

- * Prepared an analysis of the effects of HR 961 (Amendments to the Clean Water Act) on NPS wetland resources in Alaska. The analysis showed that if HR 961 becomes law, approximately 10 million of the 13 million acres of wetlands in Alaska NPS units would no longer be regulated under Section 404 of the Clean Water Act.
- * Met with representatives of the BLM to review draft protocols and strategies for conducting aquatic resource inventories and establishing a database for Alaskan watersheds.

ALASKA CLUSTER

Planning and Evaluation Branch

Denali National Park

Provided technical review of water resources section of RMP.

Glacier Bay National Park and Preserve

* Consulted with Denver Service Center (DSC) staff regarding wetland issues in park planning.

Kenai Fjords National Park

- * Consulted with DSC staff regarding wetland issues in park planning.
- * Reviewed and commented on draft DCP/EA (Front Country).

Lake Clark National Park and Preserve

* Reviewed and commented on a feasibility study for construction of the Johnson River Mine haul road.

Yukon-Charley Rivers National Preserve

* Provided technical assistance for and concurred with an Executive Order 11990 "Wetlands Statement of Findings" for all-terrain vehicle (ATV) access to the Hutchinson inholding on Woodchopper Creek.

Water Operations Branch

Denali National Park and Preserve

- * Issued a Baseline Water Quality Data Inventory and Analysis Report documenting water quality data retrievals from six EPA databases.
- * Provided information on tire inflation in heavy trucks in terms of sediment going into adjacent streams. Provided advice on studies to document effects of dust pallatives on park streams.

Gates of the Arctic National Park and Preserve

- * Created maps in support of a report issued for Gates of the Arctic National Park and Preserve.
- * Completed bankfull discharge estimations of Kobuk River tributaries.

Glacier Bay National Park and Preserve

* Issued a Baseline Water Quality Data Inventory and Analysis Report documenting water quality data retrievals from six EPA databases.

Lake Clark National Park and Preserve

- * Reviewed EPA's stormwater regulations for the Johnson River Mine.
- * Provided consultation related to floodplain compliance for a new park facility located in a tsunami zone.

Wrangell - St. Ellias National Park and Preserve

- * Provided coordination and field advice for the WRD funded project related to the outburst flooding from Kennecott Glacier.
- * Performed survey of glacial lake basin using existing control and performed geomorphic stability assessment for an area of glacial deposits.

Yukon-Charley Rivers National Preserve

* Issued a Baseline Water Quality Data Inventory and Analysis Report documenting water quality data retrievals from six EPA databases.

INTERMOUNTAIN FIELD AREA



Planning and Evaluation Branch

- * Co-presented a 3-day "Water Resources Planning Workshop" attended by natural resource management specialists from Great Sand Dunes National Monument, Theodore Roosevelt National Park, Wind Cave National Park, Canyonlands National Park, Zion National Park, Mesa Verde National Park, and Fossil Butte National Monument.
- * Participated in a "natural resource function analysis workshop" as part of the Intermountain Field Area re-structuring/re-engineering efforts.

COLORADO PLATEAU CLUSTER

Planning and Evaluation Branch

Dinosaur National Monument

* Reviewed and commented on draft RMP.

Fossil Butte National Monument

- * Reviewed and commented on water-related RMP project statements.
- * Provided assistance with wetland delineation, Clean Water Act compliance, and riparian restoration along Chicken Creek.

Glen Canyon National Recreation Area

- * Provided technical assistance and policy guidance to park staff in the development of a cooperative FMP with the States of Arizona and Utah.
- * Participated in a stepdown planning workshop for updating the park's Natural and Cultural Resource Management Plan.

Grand Canyon National Park

- * Reviewed draft GMP, and assisted Denver Service Center (DSC) in incorporating comments pertinent to water resources.
- * Assisted DSC in developing floodplains Statement of Findings for the Grand Canyon GMP.
- * Reviewed and commented on draft RMP.
- * Participated in Sustainable Design Workshop for Grand Canyon Village.

Water Operations Branch

Arches National Park

- * Evaluated issues related to final reclamation of Atlas mill uranium tailings.
- * Led interagency DOI group that assessed riverine issues downstream of the Atlas uranium mill tailings and suggested minimum study requirements.
- * Outlined needs for additional data related to staff inhalation of hazardous respirable particles associated with uranium mill tailings.

Aztec Ruins National Monument

* Assessed the impact of adjacent irrigation overflow (and underflow) on the park's cultural resources.

Canyonlands National Park

- * Analyzed spring water quality data obtained from the park and the State of Utah and prepared a technical report.
- * Provided training for park staff regarding hydrologic and geomorphic analysis of flood potential associated with back-country campsites.
- * Reviewed progress reports of aquatic macroinvertebrate protocol development studies for the Green and Colorado Rivers and recommended acceptable options for rapid bioassessment methods.

Capitol Reef National Park

- * Issued a Baseline Water Quality Data Inventory and Analysis Report documenting water quality data retrievals from six EPA databases.
- * Facilitated floodplain analysis with the park hydrologist including floodplain surveying and hydraulic modeling.

Chaco Culture National Historical Park

- * Reviewed ground water monitoring plan.
- * Reviewed draft RMP and assisted in the preparation of a Project Statement regarding stream bank erosion threatening cultural sites.

Colorado River Parks

- * Represented WRD at public meeting of Grand Canyon Trust stakeholders in Denver, Colorado.
- * Provided technical advice on use of HEC-2 in hydraulic analysis and application to fish habitat evaluations.
- * Represented NPS in the Colorado River Annual Operating Planning Process and assisted in developing terms for an FY96 controlled flood in Grand Canyon NP and Glen Canyon National Recreation Area.
- * Attended and reported on Western Area Power Administration's (WAPA's) public meeting on integrated resource planning process that affects long-term electrical infrastructure of the Colorado Plateau.
- * Attended and reported on a public meeting of WAPA's replacement process of electrical resources for peaking power from Glen Canyon Dam.
- * Developed a briefing statement for new associate Director of Resources on issues surrounding the Colorado River Storage Project.

Dinosaur National Monument

- * Repeated annual survey of Green River bank configuration to estimate erosion rate.
- * Performed additional modeling of flood hazards at proposed campground at Echo Park.
- * Evaluated riparian area restoration project in Hog Canyon.
- * Attended Flaming Gorge Annual Operations Planning meeting in Heber, Utah.
- * Provided analyses of rapid bioassessment guide being considered for Park use.
- * Provided comments to park staff on WAPA's Salt Lake City Area Integrated Projects Electric Power Marketing Draft EIS.
- * Provided technical assistance for sediment sampling protocols on the Green River and installed and operated a stage recorder at Gates of Ladore.

Fossil Butte National Monument

- * Provided direction and guidance to Superintendent and staff for watershed management, erosion control, and stream restoration issues.
- * Reviewed and provided extensive revision for Project Statements for the park's RMP.
- * Prepared, and updated extensively, a plan for the restoration of Chicken Creek watershed.
- * Coordinated the utilization of a Coop Student for seasonal work at the park conducting a masters project on geomorphic restoration of Chicken Creek.
- * Documented with extensive photographs and captions, the runoff and erosion processes during snowmelt in gullies within the park.
- * Assisted park staff in preparing for data collection during the 1995 field season and installed and debugged water-measuring instruments.
- * Conducted a profile survey of 5 miles of eroded stream channel identifying head cuts, old stock dams, and stream gradients.

Glen Canyon National Recreation Area

- * Issued a Baseline Water Quality Data Inventory and Analysis Report documenting water quality data retrievals from six EPA databases.
- * Uploaded park-collected bacteriological water quality data to STORET.
- * Attended a meeting on interagency long-term monitoring and research at Lake Powell, and prepared a draft Memorandum of Understanding for cooperation and data sharing among agencies.

- * Analyzed bacteria water quality data obtained from the park and prepared a technical report.
- * Participated in stepdown research planning meeting at the park and provided summaries of differences between risk assessment and natural resource damage assessment.
- * Assessed field conditions for WRD funded riparian grazing impact study.
- * Served as project coordinator for WRD funded investigation "Recovery of Riparian Communities Following Removal of Grazing".

Grand Canyon National Park

- * Uploaded park-collected water quality data to STORET in preparation for producing a Baseline Water Quality Data Inventory and Analysis Report.
- * Reviewed and commented on proposal to develop a ground water supply at a new development south of Tusayan.
- * Reviewed and commented on proposal for monitoring water quality from springs and investigating possible ground water flow paths.
- * Reviewed Integrated Colorado River Flood Proposal prepared by the Glen Canyon Environmental Studies Program.
- * Reviewed draft final report, "Monitoring the Effects of Interim Flows From Glen Canyon Dam on Sandbar Dynamics and Campsite Size in the Colorado River Corridor, Grand Canyon National Park, Arizona."
- * Reviewed final report on the effects of Glen Canyon Dam on campsites in Grand Canyon.
- * Submitted Final Report, "Analysis of Aerial Photography of Glen Canyon Dam Test Flows, 1990-1991."
- * Reviewed and sent formal comments to the Bureau of Reclamation on GCFLOW7, a computer model simulating the operation and associated revenues of Glen Canyon Dam.
- * Reviewed and formally commented on a Glen Canyon Environmental Studies (GCES) report on followup monitoring of the interim flows.
- * Reviewed and commented on USGS report on water table monitoring in three beaches.

Mesa Verde National Park

- * Assisted park with automation of past water quality data, reviewed efforts to evaluate sediment impacts on the Mancos River from gravel mining, and evaluated impacts from sewage wastewater lagoons and conveyance pipelines in the park.
- * Made a site visit to the area proposed for a new visitor center and provided advice regarding flood and other geologic hazards.

Navajo National Monument

* Evaluated the effects of grazing and gully erosion in and around the park and submitted monitoring recommendations involving sensitive inter-government relationship with the Navajo Tribe.

Pipe Spring National Monument

- * Provided monthly assistance with precipitation and spring flow data on the longest continuous flow record in the area.
- * Apprised the Superintendent regarding the utility of a USGS study proposal to chemically fingerprint water from the springs and nearby wells.

Zion National Park

- * Completed channel cross-section survey using existing control, merged data into existing Autocad file, completed hydraulic modeling of natural system, and analyzed the effect of development on floodplain.
- * Provided continued assistance in the form of hydraulic modeling and floodplain guideline interpretation for a concessionaire development on Birch Creek.
- * Provided detection limit and lab recommendations for metals analyses.
- * Reviewed plans for a proposed major change to visitor-use patterns in the park.
- * Provided on-site advice regarding placement of residential structures near the floodplain of North Fork Virgin River.
- * Provided advice related to the impacts to the North Fork Virgin River from proposed road reconstruction following a large landslide in April 1995.

Water Rights Branch

Canyonlands National Park

* Submitted water user's claim.

Capitol Reef National Park

- * Assisted with development of water-supply well.
- * Conducted adjudication studies.
- * Coordinated with contractor for review of adjudicated water right claims.

Colorado National Monument

- * Advised park staff on Colorado regulations for plugging wells and provided funding for plugging two wells.
- * Reviewed report regarding adjacent BLM wilderness study area.

Grand Canyon National Park

- * Continued South Rim spring monitoring program.
- * Assisted with legal/technical assessment of Canyon Forest Village development proposal.
- * Monitored progress of the Little Colorado River adjudication.
- * Conducted technical reviews of proposed settlement issues for Department of Justice.
- * Initiated USGS review of existing sediment data; conducted research of historical documents for Blue Springs and park boundary locations for Little Colorado River adjudication.

Hubbell Trading Post National Historical Site

* Monitored progress of Little Colorado River adjudication.

Mesa Verde National Park

- * Monitored progress of adjudication for Water Division 7.
- * Assisted legal counsel with preparation of draft decree.
- * Confirmed springs for inclusion in draft decree.

Petrified Forest National Park

* Monitored progress of Little Colorado River adjudication.

Pipe Spring National Monument

* Assisted with request for information concerning the water use agreement between the NPS, local cattlemen, and the Kaibab Indian Tribe.

Sunset Crater Volcano National Monument

* Monitored progress of Little Colorado River adjudication.

Timpanagos Cave National Monument

* Assisted in negotiations with the Utah State Engineer's Office to resolve reserved water right claims for the park.

Walnut Canyon National Monument

- * Cooperatively initiated a crest-stage gaging program to determine level of high flows in Walnut Canyon National Monument.
- * Continued water rights negotiations with the City of Flagstaff, Arizona.
- * Continued support to Department of Justice and Solicitor's Office on Little Colorado River settlement issues.
- * Monitored progress of the Little Colorado River adjudication.
- * Prepared final report on impacts of upstream reservoirs on riparian vegetation in Walnut Canyon.
- * Prepared an amendment of claim for Little Colorado River adjudication.
- * Prepared draft report assessing the quantities of water needed to fill and maintain pools on the valley floor.

Wupatki National Monument

* Monitored progress of the Little Colorado River adjudication.

Zion National Park

- * Conducted technical discussions with the state of Utah as part of negotiations to settle NPS reserved water right claims in Virgin River adjudication.
- * Assisted Department of Justice with presentation to the Utah State Engineer, Utah Attorney General's Office, and Washington County Water Conservation District regarding reserved water rights for the park.
- * Reviewed, edited, and coordinated delivery of draft study reports.
- * Provided status briefings for park management.
- Monitored Virgin River basin water resource management issues, including participation in Southern Utah Planning Authorities Council and Virgin River Basin Federal Land Managers meetings.
- * Prepared report on age and origin of water issuing from springs in hanging gardens.
- * Provided USGS with summary of streambed sediment data.
- * Completed "Geomorphic History of the Virgin River in the Zion National Park Area, Southwest Utah" by Hereford, Jacoby, and McCord.

