



THE SECRETARY OF THE INTERIOR
WASHINGTON

April 22, 1992

Dear Friend:

On August 9, 1991 President Bush announced a Comprehensive Wetlands Plan that seeks an expanded program of wetlands protection, enhancement, and restoration coupled with sustained economic growth and protection of private property rights. I am proud to announce that the Department of the Interior has developed a Wetlands Management Plan, described in "**Wetlands Stewardship**", to achieve the President's August 9th Plan. At the Department of the Interior, we are working to meet the President's wetlands challenges.

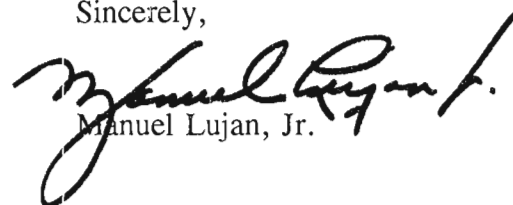
One of the premier wetlands programs is the North American Waterfowl Management Plan. The North American Wetlands Conservation Act of 1989, signed into law by President Bush, provides Federal cost-share funding to support the Plan. One of the many 1991 highlights of the North American Waterfowl Management Plan was the dedication of the Llano Seco Ranch in California, involving the protection of more than 14,000 acres for wetlands. The President's FY 93 Budget proposes \$15 million to fully fund the North American Wetlands Conservation Act of 1989.

Another premier initiative of the Department is the Bureau of Land Management's "Habitat Management on Public Lands," which is a strategy plan for management of waterfowl and wetlands currently being implemented in partnership with a variety of organizations.

During 1991, the Bush Administration was involved in many actions that have had beneficial effects for wetlands. For example, in negotiating the Exxon Valdez Oil Settlement, the Administration secured \$12 million of criminal penalties for deposit to the North American Wetlands Conservation Fund for further implementation of the North American Waterfowl Management Plan. Another example is the Phoenix Indian School/Collier land exchange, which will add about 108,000 acres of wetlands in south Florida to the National Wildlife Refuge and the National Park Systems.

On July 16, 1991, the Department of the Interior hosted a Symposium on "Wetlands Restoration Activities on Federal Lands." At this Symposium, Interior highlighted its many wetland restoration activities in various regions of the country. A significant portion of "**Wetlands Stewardship**" is devoted to the presentations made at the Symposium.

Sincerely,



Manuel Lujan, Jr.



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EXECUTIVE SUMMARY

Wetlands have important ecological values and functions. It is estimated that 80 percent of the Nation's coastal fisheries are dependent on wetlands for spawning, nursery areas, and food sources. Both coastal and inland wetlands provide essential breeding, nesting, feeding, and predator escape habitats for millions of waterfowl, other birds, mammals, and reptiles. Well over one-third of the 564 plant and animal species listed as threatened or endangered in the United States utilize wetland habitats during some portion of their life cycle.

Wetlands are also crucial to maintaining the hydrology of some watersheds. They serve as natural reservoirs and as ground-water recharge areas and are important in protecting the quantity and quality of ground water used as a source of drinking water. Studies have also shown that the presence of wetlands in a flood plain can reduce flood peaks by 80 percent. The natural water filtering, erosion and sediment control capabilities of wetlands contribute to the overall improvement of water quality. By filtering out pollutants and trapping sediments, wetlands help to maintain water quality. Artificial wetlands are now being created as a means of treating sewage.

Wetlands are vital to commercial and recreational sectors of our economy. Wetlands, especially bottomland forests, supply timber for the Nation's logging industry. Moreover, the sport fishing industry and the waterfowl hunting industry are also dependent upon the continued productivity of America's wetlands. In addition, wetland diversity of plant and animal life make them a valuable resource for nonconsumptive fish and wildlife related recreation. Wetlands provide educational and research opportunities, as well as a perspective on historical and archaeological values.

"Wetlands Stewardship" is organized first, to outline the Plan which the Interior Department has developed to implement the President's wetlands goals; second, to describe the wetlands activities of the Department and some of the 1991 highlights; third, to illustrate specific wetlands activities in various regions of the country; and fourth, to present the ABSTRACTS from the Department's Symposium on Wetlands Restoration.

"Wetlands Stewardship" is intended as a resource for everyone interested in wetlands protection. If you would like additional information, we suggest you contact the Department of the Interior or its bureaus in Washington or at field locations. We encourage you to contact us about ways we can all promote the conservation of our wetlands resources.



INTERIOR'S PLAN FOR WETLANDS MANAGEMENT

The Department of the Interior, through its land and natural resources stewardship responsibilities, will make significant contributions to the President's Plan and wetlands goals. The Department has developed an active agenda for meeting these goals.



Principles for Interior's Wetlands Management

1. Wetlands are an important natural resource.

Wetlands are valuable resources which have important ecological values and functions. In their natural state, wetlands produce numerous benefits for society. They regulate water flows, store water and buffer the effects of storms, filter and help to purify water, and provide essential habitats for plants and animals.

2. Wetlands are not Identical.

Wetlands and their values, functions and abundance, can vary greatly geographically. Public policies, regulations, and expenditures need to have flexibility to allow for regional differences in wetlands. Some wetlands may be relatively more valuable than others. Therefore, assessments of wetland values must take into account the variability, the relative benefits and functions associated with wetlands as well as the total acreage of wetlands protected, enhanced, or restored. Economic growth and private property rights are critical elements in any assessment.

3. Wetlands protection requires partnerships.

Wetlands have values that bring benefit to the American public. While Interior manages thousands of acres of wetlands on public lands, the majority of wetlands are privately owned. Therefore, strong partnerships between the Federal government, State and local governments and the private sector are key elements to ensuring a solid, comprehensive, and coordinated program for managing wetlands while sustaining economic growth and protecting private property rights.

4. The Department of the Interior will demonstrate responsible wetlands stewardship.

The Department of the Interior manages large portions of the Nation's public wetland areas. The Department's stewardship of wetlands includes land management, conservation, preservation, restoration, enhancement, resource development, regulation and the development of public and private partnerships. The Department of the Interior will use the public lands that it manages, and its expertise, as a "natural outdoor living laboratory" for developing wetland management practices which demonstrate the value of wetlands stewardship.



5. Public education about wetlands is crucial.

The Department of the Interior will initiate and enhance education programs for the public which emphasize wetlands benefits and illustrate steps the Department and others are taking to increase those benefits, and promote individual and public responsibility for sound wetlands stewardship.

6. Decisions will be based on sound science and economic information.

Decisions should be based on the best available information about wetlands functions, values, quantity, public benefits, and costs.

The President's Plan

President Bush has stated that we must look beyond regulation to encourage wetlands protection. We must enhance public understanding of the value of wetlands as well as support non-regulatory programs that encourage private, state and local actions to conserve wetlands.

To ensure further progress towards the President's wetlands goal, the Bush Administration has proposed several new initiatives to enhance wetlands protection on Federal and private lands:

- Full funding of the wetlands reserve program.
- Initiation of a wetlands restoration and creation program on Federal lands.
- Priority for wetlands in allocation of the Land and Water Conservation Funds.
- Expansion of the satellite monitoring program to assess wetland trends.
- Strengthening wetlands research.
- Expansion of outreach programs.
- Revision of the Executive Order on wetlands (EO 11990).

The Bush Administration has established an interagency Categorization and Mitigation Banking Committee to define a limited number of major wetland categories based on function, value, and relative scarcity or abundance. This committee will consult with outside experts in defining the categories and will complete its work in early 1993.

The Categorization and Mitigation Banking Committee will also refine the details of a market-oriented mitigation banking system based on the categories it defines. The mitigation banking system will be designed to provide adequate market-driven incentives for the private restoration or creation of wetlands that can be used to mitigate the effects of developed wetlands.

The Department of the Interior and its bureaus will support and contribute its expertise to these initiatives.



Secretary Lujan's Leadership and Wetlands Goals

- To continue fostering the Secretary's **Stewardship Agenda** which contains many points that relate to wetlands: improving natural resources for our children, education about natural resources, sustainable multiple-use management, science and technology, and partnerships with State and local governments and the private sector.
- To improve the quality of wetlands on lands managed by the Department of the Interior, to eliminate all avoidable losses of wetlands and, where economically feasible, to balance any wetland losses with wetland gains.
- To provide leadership in the stewardship of wetlands on Federal lands and lands held in public trust by the Department of the Interior.
- To initiate protection, restoration, enhancement and creation projects to increase, where economically feasible, acreage and values of Department of the Interior wetlands resources.
- To increase our knowledge of wetlands, their functions and values, and promising mechanisms for wetland protection and enhancement.
- To develop partnerships with State and local governments and the private sector to enhance the Nation's wetlands resources.
- To maintain wetlands policies that respect private property rights.

Strategies for Implementation

Stewardship Activities

- Design, develop and implement wetland restoration, protection and enhancement policies, plans and programs on public lands to reduce loss of wetlands, improve the quality of wetlands, and, where possible, attain wetland gains.
- Include wetlands conservation in planning, construction, operations and maintenance, and resource management programs of Department of the Interior bureaus.
- Restore and create wetlands on Department of the Interior lands, and provide information to the public on the techniques used and the degree of success achieved.



Inventory and Classification Activities

- Complete the National Wetlands Inventory, and develop a wetlands digital data base for Department of the Interior lands.
- Maintain a current inventory of the quality and quantity of Department of the Interior wetlands resources, monitor their condition and trends, and make necessary changes to manage healthy functioning wetlands.
- OMB Circular A-16 establishes an interagency committee to coordinate wetland map data. Through this Committee, Interior will work to establish standards for describing wetlands and their associated quantity, quality and trends, and ensure the compatibility of information among Department of the Interior bureaus, and other Federal agencies including the establishment of joint data bases.
- Collect and make available to others, information on the quantity, quality, functions and values of wetlands as part of land and water resource management responsibilities.

Science and Technology Activities

- Initiate studies to understand the role of nature and man in the processes that create, destroy, and deteriorate wetlands, and develop criteria for assessing wetland functions and values, including economic benefits, costs and private property rights.
- Devise and evaluate environmental engineering techniques and design for creating, restoring, and enhancing wetlands.

Education Activities

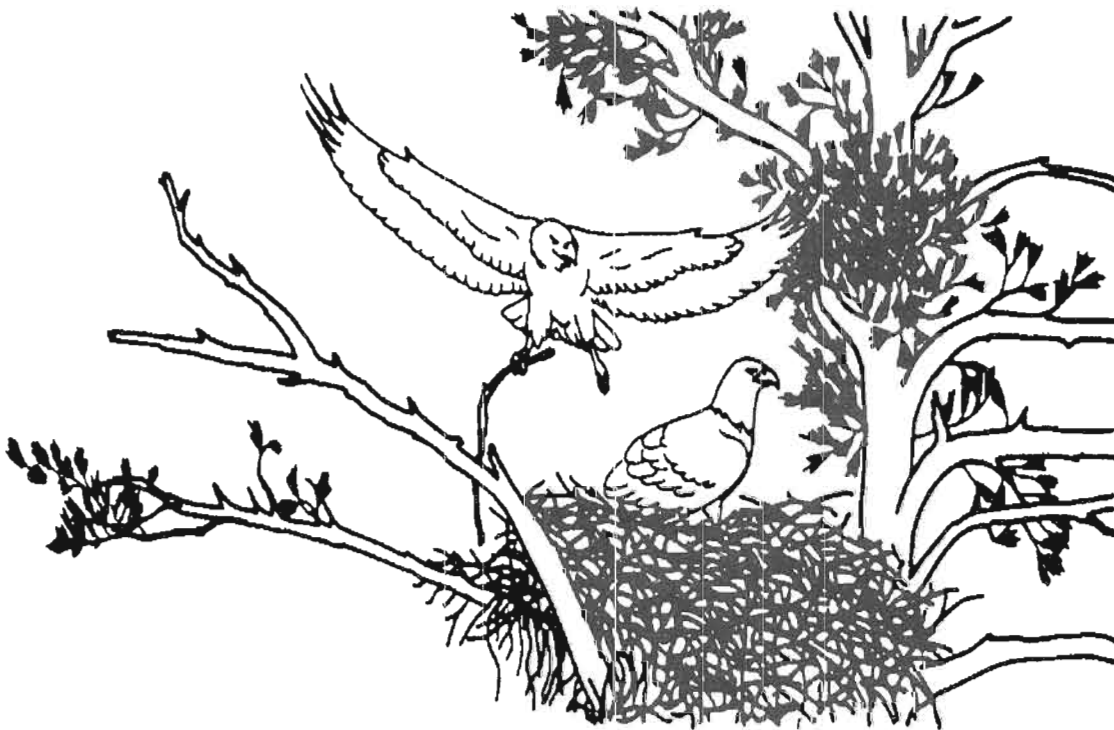
- Develop a comprehensive wetland education, training and information program regarding the Department of the Interior's wetlands activities.
- Communicate to the public an understanding of the functions and values of wetlands, and the sensitivity that wetlands are a resource worthy of protection.
- Design "showcase" projects to provide better understanding of wetlands and their role in society.



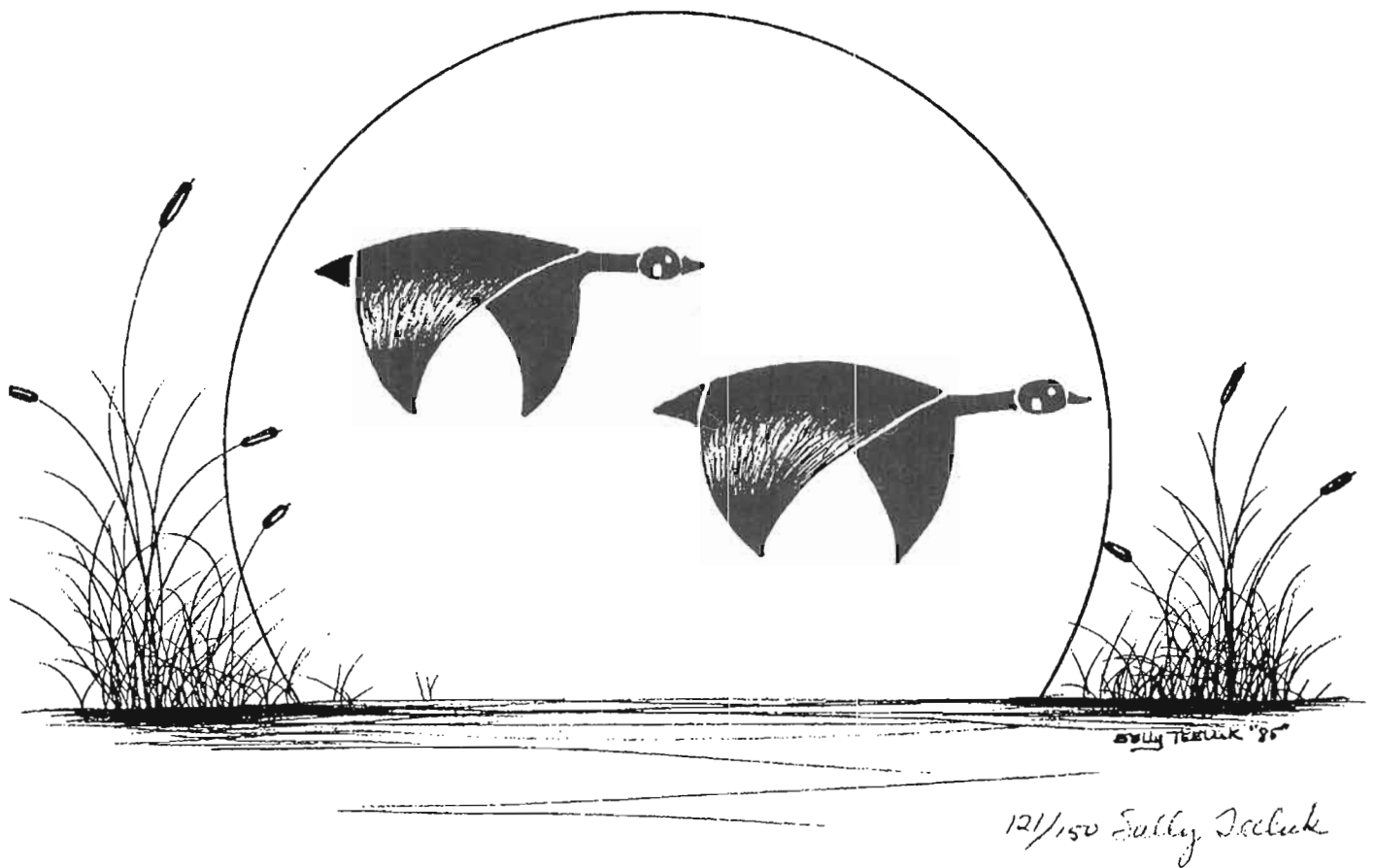


Partnerships

- Facilitate partnerships with State and Federal agencies and public and private organizations to restore and enhance wetlands resources.
- Develop cooperative arrangements for wetland stewardship, including cost sharing, technical assistance, demonstration projects, mapping, research, and technology transfer.
- Encourage the integration of geographic information systems into wetlands management with Federal, State and local agencies.
- Encourage individuals and public and private sector organizations to participate in activities relative to wetlands protection, enhancement, restoration, creation, and management.
- Ensure that resources management and wetlands policy preserve as a fundamental principle the protection of private property rights.



INTERIOR'S WETLANDS PROGRAMS





U.S. Fish and Wildlife Service



North American Waterfowl Management Plan continues to gain prominence as one of the Secretary's major wetlands conservation programs, to achieve the objectives for the conservation and preservation of the Nation's precious wetland resources. The Plan joins the efforts of public and private conservation groups by applying the joint venture concept to develop partnerships and matching grant funding arrangements to carry out wetlands protection, restoration and management practices.

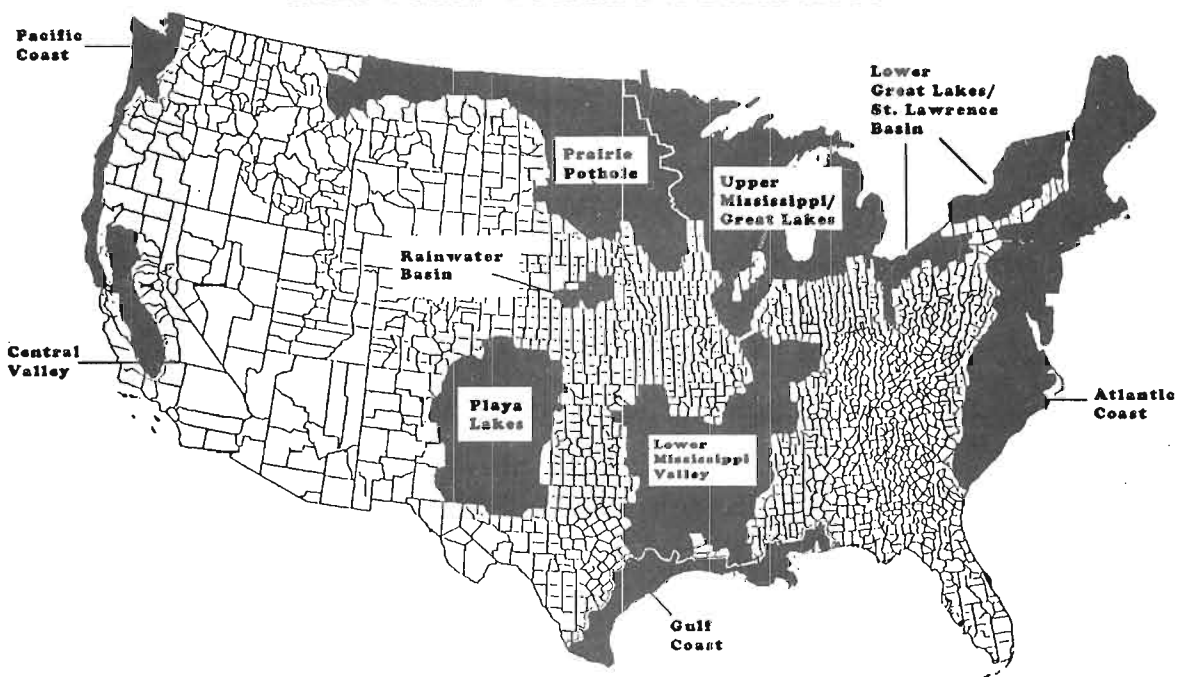


Since 1989, more than 100 wetland conservation partnerships have been arranged involving more than 140 wetland projects and securing more than 600,000 acres of vital wetlands. These wetlands benefit migratory bird populations and a host of other animal and plant species, some of which are threatened or endangered.

The **Fish and Wildlife Service** plays a lead role in the North American Waterfowl Management Plan. The **Bureau of Land Management**, the **Bureau of Reclamation**, and the **Bureau of Indian Affairs** as well as other federal agencies have been assisting in implementation of the Plan. These partnerships include the governments of the United States, Canada, and Mexico, 50 states, 10 provinces, and more than 250 conservation groups.

Through wetland conservation, the **North American Waterfowl Management Plan** has earned a reputation as one of the premier wetland conservation programs. Wetlands acreage protected, enhanced or restored within joint venture areas are shown in the table on the next page. The regional summaries provide examples of North American Waterfowl Management Plan.

NORTH AMERICAN WATERFOWL MANAGEMENT PLAN ***U.S. Joint Venture Boundaries***





 North American Waterfowl Management Plan 1991 Accomplishments¹				
Joint Venture Area	Wetlands Protected² (acres)	Wetlands Restored³ (sites)	Wetlands Enhanced⁴ (acres)	Wetlands Agreements⁵ (acres)
Pacific Coast	6,724	1,330	1,564	
Central Valley	6,079	2,812	3,574	40,435
Upper Mississippi/ Great Lakes	This Joint Venture was launched in 1991. Accomplishment figures not yet available.			
Prairie Pothole	69,184	11,749	9,314	2,731
Rainwater Basin	1,658	1,048	100	8
Gulf Coast	29,069	3,196	19,693	120,177
Lower Mississippi Valley	73,758	20,805	68,275	30,000
Atlantic Coast	53,458	3,624	21,865	
Lower Great Lakes - St. Lawrence Basin	1,750	890	2,125	
Playa Lakes		283	420	
TOTALS	241,680	45,737	126,930	193,351

- ¹ The major credit for these Fiscal Year 1991 accomplishments belongs to the many **Partners** involved in each project. Accomplishment figures do overlap with those reported for the programs of other partners in this report.
- ² Wetlands **protection** is acquiring or securing interest in property to protect wetland and other habitat functions and values.
- ³ Wetland **restoration** is the rehabilitation of degraded or lost wetlands.
- ⁴ Wetland **enhancement** is increasing specific fish and wildlife functions and values of existing wetland habitat.
- ⁵ The Fish and Wildlife Service, and other conservation entities, provide financial and technical assistance to restore or enhance wetlands and other wildlife habits to private landowners under cooperative **agreements**.



Since 1987, the Fish and Wildlife Service (FWS) has entered into over 7,000 **voluntary** agreements with private landowners to restore converted or degraded wetlands on their property. To date the Partners for Wildlife program has helped restore over 140,000 acres of wetlands on private lands throughout the country. Taking into consideration

landowner interests, restorations are designed to provide the greatest natural diversity of wildlife and other natural values that can be feasibly returned to previously converted or degraded wetland sites. Wetlands restored under the Partners for Wildlife program have both natural hydrophytic vegetation and hydrology present.

The program is truly a partnership effort. Although funding for wetland restoration efforts has primarily come from the FWS, individual landowners, local soil and water conservation districts, water management districts, Ducks Unlimited, state agencies, and other conservation groups contributed over \$2,000,000 to cost-share much of the 41,153 acres of wetland restoration on private lands in 1991. In 1991, outside funding for wetland restoration on private lands allowed the FWS to accomplish many wetland restoration projects on private lands.

Ducks Unlimited, Soil and Water Conservation Districts, and many other organizations also help publicize the program and work with landowners in planning the restorations. The U.S. Department of Agriculture Soil Conservation Service provides engineering and planning assistance on many restorations and the Agricultural Stabilization and Conservation Service makes lands in the Conservation Reserve Program available for restoration projects where landowners are interested.