ROCKY MOUNTAIN CLUSTER

Planning and Evaluation Branch

Bighorn Canyon National Recreation Area

* Assisted park in the completion of the WRD funded project for development of a WRMP.

Curecanti National Recreation Area

* Assisted park in the completion and publication of the Curecanti National Recreation Area WRSR.

Great Sand Dunes National Monument

- * Scoped study needs related to effects of San Luis Valley water use, climate change, and other factors on disappearance of interdunal wetlands.
- * Provided assistance with Clean Water Act compliance concerning vehicles driving through a stream and the maintenance of road crossings.

Rocky Mountain National Park

- * Provided technical assistance regarding impacts of the Glacier Creek Livery on wetlands and streams. Met with park staff, the Corps of Engineers, and consultants for the livery concessioner to make a final determination of jurisdictional wetlands on the site and the regulations applicable to them.
- * Reviewed and commented on draft reports presenting results from the WRD-funded project "Colorado River Headwaters Wetlands Restoration."
- * Reviewed and commented on draft DCP/EA (Lily Lake, Longs Peak, Wild Basin).

Water Operations Branch

Bighorn Canyon National Recreation Area

- * Water quality data were retrieved from STORET to support WRMP activities.
- * Completed floodplain survey and subsequent hydraulic modeling for existing campgrounds along Trail Creek.
- * Completed final report regarding sedimentation analysis at Horseshoe Bend and drafted briefing statement for public release.
- * Supplied basic data and review comments for WRMP.
- * Reviewed mercury levels found in initial studies of fish.
- * Reviewed FWS proposal to study contaminants of concern at the park.

Black Canyon of the Gunnison National Monument

* Served as project coordinator for the WRD funded project to investigate changes in the geomorphology of the Black Canyon related to the presence of the Aspinall Unit upstream.

Curecanti National Recreation Area

- * Reviewed WRSR.
- * Analyzed water quality data obtained from the park and prepared a technical report.
- * Provided review comments for the draft WRMP.

Devils Tower National Monument

- * Performed an assessment of the hydraulic function of exiting rip-rap and researched and summarized the riparian conditions necessary to support two species of riparian vegetation.
- * Provided information on tire inflation in heavy trucks versus sediment going into adjacent streams.

Glacier National Park

* Provided an inventory of flood conditions at nearly all developed locations in the park in support of the new GMP.

Grand Teton National Park

* Attended meeting to discuss NAWQA monitoring on the Snake River, USGS ground water monitoring adjacent to the park's wastewater lagoons, and a project proposal for backcountry water quality monitoring.

Grant-Kohrs Ranch National Historical Site

- * Provided technical review and comments on a City of Deer Lodge proposal to utilize park lands for a wastewater spray irrigation treatment process.
- * Reviewed remedial investigation and risk assessment reports, coordinated assistance from FWS and Bureau of Land Management, and reviewed additional environmental reports.

Great Sand Dunes National Monument

* Created maps in support of the Great Sand Dunes WRSR.

Rocky Mountain National Park

- * Conducted channel morphology and lake bathemetry survey at Fan Lake, performed "dam break" scenarios for flood wave routing to downstream campgrounds, and conveyed preliminary conclusions to park staff.
- * Conducted survey of Boulder Creek and Glacier Creek stream channels in area of concessionaire; performed hydraulic modeling of regulatory floods.
- * Conducted field inspection of Glacier Creek Stables to assess whether existing conditions met designed wetland criteria.

Yellowstone National Park

- * Analyzed water quality data collected at Bridge Bay Marina and other recreation sites in Yellowstone Lake and prepared a technical report.
- * Created maps in support of Bridge Bay Marina water quality report.
- * Provided analysis of possible hydrogeologic impacts from the proposed New World Mine near Cooke City, Mont. and performed water balance analysis of potential impacts to ground water.
- * Provided assistance regarding effect of culvert elevations and upstream wetlands on Tangle Creek as part of the road rebuilding project between Madison Junction and Old Faithful.
- * Provided assistance on a Freedom of Information Act request for the status of National Pollutant Discharge Elimination System (NPDES) discharge permits in the park.
- * Examined preliminary results of ecotoxicology work on Soda Butte Creek waters and soils performed by NBS and Montana State University in the park.
- * Provided flow information and interpretive text for NBS researcher conducting studies related to McLaren tailings pile near Cooke City, MT.

Water Rights Branch

Bent's Old Fort National Historic Site

* Provided guidance on ground water use reports and response to plan of augmentation proposal.

Bighorn Canyon National Recreation Area

- * Assisted with RMP.
- * Completed a water rights compact with Montana Reserved Water Rights Compact Commission for adjudication of Basin 43P.

Black Canyon of the Gunnison National Monument

- * Assisted park with negotiations for a contract and in the implementation of interim flow delivery contract.
- * Conducted studies to quantify reserved water right.
- * Coordinated interim flow releases according to preliminary Aspinall Flow Delivery Contract.
- * Reviewed water rights aspect of proposed legislation redesignating the monument as a national park.

Curecanti National Recreation Area

- * Assisted with WRSR.
- * Reviewed proposed legislation to establish Curecanti National Recreation Area.

Florrissant Fossil Beds National Monument

- * Obtained permit from the State Engineer for the Sawmill Trail Well.
- * Provided technical review of draft Water Right Decree.

Glacier National Park

- * Evaluated water right applications for Montana Water Rights Compact.
- * Continued analysis of hydrologic data for use in hyphorheic organism study.

Grant-Kohrs Ranch National Historic Site

* Monitored progress of Montana adjudication for Basin 76G.

Great Sand Dunes National Monument

- * Funded monitoring programs.
- * Reviewed report regarding adjacent BLM wilderness study area.
- * Advised regarding acquisition of water rights for interdunal ponds.
- * Reviewed and revised water rights section of draft WRMP.
- * Provided information on proposal to sell San Luis Valley water rights to downstream appropriators.

Little Bighorn Battlefield National Monument

* Completed a water rights compact with Montana Reserved Water Rights Compact Commission for adjudication of Basin 430.

Rocky Mountain National Park

- * Reviewed water right filings prepared by park staff.
- * Reviewed hydrologic data and prepared summary of data collected as part of adjudication studies.
- * Reviewed proposed exchange agreement for Eureka Ditch water right.
- * Provided comments on proposed wilderness legislation.
- * Assisted Department of Justice with negotiated settlement of the application for finding of reasonable diligence for Mirror Lake water right.
- * Assisted with study of water diversion impacts at Upper Beaver Meadows.
- * Prepared report on estimated amount of water captured by the Eureka Ditch.

Yellowstone National Park

- * Assisted Department of Justice in supporting NPS claims in the Snake River Basin adjudication.
- * Reviewed preliminary draft EIS for proposed New World Mine.
- * Continued tracking of non-NPS claims and objections in Montana adjudication Basin 43B.
- * Evaluated water right applications for the Montana Compact water rights.
- * Assisted park staff in responding to a request by Gardiner, MT to develop a well within park boundary.
- * Assisted park staff in briefing World Heritage Committee representatives on water rights issues surrounding the park.
- * Made presentations at the Soda Butte Creek Conference concerning the explanation of the water rights compact and stream flow data collected for Soda Butte Creek.
- * Initiated preparation of study plan to describe hydrologic system of the Soda Butte Creek drainage upstream from park boundary.
- * Provided hydrologic assistance regarding the New World Mine and water rights.
- * Developed and implemented a cooperative agreement with the Montana Dept. of Natural Resources Conservation to administer the Yellowstone Controlled Ground Water Area.

Multi-Park

- * Responded to Montana temporary preliminary decrees.
- * Reviewed monthly Colorado Water Court resumes.

SOUTHWEST CLUSTER

Planning and Evaluation Branch

Amistad National Recreation Area

* Provided assistance with literature review and compliance issues concerning using wetlands for wastewater treatment.

Bandelier National Monument

* Reviewed and commented on the draft DCP for Frijoles Canyon and Tsankawi.

Big Bend National Park

- * Provided water resources issues overview to DOI Border-related Water Resource Issues Committee.
- * Provided technical guidance and review on draft WRMP.
- * Co-authored a paper entitled "Riparian Wetlands and Visitor Use Management in Big Bend National Park, Texas" presented at a symposium on desired future conditions for southwestern riparian ecosystems.
- * Coordinated with FWS and Texas Parks and Wildlife to assess potential impacts on fish and wildlife resources from channelization and other water management projects.

Carlsbad Caverns National Park

* Reviewed and commented on a draft GMP.

Chickasaw National Recreation Area

* Assisted park staff in identifying a contractor to implement a WRD funded project to develop a WRMP.

Chiricahua National Monument

* Provided water resources issues overview to DOI Border-related Water Resource Issues Committee.

Coronado National Monument

* Provided water resources issues overview to DOI Border-related Water Resource Issues Committee.

Fort Bowie National Historic Site

* Provided water resources issues overview to DOI Border-related Water Resource Issues Committee.

Pecos National Historical Park

- * Oversaw the completion of WRMP.
- * Provided DSC with a technical review of the Pecos GMP/DCP.

Organ Pipe Cactus National Monument

* Provided water resources issues overview to DOI Border-related Water Resource Issues Committee.

Saguaro National Park

* Provided water resources issues overview to DOI Border-related Water Resource Issues Committee.

Tumacacori National Historical Park

* Provided water resources issues overview to DOI Border-related Water Resource Issues Committee.

White Sands National Monument

- * Provided technical consultation on a proposal to introduce the white sands desert pupfish into artificial, culturally significant water-holes within the monument.
- * Provided assistance to park staff in developing a position description and announcement for a resource management specialist with substantial water responsibilities.

Water Operations Branch

Amistad National Recreation Area

* Consulted with DSC staff on how to ensure compliance with NPS Floodplain Management Guidelines for a new park development and assisted in the development of draft Statement of Findings.

Bandelier National Monument

* Provided invertebrate monitoring advise to the park.

Big Bend National Park

- * Issued a Baseline Water Quality Data Inventory and Analysis Report documenting water quality data retrievals from six EPA databases.
- * Completed topographic survey of the Panther Junction housing area including channel morphology, sedimentology, and geomorphic stability assessment and performed hydraulic modeling and completed final detailed report.
- * Reviewed the report "Binational Study Regarding the Presence of Toxic Substances in the Rio Grande/Rio Bravo and its tributaries along the boundary portion between the United States and Mexico" and provided comment to park staff.

Carlsbad Caverns National Park

* Provided advice on hydrogeology and potential for alternative ground water sources as a potable supply for the park.

Chiricahua National Monument

* Provided advice regarding the installation of a flash flood warning system.

Coronado National Memorial

- * Provided assistance in evaluating potential for ground water depletion and impacts on park resources from development outside the park.
- * Provided advice on design of water level monitoring program.

Lyndon B. Johnson National Historical Park

- * Provided advice on problems with an existing water supply well, assisted park staff with permitting and contract specifications for a new well, and tested new well.
- * Provided information on carbaryl and benomyl risks to park.

Montezuma Castle National Monument

- * Issued a Baseline Water Quality Data Inventory and Analysis Report documenting water quality data retrievals from six EPA databases.
- * Provided benchmark information for carbon dioxide levels in water.
- * Reviewed a USGS study on ground water resources near the park that would affect Montezuma's Well.

* Coordinated the submittal of a formal response to USGS on publishing a report on their ground water investigations.

Pecos National Historic Park

- * Issued a Baseline Water Quality Data Inventory and Analysis Report documenting water quality data retrievals from six EPA databases.
- * Contributed to and reviewed WRMP.
- * Assisted in developing a water quality monitoring project for the Pecos River.
- * Uploaded park-collected water quality data to STORET.
- * Created maps for the WRMP.
- * Reviewed scoping report and provided contaminants data analysis information.

Petroglyphs National Monument

- * Provided a review of a letter from the park to city management addressing issues surrounding urban runoff impacting park resources.
- * Assisted park staff on technical material regarding 100-year flood calculations in a developer's plan for Piedras Marcadas Arroyo.
- * Reviewed a proposal from the Superintendent to the flood control district about accepting historical flows through the park.
- * Assisted the park in evaluating watershed development proposals and flood-control alternatives affecting lands adjacent to the park.
- * Provided technical comments on a detention pond proposal affecting lands on the south side of the park adjacent to the Ladera watershed.

San Antonio Missions National Historical Park

* Provided technical review and recommendations for the issuance of an NPDES permit at Brooks Air Force Base.

Water Rights Branch

Big Bend National Park

* Advised park management on possible effects and limitations of purchasing water rights to improve stream flows in the Rio Grande River.

Capulin Volcano National Monument

* Finalized report of water rights and alternative actions to protect NPS rights.

Chickasaw National Recreation Area

* Assisted in requesting assistance from Bureau of Reclamation to replace and plug Vendome well.

Coronado National Memorial

- * Monitored progress of Lower Gila River adjudication.
- * Reviewed water use and needs, and assisted Department of Justice with the preparation of abstracts, settlement language, and responses for Status Conferences with Special Master.