Landowners in increasing numbers are looking to the FWS to restore and protect wetlands on their property. In most states with active programs there are waiting lists for wetland restoration assistance. Some want wetlands restored because of hunting and other recreational opportunities provided. Others interested in the aesthetics of diverse vegetation and wetland wildlife. All the participating landowners agree to maintain the wetlands for at least 10 to 25 years; some **voluntarily** place permanent easements on restored wetlands. Examples of wetland benefits to landowners, through the **Partners in Wildlife** are illustrated in the regional summaries.





WETLANDS STEWARDSHIP



The Fish and Wildlife Service continues to protect, restore, and manage over 30 million acres of wetlands within the National Wildlife Refuge System. The Service has been involved in a wide variety of activities to improve the quality of wetlands within the System. For example: on the Bear River NWR in Utah dikes and water control structures were replaced to manage

25,000 acres of marsh as floodwaters of the Great Salt Lake recede; 2,500 acres of marsh restorations were completed at Anahuac National Wildlife Refuge in Texas; 1,200 acres at Back Bay NWR in coastal North Carolina; 1,500 acres at Prime Hook National Wildlife Refuge in Delaware; 360 acres at Agassiz in Minnesota; and 700 acres at Squaw Lake in Missouri.

Numerous smaller projects restored 2,045 acres of wetlands in the intermountain states, 1,088 acres in the upper midwest, and 22,377 acres in the southeast. 1,350 acres of bottomland hardwood was restored by replanting in the southeast region.

The Fish and Wildlife Service continues to acquire fee title or easement to lands containing wetlands to protect important waterfowl breeding habitat, migration resting places and wintering areas as well as important habitat for other migratory birds and endangered species. The areas, acquired in fee, easement, or other interests (leases, cooperative agreements, etc.) become units of the National Wildlife Refuge System. Lands acquired in Fiscal Year 1991 through use of the Migratory Bird Conservation Fund and the Land and Water Conservation Fund totaled 230,510 acres of which 140,000 acres or 61% were in wetland project areas.

NATIONAL WILDLIFE REFUGE SYSTEM 1991 ACQUISITIONS

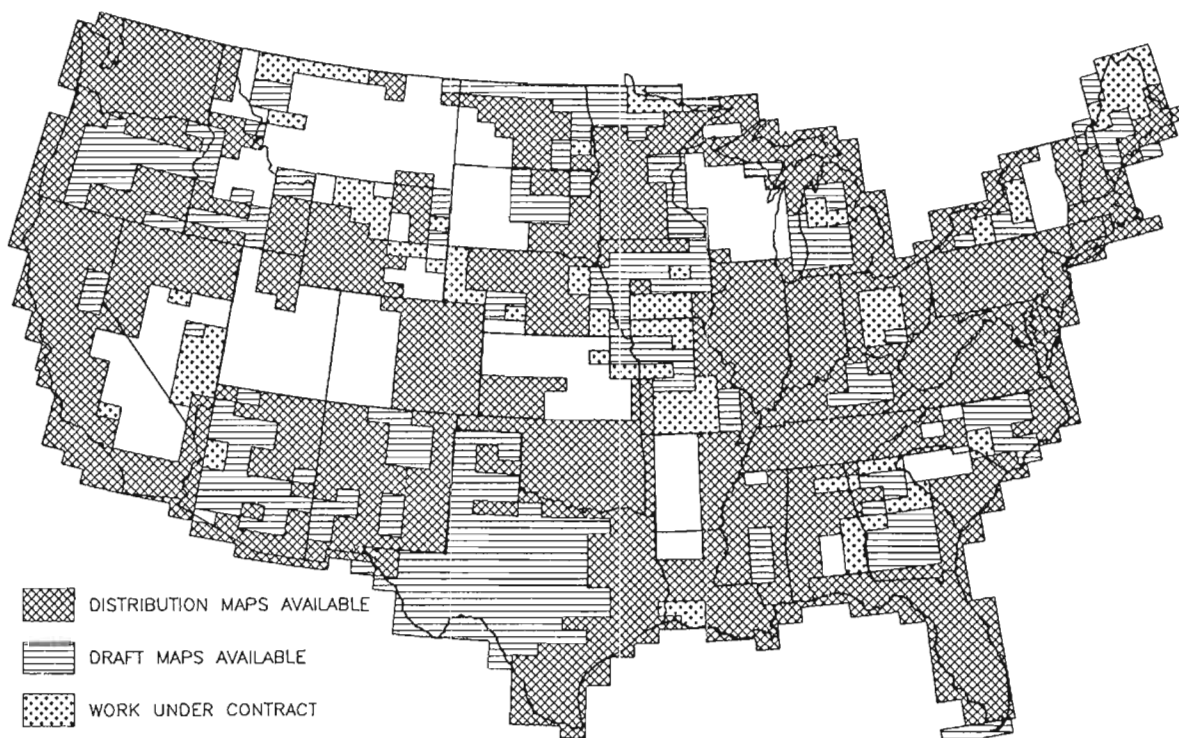
STATE	ACRES
Alabama	288
Arizona	93,162
California	11,502
Connecticut	4
Florida	8,029
Georgia	52
Iowa	1,150
Illinois	3,249
Kansas	8
Louisiana	18,100
Maine	353
Maryland	556
Minnesota	6,680
Missouri	40
Mississippi	12,692
Montana	5,267
N Carolina	3,137
N Dakota	2,907
Nebraska	898
New Jersey	1,996
Oklahoma	794
Oregon	1,902
Pennsylvania	369
Rhode Island	83
S. Carolina	3,729
S. Dakota	32,511
Tennessee	168
Texas	14,632
Virginia	3,856
Washington	688
Wisconsin	952
W. Virginia	736
Wyoming	20
230,510	





National Wetlands Inventory. The U.S. Fish and Wildlife Service's National Wetlands Inventory is mandated by the Emergency Wetlands Resources Act of 1986 to produce two different products: 1) periodic reports to Congress on the current status and trends of wetlands using statistical sampling procedures; and 2) detailed maps of the Nation's wetlands. A report entitled "**Wetlands Status and Trends in the Conterminous United States, Mid-1970's to Mid-1980's**" was sent to Congress. It is the first update of the original wetlands status and trends report to Congress, "**Wetlands of the United States: Current Status and Recent Trends**" that covered wetland status and trends from the mid-1950's to the mid-1970's. The Emergency Wetlands Resources Act requires that this monitoring of the wetlands status and trends be reported on a 10-year cycle. Copies of the maps are sold through the toll free telephone number 1-800-USA-MAPS and also through 28 State-run distribution centers.

STATUS OF NATIONAL WETLANDS INVENTORY



-  DISTRIBUTION MAPS AVAILABLE
-  DRAFT MAPS AVAILABLE
-  WORK UNDER CONTRACT

TELEPHONE 1-800-USA-MAPS FOR MAP INFORMATION
[IN VIRGINIA (703) 648-6045]

OCTOBER 1991



Bureau of Land Management

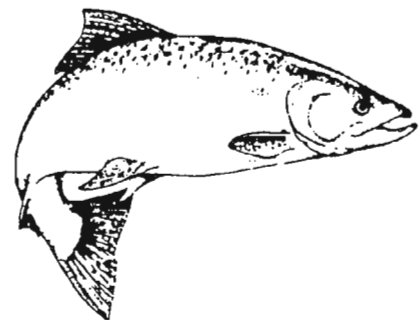


The Bureau of Land Management (BLM) is continuing to implement **"Riparian Wetland Initiative for the 1990's,"** **"Waterfowl Habitat Management On Public Lands, A Plan For the Future,"** and **"Fish and Wildlife 2000."** These strategy documents lay out a series of goals and recommendations that identify management and conservation strategies for 23.7 million wetland-acres of public lands. These initiatives specify strategies for restoring and enhancing wetlands/riparian areas over the next ten years. They provide a framework for each state to implement riparian/wetland strategy plans in a consistent manner and in partnership with a variety of organizations.

BLM improved 9,300 acres of existing wetlands/riparian areas, and expanded wetlands habitat by 2,900 acres. A total of 682 projects were constructed for the restoration of riparian/wetlands areas. These projects included planting, fencing, implementation and modification of grazing systems, construction of nesting islands and platforms and dike systems for expansion of wetlands habitats.

BLM inventoried 1.5 million acres and 2,970 miles of riparian/wetlands areas. Approximately 1.0 million acres of the total was a cooperative challenge cost share project with Ducks Unlimited in Alaska. In other states, 324,000 acres were inventoried in cooperation with the FWS's National Wetlands Inventory. The balance of the inventories completed were site specific surveys necessary to develop management objectives and to assess habitat condition.

In 1991, the BLM Director presented Riparian Stewardship Awards to 2 individuals and 11 groups for their outstanding efforts in riparian area restoration and enhancement, protection, education, or coordination. This award is presented each year to honor outstanding private sector contribution for public land riparian improvement. In Montana, a rancher received the award for his outstanding effort in implementing resource management involving all resource values, including enhancement of fishery values. In Nevada, the mining industry received the award for their effort in providing construction equipment, personnel, and expertise for maintenance of existing investments in the Sonoma Creek area, near Winnemucca.



The BLM is actively acquiring riparian-wetland areas through exchange, donation, or purchase, especially in areas adjacent to Key Waterfowl Habitat Management Areas, as identified in **"Waterfowl Habitat Management on Public Lands,"** or in areas that are critical for threatened or endangered species. Opportunities to acquire key riparian-wetland areas from voluntary sellers were exercised through mutually beneficial transactions.



 Recent Key Riparian/Wetlands Acquisitions		
Project Name	District/State	Acres
FEE PURCHASE		
King Range	Arcata, California	41
Carrizo Plains	Calienta, California	16,712
Carrizo Plains	Calienta, California	60
Kelley Property	Montrose, Colorado	16
Clearwater River	Coeur d'Alene, Idaho	27
Egin Lakes	Idaho Falls, Idaho	20
Owyhee Wild River	Vale, Oregon	107
S F Walla Walla River	Baker, Oregon	65
New River	Coos Bay, Oregon	345
SUBTOTAL		17,393
LAND EXCHANGE		
North Eagle Lake	Eagle Lake, California	138
Afton Canyon	Barstow, California	14,348
Consumnes River	Folsom, California	154
Randleman	Craig, Colorado	640
Sheppard and Assoc.	Canon City, Colorado	1,013
East Fork Salmon River	Salmon, Idaho	40
Black River	Carlsbad, New Mexico	440
Marys River	Elko, Nevada	46,969
Blue Grade Partnership	Washington	380
SUBTOTAL		65,922
TOTAL		83,315



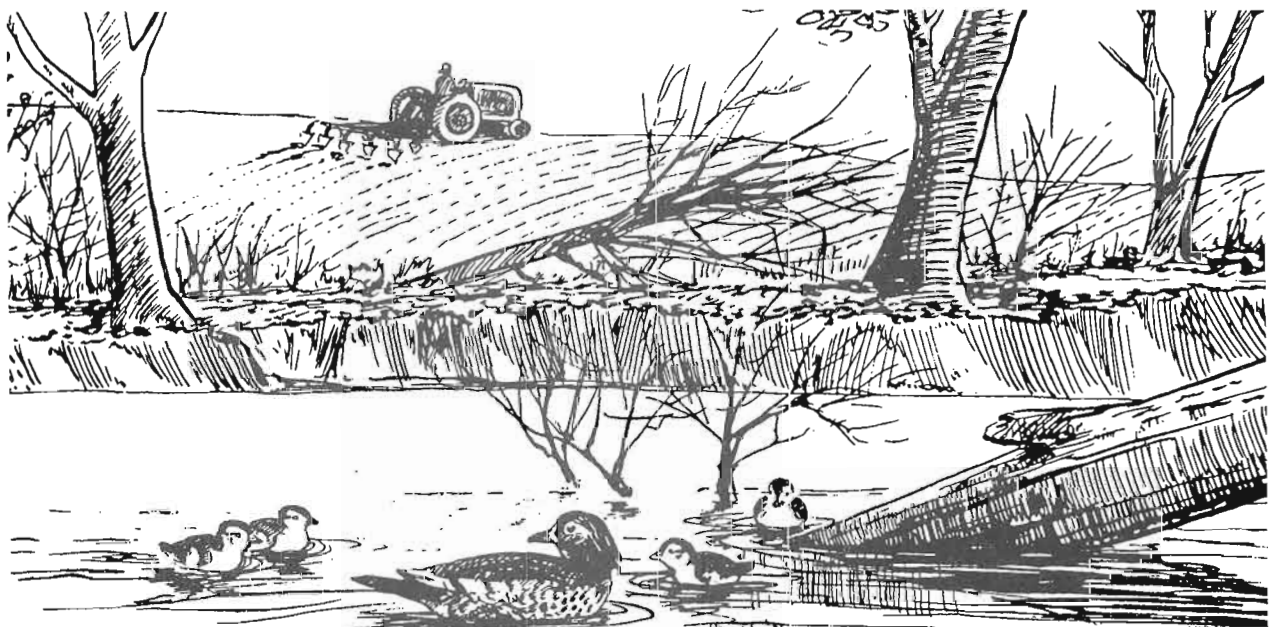
Bureau of Reclamation



The Bureau of Reclamation's wetlands and riparian habitat initiative continues to emphasize: (1) cooperative projects on Reclamation lands that support the North American Waterfowl Management Plan, (2) cooperative research projects that demonstrate how wetlands and riparian habitat can be preserved and enhanced in concert with overall water resources management, and (3) development of a complete inventory of wetlands and associated riparian areas on the 8.5 million acres of land owned by Reclamation.