Fort Bowie National Historic Site

- * Monitored progress of Upper Gila River adjudication.
- * Continued negotiation for withdrawal of protests for water right filings for Apache and Mine Tunnel Springs.

Montezuma Castle National Monument

* Monitored progress of Verde River adjudication.

Organ Pipe Cactus National Monument

- Reviewed final draft of USGS's report on the hydrology of Quitobaquito Springs and La Abra Plain.
- * Made field reconnaissance of Quitobaquito Springs and park monitoring program.

Pecos National Historical Park

* Assisted with WRMP scoping.

Saguaro National Park

- * Monitored progress of San Pedro and Santa Cruz River adjudications.
- * Initiated review and established water right records for newly acquired lands.
- * Reviewed water uses and needs, and assisted Department of Justice with the preparation of abstracts, settlement language, and responses for status conferences in the Special Master.

San Antonio Missions National Historical Park

* Assisted the Field Solicitor with plans to re-establish the San Juan Ditch Corporation.

Tonto National Monument

* Monitored progress of Salt River adjudication.

Tuzigoot National Monument

* Monitored progress of Verde River adjudication.

MIDWEST FIELD AREA



GREAT LAKES CLUSTER

Planning and Evaluation Branch

Cuyahoga Valley National Recreation Area

* Reviewed a draft study proposal by scientists at the University of Akron to conduct an angler use survey.

Isle Royale National Park

* Provided technical consultation and coordination with FWS in the development of a coaster brook trout restoration project.

Pictured Rocks National Lakeshore

- * Provided technical review of a draft FMP and participated in a joint meeting between park resource management staff and fishery biologists with the Michigan Department of Natural Resources (DNR) for the purpose of implementing portions of the cooperative FMP.
- * Provided technical review and comments on a WRD project to assess walleye habitat in Beaver Lake.

St. Croix National Scenic Riverway

- * Participated in an interagency effort with the State of Wisconsin DNR and State of Minnesota DNR to develop a cooperative FMP for the St. Croix and Namekagon Rivers.
- * Participated in an Issue Scoping Workshop to initiate the development of a WRMP.

Water Operations Branch

Cuyahoga Valley National Recreation Area

- * Issued a Baseline Water Quality Data Inventory and Analysis Report documenting water quality data retrievals from six EPA databases.
- * Uploaded park-collected water quality monitoring data to STORET.

George Rogers Clark National Historical Park

* Provided review and consultation related to plans for river bank stabilization.

Indiana Dunes National Lakeshore

- * Issued a Baseline Water Quality Data Inventory and Analysis Report documenting water quality data retrievals from six EPA databases.
- * Assisted park and NBS staff in wetland restoration study by providing electronic recording equipment and with data collection, downloading, and management.

Isle Royale National Park

- * Issued a Baseline Water Quality Data Inventory and Analysis Report documenting water quality data retrievals from six EPA databases for Isle Royale National Park.
- * Helped develop plans for zooplankton and contaminants monitoring.

Mississippi National River & Recreation Area

- * Issued a Baseline Water Quality Data Inventory and Analysis Report documenting water quality data retrievals from six EPA databases.
- * Participated in a meeting held by Minnesota Natural History Museum to discuss impacts of a proposed new museum in the floodplain and ideas for interpretive exhibits regarding the Mississippi River floodplain.

Pictured Rocks National Lakeshore

- * Issued a Baseline Water Quality Data Inventory and Analysis Report documenting water quality data retrievals from six EPA databases.
- * Uploaded archival (analog) water quality data to STORET.

St. Croix National Scenic Riverways

* Assisted the DSC in development of river and floodplain information for inclusion in park GMP.

Voyageurs National Park

* Issued a Baseline Water Quality Data Inventory and Analysis Report documenting water quality data retrievals from six EPA databases.

GREAT PLAINS CLUSTER

Planning and Evaluation Branch

Buffalo National River

- Participated in meetings with Arkansas Game and Fish Commission to develop a cooperative channel catfish restoration project and arranged for technical support for the project from Mammoth Springs National Fish Hatchery.
- * Reviewed and commented on draft RMP.

Fort Union Trading Post National Historic Site

* Provided assistance with Clean Water Act compliance for a downstream irrigation intake with instream water diversion structures.

Mount Rushmore National Memorial

* Reviewed and commented on draft RMP.

Scotts Bluff National Monument

* Provided DSC with a technical review of the GMP Task Directive.

Theodore Roosevelt National Park

* Assisted park staff in developing a project statement for the park's WRSR.

Water Operations Branch

Badlands National Park

* Performed field reconnaissance of proposed development sites and completed ground water development analysis.

Buffalo National River

- * Water quality data were downloaded from STORET to determine whether the park's water quality monitoring data exist in STORET.
- * Provided contacts for rapid bioassessment work and provided a summary of biological criteria issues.
- Provided study plan review and guidance on rapid bioassessment protocols.
- * Reviewed and commented on technical watershed related reports produced by park staff.

Denver Service Center

* Provided interpretation of the stormwater regulations for a construction project in Arizona.

Herbert Hoover National Historic Site

* Provided comments on the park's draft Cultural Landscape Report about the lack of references to a park funded flood study.

* Coordinated with System Support Office (SSO) staff on formal approval of a floodplain study conducted by the USGS.

Jefferson National Expansion Memorial

* Provided advice on potential ground water supplies for irrigation of lawns and grounds.

Niobrara National Scenic Riverway

- * Issued a Baseline Water Quality Data Inventory and Analysis Report documenting water quality data retrievals from six EPA databases.
- * Reviewed and prepared formal comments on the draft Niobrara Special Resources Study.

Missouri National Recreational River

* Provided technical interpretation to park staff of alternatives proposed by the Army Corps of Engineers in their Missouri River Master Control Manual EIS.

Ozark National Scenic Riverways

- * Reviewed USGS annual report on monitoring activities in contributing watersheds.
- * Uploaded park-collected water quality data to STORET in preparation for producing a Baseline Water Quality Data Inventory and Analysis Report.
- * Provided review and comments on the State of Missouri's antidegradation policy and regulations.

Theodore Roosevelt National Park

- * Provided guidance on the monitoring of brine spills.
- * Provided recommendations to park staff for laboratory and field strategies of dealing with oil and brine contamination, and provided rapid bioassessment recommendations.

Water Rights Branch

Niobrara National Scenic Riverway

* Reviewed GMP.

Scotts Bluff National Monument

* Provided assistance to determine options for use or sale of water rights.

NATIONAL CAPITAL FIELD AREA



Planning and Evaluation Branch

* Participated in a joint meeting of natural resource and cultural resource staffs of the National Capital Field Area and Northeast Field Area involved in the interagency efforts to manage the Chesapeake Bay System. Provided an overview of the values of ecosystem management for solving aquatic and fisheries resource management problems of the Bay System.

NATIONAL CAPITAL CLUSTER

Planning and Evaluation Branch

Catoctin Mountain Park

- * Evaluated and concurred with an Executive Order 11990 "Wetlands Statement of Findings" for a sewage line replacement project.
- * Worked with park resource management staff to design a randomly stratified roving creel census to assess trout fishing activities in Big Hunting Creek.

George Washington Memorial Parkway

* Provided technical review of research applications of "fat bag" technologies for contaminant monitoring Dyke Marsh and the Potomac River.

Monocacy National Battlefield

- * Reviewed Clean Water Act public notice involving water and sewer lines in the park.
- * Reviewed and commented on draft DCP/EA (Bush Creek).

Water Operations Branch

Antietam National Battlefield

* Uploaded park-collected water quality data to STORET in preparation for producing a Baseline Water Quality Data Inventory and Analysis Report.

Catoctin Mountain Park

* Issued a Baseline Water Quality Data Inventory and Analysis Report documenting water quality data retrievals from six EPA databases.

Greenbelt Park

* Water quality data were retrieved from STORET to answer basic water quality inventory questions in advance of preparing a Baseline Water Quality Data Inventory and Analysis Report.

NORTHEAST FIELD AREA



ALLEGHENY CLUSTER

Planning and Evaluation Branch

Fort Necessity National Battlefield

* Reviewed and commented on a contracted wetland delineation report and on water resources project statements for the park's RMP.

Gauley River National Recreation Area

 Provided technical assistance on cooperative trout management programs with the State of West Virginia.

New River Gorge National River

- * Provided liaison (via the Area Hydrologist Program) for the initiation of a water resources issues overview.
- * Provided technical assistance on fisheries management issues.

Water Operations Branch

* Provided technical review and comment on a University of Rhode Island Draft Report entitled "Review of Technologies for Onsite Water Treatment."

Allegheny Portage Railroad National Historical Site

* Water quality data were retrieved from STORET in support of evaluating a water quality monitoring proposal submitted to WRD for funding.

Allegheny Portage Railroad National Historical Site/Johnstown Flood National Memorial

* Provided review and recommendations for development of scope of work for water quality monitoring with Pennsylvania State University.

Bluestone National Scenic River

* Uploaded park-collected water quality data to STORET in preparation for producing a Baseline Water Quality Data Inventory and Analysis Report.

Fort Necessity National Battlefield

* Trained Area Hydrologist in standard hydrologic/hydraulic analysis techniques; conducted survey of stream channel including bridges; performed hydraulic modeling, provided review comments for final report; and consulted with DSC personnel regarding proposed development and interpretation of Floodplain Management Guidelines.

Gauley River National Recreation Area

* Uploaded park-collected water quality data to STORET in preparation for producing a Baseline Water Quality Data Inventory and Analysis Report.

Johnstown Flood National Memorial

* Water quality data were retrieved from STORET in support of evaluating a water quality monitoring proposal submitted to WRD for funding.

New River Gorge National River

* Uploaded park-collected water quality data to STORET in preparation for producing a Baseline Water Quality Data Inventory and Analysis Report.

NEW ENGLAND/ADIRONDACK CLUSTER

Planning and Evaluation Branch

Acadia National Park

* Provided technical guidance and review on the park's draft WRMP.

Cape Cod National Seashore

- * Provided technical assistance to the park regarding the proposed rehabilitation of a cranberry farm at Pamet Bog. Issues included nutrient enrichment of adjacent aquatic resources, mobilization of residual contaminants (e.g., lead, arsenic) from previous farming, and compliance with NPS wetland guidelines.
- * Reviewed and commented on a consultant's report "Environmental Notification Form: Pamet Cranberry Bog Restoration Project."
- * Reviewed and commented on the report "Effects of Diking, Drainage, and Seawater Restoration on Biogeochemical Cycling in New England Salt Marshes".
- * Provided review and comment to DSC on the water resources sections of the Cape Cod National Seashore GMP.
- * Provided technical review and comment on WRMP Study Plan.

Hudson River Valley Greenway

* Reviewed Task Directive.

Saint-Gaudens National Historic Site

* Assisted DSC with wetland compliance aspects of developing a park GMP.

Saugus Iron Works National Historic Site

* Reviewed and commented on Task Directive for GMP/EIS.

Water Operations Branch

Acadia National Park

Provided guidance on data interpretation of total as opposed to dissolved water concentrations of metals and nutrients and helped interpret some initial mercury concentrations in aquatic biota.

Cape Cod National Seashore

- * Coordinated with NBS on a proposal to investigate the ecological effects of alterations to the natural hydrologic system from ground water withdrawals.
- * Reviewed USGS report regarding hydrologic impacts of ground water pumping.
- * Provided assistance in evaluating potential impacts of restoration of a cranberry bog in the headwaters of the Pamet River.
- * Coordinated with park, region, local, State, and other Federal agencies in working toward development of an aquifer management plan for the outer cape.
- * Assisted in preparing the water resources sections of the GMP.
- * Coordinated a WRD-funded project to investigate the hydrogeology of kettle ponds.
- * Issued a Baseline Water Quality Data Inventory and Analysis Report documenting water quality data retrievals from six EPA databases.

* Advised park management on the types of contaminants typically of concern in past cranberry monitoring.

Fire Island National Seashore

* Provided guidance for obtaining funding from the National Park Foundation for the plugging and abandonment of flowing artesian wells.

Lowell National Historical Park

* Provided assistance in planning a contaminants survey of the park.

Morristown National Historical Park

* Issued a Baseline Water Quality Data Inventory and Analysis Report documenting water quality data retrievals from six EPA databases.

Roosevelt-Vanderbilt National Historical Park

- * Issued a Baseline Water Quality Data Inventory and Analysis Report documenting water quality data retrievals from six EPA databases.
- * Uploaded park-collected and archival (analog) water quality data to STORET.

Saratoga National Historical Park

* Provided advice and documentation regarding water well sampling protocols.

Water Rights Branch

Cape Cod National Seashore

- * Reviewed plan of study to address effects of ground water withdrawals on aquatic resources.
- * Provided NPS guidance on water rights and sale and lease of water.

CHESAPEAKE CLUSTER

Planning and Evaluation Branch

Assateague Island National Seashore

* Reviewed and commented on the draft report "Wetlands Assessment - Assateague Island, Maryland."

Delaware Water Gap National Recreation Area

* Provided technical assistance for and concurred with an Executive Order 11990 "Wetlands Statement of Findings" for construction of facilities at Bushkill Access.

Fredericksburg and Spotsylvania National Military Park

- * Consulted with park staff and provided information regarding management of wetland resources.
- * Provided technical assistance in the development of a fisheries survey of Milstead Pond.

Shenandoah National Park

- Participated in an interagency effort to assess flood and storm damage to the Rapidan River, Staunton River, and North Fork Mormans River and provided recommendations for short- and long-term fisheries management.
- * Participated in meetings with Virginia Game and Inland Fisheries to develop interagency protocols and priorities for trout stream management.

Steamtown National Historic Site

* Reviewed and commented on draft RMP.

Water Operations Branch

Assateague Islands National Sheashore

- * Issued a Baseline Water Quality Data Inventory and Analysis Report documenting water quality data retrievals from six EPA databases.
- * Uploaded park-collected water quality data from 1991-1994 to STORET.
- * Helped in analysis of first year study results for a study of contaminated sediments.

Booker T. Washington National Monument

* Water quality data were retrieved from STORET to answer basic water quality inventory questions in advance of preparing a Baseline Water Quality Data Inventory and Analysis Report.

Colonial National Historical Park

- * Coordinated a WRD-funded project to investigate water quality of the shallow ground water system and identify possible sources of contamination.
- * Assisted park staff in developing a project proposal to investigate the hydrogeologic framework of the Grafton Ponds sinkhole complex.
- * Provided recommendations on monitoring to assess potential impacts to park wetlands from stormwater runoff during the construction of the new York County Courthouse.
- * Issued a Baseline Water Quality Data Inventory and Analysis Report documenting water quality data retrievals from six EPA databases.
- * Provided technical review and comments on a Department of Defense document assessing the impacts of a release from the Naval Weapon Station's fuel farm.
- * Provided comments on monitoring results at Site 12 and fuel storage areas and assisted park staff in attending meetings with Navy staff and contractors on hazardous waste site 12.
- * Completed a detailed review of the draft final work plan for Naval Special Fuel Oil Area and Yorktown Fuels Annex, and several other environmental reports on behalf of the park.

Delaware Water Gap National Recreation Area

- * Issued a Baseline Water Quality Data Inventory and Analysis Report documenting water quality data retrievals from six EPA databases.
- * Oversaw contracted project designed to link a water quality/watershed model (Soil and Water Assessment Technique SWAT), with Geographic Information System (GIS) to enable the park and Delaware River Basin Commission to assess the impacts on water quality of rapid land development around the park.

George Washington Birthplace National Monument

* Provided requested information on environmental issues associated with CCA and other wood treatments.

Petersburg National Battlefield

- * Evaluated existing water quality monitoring program and provided assistance related to contaminant spills from the Fort Lee motor pool and City of Petersburg sewage lift stations.
- * Made recommendations on oil analyses and field collection strategies in response to a sewage leak.

Richmond National Battlefield

* Recommended sampling and lab analyses strategies for studying effects of a landfill.

Shenandoah National Park

- * Participated in formal review of the Shenandoah Watershed Acidification Study.
- * Participated in a team assessment of flood hydrology and geomorphic evolution of 1995 flood event, performed indirect discharge measurements, submitted detailed write up to park staff, and provided review comments for final document.

Upper Delaware Scenic and Recreation River

* Provided summary on the effects of foam on freshwater surfaces.

Valley Forge National Historical Park

* Provided technical review, comments, and recommendations to USGS investigation of ground water and wetland contamination.

Valley Forge National Historical Park

* Provided pesticide and polychlorinated biphenyl summary information.

PACIFIC WEST FIELD AREA

Planning and Evaluation Branch



Bear River Massacre Site Special Resource Study

* Reviewed and commented on draft Special Resource Study EA.

COLUMBIA/CASCADE CLUSTER

Planning and Evaluation Branch

Coulee Dam National Recreation Area

- * Provided RMP technical review.
- * Provided liaison (via the Area Hydrologist Program) for the initiation of a water resources issues overview.

Fort Clatsop National Memorial

* Presented park and SSO personnel with a "close-out" briefing on the results and recommendations of the park's WRSR.

Lake Chelan National Recreation Area

 Provided technical assistance for and concurred with an Executive Order 11990 "Wetlands Statement of Findings" for the Company Creek Road realignment and Stehekin Airstrip operations.

Olympic National Park

* Provided technical assistance for and concurred with an Executive Order 11990 "Wetlands Statement of Findings" for the Quinault North Shore Road repair project.

Water Operations Branch

City of Rocks National Reserve

- * Water quality data were retrieved from STORET to support WRMP activities.
- * Provided advice on location and probable hydrogeologic conditions for a new water supply well.

Coulee Dam National Recreation Area

* Issued a Baseline Water Quality Data Inventory and Analysis Report documenting water quality data retrievals from six EPA databases.

Crater Lake National Park

* Provided information related to impacts of oil contaminants on boat harbors and the Lake.

Mount Rainier National Park

- * Issued a Baseline Water Quality Data Inventory and Analysis Report documenting water quality data retrievals from six EPA databases.
- * Reviewed progress report titled "Identification and Enumeration of Plankton Samples."
- * Worked with DSC and the park hydrologist from North Cascades National Park to develop flood information for the new GMP.

Nez Perce National Historical Park

* Provided information to park staff on woods treated with creosote, CCA, and other preservatives and made recommendations for untreated hardwood alternatives.

North Cascades National Park

* Issued a Baseline Water Quality Data Inventory and Analysis Report documenting water quality data retrievals from six EPA databases.

Olympic National Park

- * Reviewed the Elwha River EIS (for dam removal and stream restoration).
- * Reviewed/co-authored the Elwha River Drawdown Experiment Sediment report.
- * Provided a scoping memorandum containing an analysis of potential Clean Water Act permitting requirements for the removal of the Elwha River Dams.
- * Provided comments and suggestions for improving the Elwha River sediment and water quality monitoring plans.

- * Provided information for use by the State of Washington DNR on pollutants proposed for discharge from a water treatment plant (aluminum, alum, and kerosene).
- * Reviewed study plan entitled "Monitoring Protocols for Biological, Chemical and Physical Indicators of Ecosystem Health in Selected Streams."
- * Assisted in the development of a model of sediment transport during and after dam removal and provided briefings to State of Washington DNR staff and others.
- * Made a site visit to Quinault District of the park and provided geomorphic interpretation and floodplain advice related to the location of new employee housing.

San Juan Island National Historical Park

* Issued a Baseline Water Quality Data Inventory and Analysis Report documenting water quality data retrievals from six EPA databases.

Water Rights Branch

City of Rocks National Reserve

- * Assisted Department of Justice and Solicitor's Office attorneys as requested in ongoing Snake River Basin adjudication.
- * Collected field data in support of reserved water rights claims.

Crater Lake National Park

- * Conducted Klamath adjudication studies.
- * Coordinated with Solicitor's Office and Department of Justice attorneys, as well as technical specialists from other agencies, to ensure consistent claims for Federal water rights.
- * Assisted with technical evaluation of park water supply needs.
- * Provided advice regarding the availability of ground water and potential sites for production wells.

Craters of the Moon National Monument

* Assisted the Department of Justice in supporting NPS claims in the Snake River Basin adjudication.

San Juan Island National Historical Park

* Continued implementation of action plan to protect water rights and water resources.

PACIFIC COAST/GREAT BASIN CLUSTER

Planning and Evaluation Branch

Channel Islands National Park

* Participated in a Rapid Riparian Assessment Team and co-authored a report evaluating functional condition of riparian systems on Santa Rosa Island.

Death Valley National Park

* Assisted the park and the FWS in groundtruthing wetland inventory maps for the park, particularly along playa margins. A method for mapping Allenrolfea occidentalis (pickleweed) wetland communities along the playa margin was developed utilizing soil, hydrology, and vegetation characteristics.

- Provided technical assistance for the Executive Order 11990 "Wetlands Statement of Findings" (SOF) for the Scotty's Castle flood protection levee.
- * Reviewed and assembled WRD comments on the Briggs Mining Project near park.

Golden Gate National Recreation Area

- Reviewed and commented on "scope of work" for completion of the Big Lagoon restoration project.
- * Reviewed and commented on restoration plan for Lobos Creek.
- * Reviewed and commented on draft letter to be sent to the Corps of Engineers regarding dredging near Alcatraz.

Joshua Tree National Park

- * Provided water resources issues overview to DOI Border-related Water Resource Issues Committee.
- * Assisted park in the evaluation of impacts of the proposed Eagle Mountain Landfill, and Pump Storage projects on park water resources.

Lava Beds National Monument

* Reviewed and commented on draft RMP.

Redwood National Park

- * Provided technical assistance regarding wetland delineation procedures and regulatory compliance at Redwood Creek Estuary, Davison Ranch, and the South Operations Center.
- * Reviewed and commented on draft DCP/EA (Davison Ranch).
- * Evaluated and concurred with an Executive Order 11990 "Wetlands Statement of Findings" for removal of the Ah Pah Road and site restoration.
- * Reviewed EA for the Arcata, California Planning Area.

Point Reyes National Seashore

* Oversaw the completion of a draft WRMP.

Santa Monica National Recreation Area

* Provided assistance with the WRD funded update of the park's WRMP.

Yosemite National Park

- * Reviewed and commented on wetland delineations for the Wawona Bridge diversion and the Tuolumne Meadows Campground water lines and sewer lagoon.
- * Assisted the park in identifying a cooperator for a planned "update" of the park's WRMP.

Water Operations Branch

Cabrillo National Monument

- * Coordinated an agreement for assistance in data compilation and summarization by the Navy.
- * Advised the park on a water quality monitoring program, with an emphasis on pre-oil-spill intertidal monitoring.

Channel Islands National Park

* Reviewed the Santa Rosa Island water quality report.

- * Provided advice and documentation regarding channel cross-section monitoring.
- * Water quality data were retrieved from STORET in support of the ongoing effort to examine the impact of grazing on water resources.
- * Provided management direction and technical leadership and guidance to respond to a State of California Cleanup and Abatement Order for grazing activities on Santa Rosa Island.
- * Provided technical representation for the park at a meeting with the California Regional Water Quality Control Board concerning cleanup and abatement order for grazing activities.
- * Assembled and co-coordinated the activities of a team of riparian, grazing, hydrology, and water quality specialists to assess riparian conditions and develop management recommendations on Santa Rosa Island.
- * Made a site visit to Santa Cruz Island and provided advice to park management regarding the impacts associated with planned channel excavation.
- * Participated in a review of the park Inventory and Monitoring Program.

Death Valley National Park

- * Provided review and recommendations for monitoring of hydrocarbon contamination of ground water.
- * Provided hydrologic data and graphics for springs and streams.
- * Provided information on environmental effects of asphalt.

Golden Gate National Recreation Area

- * Provided review of alternatives for infiltration galleries on Lobos Creek at the Presidio.
- * Answered a number of park staff questions on creosote and provided a summary of information on the environmental effects of creosote.
- * Reviewed Army's proposed corrective action plan for the Building 637 area of the Presidio.
- * Helped represent the Park in discussions of technical/contaminants issues related to wetlands restoration with California Board of Water Quality experts.
- * Provided detailed comments on Dames and Moore, Inc. Feasibility Study on wetlands restoration.
- * Reviewed draft project statement for project titled "Establish a Water Quality Monitoring Program at GGNRA."

Great Basin National Park

* Water quality data were retrieved from STORET to support WRMP activities.

Joshua Tree National Park

- * Water quality data were retrieved from STORET to support a WRD-funded inventory and monitoring project.
- * Investigated and provided comments to park staff on Eagle Mountain Landfill and associated development.
- * Coordinated a thorough data retrieval from the San Diego Subdistrict of the USGS for all WATSTORE and GWSI data for park and its expansion and areas surrounding it.
- * Assisted park staff with WRD funded project for designing and implementing a water resource inventory and database development.

Lake Mead National Recreation Area

- * Issued a Baseline Water Quality Data Inventory and Analysis Report documenting water quality data retrievals from six EPA databases.
- * Provided information regarding water supply wells at Willow Beach.
- * Provided assessment of hydrologic conditions of the riparian area near Stewarts Point.
- * With park personnel, co-coordinated interagency technical transfer meeting on Las Vegas Wash and Las Vegas Bay.
- * Conducted an on-site assessment of grazing and watershed management techniques and restoration for the Shiviwits Plateau.
- * Developed further material for forthcoming report on monitoring water tables in Sacatone Wash.

Point Reyes National Seashore

- * Provided U.S. Census Tiger information for Sonoma and Marin counties in Arc/Info importable format to the park for use in their GIS.
- * Provided extensive review comments on the park's draft WRMP.
- * Assisted park in reviewing Point Reyes hydrocarbon study proposals.

Redwood National and State Parks

- * Provided consultation to park staff regarding substantial activities that are planned in the Prairie Creek floodplain.
- * Conducted a field inspection and evaluated stream restoration and sediment reduction efforts in the Redwood Creek Watershed.

Santa Monica Mountains National Recreation Area

- * Investigated potential ground water impacts of subway tunnel construction beneath Runyon Canyon.
- * Advised park staff on contaminants issues, including potential impacts to creeks and lagoons from horse confinement, golf courses, sewage plants, urban runoff, and a Navy facility.
- * Reviewed a report concerning the hydrology and hydraulics of Zuma Creek where it passes under the Pacific Coast Highway.
- * Developed an alternative for modification of a hazardous dam in the park that would reduce downstream risk and provide conditions supporting a wetland just upstream.