On May 15, 1990, Reclamation entered into an agreement with the Fish and Wildlife Service's National Wetlands Inventory to produce a wetlands inventory and aerial maps for wetlands and riparian habitat on approximately 8.5 million acres of lands managed by Reclamation throughout the 17 Western States. This inter-agency agreement was designed to achieve respective agency goals related to wetlands and riparian habitat inventory, classification, and mapping. The estimated \$2.5 million cost of the agreement will be shared equally between the two organizations.

Reclamation's "**Wetlands Ecology and Utilization**" is a 5-year research program which focuses on basic wetland processes and is primarily confined to four sites; Upper Klamath Lake, Oregon; Eastern Municipal Water District, Hemet, California; American Falls Reservoir, Idaho; and Heart Butte Reservoir, North Dakota. Other local, State, and Federal agencies have been involved in this field research.





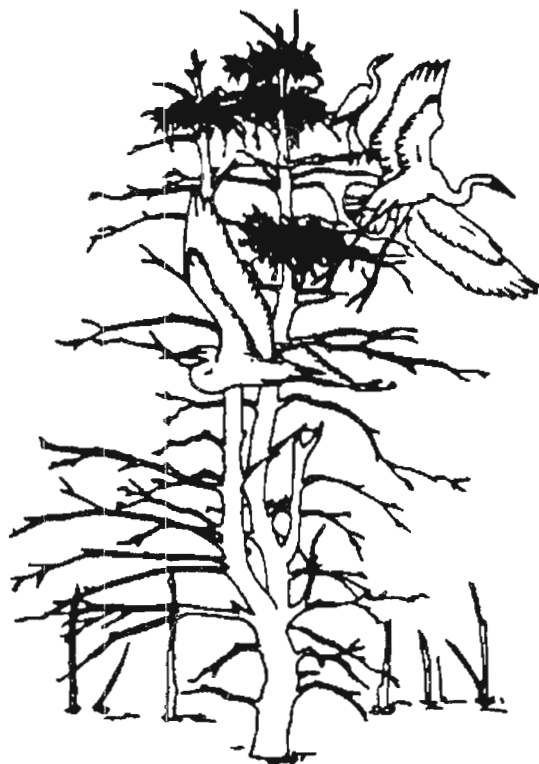
National Park Service



The National Park Service manages over 80 million acres of land and water across 49 States, the District of Columbia, and the Trust Territories. A diversity of wetland types is represented in the 354 units of the National Park

Service, ranging from the sawgrass marshes of the Florida Everglades to the tundra of Denali National Park in Alaska.

The National Park Service Servicewide Wetlands Protection program is dedicated to assisting units of the National Park System to meet the increasing challenges of protecting and preserving wetlands resources and values. The emphasis of the National Park Service wetlands program is on completing park inventories of wetlands resources and restoring wetlands functions and values where they have been impaired by or threatened by man-induced disturbances.



 WETLAND INVENTORIES COMPLETE	
Region	National Park System Unit
Alaska	Yukon-Charley Rivers National Preserve
Northeast	Acadia National Park (ME) Colonial National Historic Park (VA) George Washington Memorial Parkway (VA)
West	North Cascades National Park (WA)
Southwest	Pecos National Monument (NM)
Mountain	Glacier National Park (MT)



Geological Survey

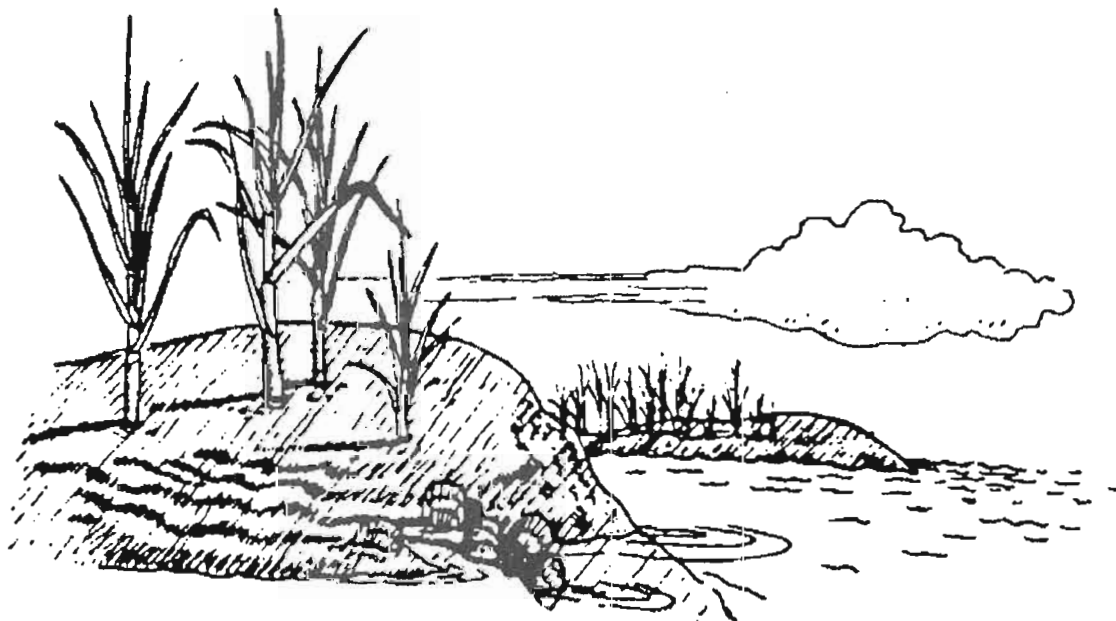


The Geological Survey currently is planning and preparing a **National Water Summary on Wetlands** to be published in 1994 as part of the National Water Summary. This effort involves significant participation by other Department of the Interior bureaus such as the U.S. Fish and Wildlife Service, other Federal agencies, and State and local agencies. National Water Summaries are intended to be informative to a wide range of audiences, including land and resource managers, decisionmakers, scientists, and the general public.

The Geological Survey published Circular 1075, "Coasts in Crisis," which describes the varied coastal environments of the United States, including coastal wetlands, and the natural processes which impact shorelines, such as sea-level rise and erosion, and shrinking sediment supplies, that constantly modify and often threaten coastal wetland stability.

The Geological Survey is preparing a circular on wetlands similar to Circular 1075 with publication expected before mid-1992. The circular will provide an overview of USGS wetlands studies across the country. Many of these studies are being conducted in cooperation with other bureaus of the Department of the Interior. The purpose is to provide an overview to a general audience of the many kinds of wetlands that occur in the United States, some of the processes that occur in them, and the impact man is having on them.

The Geological Survey, implementing a 1990 Memorandum of Understanding with the U.S. Fish and Wildlife Service (FWS), has formed a group of geographers and cartographers to investigate the feasibility and appropriateness of transferring digital wetlands data provided by the FWS National Wetlands Inventory (NWI), for use by the USGS in revising portions of the national topographic map series.





Bureau of Mines



Using Wetlands To Control Acid Mine Drainage. As a result of research efforts by the Bureau of Mines (BOM), which established that wetlands could be constructed on mined lands to treat acidic mine water biologically, wetlands continue to be created in the Eastern United States by mining companies and State reclamation agencies. In 1991, to promote this trend, Bureau of Mines personnel presented workshops on wetlands construction for acid mine drainage treatment in Pennsylvania, Ohio and West Virginia.

Contaminated mine drainage is one of the most persistent mining-related problems in the United States. More than 5,000 miles of waterways in Appalachia, from Pennsylvania to Alabama, are contaminated by acid mine drainage. The most common pollution is caused by pyrite -- better known as "fool's gold" -- which is found in many mines. When exposed to air and water, pyrite, which contains iron and sulfur, is gradually transformed into iron-laden sulfuric acid. The acid then dissolves other metals -- including manganese and aluminum -- from the surrounding rock. Water from underground streams and rainfall washes these contaminants into the closest streams, turning them a bright, rusty red. The acid drainage enters streams at levels 30 to 300 times more acidic than rain, strong enough to kill many species of fish and aquatic vegetation. In several cases, the water can become undrinkable for wildlife, animals and humans.

Standard mine drainage treatment is costly, involving the addition of alkaline chemicals to the water, neutralizing the acidity and causing metals to precipitate. Much of the research by the Bureau of Mines in this area is directed to the development of less expensive alternatives to chemical treatment, as well as control methods appropriate for abandoned mines.

Biological water treatment with artificial wetlands is one approach that has proved useful at both active and abandoned mines. Metals are precipitated and acidity is neutralized by biological activity, with iron and manganese-oxidizing bacteria and sulfate-reducing bacteria playing significant roles. Constructed wetlands have been built at a number of mine sites to assist in the treatment of acid mine drainage. Bureau scientists are investigating the role of bacteria in these systems and are developing new approaches to wetland design and construction. In addition, Bureau of Mines research in 1991 investigated the use of limestone drains as a low-cost supplement to wetland treatment systems.

Biological treatment of metal mine drainage. The Bureau of Mines has begun to use the biological processes studied in wetlands to treat mine waters contaminated with metals other than iron and manganese. Although little evidence has been accumulated to date, it appears unlikely that wetland systems alone will prove sufficient to treat waters contaminated with cadmium, copper, lead, mercury, nickel, silver, and zinc. Biological treatment of such waters is being investigated using contained systems rather than open wetlands. Laboratory experiments and pilot-scale studies are underway at several locations, including the Bureau of Mines research mine in Pittsburgh, Pa.



Office of Surface Mining



In January 1991, the Office of Surface Mining and Reclamation Unlimited signed a Memorandum of Understanding in support of the President's wetlands goals. The MOU pledges to support and promote wetlands education for the coal industry, private associations, and State agencies.

Minerals Management Service



The Minerals Management Service (MMS) has an extensive Environmental Studies Program which is designed to gather information concerning the effects of mineral activities on the environment, including coastal wetlands. As part of this effort, the MMS funds studies of coastal habitats in such areas as the Gulf of Mexico and Alaska in order to increase the knowledge of the effect of offshore mineral activities on the environment.

Bureau of Indian Affairs



The Bureau of Indian Affairs administers and manages approximately 54 million acres of land held in trust by the United States for Native Americans. With this responsibility comes development of forest lands, leasing mineral rights, directing agriculture programs and protecting and promoting stewardship of water and land rights.

Most Indian land is located in arid regions not known for their wetlands values; however, approximately one million acres of trust land contain wetlands which possess significant fish and wildlife resources. Approximately 400,000 acres of wetlands are located on 18 Indian reservations in Minnesota, Michigan and Wisconsin. In conjunction with the North American Waterfowl Management Plan, these tribes developed a consolidated set of wetlands management and development project proposals for their reservations.



Take Pride in America



Take Pride in America is a broad-based partnership of federal agencies, states and the private sector. The program educates all Americans about the need to preserve and enhance our nation's natural, cultural and historic public resources. Take Pride in America promotes grassroots activities through public service advertising and an annual national awards program. Many Interior bureaus participate.

For instance, the Fish and Wildlife Service has implemented the **Take Pride in America** program in its efforts to educate the public, particularly children, through its partnership with the creators of Mark Trail, a popular comic strip carried by many daily newspapers. Additionally, hundreds of volunteers in wetlands preservation, restoration and enhancement projects have been welcomed and trained by FWS personnel at refuges across the country. These volunteers provide support through the planting of wetlands flora, banding or tagging of wetlands fauna, conducting research and compiling statistics relative to wetlands.