Sequoia & Kings Canyon National Parks

- * Completed hydraulic analysis of flood hazard for proposed water treatment facility adjacent to Lewis Creek.
- * Uploaded park-collected water quality data to STORET in preparation for producing a Baseline Water Quality Data Inventory and Analysis Report for Sequoia-Kings Canyon National Park.
- * Provided interpretation of the application of the Clean Water Act stormwater regulations for the re-paving of a parking lot.

Yosemite National Park

- * Issued a Baseline Water Quality Data Inventory and Analysis Report documenting water quality data retrievals from six EPA databases.
- * Reviewed Merced River Ecosystem Management Plan.
- * Reviewed WRMP update and attended meeting with contractor.

- * Developed a geomorphic interpretation of Mirror Lake and provided recommendations to park staff regarding the removal of a man-made dam at the outlet of the lake.
- * Wrote a portion of a report describing conditions associated with several Merced River bridges to help guide park management in deciding on the ultimate fate of the bridges.
- * Provided an assessment of sedimentation in Mirror Lake and suspected forest encroachment into meadows in Yosemite Valley due to lowered water tables near the Merced River.
- * Reviewed and commented on the Mirror Lake Restoration EA prepared by park staff.
- * Organized a topographic survey of Mirror Lake and vicinity to quantify sediment accumulation for ongoing restoration work sponsored by a corporate partnership.

Water Rights Branch

Death Valley National Park

- * Prepared draft report describing regional ground water flow system west of park.
- * Continued development of project and study plans to protect water rights.
- * Continued monitoring of Devil's Hole for detection of crustal movement and barometric pressure effects on water surface elevation.
- * Evaluated EIS for Briggs Mining Project.
- * Assisted Department of Energy (DOE) in preparing fourth annual Devil's Hole workshop in Las Vegas, Nev.
- * Monitored Devil's Hole pool level discharge of Nevares, Texas and Travertine springs.
- * Negotiated with Rayrock Mines, Inc. concerning its water right application upgradient from the park and reviewed proposed monitoring plan.
- * Prepared for hearings on Las Vegas Valley Water District applications.
- * Assisted in monitoring contract to prepare hydrologic conceptual model of Death Valley region.
- * Protested 14 Nevada Water Right applications.
- * Recommended that six applications not be protested, and one protest be withdrawn.
- * Compiled and reviewed monitoring data on DOE and Barrick Bullfrog water permits.
- * Reviewed State Engineer's Ruling concerning applications by Nevada Department of Prisons and recommended response.

Golden Gate National Recreation Area

- * Provided information concerning restrictions on sale or lease of water.
- * Commented on proposed NPS/San Francisco hydrologic study.
- * Reviewed report section on analysis of land use impact on water quality and quantity.

Great Basin National Park

- * Initiated analysis of seepage runs conducted by USGS on Baker, Lehman, and Snake Creeks.
- * Assisted with WRMP.
- * Funded operation of gaging stations on Lehman and Baker Creeks.
- * Prepared for hearings on Las Vegas Valley Water District applications.
- * Protested five water right applications.
- * Recommended that one application not be protested.

Joshua Tree National Monument

* Reviewed environmental impact documents for landfill project located adjacent to park and evaluated impact to water-related resources and rights.

Lake Mead National Recreation Area

- Negotiated settlement of NPS protest to application by Bureau of Land Management.
- * Reviewed monitoring plan prepared by Moapa Valley Water District.
- * Initiated investigation by Desert Research Institute to investigate origin and flowpaths of water issuing from selected springs.
- * Assisted legal counsel to seek clarification of ruling concerning Southern Nevada Water Authority surface-water permits on the Virgin River.
- * Provided funding to monitor discharge of Rogers Spring.
- * Prepared for hearing on Las Vegas Valley Water District applications.
- * Explored settlement options and prepared for and participated in a hearing concerning NPS protests to applications by Moapa Valley Water District.
- * Protested three water right applications.
- * Recommended that fifteen applications not be protested and one protest be withdrawn.
- * Explored settlement options concerning NPS protests to application by Nevada Cogeneration Associates.

Mojave National Preserve

* Assisted with response concerning proposed ground water development and potential impacts to the park.

Point Reyes National Seashore

- * Assisted with draft WRMP.
- * Assisted with water right issues at Point Reyes Bird Observatory.
- * Coordinated state water-use compliance inspections and reporting requirements.
- * Prepared a summary of water rights and land ownership in Arroyo Hondo.
- * Reviewed Giacomini land exchange feasibility report for water right issues.
- * Provided review comments on State of California decision for Lagunitas Creek.

Santa Monica Mountains National Recreation Area

* Reviewed water rights issues and assisted with WRMP.

Yosemite National Park

- * Obtained water rights information for State Water Resources Control Board to address water right issues at Yosemite National Park.
- * Provided information on restrictions concerning sale or lease of water.
- * Reviewed draft WRMP.

Multi-Park

- * Reviewed water right applications for Nevada.
- * Submitted Reports of Licensee for California parks.
- * Attended 1995 Nevada Water Resources Conference.

PACIFIC ISLAND CLUSTER

Planning and Evaluation Branch

* Evaluated water resource issues at six Hawaii parks in support of their RMPs.

Water Operations Branch

Kaloko-Honokohau National Historic Park

* Negotiated with USGS to conduct geohydrology project, reviewed scope of work, and drafted amendment to Interagency Agreement between NPS and USGS.

Water Rights Branch

Haleakala National Park

- * Assisted with RMP.
- * Reviewed and prepared comments on draft biological studies reports.
- * Assisted park with response to ground water pumping issue.
- * Assisted SSO with Kipahulu well installation.

Kalaupapa National Historic Park

- * Continued the Waikolu stream study.
- * Executed Interagency Agreements with the USGS for stream gaging and cost sharing.

Kaloko-Honokohau National Historic Park

* Initiated a ground water modelling study with USGS to determine effects of proposed ground water withdrawals.

SOUTHEAST FIELD AREA



Planning and Evaluation Branch

- * Presented three workshop sessions entitled "Water Resources Aspects of Natural Resource Protection and Facilities Management" at the Southeast Field Area's Resource Management/ Facilities Management Partnerships Conference.
- * Reviewed and commented on the living marine resource component of the Gulf of Mexico Project.

APPALACHIAN CLUSTER

Planning and Evaluation Branch

Big South Fork National River and Recreation Area

- * Assisted park staff and contractor in progressing toward a WRMP for the park.
- * Conducted a workshop for park management and staff on WRMP.

Little River Canyon National Preserve

* Provided technical review of GMP Task Directive.

Obed Wild and Scenic River

- * Assisted park management in developing an Interagency Agreement to prepare a WRMP for the park.
- * Evaluated a proposal from Tennessee Valley Authority to prepare a WRMP.
- * Provided an orientation to WRMP to park staff and Tennessee Valley Authority.

Water Operations Branch

Big South Fork National River & National Recreation Area

- * Provided lecture to park management and staff on the Clean Water Act.
- * Provided management and technical leadership and guidance for an Natural Resources Preservation Program funded study to characterize and remediate acid mine drainage in the park.

Blue Ridge Parkway

* Provided a digitized park boundary for use in park GIS.

Great Smoky Mountains National Park

* Issued a Baseline Water Quality Data Inventory and Analysis Report documenting water quality data retrievals from six EPA databases.

Little River Canyon National Preserve

* Provided a digital boundary map for use in park GIS.

Water Rights Branch

Obed Wild and Scenic River/Big South Fork National River and Recreation Area

- * Assisted with responses to water development permits.
- * Reviewed plan of work for WRMP.
- * Conducted workshops on water rights and water resources policies.
- * Provided technical water rights guidance on regional water supply study.

ATLANTIC COASTAL PLAIN CLUSTER

Planning and Evaluation Branch

Canaveral National Seashore

* Reviewed and commented on draft RMP.

Cape Hatteras National Seashore

* Reviewed and commented on the EA for the Graveyard of the Atlantic Museum.

Cape Lookout National Seashore

* Provided technical assistance regarding feasibility and environmental impacts of a proposal to enhance waterfowl habitat in an impacted wetland.

Canaveral National Seashore

* Provided technical assistance and review of proposals to control pothole mosquito populations and assessed the potential impacts to native fish populations.

Congaree Swamp National Monument

- * Provided technical guidance and review on the draft WRMP.
- * Reviewed and commented on the draft report "Wetlands Inventory of Congaree Swamp National Monument, South Carolina."

Fort Caroline National Memorial

* Provided technical assistance for and concurred with an Executive Order 11990 "Wetlands Statement of Findings" for boat dock construction.

Timucuan Ecological and Historical Preserve

* Oversaw completion of the Timucuan Ecological & Historical Preserve Water Resources Issues Overview and Assessment and the initiation of a WRMP.

Water Operations Branch

Canaveral National Seashore

- * Reviewed project proposal to investigate impacts of drainage ditches on ground water flow system that discharges to Mosquito Lagoon.
- * Uploaded park-collected water quality data to STORET in preparation for producing a Baseline Water Quality Data Inventory and Analysis Report.
- * Provided information summaries on environmental impacts of creosote.

Cape Hatteras National Seashore

- * Evaluated potential impacts of ground water withdrawals from the Buxton Woods wellfield.
- * Coordinated a WRD-funded project to investigate potential for impacts to water quality in the shallow ground water system from septic field leachate.
- * Reviewed report from North Carolina Dept. of Environment, Health, and Natural Resources regarding the hydrogeology and ground water supplies in the Buxton Woods aquifer.

- * Reviewed reports regarding modification and expansion of existing Cape Hatteras Water Association well field.
- * Reviewed State's management plan for the Buxton Woods Coastal Reserve.
- * Provided information about environmental effects of creosote-treated logs to park staff.

Cape Lookout National Seashore

- * Evaluated potential hydrologic impacts of ground water pumping on a seasonal pond.
- * Reviewed and assisted in developing strategy to investigate and monitor impacts of a proposed duck pond.

Chattahoochee River National Recreation Area

- * Provided a digital boundary to the park for use in their GIS.
- * Provided review and comment on park-prepared Environmental Analysis on gravel mining.

Congaree Swamp National Monument

- * Reviewed draft WRMP, provided input on opportunities for water quality monitoring at the park, and attended meeting to develop a collaborative monitoring project as part of the NAWQA program.
- * Water quality data were retrieved from STORET to support WRMP activities.
- * Coordinated a WRD funded project related to predicting flooding conditions in the park.

Jimmy Carter National Historical Site

* Consulted with park staff regarding a pond management plan drafted by Auburn University.

Timucuan Ecological & Historic Preserve

* Water quality data were retrieved from STORET to support WRMP activities.

Water Rights Branch

Cape Hatteras National Seashore

- * Coordinated (through East Carolina University and the Virginia Institute of Marine Science) studies to monitor/assess potential impacts of water withdrawals on island vegetation.
- * Provided funding for two gaging stations near Buxton.
- * Provided funding for vegetation and hydrologic studies.
- * Continued North Carolina State University (NCSU) investigation to describe spatial and temporal variation of water table.
- * Completed NCSU investigation to determine hydraulic characteristics of surficial aquifer.
- * Inspected NCSU's monitoring system.
- * Participated in meeting between NPS, State of North Carolina, USGS, and Cape Hatteras Water Association scientists regarding water and vegetation resources.
GULF COAST CLUSTER

Planning and Evaluation Branch

Big Cypress National Preserve

- * Assisted park and contractor in drafting a WRMP for the park.
- * Evaluated the applicability of Florida Nondegradation Standards to Big Cypress Preserve.

Everglades National Park

* Reviewed and commented on a draft EA for construction of 65 new housing pads and septic systems on the Miccosukee Tribe Reservation at the northern edge of the park.

Gulf Islands National Seashore

* Provided technical assistance regarding effects of the proposed Beverly Place Subdivision drainage system on a pine savannah wetland ecosystem.

Padre Island National Seashore

- * Reviewed and commented on the draft "Padre Island National Seashore Parkwide Development Concept Plan and Environmental Assessment" and provided additional consultation regarding potential effects of proposed development on wetlands at Bird Island Basin.
- * Reviewed and commented on draft RMP.

Water Operations Branch

Cluster-wide

* Provided guidance for developing stage-discharge rating curves for Small Parks Water Quality Monitoring Program.

Big Cypress National Preserve

* Provided assistance to Park staff on potential contaminants in drilling mud and how to trace zones of drilling mud influence.

Big Thicket National Preserve

* Issued a Baseline Water Quality Data Inventory and Analysis Report documenting water quality data retrievals from six EPA databases.

Biscayne National Park

- * Water quality data were retrieved from STORET to support investigations into water quality issues.
- * Assisted park in evaluating ground water impacts of the South Dade County landfill, located adjacent to the park.
- * Provided technical review and comments on Biscayne Bay Ammonia Monitoring Report.
- * Provided information to Park staff relating to potential impacts of oil on mangroves.

Everglades National Park

* Reviewed EA concerning a proposal to construct an extensive residential area by the Miccusukee Tribe.

Gulf Island National Seashore

- * Assisted in developing a project proposal and study plan to investigate possible impacts of the park's septic leach fields on Santa Rosa Island.
- * Prepared report on local hydrogeology, ground water supplies, and potential threats to the park's water supply wells.
- * Assisted park staff in evaluating potential impacts of proposed drainage ditch adjacent to the park boundary on park wetlands.

Gulf Islands National Seashore

* Provided technical review and comments on the Davis Bayou Study Proposal.