The Take Pride in America National Awards Program annually recognizes many water-based projects, including beach, river, stream and lake cleanups, shore and dune stabilization projects, and public education efforts by Federal, State and private sector organizations across the country.





REGIONAL PROGRAMS

NORTHEAST REGION

Fish and Wildlife Service



Northeast Coastal Areas Study. The Fish and Wildlife Service completed its report to Congress on its Northeast Coastal Areas Study. The report identified 40 regionally significant habitats of fish and wildlife protection along the coasts of New York, Connecticut, Rhode Island, and Massachusetts. Another major report, "**Habitat Requirements for Chesapeake Bay Living Resources**" was completed in 1991 in cooperation with the Maryland Department of Natural Resources and the Chesapeake Research Consortium. The Delaware Bay Estuary Project completed work on a report for the Service to nominate Delaware Bay as a "wetland of international importance." Areas to be nominated include 64,200 acres in Delaware and 80,550 acres in New Jersey.

Maine. As part of the **North American Waterfowl Management Plan**, several partners including Maine's Department of Inland Fisheries and Wildlife, the Land for Maine's Future Board, The Nature Conservancy, The National Fish and Wildlife Foundation, the Quoddy Regional Land Trust, the Maine Coast Heritage Trust and the Fish and Wildlife Service are working together to protect the Cobscook Bay ecosystem. Because of its importance to shorebirds, eagles, waterfowl, marine mammals and commercial and recreational fisheries, Cobscook Bay is the state's top priority for protection in the Atlantic Coast Joint Venture. Over 2,600 acres of critical estuarine habitats have now been protected by project partners.

New Jersey. Over 190 acres were acquired to help complete the Edwin B. Forsythe **National Wildlife Refuge**, an expansive area extending for approximately 40 miles along the New Jersey coastline. This area is crucial to the migrating birds especially black ducks.

Virginia. The Nature Conservancy, Ducks Unlimited Inc., the Virginia Department of Conservation and Recreation, the National Fish and Wildlife Foundation and other partners have forged a strong coalition working to conserve the North Landing River in southeastern Virginia under the **North American Waterfowl Management Plan**. The 10,000 acres to be protected contain one of the most diverse and unspoiled wetland systems in the state. More than 5,000 acres have been secured to date including donations of a 528 acre parcel of land by the City of Chesapeake and 2,200 acres by the Day Companies, Inc.

Rhode Island. The Fish and Wildlife Service acquired 83 acres to work toward completion of the Pettaquamscutt Cove **National Wildlife Refuge** in Rhode Island. This refuge consists of many marsh and wetland tracts flanking the Pettaquamscutt Cove and has been recognized as an extremely productive and valuable wetland complex.



Virginia Virginia Polytechnic Institute and the State University were awarded a \$256,142 three-year study, "Evaluating the Potential for Created Wetlands Establishment on Restored Surface Mine Sites". This study will determine the feasibility of creating wetlands on reclaimed coal mines that fulfill ecologically and aesthetically important functions of natural wetlands. Research will involve evaluation of natural and volunteer wetlands as baseline information and construction of several experimental wetlands to test construction and evaluation techniques.

Partners in Wildlife. One of the successes of the Partners in Wildlife Program was the restoration of 1,300 acres of wetlands on 222 separate sites in the New England and northeastern seaboard states in 1991. Although the cost of wetland restoration is higher than in other parts of the country (\$302/acre), the FWS was able to generate an additional \$147,000 of outside funds to accomplish wetland restoration projects on private lands.

New York. One hundred restorations were completed in New York state during the summer of 1991. More than 700 remain on the waiting list. In one area in the central part of the state 15 landowners cooperated to restore a 30 acre bog. One individual, typical of many new landowners in central New York, bought a 350-acre farm to grow nursery stock. He had no productive use for about 80 acres of former corn and hay fields, and cooperated with the FWS to restore them to functioning wetlands.

Vermont. A Vermont landowner, because he "wanted to make a commitment to conservation, starting in my back yard," had the FWS restore a shallow 3-acre wetland by removing tile drains in the corner of a crop field. A half-acre shallow wetland was built for another Vermont landowner. When asked why he wanted the wetland restored he said; "It's a simple pleasure, but if you want to keep wildlife you've got to have diversity. You've got to have the habitat."

National Park Service

District of Columbia. The District of Columbia is planning an urban renewal project and is cooperating with the National Park Service to restore a degraded Anacostia River wetlands and to enhance two other wetlands located on park lands. These wetlands, now remnant parcels, represent some of the few remaining natural wetlands along the Anacostia River in the District of Columbia.

Geological Survey

Delmarva Peninsula

As part of its **National Water Quality Assessment (NAWQA)** Program studies, USGS has been conducting studies on the interaction between forested and temporarily flooded wetlands in the **Delmarva Peninsula**. These studies have demonstrated that forested wetlands have an important affect on water quality.



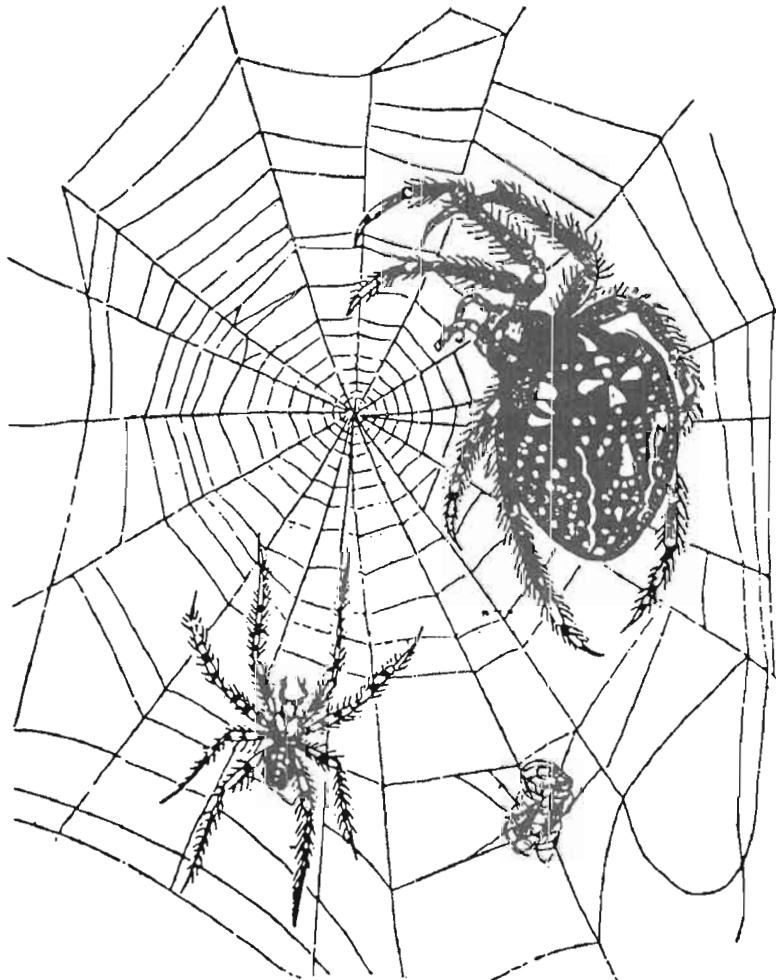
Massachusetts. USGS is continuing a combination of field surveys and sophisticated computer modeling of water and sediment circulation in the bays and wetlands comprising Boston Harbor and Massachusetts Bay that can be used to design clean-up efforts.

Virginia. USGS has conducted a study in Virginia that focuses on determining the effects of ground-water flow and biogeochemical processes on nitrate concentrations in ground water that discharges into coastal estuaries, saltwater marshes, and wetlands.

Office of Surface Mining

Pennsylvania. Pennsylvania State University has a two-year study "Optimizing Wetlands Creation on Coal Mined Sites." The study will develop a "hydrologic" model which will enable mine planners to evaluate sites for potential wetland creation. The model will be field verified and will be incorporated into a technical guidance handbook on specific design and performance criteria that will relate to locating and creating functional wetlands on mine sites.

West Virginia. The Buffalo Coal Company received the OSM Director's award when twenty acres of new wetlands were constructed at the company's mining site.





SOUTHEAST REGION

Arizona/Florida Land Exchange. In December 1991, the Barron Collier Company of Naples, Florida, accepted the Department of the Interior's offer to exchange the Phoenix Indian-School property in Arizona for 108,000 acres of environmentally sensitive lands in south Florida. The Fish and Wildlife Service will receive 20,000 acres at Ten Thousand Island National Wildlife Refuge and 4,000 acres at Florida Panther National Wildlife Refuge. The National Park Service will receive approximately 83,000 acres to add to the Big Cypress National Preserve. This is the largest land exchange in the history of the Department of the Interior. The exchange completes three years of negotiations following the passage of the enabling legislation in 1988.



Louisiana Coastal Wetlands Restoration

The Coastal Wetland Planning, Protection and Restoration Act was passed by Congress authorizing funding for restoration of Louisiana coastal wetlands, restoration of coastal wetlands in other states through a grant program, and restoration of coastal wetlands under authority of the North American Conservation Act. The Department of the Interior is a member of the interagency task force determining priority coastal wetlands restoration projects in Louisiana which can be completed within a five year period and developing a long-term restoration plan.

The Fish and Wildlife Service, National Park Service, Geological Survey and the Minerals Management Service are working to slow the rapid loss (30 to 35 square miles per year) of wetlands in coastal Louisiana. The Department has worked closely with the Louisiana Coastal Wetlands Task Force to identify priority wetland restoration projects, and is also cooperating with the State to help private landowners improve management of nearly 16,700 acres of coastal wetlands. Wetlands conservation projects are for the purpose of enhancement, restoration, protection, and acquisition of coastal wetlands ecosystems.

In 1991, \$5.7 million was made available from the Sport Fish Restoration Account for funding coastal wetlands conservation projects. Federal matching grants to coastal States are available for up to 50% of the total project costs. Grants of up to 75% of the total project costs are available if the coastal State has an established trust fund for acquiring coastal wetlands, other natural areas or open spaces.

Thirteen coastal wetlands projects will receive \$5.7 million in funding under this new program: three in Washington, three in Florida, and one each in Texas, Michigan, North Carolina, Connecticut, Hawaii, Mississippi, and California.



Potlatch Land Exchange. The Potlatch Corporation (Potlatch), a national timber products firm has proposed a four-party exchange of lands in **Arkansas** and **Idaho** with the Bureau of Land Management (BLM), the Forest Service (FS) and the Fish and Wildlife Service. Potlatch would transfer 56,000 acres of its land in Arkansas to the Fish and Wildlife Service for isolated and scattered BLM/FS land in Idaho. The exchange would join the Cache and White River National Wildlife Refuges and would provide over 100 miles of protected bottomland hardwoods. The Administration will be sending legislation to the Congress to complete this exchange.

Fish and Wildlife Service

Partners in Wildlife. In the Partners in Wildlife Program, 10,706 acres of former wetlands, including bottomland hardwoods, were restored on 59 separate parcels of private land in the southeastern region in 1991. Over 6,400 acres of bottomland hardwoods were replanted in order to restore portions of the Lower Mississippi Delta that had once been cleared for agricultural purposes. Outside contributors cost-shared an additional \$105,000, thereby reducing Service costs to \$166/acre. Because of the nature of wetland restoration on floodplains, hydrology can be restored on a relatively large area with minimal costs using low dikes or levees and small water control structures.

Alabama. National Wetlands Conservation Award. Scott Paper Company, Mobile, Alabama. This company entered into voluntary agreements, under the auspices of the North American Waterfowl Management Plan, for management of 67,850 acres of forested floodplain swamp and bottomland hardwoods in the Mobile-Tensaw Delta for the benefit of wintering waterfowl; donated wood to trade schools for the building of wood duck nesting boxes; and provided Company volunteers who worked with Fish and Wildlife Service volunteers to install 300 nesting boxes on Company lands.

Arkansas. National Wetlands Conservation Award. St. Francis Lake Association, Trumann, Arkansas. Activities and projects of this Association have resulted in the planting of 1,200 acres of bottomland hardwoods, construction of a 20-acre marsh, planting of numerous food plots for wildlife, installation of over 100 wood duck nesting boxes, and enhancement and protection of more than 4,000 acres of wetlands in northeastern Arkansas.

Louisiana. The Fish and Wildlife Service completed acquisition of the Nation's newest urban wildlife refuge, the 18,000 acre Bayou Sauvage **National Wildlife Refuge** located less than 10 miles from downtown New Orleans. The new refuge will protect wetland habitat for waterfowl, alligators, great blue herons, snowy egrets, and many other species.

Florida. The Fish and Wildlife Service is helping the Corps of Engineers and other agencies plan the restoration of the Kissimmee River and its flood plain in south central Florida. Construction of a 52-mile canal in the 1960's replaced the meandering natural river channel and drained 45,000 acres of floodplain wetlands. Proposed restoration will involve backfilling most of the canal and restoring approximately 30,000 acres of wetlands. This will be the largest restoration project of this type ever undertaken.



Kentucky. As part of the **North American Waterfowl Management Plan**, the Kentucky Department of Fish And Wildlife Resources and the Westvaco Corporation signed a cooperative agreement to protect, develop and manage up to 6,000 acres of bottomland hardwoods and other wetlands along the Mississippi River. Westvaco, a private pulp and papermaking company, has agreed to acquire, fund habitat development costs, and assist the Kentucky Department of Fish and Wildlife Resources with waterfowl management on the acreage in Hickman and Carlisle counties.

Mississippi. The Lake Lafayette Wetland Restoration Project in northern Mississippi is a good example of numerous partners working together. Lake Lafayette, an approximately 2,000-acre forested wetland complex adjacent to Steele Bayou, has been partially drained and most of the historic flood waters have been diverted by major flood control projects. Under the sponsorship of the Issaquena Soil and Water Conservation District, six landowners, the Soil Conservation Service, Mississippi Partners for Waterfowl Program, Mississippi River Levee Board, and the FWS's Partners for Wildlife are working together to build 5 miles of levees and install 21 water control structures to allow the area to flood up to three feet deep during the winter.

Mississippi. The purchase of 2200 acres started the acquisition of the Tallahatchie National Wildlife Refuge in northwest Mississippi. The new Refuge area provides habitat management capabilities that will insure viable populations of migratory birds. The refuge, pinpointed as critical habitat for wintering waterfowl, includes all or portions of three areas that have been identified in the Lower Mississippi River Delta Section of the **North American Waterfowl Management Plan** as high quality waterfowl habitat.

North Carolina. National Wetlands Conservation Award. **Richard King Mellon Foundation**, Pittsburgh, Pennsylvania. Through the efforts of this Foundation, in cooperation with The Conservation Fund, 93,000 acres of wetlands and wildlife habitat were purchased which made possible the establishment of the Pocosin Lake National Wildlife Refuge in North Carolina. They also acquired 10,000 acres for the Alligator River Refuge, thus assuring proper management of significant wetlands habitat for both fish and wildlife in this southeastern United States area. This was one of the largest gifts of land ever made for this purpose.

National Park Service

Florida. In the summer of 1991, the Federal government and the State of Florida agreed to settle litigation relating to the water quality in Everglades National Park and wetlands in southern Florida. As a result of the agreement, water is to be filtered through a huge artificial marsh that will be created to the south of Lake Okeechobee, before it flows into two large sections of Everglades National Park and the Loxahatchee National Wildlife Refuge.



Geological Survey

Florida. The U.S. Geological Survey completed the first year of a 5-year study along the northwestern Florida coast to delineate the geologic framework and history of marsh coasts, determine water movement processes and sediment transport, and identify the factors affecting saltwater intrusion into these wetland areas.

Louisiana. The U.S. Geological Survey, in cooperation with the U.S. Fish and Wildlife Service, the U.S. Environmental Protection Agency, the U.S. Army Corps of Engineers, and the States of Louisiana, Texas, Alabama, and Mississippi, continues to analyze wetlands loss and coastal erosion along the Gulf Coast. For example, field work was completed in the Terrebonne/Barataria Basin of the Louisiana coast and similar work continues in the Atchafalaya Basin. Comparison of the two large data sets resulting from the work in these two very different wetland environments is greatly enhancing knowledge of how wetlands function. 1991 was the third year of a planned 5-year study of Louisiana wetlands.

Tennessee. The U.S. Geological Survey has demonstrated that channelization has a significant impact on forested wetlands sedimentation perhaps more so than bridge construction or most agricultural activity. This research has led to insights into the poorly understood temporal and spatial patterns of sediment deposition in wetlands and the effect on wetland hydrology and wetland-forest ecology.

Office of Surface Mining

Alabama. Alabama A & M University is working on a \$138,336 study, "Evaluation of the Biotic Potential of Microorganisms and Higher Plants to Enhance the Quality of Constructed Wetlands." The purpose of this study is to develop practical methods of establishing wetland communities on mined lands and to evaluate the importance of nutrient cycling and the role of the microbial community in sustaining the wetland function.

Kentucky. Nearly 750 acres of wetlands are currently being constructed at 14 mine sites, and the Kellerman Mine, Drummond Coal Company, Alabama, and Homestead/Sinclair Mine Peabody Coal Co. received the Director's Excellence in Surface Mining Awards. At Kellerman, the dikes of over 80 sediment ponds were lowered when mining was completed to convert the ponds to wetlands. At Homestead/Sinclair, islands were constructed to increase the wetland potential of the site as Canada goose nesting areas.

Kentucky. Villanova University received an OSM grant of \$605,386 to study "The Kentucky Wetlands Projects: A Field study to evaluate the Effectiveness of man-made wetlands for the treatment of Acid Mine Drainage."

Kentucky. The University of Kentucky completed a \$24,000 study, "The Effect of Alternative and Reclaimed Areas on the Value of Wetlands." This study conducted surveys of public preference regarding wetlands and developed software which will help in determining preferred mitigation measures for reclaiming wetlands affected by mining.



Minerals Management Service

Louisiana. The Minerals Management Service is funding the Louisiana University Marine Consortium (LUMCON) to explore long-term environmental and socio-economic consequences of offshore oil and gas production. LUMCON is addressing two Framework Issues pertinent to wetlands: 1) residual effects of oil spills and the recovery of coastal wetlands from oiling, and 2) the effects of channelization of wetlands from pipeline emplacement and navigation.

Louisiana. A joint Federal/Multi-State Technical Task Force, formed by the MMS in January 1987, completed an assessment of the development potential of Ship Shoal as a sand source for barrier island/wetlands protection offshore Louisiana. The study concluded that the use of sand from Ship Shoal, a submerged sand body about 9 miles offshore, is economic and environmentally preferable to onshore supplies for possible restoration and nourishment of the Isles Dernieres barrier islands. The assessment concept and methods for the characterization of Ship Shoal involved an integrated approach including geological, engineering, environmental, and economic assessments. Techniques and methods developed and used for this project form a model for future, similar studies in other areas.

Take Pride in America

Florida. Beginning in 1975, the Broward County (FL) Board of Commissioners led a 10-year effort to purchase a 1,400-acre parcel of coastal wetland, stretching three miles in length along the Intracoastal Waterway in Hollywood, Florida. Their goal was to preserve valuable wetlands, and they hope one day to establish and maintain a nature center on the site. The area is home to 123 different bird species, 10 animal species, 91 species of fish and 80 forms of plant life. A Coral Springs Girl Scout troop and Hollywood professional association have expressed their interest in preserving wetlands by planting hundreds of mangrove trees in the past few years.





GREAT LAKES REGION

Fish and Wildlife Service

Indiana. National Wetlands Conservation Award. Ray McCormick, Vincennes, Indiana. On his own land, Ray has restored, enhanced or created 150 acres of wetland that includes conversion of a bottomland farm field into a 19-acre wetland, two 6-acre shallow marshes, and seasonal flooding of a 112-acre grain field in a river bottom for ducks and geese. Ray has created his own video-tape explaining the use of metal barrels for goose nests; he helped organize a group of private citizens to help support the Patoka River National Wildlife Refuge; and hosts nature hikes through his farm. He has become nationally known as an avid wetlands and wildlife advocate.



Illinois. Citizen's Committee To Save The Cache River, Perks, Illinois. This citizens group's efforts, working with other agencies and organizations, led to the purchase of 4,000 acres of wetlands; assisted with the establishment of the 35,000 acre Cypress Creek National Wildlife Refuge; cooperated with the Nature Conservancy in control of noxious weeds and restoration of 175 acres of forest habitat adjacent to the Cache River. The potential impacted area of wetlands is nearly 200,000 acres within the Cache River basin.

Minnesota. The Heron Lake Restoration is a long-term, cooperative **North American Waterfowl Management Plan** project to reverse the degradation of a once nationally known waterfowl lake. Partners include the Minnesota Department of Natural Resources, The Nature Conservancy, Pheasants Forever, the North Heron Lake Game Producers Association, and the Fish and Wildlife Service. An electric fish barrier prevents rough fish from entering the watershed from the Des Moines River and destroying wetland vegetation and stirring up old sediment.

Michigan. Wetlands in the Saginaw Bay watershed received major support from Dow Chemical Company and the General Motors Corporation during 1991 as part of the **North American Waterfowl Management Plan**. These companies each contributed \$10,000 towards wetland restoration and enhancement within the watershed. Their donations were matched by Federal money under the Fish and Wildlife Service's Partners in Wildlife Program.

Iowa. The Clean Water Alliance for the Iowa Great Lakes is a coalition to restore water quality and recreation values in north-central Iowa. This **North American Waterfowl Management Plan** Project was greatly expanded when Ducks Unlimited, Iowa Department of Natural Resources and the Fish and Wildlife Service joined to restore prairie wetland ecosystems for grassland nesting migratory birds and resident wildlife. Restoration of



drainage basins adjacent to Okoboji Lakes has improved the water quality for these heavily used recreational lakes.

Illinois. At the Cypress Creek National Wildlife Refuge in southern Illinois, a unique partnership of the **North American Waterfowl Management Plan** involves restoration along the Cache River in areas that have been converted from bottomland hardwoods to agriculture. Major partners in the project are Illinois Department of Conservation, The Nature Conservancy, Ducks Unlimited and the Fish and Wildlife Service. A coalition of individuals and organizations, "Citizens Committee to Save the Cache River," started in 1971 to preserve the remaining cypress/tupelo gum swamp and led to a broader restoration effort.

Partners in Wildlife. One of the most successful regions in the US for developing partnerships with private landowners interested in wetland conservation (**Partners in Wildlife**) has been the Great Lakes/Upper Mississippi States. In 1991 alone, 2,211 separate wetland sites were restored on 10,001 acres of previously converted or degraded wetlands on private lands. This area has served as a proving ground for partnership development between private landowners and the FWS. In **Indiana**, the Fish and Wildlife Service has so many requests from individuals wishing to restore wetlands on their property that it is estimated some of these projects cannot be started until 1994. Yet, landowners are willing to wait for the Service's assistance. The popularity of this program is also reflected by the generation of \$430,000 in outside funding in 1991, and pledges of over \$3,000,000 for future wetland restoration projects on private lands from over 45 separate sources. Outside funding sources include individual landowners, State agencies, sportsman's clubs, local conservation groups, local businesses and major U.S. Corporations.

Following the successful program in which the Soil and Water Conservation District's (SWCD's) in Minnesota's Rice and Wright Counties cooperated in the restoration of 270 wetlands in the last couple of years, the North Central Region of the National Association of Conservation Districts and the FWS have expanded this cooperation throughout the Midwest. This coming year the SWCDs plan to match a \$300,000 challenge grant from the Fish and Wildlife Foundation with \$600,000 to be raised in the local communities to restore 1,600 wetlands covering about 5,000 acres.

Geological Survey

Indiana. The U.S. Geological Survey continued studies in cooperation with the Fish and Wildlife Service, the Corps of Engineers, the Environmental Protection Agency, and the States of Illinois and Indiana, to analyze coastal erosion and wetlands loss along southern Lake Michigan. The emphasis was on delineating and describing the wetlands environments and promoting better understanding of the physical processes, both natural and man-induced, affecting lake shore wetland.