Padre Islands National Seashore

- * Provided technical comments and recommendations on Chevron's Environmental Remediation plan for abandoned Shorebase production facility.
- * Provided technical review and recommendations on American Explorations' site characterization for the Yarborough Pass facility.
- * Provided technical comments on Vantage Point's Site Characterization and Remediation Plan for Laguna Madre.
- * Provided review comments on the draft RMP.
- * Assembled information on petroleum hydrocarbons in soil.

Virgin Islands National Park

- * Issued a Baseline Water Quality Data Inventory and Analysis Report documenting water quality data retrievals from six EPA databases.
- * Uploaded results from park-based water quality monitoring program to STORET.

Russell Cave National Monument

* Supplied basic information and review comments for a Stream Management Plan.

SERVICEWIDE

Planning and Evaluation Branch

- * Served as NPS representative on a DOI committee to assess border area water resource issues that may relate to NAFTA.
- * Prepared the NPS response to a Corps of Engineers proposal to establish a Clean Water Act Section 404 "nationwide permit" for single family homes with under 1/2 acre of wetland impact. Comments focused on aspects of the permit that would diminish protection of park resources from activities on inholdings or outside park boundaries.
- * Presented an analysis of the effects of HR 961 (Amendments to the Clean Water Act) on NPS wetland resources in Alaska at a meeting of the DOI's Alaska Issues Group.
- * Served as NPS's representative on the Federal Geographic Data Committee's Wetlands Subcommittee. Duties included coordination of wetland data collection, mapping protocols, classification systems, and digital data within NPS and across Federal agencies.
- * Prepared comments to Senator Connie Mack's (Fla.) staff regarding a proposed amendment to exempt recreational ORV use from Section 404 of the Clean Water Act.

- * Reviewed Senate Bill 851 "Wetlands Regulatory Reform Act of 1995" with respect to impacts on NPS wetlands protection and management.
- * Wrote a draft revision of the NPS Wetlands Guidelines.
- * Reviewed the Federal Register notice for the establishment, use, and operation of mitigation banks for Clean Water Act permits.
- * Reviewed the Federal Register notice for the establishment of the Wetland Delineator Certification Program by the Corps of Engineers.
- * Reviewed the Federal Register notice concerning the Corps of Engineers Administrative Appeals process for Clean Water Act permits.
- * Reviewed and commented on the Federal Register notice for the development of a new Clean Water Act Nationwide Permit (#29) for allowing wetland fills for single-family homes.
- * Reviewed and commented on HR 1949 "Agricultural Wetlands Administration Act of 1995" (amendments to the Food Security Act), which removes some Corps jurisdiction over wetlands on agricultural lands and removes FWS oversight of minimal effect determinations. These changes could result in impacts to NPS resources.
- * Provided evaluation and comments on NPS GMP funding process.
- * Participated as a member of the Natural Resource Interpretation Committee for implementation of the Natural Resource Strategic Plan. Developed a Draft Action Plan for the Interpretation of Natural Resource Issues in the NPS.
- * Developed four proposals for park water-related interpretation projects for submission to the Education Project Program.
- * Reviewed and commented on proposed revisions to the Guidelines for RMPs.
- * Reviewed and commented on proposed revisions to NPS strategic plan.
- * Participated on the team for the development and implementation of the Natural Resource Management Assessment Program (NR-MAP), to implement the program Servicewide, and to use NR-MAP to expand the Resource Professionalization Initiative.
- * Reviewed and recommended revisions to NPS-70 (Design Guidelines).
- * Reviewed and commented on a proposed amendment to the Clean Water Act that would exempt ORV use from regulation.
- * Assisted in placing park personnel in wetland delineation classes offered by the Natural Resource Conservation Service and Corps of Engineers. A total of 11 people were placed from parks in the National Capital, Northeast, and Southeast Field Areas.
- * Represented NPS on the National Fishing Week Steering Committee and coordinated NPS involvement in the "National Event" at the tidal basin, Jefferson Memorial in Washington, D.C. Coordinated with parks and field offices in the preparation of the Service's annual accomplishment report for National Fishing Week.
- * Represented NPS in development of the DOI's Recreational Fisheries Stewardship Initiative.
- * Provided assistance to the Congressional Research Service in the preparation of reports to Congress on NPS fisheries and aquatic management programs and capabilities.
- * Represented NPS on the International Coral Reef Initiative and U.S. Domestic Coral Reef Initiative interagency committees.
- * Participated in the congressional Fisheries Summit at the U.S. Capitol.
- * Participated in an interagency committee to draft language for Executive Order 12962 on Recreational Fisheries and served on the committee to draft the Recreational Fishery Resources Conservation Plan.

Water Operations Branch

- * Worked with WRD management to initiate Servicewide natural resource communication using electronic media.
- * Developed and submitted mission statement and other requirements to implement the Natural Resources Bulletin Board; Researched, composed and edited introductory message and communication etiquette for the Bulletin Board; and served as the first Bulletin Board Moderator.
- * Developed and maintained a mailing list (WETNET) of NPS water resource specialists to facilitate distribution of discipline specific information.
- * Coordinated all aspects of the joint WRD Servicewide Inventory and Monitoring Program's effort to produce Water Quality Baseline Data Inventory and Analysis Reports for all Inventory and Monitoring parks.
- * Maintained and updated a geo-referenced park boundary digital database for use in GIS-based water resources analyses and queries; provided copies of this database to other WASO Divisions, as well as groups within the USGS, EPA, Census Bureau, Nature Conservancy, and the private sector.
- * Compiled and integrated a number of hydrographic-related digital databases into GIS format including: (1) the USGS Hydrologic-Climatic Data Network; (2) USGS Hydrologic Units; (3) USGS Water Quality Monitoring Station Locations; (4) USGS 7.5" quadrangle outlines; and (5) EPA/Corps of Engineers Water Impoundments.
- * Wrote software called DUMMY to automatically generate page mock ups for reports that are sent to printers. DUMMY has been used for reports other than the Baseline Water Quality Data Inventory and Analysis Report series.
- * Wrote software called COUNTEM designed to simplify and make less mundane the preparation of Executive Summaries for the Baseline Water Quality Data Inventory and Analysis Report series.
- * Maintained software called PRINTZIP, which automatically decompresses and prints .PCL and .DOC files from the compressed .ZIP files transmitted with Baseline Water Quality Data Inventory and Analysis Reports.
- * Maintained software called PAGENUM which semi-automatically stamps page numbers on each page of the Baseline Water Quality Data Inventory and Analysis Reports.
- * Maintained software called IDEA which performs an Inventory Data Evaluation and Analysis for each Baseline Water Quality Data Inventory and Analysis Report comparing retrieved park water quality data against the Servicewide Inventory and Monitoring Program "Level I" water quality parameters to determine deficiencies.
- * Enhanced the TO STORET software, which converts DBASE III+ compatible .DBF files to EPA STORET format for uploading park water quality datasets to STORET.
- * Assisted the Servicewide Inventory and Monitoring Program in hiring a research associate.
- * Primary lead in hiring, training, and supervising five Colorado State University (CSU) studenthourly employees and a research associate.
- * Provided review and comment on the WRD Marine, Estuarine, and Riverine Water Quality Monitoring Protocols.
- * Provided review and comment on the Servicewide Inventory and Monitoring Program Data Management Plan.

- Provided review and comment on draft report entitled "On the Evaluation of Existing Environmental Data Management and Compliance Reporting Systems" for the NPS Hazardous Materials Management Program.
- * Wrote the Joint WRD-Servicewide Inventory and Monitoring Program Cooperative Agreement with the Chemical and Bioresource Engineering Department at CSU.
- * Created the WRD's Internet World Wibe Web Home Page.
- * Chaired the National Natural Resource Centers (NNRC)ADP Committee.
- * Represented the NPS at the Third STORET Modernization Workshop hosted by the EPA in Dallas, Tex.
- * Participated in a joint USGS-NPS Servicewide Inventory and Monitoring Program scoping meeting in Denver to provide advice and recommendations on the geologic I&M component.
- * Represented WRD at the Interagency Safety of Dams Meeting, Port Angeles, Washington.
- * Assisted in development and implementation of a formal program to coordinate the integration of NPS units into the USGS NAWQA Program, attended national and study unit liaison committee meetings, negotiated collaborative monitoring activities with parks and NAWQA study units, and prepared a NPS-NAWQA notebook.
- * Prepared water quality brief for the NPS Bridge Team presentations to Congress.
- * Developed sections of, and provided review and recommendations on several iterations of the Interdepartmental Abandoned Mine Lands Work Group's draft NPDES permit incorporating the watershed management concept for reducing pollution from Federally-owned abandoned mines.
- * In cooperation with representatives from the BLM and the U.S. Forest Service, provided two briefings to the Montana State Water Quality Bureau on the watershed approach for abandoned mines. The second briefing resulted in a letter of support from the Governor of Montana to the Administrator, EPA.
- * Presented a briefing to the Deputy Director of the NPS on the watershed permitting process and negotiations with EPA.
- * Provided cost estimates for water quality analysis for Geologic Resource Division's cost estimates for the characterization and remediation of NPS AML sites.
- * Participated on the Interdepartmental AML Budget Initiative Team. An initiative was developed, and highlighted in the Secretary of the DOI's budget highlights for FY96.
- * Provided review and comment of National Oceanic and Atmospheric Administration's Coastal Nonpoint Pollution Control Program.
- * Developed responses to questions from Government Accounting Office on the cost of implementing the Clean Water Act in the NPS.
- * Co-authored paper on the Water Quality Management Program for presentation at the American Water Resources Association (AWRA) annual symposium in Chicago, Ill.
- * Provided guidance for the initiation of \$190,000 pilot NAWQA program in 8 parks co-located in NAWQA Study Basins. Specifically helped frame the objectives for, and initiated, the only intensive investigation in the pilot program for the study of contaminants at Las Vegas Wash and Bay at Lake Mead National Recreation Area.
- * Reviewed and edited 10 executive summaries for the final water quality data inventory reports.
- * Provided direction on resolving conflicts when STORET data exceeds the EPA edit criteria for individual parameters.
- * Reviewed and ranked applications from 80 candidates, and interviewed the five finalists for the position of Water Quality Specialist to supervise the water quality inventory project.

- * Served on the NPS-Inventory and Monitoring Program Steering Committee.
- * Continued development of the NPS "Contaminants Encyclopedia" database. Developed a "finish up" plan for finalizing drafts while utilizing existing staff.
- * Developed decision tree for how to select oil laboratory analyses for different types of oil products and different pathways of concern.
- * Reviewed proposed changes in DOI Natural Resources Damage Assessment Regulations.
- * Assisted in the facilitation of "Area Hydrologists" in WRD activities.
- * Helped coordinate (and participated in) a WRD meeting of NPS water resources professionals.
- * Enhanced professional networking by submitting information for various resource directories, acquired and distributed interagency publications and databases to NPS field units and supporting non-government organizations in the natural resources field.
- * Prepared for the Associate Director of Natural Resources a briefing on examples erosion control and watershed activities throughout the NPS.
- * Composed a draft Sevicewide initiative to investigate characteristics of urban stream channels that have comparisons in harsh, but natural environments.
- * Prepared and delivered a public presentation on interpretation of stream channel forms and characteristics based on state-of-the-knowledge field of geomorphology.

Water Rights Branch

- * Updated water rights information contained in NPS's dockets.
- * Presented talk to "National Park and Public Land Ecosystems Workshop" on NPS' "Virgin River Studies and Their Management Implications".
- * Provided NPS Servicewide water rights issues for discussion at "Water Law Training Conference" held by the Office of the Solicitor.
- * Provided responses on the effects of pending legislation, for example, grazing, wilderness designation, and California Desert Protection Act, on NPS water rights.
- * Presented talk on "The NPS Perspective" at the Nevada Water Resources Association Conference - "Water-Nevada's Lifeblood", Las Vegas, Nev.

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- _____. 1995. Baseline water quality data inventory and analysis: Bluestone National Scenic River. Fort Collins, Colo.: Technical Report no. NPS/NRWRD/NRTR-95/73.
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Financial Status of the Water Resources Division

By Dan B. Kimball Division Chief

and Debi Cox Program Analyst

FY96 base funding for the Water Resources Division (WRD) was \$4,698,000. The figure below illustrates the distribution of total WRD funds among technical assistance, project, and administrative support costs. Technical assistance, which is predominately day-to-day operational support to the parks includes staff salaries, travel, and associated expenses. Administrative support includes program management costs, administrative support, equipment, and supplies and materials Divisionwide. The projects category includes funds supporting WRD-sponsored projects in the areas of general water resources, water quality, wetlands protection, and water rights. Tables 1, 2, 3, and 4 list WRD-sponsored projects for FY96.