Indiana. In cooperation with the National Park Service, the U.S. Geological Survey published Circular 1085 on the changing landscape at the Indiana Dunes National Lakeshore on



southern Lake Michigan. This circular is part of a new series that will be dedicated to public issues in the earth sciences. The circular documents the potential effects of global change, land use, shoreline erosion, and contamination on wetlands in the park.

Michigan. The U.S. Geological Survey is studying the rate of shoreline emergence along the southern coast of Lake Superior. The earth surface in that area rises as a result of the melting of the glaciers of the last ice age. As the surface adjusts, the shoreline is emerging along most of the periphery of the lake, including the eastern end where the lake drains into Lake Huron near Sault Saint Marie, Michigan. Changes in the water level along the shores of the lake because of the rebound phenomenon affect the evolution of adjacent wetlands. Wetlands that are inundated are being lost, while the changing water level will help create new wetlands upstream along drainage entering the lake. The greatest effect is near Duluth, Minnesota.

Lake Erie. The U.S. Geological Survey is studying the lake level history of Lake Erie. At the western end of the lake are remnants of the Great Black Swamp, a wetland that was drained. However, pockets of the wetland remain. The purpose of the study is to determine the effects of human activity and natural processes, including the normal rise and fall of Lake Erie, on the shoreline and the evolution of the wetland.

Wisconsin. The U.S. Geological Survey is conducting a new study in southern Wisconsin which is looking at hydrologic processes involved in wetland restoration and creation. A restoration site and a creation site were instrumented with rain gauges, and evaporation pans, and sampling was conducted to determine water flow paths through the wetlands.

Office of Surface Mining

Indiana and Illinois. The Surface Mining Control and Reclamation Act allows the use of experimental practice permits to demonstrate evolving mining and reclamation technology. Three experimental practice permits have been issued and two more permits are currently under consideration which have or will result in the development of wetlands on mine sites. All of these experimental practices are aimed at demonstrating that a coal waste disposal areas (slurry pond) can be developed into a wetland, capable of supporting a diverse wetlands habitat, without being covered with four feet of non-toxic nor non-combustible material. Permits have been approved for the Ayrshire Mine, AMAX Coal Co., in Indiana, and the Burning Star No. 4 Mine, Consolidation Coal Co., and the Captain Mine, Arch of Illinois, in Illinois.

Director's Awards. The following companies received the OSM Director's Award for Excellence in reclamation activities:

Illinois. Will Scarlet Mine, Peabody Coal Company. Mine restored 2400 acres which were mined prior to the enactment of the Surface Mining Reclamation and Control Act to quality wetlands.



Indiana. Discovery Mine, Vigo Coal Company. Reclamation of the entire 300 acre mine sites was designed to construct wetland consisting of both seasonally and permanently inundated areas.

Ohio. B&N Coal Company. Remining cooperation demonstrated that wetlands can be created on previously mined areas.

Ohio. R&F Coal Company. The conversion of sediment ponds to wetlands in this area primarily devoted to farming significantly enhanced the area's wildlife habitat.

Missouri. BeeVeer Mine, Associated Electric Company. Unique system was constructed for conveying mine water through the permit area in such a manner that wetlands and other water resources were not affected.

Take Pride in America

Illinois. Formed in 1989, Friends of the Fox River, Inc., is an environmental education program for residents of this watershed area in northeastern Illinois. By educating the public about stream ecology, local surface water pollution and pollution abatement issues, the group instills a sense of pride for the wise management of Illinois' resources. They not only teach stream ecology, but also empower citizens with the knowledge, skills and confidence necessary to improve water quality at both the local and regional level. Their purpose is to improve water quality at both the local and regional level. Their goal is to grow and involve every interested classroom, youth group and citizen group along the 195-mile river corridor.





Bureau of Indian Affairs

CIRCLE OF FLIGHT 1991 ACCOMPLISHMENTS

Eighteen Indian tribes in Michigan, Minnesota and Wisconsin have begun work on 30 projects on approximately 400,000 acres of wetlands to begin increasing waterfowl breeding and migration habitats and populations. These projects, collectively known as the "Circle of Flight," were developed by the tribes and the Minneapolis Area Office of the Bureau of Indian Affairs in conjunction with the goals of the North American Waterfowl Management Plan.



Michigan

- Waterfowl food plantings on 160 acres of state refuge land in cooperation with the Department of Natural Resources.
- One tribe established a 57-acre waterfowl/wetland management area/refuge.
- Acquisition of 57 acres of wetlands.
- Wild rice enhancement on 4 lakes totalling 162 acres.

CIRCLE OF FLIGHT

Minnesota

- Wild rice enhancement on 5 lakes totalling 300 acres.
- Five tribes established 8,970 acres of waterfowl/wetland management area/refuges.
- Acquisition of 200 acres of wetlands.
- Three new impoundments were created totalling 1,920 acres.
- Constructed 5 one-acre nesting islands.
- Maintenance of 70 miles of existing dike/levee systems.
- Enhanced 30 acres of upland cover.
- Educational material was developed which included a display featured at the Minnesota State Fair; 35,000 Circle of Flight posters and 25,000 Save Our Wetlands buttons.

Wisconsin

- Wild rice enhancement on 3 lakes totalling 30 acres.
- Two tribes established 730 acres of waterfowl/wetland management area/refuges.
- One new 30-acre impoundment was created.
- Maintenance on 4.6 miles of existing dike/levee systems.
- Surveyed 3,822,600 acres of wetlands and 40 wild rice lakes encompassing 4,100 acres for purple loosestrife.
- Purple loosestrife intensive treatment/removal on 251 acres of wetlands.



GREAT PLAINS REGION

Fish and Wildlife Service

Kansas. In south-west Kansas, as part of the Playa Lakes Joint Venture, the Kansas Department of Fish and Wildlife has acquired permanent easements this year from 5 landowners totaling over 100 acres. Phillips Petroleum and the North American Waterfowl Management Plan assisted the State in funding the acquisition. These Playas will be fully restored to provide valuable habitat for migratory birds. Thirty private landowners have expressed interest in selling permanent easements to allow restoration of these valuable playas and plans are underway to acquire more restorable playas.



Restoration efforts are also underway in the Cheyenne Bottoms area. North American Waterfowl Management Act funds were provided to the State for deepening and building dikes to manage water levels in the 3900 acre center pool. Of all the migratory species that utilize the Bottoms, shorebirds may be the group most dependent on the area. It has been estimated that 45 percent of the shorebirds in North America, including over 90 percent of five species, stop at Cheyenne Bottoms during spring migration. In addition, the Bottoms has been designated as Critical Habitat for the whooping crane.

Nebraska. In the Rainwater Basin area of Nebraska, the Fish and Wildlife Service, the Nebraska Game and Parks Commission, The Nature Conservancy and Ducks Unlimited are working to acquire and protect wetlands under the **North American Waterfowl Management Plan**. As part of an overall coordinated effort, The Nature Conservancy has facilitated wetland acquisition for both the Service and the Commission through landowner negotiations and creative acquisition techniques.

North Dakota. Researchers at the National Wildlife Health Research Center, Madison, Wisconsin, and at the Northern Prairie Research Center, Jamestown, North Dakota, are investigating the environmental conditions in wetlands that initiate the outbreaks of avian botulism. The results of these studies will help wetland managers learn how to modify environmental conditions to prevent or control this disease.

South Dakota. As part of the **North American Waterfowl Management Plan**, South Dakota Game and Fish and Parks, Fish and Wildlife Service, Ducks Unlimited and The National Wildlife Federation have restored dams, created nesting islands, restored drained wetlands and placed nesting structures. In addition, over 7,000 acres of land, including wetlands and adjacent uplands, have been acquired perpetuating these sensitive habitats.



Partners in Wildlife. Through its Partners for Wildlife Program, the FWS has worked closely with landowners in the Great Plains States to put back 6,915 acres of wetlands on 950 separate sites on America's landscape. This has been done through voluntary agreements with 683 individual landowners in North and South Dakota, Kansas and Nebraska. On top of these accomplishments, over 623 acres (2.2 miles) of degraded riparian wetland habitat was restored to benefit a broad diversity of wildlife species in North Dakota and Kansas. The cost of restoration projects on private lands to the FWS in this Region averaged less than \$50 per acre thanks to the enthusiastic support of State, local, and individual sponsors who contributed over \$594,000 in support of these restoration activities.

Activities ranged from the restoration of small prairie potholes in North Dakota to the restoration of large playa lakes in the south. In South Dakota, under a new cooperative agreement, the Partners program is teaming with the State's Department of Agriculture to provide technical assistance, materials and funds to farmers and ranchers to develop small ponds designed to benefit wildlife and livestock.

Bureau of Reclamation

Kansas. Reclamation initiated work with the State of Kansas and other interested partners to purchase lands for a demonstration wetlands that will be adjacent to Glenn Elder Reservoir. Cooperators include the Kansas Department of Wildlife and Parks which has agreed to prepare a wetlands development plan in cooperation with the Service. The State of Kansas has also agreed to do all appraisal work to Federal standards. A local vocational education school will complete all construction work as part of their special projects curriculum. Also in Kansas, construction of dikes and water control features at a Bureau of Reclamation reservoir will create an additional 50 to 75 acres of wetlands.

North Dakota. Heart Butte Reservoir is experiencing water quality problems caused by nutrient enrichment and sediment accumulation. A research and demonstration project at Heart Butte Reservoir will evaluate the role of wetlands in improving the quality of inflows to the reservoir. Because of the water quality and wildlife interest generated by this research and demonstration effort, Reclamation is considering how the project might be expanded to include other interested Federal, State, and private organizations and individuals. The State of North Dakota, Environmental Protection Agency, Soil Conservation Service, and private landowners are expected to be key players in an expanded watershed project focusing on controlling nonpoint sources of pollution. The Fish and Wildlife Service, Ducks Unlimited, and the North Dakota Game and Fish Department are also interested in the wildlife habitat potential offered by this project in relation to the **North American Waterfowl Management Plan.**



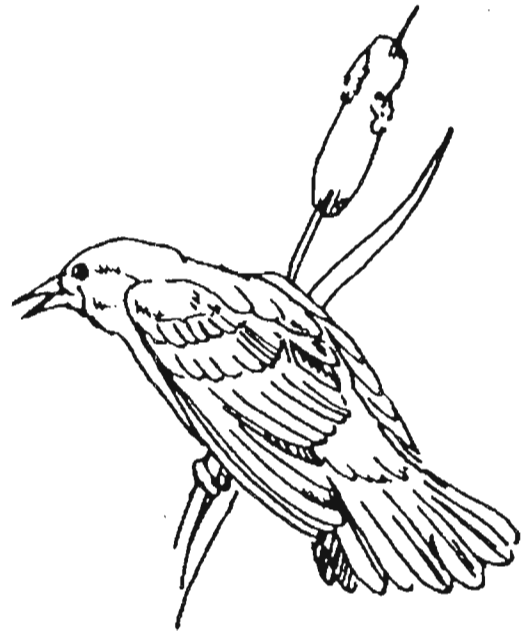
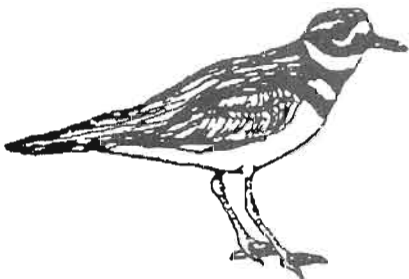


North Dakota. Reclamation has agreed to work with the Fish and Wildlife Service's Northern Prairie Wildlife Research Center to undertake an evaluation of the success of wetlands mitigation at the Garrison Project in North Dakota. Since an important national wetlands issue has been the success of "restored" versus "created" wetlands, the Garrison mitigation effort is an ideal site to evaluate how well restored versus created versus natural wetlands are functioning.

North Dakota. During the continuing drought of 1990 and 1991, Reclamation worked with the NDGFD, the Garrison Diversion Conservancy District, Nature Conservancy, local agencies, and private landowners to initiate emergency releases of water from Lakes Brekken and Holmes to bring water levels within Lake Williams to a level that would satisfy the needs of the threatened piping plover and other migratory birds. Short-term water deliveries to Lake Williams, a shallow, saline body of water normally covering about 770 surface acres, were needed from 1989 to 1991. Reclamation has pursued cooperative small-scale wetland enhancement projects in North Dakota by pumping or siphoning water from McClusky Canal into small wetlands on private lands to provide waterfowl habitat during critical waterfowl migration and nesting periods.