Distribution of WRD FY96 Funding

Fiscal Year 96 Water Resources Division Prioritized Projects

Table 1 - Water quality projects

[WRD, Water Resources Division; FY, fiscal year]

			WPD project	Fund (in thousands	ling s of dollars)
Park ¹	Field area	Project description	coordinator	FY 96	FY 97
		NEW PROJECTS			
ISRO	Midwest	Establish water quality baseline	Irwin	19.30	0.00
ACAD	Northeast	Develop long-term monitoring protocols for freshwater resources	Rosenlieb	25.95	12.25
GOGA	Pacific West	Establish a water quality monitoring program	Long	18.50	16.50
SAGA	Northeast	Monitor water quality of the Blow-Me-Down watershed	Rosenlieb	10.80	0.00
TIMU	Southeast	Comparative evaluation of physical and biological water quality	Irwin	27.00	13.00
DEWA	Northeast	Monitor water quality (evaluate total suspended solids)	Long	15.00	0.00
LACL	Alaska	Initiate water quality assessment program - johnson River and Bear Creek	Long	19.50	19.50
GUIS	Southeast	Assessment of bacterial and nutrient pollution in park waters	Rosenlieb	21.00	14.00
GRTE	Intermountain	Water quality in the backcountry	Long	18.80	11.00
		Subtotal new w	ater quality projects	175.85	86.25
		CONTINUING PROJECTS			
CHAT	Southeast	Determine source and load of pollutants to CHAT	Irwin	17.00	0.00
KATM	Alaska	Manage hazardous and toxic materials: design and implement water monitoring in areas of high human use	Irwin	20.00	0.00
КАНО	Pacific West	Geohydrology and contamination of the shallow fresh-water aquifer	Long	15.00	0.00
BUFF	Intermountain	Develop aquatic biomonitoring program	Irwin	9.80	0.00
FOCL	Pacific West	Develop baseline water quality inventory	Rosenlieb	21.50	0.00
PECO	Intermountain	Water quality condition assessment	Long	15.00	0.00
CAHA	Southeast	Assess impacts of leaching fields on CAHA resources	L. Martin	15.00	0.00
		Subtotal continuing w	vater quality projects	113.30	0.00
		Total new and continuing wa	ter quality projects	289.15	86.25

¹Acronyms for park names are listed in appendix 1.

Table 2 - Wetlands projects

[WRD, Water Resources Division; FY, fiscal year]

				Fund	ing
			WRD project	(in thousands	s of dollars)
Park ¹	Field area	Project description	coordinator	FY 96	FY 97
		NEW PROJECTS			
GAAR	Alaska	Wetland mapping for the Upper Kobuk River watershed	Krueger	26.90	0.00
ROMO	Intermountain	Restoration of selected streams and wetlands impacted by the Grand Ditch	Wagner, L. Martin	39.88	0.00
GLCA	Intermountain	Wetland inventory and classification using mult-spectral videography	Krueger	20.00	20.00
COSW	Southeast	Wetland database-guided field verification of vegetative communities	Wagner	18.00	18.00
MORA	Pacific West	Inventory and mapping of park wetlands	Krueger	20.00	20.00
DEWA	Northeast	Manage wetlands (develop digital overlay for wetlands)	Krueger	10.00	8.00
GRBA	Pacific West	Delineation and mapping of high visitor-use riparian wetland sites	Wagner	19.10	20.90
INDU	Midwest	Ecological assessment of the Grand Calumet Lagoons	Irwin	20.00	20.00
Subtotal new wetland projects			173.88	106.90	
CONTINUING PROJECTS					
BICY	Southeast	Restore wetlands within the Loop Road	Wagner	33.00	0.00
CACO	Northeast	Kettle Pond aquatic macrophyte monitoring	Wagner	8.20	0.00
GUIS	Southeast	Wetland delineation and hydrologic community survey	Wagner	15.00	0.00
DINO	Intermountain	Riparian study on the Green and Yampa Rivers	Wagner	20.00	0.00
		Subtotal continu	uing wetlands projects	76.20	0.00
Total wetlands activity new and continuing projects			250.08	106.90	

¹Acronyms for park names are listed in appendix 1.

Table 3 - New other water-related issues projects

				Fund	ing
Park ¹	Field area	Project description	WRD project coordinator	FY 96	FY 97
		NEW PROJECTS			
CRLA	Pacific West	Extent and significance of hydrocarbon contamination	Irwin	20.00	0.00
BUFF	Intermountain	Inventory and delineate karst hydrology	L. Martin	25.00	25.00
ROMO	Intermountain	Restoration of Hidden Valley Creek	Inglis, Panek	35.00	15.00
CHCU	Intermountain	Implement protection against erosion	Smillie	23.00	23.00
ASIS	Northeast	Baseline information: long-term monitoring	Inglis	15.00	0.00
ANTI	National Capital	Water resources management (stream and habitat restoration)	Panek	9.80	0.00
SACN	Midwest	Effects of cranberry agriculture operations on river health	Irwin	20.00	20.00
THRO	Midwest	Water resources management planning - scoping report	Flora	15.00	0.00
PIRO	Midwest	Fisheries habitat restoration: Beaver Lake	Panek	20.00	0.00
BISO	Southeast	Initiation of monitoring program for the biotic component of aquatic systems	Rosenlieb, Irwin	15.00	35.00
7		Subtotal new other w	water-related projects	197.80	118.00
CONTINUING PROJECTS					
DINO	Intermountain	Study sediment transport on the Green River	Smillie	25.00	0.00
GLCA	Intermountain	Recovery of riparian communities following removal of livestock grazing	Inglis	15.00	0.00
CANA	Southeast	Determine groundwater flow characteristics to Mosquito Lagoon	Rosenlieb, L. Martin	29.00	0.00
ACAD/ CACO	Northeast	Evaluate mercury contamination	Irwin	24.60	0.00
NOCA	Pacific West	Resource baseline inventory and monitoring	Rosenlieb	24.00	0.00
CHIC	Intermountain	Water resources management plan	Sharrow	50.00	0.00
JOTR	Pacific West	Inventory and monitor natural and historical water sources	Inglis	20.40	0.00
OLYM	Pacific West	Develop protocols for physical, chemical, and biological monitoring	Irwin, Rosenlieb	22.80	0.00
CURE	Intermountain	Develop water resources management plan	Flora	25.00	0.00
		Subtotal continuing other v	water-related projects	235.80	0.00
		Total other new and continuing wa	ter-related projects	433.60	118.00

[WRD, Water Resources Division; FY, fiscal year]

¹Acronyms for park names are listed in appendix 1.

Table 4 - Projects funded through the water rights program

[WRD, Water Resources Division]

	7		WRD project	Funding (in thousands
Park'	Field area	Project description	Coordinator	of dollars)
BIBE	Intermountain	Rio Grande trend analysis	williams	11.5
GRCA	Intermountain	Spring monitoring	Hansen	42.0
CRLA	Pacific West	Departure analysis studies	Albright	116.9
DEVA	Pacific West	Devil's Hole monitoring	Christensen	24.0
BLCA	Intermountain	Quantification/contract negotiation	Wondzell/Pettee	45.5
DEVA/ LAME/ GRBA	Pacific West	Preparation for administrative hearings for the Las Vegas Valley Water District Water Right hearing	Johns	26.2
ROMO	Intermountain	Preparation for negotiation/litigation - Mirror Lake	McGlothlin	2.5
CARE	Intermountain	Reserved right quantification	Albright	52.5
CAHA	Southeast	Vegetation - ground water study	Wondzell	20.0
ALL	ALL	Preparation for dockets scanning	Albright	20.0
KALA	Pacific West	Hydrology study	Hughes	52.4
CRLA	Pacific West	Acquisition of water rights	Williams	31.0
MT Parks	Intermountain	Preliminary decree for Montana compact	Pettee	30.0
GRCA	Intermountain	Departure analysis data collection	Hansen	96.0
PISP	Intermountain	Historical research	Williams	10.6
CACO	Northeast	Ground water protection	McGlothlin	35.0
DEVA	Pacific West	Preparation for administrative hearings	Johns	5.0
ZION	Intermountain	Preparation for negotiation/litigation	Hansen	17.5
YELL	Intermountain	Stream gaging and ground water model	Gable/Christensen	101.1
CIRO	Pacific West	Sediment study	Hughes	0.5
LAME	Pacific West	Isotope hydrology study	Christensen	20.0
КАНО	Pacific West	Ground water study	Hughes	44.8
		Tot	al water rights program	805

¹Acronyms for park names are listed in appendix 1.



Water Rights Asst., Denise Newberry (F)

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OFFICE OF THE DIVISION CHIEF

Organization and Staff



Dan Kimball: Division Chief, M.S. in Water Resources Administration. Specialty areas include water and natural resources management planning and evaluation of complex regulatory issues.

Bill Walker: Water Resources Program Coordinator, Ph.D. in Aquatic Ecology. Specialty areas include natural resources management and aquatic ecosystem management.

Sharon Kliwinski: Water Resources Washington Liaison, B.S. in Environmental and Pollution Sciences. Specialty area includes environmental legislation and regulations; natural resource policy issues; and mining laws, policies, and programs.

Dave Ryn: Mathematician, M.S. in Mathematics. Specialty areas include computer and statistical technology.

Debi Cox: Program Analyst, B.A. in Anthropology.

Patty Hennessy: Secretary, B.B.A. in Business.

Carol Liester: Office Automation Clerk.

PLANNING AND EVALUATION BRANCH

Organization and Staff



Mark Flora: Branch Chief. Hydrologist, M.S. in Environmental Science. Specialty areas include waterresources management planning, water quality, and watershed management.

Joel Wagner: Hydrologist, M.S. in Environmental Science. Specialty areas include wetlands delineation, hydrology, and regulatory issues.

Leslie Krueger: Resource Management Specialist, B.S. Specialty areas include wetlands science, management, and regulatory issues.

David Sharrow: Hydrologist, B.S. in Watershed Science. Specialty areas include water resources management planning, water quantity, and water quality.

Frank Panek: Fishery Biologist, Ph.D. in Fishery Biology. Specialty areas include aquatic and marine resources management, fish biology, and habitat condition assessment/mitigation.

David Vana-Miller: Hydrologist, M.S. in Marine Biology. Specialty areas include water resources planning, aquatic and marine resources management, and water quality.

WATER OPERATIONS BRANCH

Organization and Staff



Bill Jackson: Branch Chief, Ph.D. in Hydrology. Specialty areas include sedimentation processes, fluvial geomorphology, and river rehabilitation and management.

Gary Rosenlieb: Water Quality Program Team Leader, M.S. in Water Resources. Specialty areas include water quality (chemistry and micro-biology), ground-water quality, and hazardous materials management.

Gary Smillie: Hydrology Program Leader, Hydrologist/Hydraulic Engineer, M.S. in Civil Engineering. Specialty areas include flood-frequency analysis, open-channel hydraulics, floodplain management, and sediment transport.

Larry Martin: Hydrologist, M.S. in Hydrology. Specialty areas include ground-water watershed management, riparian management, ground-water modeling, GIS applications in water resources, and hydrologic data analysis.

Rick Inglis: Hydrologist, B.S. in Watershed Science. Specialty areas include field hydrologic data collection using automated recorders, watershed management, ground-water monitoring, and data analysis.

Dean Tucker: Computer Programmer-Analyst, Ph.D. in Forestry. Specialty areas include data management, computer graphics, and water resources applications in GIS.

Barry Long: Hydrologist, M.S. in Forest Hydrology. Specialty areas include physical-chemical aspects of water quality.

Jill Minter: Research Associate, M.S. in Watershed Sciences. Specialty area includes water quality inventory and monitoring and water-quality data analysis.

Roy Irwin: Senior Contaminants Specialist, Ph.D. in Biology. Specialist in environmental contaminants and biological aspects of water quality (including bio-monitoring).

Michael Martin: Hydrologist, M.S. in Watershed Science. Speciality areas include geochemistry, water quality, geomorphology, flood analysis, and tropical aquaculture.

Brian Cluer: Grand Canyon National Park, Fluvial Geomorphologist, Ph.D. Candidate in Earth Resources at Colorado State University. Duty-stationed with the Water Operations Branch.

John Benham: Hydrologist, M.S. in Hydrology. Specialty areas include geohydrology, water quality, and contaminated area site characterizations (hydrology and water quality).

Alice Piotrowska: Secretary

STUDENT ASSISTANTS

Marion Dubler: Assistant Contaminants Specialist/CSU Cooperative Agreement Student Assistant. B.S. Candidate in PreMed.

Scott Hermsen: Water Quality Technician, M.S. Candidate in Analytical Chemistry (1995) & Environmental Engineering Division (1996). B.S. in Chemistry (1990).

Julie Mattick: Water Quality Technician, M.S. in Hydrology. Specialty areas include ground water contamination investigations.

Lynette Stevens: Assistant Contaminants Specialist/CSU Cooperative Agreement Student Assistant. M.S. Candidate in Watershed Science.

Mark VanMouwerik: Assistant Contaminants Specialist/CSU Cooperative Agreement Student Assistant. M.S. (pending) in Environmental Health.

Randy Siddens: Water Quality Data Analyst/CSU Cooperative Agreement Student Assistant. M.S. Candidate in Civil Engineering (Water Resources Planning and Management).

Elizabeth Eisenhauer: GIS specialist, M.S. Candidate in Geology (1997).

WATER RIGHTS BRANCH

Organization and Staff _____



Owen Williams: Branch Chief, M.S. in Watershed Science. Specialty areas include water law, upland watershed management, fluvial geomorphology, and surface water hydrology.

Chuck Pettee: Supervisory Hydrologist, Team Leader, M.S. in Watershed Science. Specialty areas include water rights, surface water hydrology and hazardous materials.

Dan McGlothlin: Supervisory Hydrologist, Team leader, B.S. in Watershed Hydrology. Specialty areas include water law, surface water hydrology, and upland watershed management.

Paul Christensen: Hydrologist, M.S. in Geology. Specialty areas include hydrogeology, ground-water hydrology, and ground water modeling.

Bill Hansen: Hydrologist, M.S. in Hydrology. Specialty areas include water law, surface water hydrology, field methods, and watershed management and rehabilitation.

Alice Johns: Hydrologist, B.S. in Watershed Sciences. Specialty areas include water law, upland watershed management, fluvial geomorphology, and field methods.

Jeff Albright: Hydrologist, M.S. in Watershed Management. Specialty areas include surface water hydrology, field methods, and instrumentation.

Jeff Hughes: Hydrologist, M.S. in Watershed Sciences. Specialty areas include surface water hydrology, field methods, and instrumentation.

Mark Wondzell: Hydrologist, M.S. in Agricultural Engineering. Specialty areas include surface water hydrology, riparian vegetation ecology/management, and field techniques.

Chris Gable: Hydrologist, B.S. in Watershed Sciences. Specialty areas include surface water hydrology and water quality control.

Denise Newberry: Water Rights Specialist, M.S. in Natural Resources Management and Range Science. Specialty areas include NPS law enforcement, and natural resources policy and administration.

Andrew Hautzinger: Hydrologist, B.S. in Watershed Sciences. Specialty areas include surface water hydrology, field methods, instrumentation, and riparian management.

Gustavo Diaz: Ph.D. in Civil Engineering. Speciality areas include Water Resources and Modeling.

Bernadette Berger: Research Associate; Colorado State University. B.A. in Speech Communications.

Lauren Hammack: Research Associate; Colorado State University. M.S. in Earth Sciences (Water Resources). Specialty areas include fluvial geomorphology, hydraulics, sediment transport, and computer modelling.

Marion Ford: Secretary. B.A. in Business.



AWARDS

Office of the Division Chief

Dan Kimball received the Stephen Tyng Mather Award for his unwavering pursuit of the greatest possible protection for national parks and park water resources. The award is presented by the National Parks and Conservation Association. This annual award goes to a government employee who has risked his or her job or career to preserve the integrity of the national parks' ideal.

Sharon Kliwinski received a Special Achievement Award for her contributions on work on abandoned mines initiatives and Clean Water Act reauthorization efforts.

Planning and Evaluation Branch

Mark Flora received a 'Fast Track' award from the NPS Office of Mexican Affairs for work accomplished on water-related activities undertaken in support of the DOI Border Environmental Issue Team.

Frank Panek received a Quality Step Increase from the former Wildlife & Vegetation Division as an acknowledgment of his performance in administering the 1995-1996 Natural Resources Professionalization Program.

Dave Sharrow received a Time-in-Service Award for 15 years with the Federal government.

Joel Wagner received a Time-in-Service Award for 15 years with the Federal government.

Water Rights Branch

Jeff Albright received a Time-in-Service Award for 10 years with the Federal government.

Paul Christensen received a Special Achievement Award in recognition of sustained superior performance that has consistently exceeded expectations for the protection of resource values at three Nevada park units.

Bill Hansen received a Time-in-Service Award for 15 years with the Federal government.

Alice Johns received a Special Achievement Award in recognition of sustained superior performance that has consistently exceeded expectations. Alice also received a Time-in-Service Award for 15 years with the Federal government.

Dan McGlothlin received a Performance Award for consistent outstanding levels of performance with respect to project management preparatory to litigation or negotiations involving Utah and Colorado park units.

Chuck Pettee received a Performance Award for consistent outstanding levels of performance with respect to project management leading to completion of the second phase of the water rights Compact for park units in Montana.

Water Operations Branch

Barry Long received a Special Achievement Award for work associated with the Dryden Landfill issue at Amistad National Recreation Area, anchialine pond water quality project at Kaloko-Honokohau National Historic Park, and USGS water quality monitoring at Bandelier National Monument as part of the NAWQA Program. Barry received a Certificate of Appreciation for serving as a member of the water resources projects evaluation panel.



Appendix 1

Referenced Units of the National Park System

Acronymn	Park Name	Area
ACAD	Acadia National Park	Northeast
AMIS	Amistad National Recreation Area	Intermountain
ANTI	Antietam National Battlefield	National Capitol
ARCH	Arches National Park	Intermountain
ASIS	Assateague Island National Seashore	Northeast
BAND	Bandelier National Monument	Intermountain
BEOL	Bent's Old Fort National Historical Site	Intermountain
BIBE	Big Bend National Park	Intermountain
BICA	Bighorn Canyon National Recreation Area	Intermountain
BICY	Big Cypress National Preserve	Southeast
BIHO	Big Hole National Battlefield	Pacific West
BISC	Biscayne National Park	Southeast
BISO	Big South Fork National River & Recreation Area	Southeast
BLCA	Black Canyon of the Gunnison National Monument	Intermountain
BLRI	Blue Ridge Parkway	Southeast
BRCA	Bryce Canyon National Park	Intermountain
BUFF	Buffalo National River	Intermountain
CAVE	Carlsbad Caverns National Park	Intermountain
CACO	Cape Cod National Seashore	Northeast
CAGR	Casa Grande National Monument	Intermountain
CAHA	Cape Hatteras National Seashore	Southeast
CAKR	Cape Krusenstern National Monument	Alaska
CANA	Canaveral National Seashore	Southeast
CANY	Canyonlands National Park	Intermountain
CARE	Capitol Reef National Park	Intermountain
CAVO	Capulin Volcano National Monument	Intermountain
CHAT	Chattahoochee River National Recreation Area	Southeast
CHCU	Chaco Culture National Historical Park	Intermountain
CHIC	Chickasaw National Recreation Area	Intermountain
CHIR	Chiricahua National Monument	Intermountain
CHIS	Channel Islands National Park	Pacific West
CHPI	Charles Pickney National Historical Site	Southeast
CIRO	City of Rocks National Reserve	Pacific West
CODA	Coulee Dam National Recreation Area	Pacific West
COLM	Colorado National Monument	Intermountain
COLO	Colonial National Historical Park	Northeast
CORO	Coronado National Memorial	Intermountain
COSW	Congaree Swamp National Monument	Southeast
CRLA	Crater Lake National Park	Pacific West

CRMO	Craters of the Moon National Monument
CURE	Curecanti National Recreation Area
CUVA	Cuyahoga Valley National Recreation Area
DENA	Denali National Park and Preserve
DEVA	Death Valley National Monument
DEWA	Delaware Water Gap National Recreation Area
DINO	Dinosaur National Monument
EBLA	Ebey's Landing National Historic Reserve
ELIS	Ellis Island
ELMO	El Morro National Monument
EVER	Everglades National Park
FIIS	Fire Island National Seashore
FLFO	Florissant Fossil Beds National Monument
FOBO	Fort Bowie National Historical Site
FOBU	Fossil Butte National Monument
FOCL	Fort Clatsop National Memorial
FOLS	Fort Larned National Historical Site
FONE	Fort Necessity National Battlefield
FOSC	Fort Scott National Historical Site
FRHI	Friendshin Hill National Historical Site
GAAR	Gates of the Artic National Dark & Preserve
GATE	Gateway National Pacreation Area
CETT	Gettysburg National Military Dark
GLAC	Glacier National Park
GLCA	Glan Canvon National Pacreation Area
COGA	Golden Gate National Decreation Area
COSP	Golden Snike National Historical Site
CDDA	Great Pasin National Dark
CDCA	Great Canyon National Dark
CDEE	Graanhalt Dark
GREE	Greenbell Park
GRAU	Grant-Konrs Kanch National Historical Site
GRPU	Grand Portage National Monument
GRSA	Great Sand Dunes National Monument
GRSM	Great Smoky Mountains National Park
GRIE	Grand Teton National Park
GUIS	Gulf Islands National Seashore
GUMO	Guadalupe Mountains National Park
GWCA	George Washington Carver National Monument
GWMP	George Washington Memorial Parkway
HAFO	Hagerman Fossil Beds National Monument
HALE	Haleakala National Park
HAVO	Hawaii Volcanoes National Park
HEHO	Herbert Hoover National Historical Site
HOSP	Hot Springs National Park
HUTR	Hubbell Trading Post National Historical Site
INDU	Indiana Dunes National Lakeshore
ISRO	Isle Royale National Park
JECA	Jewel Cave National Monument
JELA	Jean Lafitte National Historical Park & Preserve
JOTR	Joshua Tree National Monument

Pacific West Intermountain Midwest Alaska Pacific West Northeast Intermountain Pacific West Northeast Intermountain Southeast Northeast Intermountain Intermountain Intermountain Pacific West Midwest Northeast Midwest Northeast Alaska Northeast Northeast Intermountain Intermountain Pacific West Intermountain Pacific West Intermountain National Capital Intermountain Midwest Intermountain Southeast Intermountain Southeast Intermountain Midwest National Capital Pacific West **Pacific West Pacific West** Midwest Midwest Intermountain Midwest Midwest Intermountain Southeast Pacific West

KAHO	Kaloko-Honokohau National Historical Park
KALA	Kalaupapa National Historical Park
KATM	Katmai National Park and Preserve
KEMO	Kennesaw Mountain National Battlefield Park
KNRI	Knife River Indian Village National HS
LACH	Lake Chelan National Recreation Area
LACL	Lake Clark National Park and Preserve
LAME	Lake Mead National Recreation Area
LIBI	Little Bighorn Battlefield National Monument
LYJO	Lyndon B. Johnson National Historical Park
MACA	Mammoth Cave National Park
MANA	Manassas National Battlefield Park
MANZ	Manzanar National Historical Site
MEVE	Mesa Verde National Park
MIMA	Minute Man National Historical Park
MNRR	Missouri National Recreation River
MOCA	Montezuma Castle National Monument
MORA	Mount Rainier National Park
MORR	Morristown National Historical Park
MECC	Mississippi River Corridor Heritage Comm
NARP	Natural Bridges National Monument
NACE	National Capital Parks - Fast
NACL	National Park of American Samoa
NATE	Natchez Trace Darkway
NCEA	National Capital Field Area
NEDI	New River Corge National River
NIMI	Nichrara Missouri National Divervey
NOCA	North Casedon National Dark
OPDI	Obed Wild and Seemie Diversion
ODKI OLVM	Observation National Dark
	Organ Dine Costus National Manuscrat
ORPI	Organ Pipe Cactus National Monument
UZAK	Ozark National Scenic Riverways
PAIS	Padre Island National Seasnore
PECO	Pecos National Historical Park
PEFO	Petrified Forest National Park
PEIR	Petroglyph National Monument
PIRO	Pictured Rocks National Lakeshore
PISP	Pipe Spring National Monument
PORE	Point Reyes National Seashore
PRWI	Prince William Forest Park
PUHE	Puukohola Heiau National Historical Site
PUHO	Pu'uhonau O Honaunau National Historical Park
REDW	Redwood National Park
RICH	Richmond National Battlefield Park
ROCR	Rock Creek Park
ROMO	Rocky Mountain National Park
RUCA	Russell Cave National Monument
SAAN	San Antonio Missions National Historical Park
SACN	Saint Croix National Scenic Riverway
SAGA	Saint-Gaudens National Historical Park

Pacific West Pacific West Alaska Southeast Midwest **Pacific West** Alaska Pacific West Intermountain Intermountain Southeast National Capital Pacific West Intermountain Northeast Midwest Intermountain Pacific West Northeast Midwest Intermountain National Capital Pacific West Southeast National Capital Northeast Midwest Pacific West Southeast Pacific West Intermountain Midwest Intermountain Intermountain Intermountain Intermountain Midwest Intermountain Pacific West National Capital Pacific West Pacific West Pacific West Northeast National Capital Intermountain Southeast Intermountain Midwest Northeast

SAGU	Saguaro National Monument	Intermou
SAIR	Saugus Iron Works National Historical Site	Northeas
SAJH	San Juan Island National Historical Park	Pacific V
SAMO	Santa Monica Mountains National Recreation Area	Pacific V
SARA	Saratoga National Historical Park	Northeas
SCBL	Scotts Bluff National Monument	Midwest
SEKI	Sequoia and Kings Canyon National Park	Pacific V
SHEN	Shenandoah National Park	Northeas
STLI	Statue of Liberty National Monument	Northeas
SUCR	Sunset Crater Volcano National Monument	Intermou
THRO	Theodore Roosevelt National Park	Midwest
TIMU	Timucuan Ecological and Historic Preserve	Southeas
TONT	Tonto National Monument	Intermou
TUZI	Tuzigoot National Monument	Intermou
UPDE	Upper Delaware Scenic and Recreation River	Northeas
VAFO	Valley Forge National Historical Park	Northeas
VIIS	Virgin Islands National Park	Southeas
VOYA	Voyageurs National Park	Midwest
WACA	Walnut Canyon National Monument	Intermou
WEIR	Weir Farm National Historical Site	Northeas
WRST	Wrangell-St. Elias National Park and Preserve	Alaska
WUPA	Wupatki National Monument	Intermou
YELL	Yellowstone National Park	Intermou
YOSE	Yosemite National Park	Pacific V
ZION	Zion National Park	Intermou





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As the nation's principal conservation agency, the Department of the Interior has the responsibility for most of our nationally owned public lands and natural and cultural resources. This includes fostering wise use of our land and water resources, protecting our fish and

wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people. The Department also promotes the goals of the Take Pride in America campaign by encouraging stewardship and citizen responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

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