Office of Surface Mining

Director's Award. Falkirk Mining Company, North Dakota. Sediment ponds were converted to wetlands, demonstrating that wetlands can be created in this semi-arid region.





MOUNTAIN REGION

Fish and Wildlife Service

Partners in Wildlife. The FWS restored 3,463 acres of privately owned wetlands on 451 sites in 1991. In addition, 920 acres (8.75 miles) of riparian wetland habitat were restored in 4 sites in Colorado, Montana, and Wyoming. Over 320 landowners were involved in voluntary cooperative agreements with the FWS to restore wetlands in 1991. The Service was able to generate \$303,000 in cost-share funds from individual landowners, conservation organizations, and State and local resource management agencies which enabled the Service's cost for restoration to be less than \$200 per acre.



Colorado. In Colorado's San Luis Valley, the Division of Wildlife, and the Soil Conservation Service, through partnership with the irrigation district, are restoring large shallow wetlands. These projects spread out concentrations of wintering waterfowl, relieving disease problems on the Monte Vista National Wildlife Refuge. The wetlands also provide important habitat for black-necked stilts, white-faced ibis, avocet, and several sandpipers while improving groundwater recharge and forage production.

Bureau of Land Management

Colorado. The BLM established the **Hebron Waterfowl Area** in the late 1970's to enhance waterfowl production. The Hebron Waterfowl Area is located in North Park in north central Colorado (Craig District, Kremmling RA, Jackson County). It is part of the North American Waterfowl Plan and adjacent to the U.S. Fish and Wildlife Service Arapaho National Wildlife Refuge. North Park is second only to the San Luis Valley in duck production. The 3,000-acre Hebron Slough is located in an island basin with numerous natural lakes and small natural prairie pothole areas. Under a cooperative agreement, the BLM, Colorado Division of Wildlife and Ducks Unlimited have worked to enhance the areas through a variety of management actions: constructing dikes and water control structures, building nesting structures and other habitat treatments, and developing islands for waterfowl nesting.

In an unprecedented interagency cooperative effort, the Fish and Wildlife Service, Colorado Division of Wildlife, Ducks Unlimited, private land owners and the BLM are pursuing water rights and adjacent land acquisition/exchanges. The objectives of the Hebron Waterfowl Area are about 60% completed. The land and water rights acquisition are critical to full development for the waterfowl area. A ditch system is planned once water rights are obtained. Brochures and other public educational materials are also planned.

The **Blanca Wildlife Area** is an example where a wetland has been created through professional habitat and water management activities. Key benefits have been the creation



of outstanding habitat for wetlands wildlife and excellent fishing areas for the public. Quality wildlife associated recreation is now being provided for the general public consistent with the overall wildlife objectives of the areas. This Area is located in the San Luis Valley in south central Colorado, approximately 10 miles northeast of Alamosa (San Luis Ra, Canon City District). It is within the Closed Basin Rio Grande River aquifer and is part of the North American Waterfowl Plan. The San Luis Valley is one of the most important waterfowl areas in the state, producing the highest numbers of ducks. Examples of work completed include protection and restoration of 1,500 acres of historic wetland/marsh habitat. This has been handled by building dikes between sand dunes and providing surface water with numerous artesian wells. BLM is also acquiring water rights and adjacent private lands that have potential for development as wetlands. Cooperators include the Audubon Society, Rural Electric Association, Ducks Unlimited, federal, state and local agencies. The Area has been used for local schools and universities for wetland studies and research, outdoor education, and, waterfowl retriever dog trials.

Idaho. Located in west-central Idaho approximately 35 miles east of Grangeville, the **Elk City Aquatic Zone Showcase Area** encompasses 27 miles of stream and 683 acres of associated riparian habitat in a scenic mountain basin environment. Early dredge mining practices in the Elk City township damaged over 27 miles of riparian and anadromous fish habitat. Management plans will include elimination of fish migration barriers, installation of plantings along streambanks, stabilization of streambanks, installation of stream structures, reconstruction of channels, construction of connecting channels between dredge ponds for chinook rearing areas, and rehabilitation of dredge piles and installation of fencing and clean gravel.

Montana. The **Prairie Pothole Habitat Area** is a Showcase Area centered around Beaver Creek and Comertown areas in Phillips and Sheridan counties. The Beaver Creek project involves creation of 3800 acres of additional wetlands within the 300-square-mile project area. When this new wetland acreage is superimposed over large areas of native prairie with high nest success rates and high pair densities per wetland acre, the contribution towards increased fall flight will be significant. Aside from waterfowl production, full implementation of this Habitat Management Plan will result in improved condition of native rangeland and establishment of perennial cover on marginal cropland through upland vegetation management. Thus far, the BLM has completed a cooperative wetland project with Ducks Unlimited that has constructed 20 waterfowl nesting islands, acquired important waterfowl habitat through land exchange, monitored waterfowl use and waterfowl production, and conducted a public affairs program in cooperation with other agencies. Principal cooperators with the BLM in the Beaver Creek project area are the Montana Department of Fish, Wildlife and Parks, the Fish and Wildlife Service, Ducks Unlimited, the Bureau of Reclamation, the Soil Conservation Service, the Montana Department of State Lands, the Montana Department of Natural Resources and Conservation, and the Milk River Irrigation District.

Montana. At **Custer Creek Waterfowl Area**, through cooperative efforts with Ducks Unlimited, 64 acres of wetlands and 1.5 miles of shoreline were created. This project is important to waterfowl because of the lack of wetland habitats in the surrounding area. The



project entailed reconstructing a 940-foot dam and constructing a fence that provides 270 acres of nesting habitat around the wetlands complex. The Haughin Livestock Inc. is volunteering their tractor and planting the seed to expedite establishment of nesting cover on the 270 acre upland area.

Utah. Wetland values are being maintained and enhanced in the 9,000-acre **Pariette Wetlands** along with oil and gas development and livestock grazing. Intensive wetland management is occurring on the area such as construction of dike systems, nesting islands and platforms, development of wet meadows and food patches and raptor nests and perches. Cooperators include the Utah Division of Wildlife Resources, Ducks Unlimited and other State and Federal agencies.

The **Horseshoe Springs Habitat Showcase Area** covers an important wetland complex of springs and marshes located 50 miles west of Salt Lake City. Waterfowl, shore birds and other typical aquatic/marsh mammals, reptiles, amphibians, and non-game birds live in this area. Long-billed curlews nest in the uplands and peregrine falcons use the area as feeding habitat. This rich riparian and wetland area has been nominated as a Watchable Wildlife Area. The Tooele Wildlife Federation has agreed to assist in developing this area and the Utah Division of Wildlife Resources is a cosponsor of the plan and committed to assisting in its implementation. Other organizations thus far expressing an interest in the Habitat Management Plan include the Salt Lake County Wildlife Federation, Boy Scouts of America, American Salt and MagCorp.

Bureau of Reclamation

Colorado. Reclamation is working with the Colorado Division of Wildlife (CDW) to rehabilitate an abandoned irrigation ditch, the Lone Dome Ditch, located along the Dolores River below McPhee Dam. Water rights belonging to the CDW will be used to create approximately 23 acres of new wetlands as partial mitigation for losses resulting from salinity control measures associated with the Dolores Project. The CDW will manage the project when it is completed.

Colorado. Reclamation's Durango Projects Office, Upper Colorado Region, has been working with the Colorado Department of Wildlife to improve the Sambrieto Creek Wetlands area through the restoration of a water delivery system. Previous plantings and culvert improvements have improved the site for waterfowl and bald eagles.



Utah. Jordanelle Dam is under construction on the Provo River, north of Hebner, Utah. To partially mitigate for wetlands that will be inundated by the reservoir, approximately 85 acres of new wetlands and riparian habitat will be created on Reclamation lands downstream. The new wetlands complex will be a flow-through system of wide ditches and ponds and will provide habitat for the spotted frog, a potential candidate species for listing under the Endangered Species Act.



Idaho. The Montour Wildlife/Recreation area is a small valley on the upper end of the Black Canyon Reservoir in southwestern Idaho. Reclamation's Central Snake Projects Office, entered into a cost-share agreement with the Idaho Department of Fish and Game (IDFG) to construct and restore several wetland areas in the valley. IDFG has finished the design work and will proceed with construction of the second phase of these wetlands enhancement projects. They include the construction of an earthfilled dike to impound more wetland area on the south side of the valley along with the rehabilitation of a feeder canal. A new pond of approximately 6 acres will also be constructed at the west end of the valley near an existing pond and slough. A new headgate will be installed in the northeast area of the valley to direct and supply an adequate quantity of water to the wetlands on the west side of the valley.

Wyoming. Over the years, an area of approximately 100 acres, downstream of Fontenelle Dam on the Green River, has been subject to severe grazing pressure throughout the summer months. The grazing resulted in approximately 50 percent bare ground and prevented regeneration of the cottonwoods. Due to the remote location and lack of on-site land management, the existing fencing was not being maintained. Since the area received water from an intermittent creek and several seeps, it was recognized to have the potential to support wetland and other important riparian vegetation. As a result, a buck-and-pole fence was constructed. This fence was selected because it requires low maintenance, can withstand heavy snows and cattle pressure, and is less subject to vandalism. It was also designed in such a way to exclude cattle but allow for passage of pronghorn antelope and other wildlife. Within a single growing season, the area has become a lush wet meadow/marsh wetland complex and was used by the Wyoming Game and Fish Department as a nursery area for Kokanee salmon.

Wyoming. Reclamation initiated a project to support Secretary Lujan's Watchable Wildlife and handicapped access program by developing a wetlands interpretive area at Glendo Reservoir. Boardwalks, trails, public parking, and nature signs will be constructed for the area along with an explanation of the role that wetlands play in water resources management.

In addition, Reclamation is designing and will be constructing a low-flow outlet works at Glendo to provide instream flows for the fishery and associated riparian habitat in the 20-mile reach of the North Platte River between Glendo Dam and Guernsey Reservoir.

Wyoming. Reclamation entered into a cooperative agreement with the Midvale Irrigation District in Wyoming to control severe erosion problems in Cottonwood Creek. Five drop structures were constructed which stopped the erosion, created valuable wetlands, and are restoring the surrounding water table and riparian habitat back to pre-erosion conditions. Reclamation provided the funding for the construction materials, and the District accomplished the work at nominal cost.





The District is also providing fencing, at its own cost, along the streams throughout the entire drainage to protect the riparian areas from overgrazing. The goal is to protect and control nonpoint sources of pollution from entering Ocean Lake, a very popular recreation lake in central Wyoming. The wetland/riparian restoration efforts on Cottonwood Creek will eliminate virtually all sediment entering the lake, enhance the lake fishery, provide improved waterfowl habitat, enhance fish and wildlife benefits along Cottonwood Creek, and reverse the trend in groundwater level decline in the Cottonwood Creek flood plain.

Wetlands Protection and Enhancement - Drought Assistance Program. Several wetland projects are being conducted under the Drought Assistance Program. They are in various stages of planning and implementation and include new wells and ponds at Ouray National Wildlife Refuge, wetland enhancement at Fish Springs National Wildlife Refuge, and increased water supplies for the Perriott Draw wetlands--all in Utah. In Texas, Reclamation is rehabilitating an irrigation ditch and constructing a new refuge habitat near Balmorea to protect the habitat of the endangered Comanche Springs pupfish. Work is also continuing at Bone Draw, Wyoming, to provide water for wetlands in this area.

Geological Survey

Colorado. The U.S. Geological Survey is conducting integrated earth science studies in a stream and wetland in Colorado that is being impacted by acid-mine drainage and heavy metals from an abandoned mining operation. The purpose is to determine the capacity of the wetland to collect and store metals and determine the effects of the metals on the wetland. The wetland has both contaminated water and normal water inputs. Results of the studies suggest that only iron is being collected and stored by the wetland, but that the collection of the other heavy metals may be too slow to detect in the current study. Patterns of metal accumulation in vegetation in the wetland reflect surface flow inputs, but some patterns suggest subsurface flow of the contaminated water, as well.

Colorado. The U.S. Geological Survey is completing a study of a fen in northern Colorado. Known as the Boston Peak fen, the wetland is the subject of an integrated, multidisciplinary study to map and determine the source and processes responsible for an elevated concentration of naturally-occurring uranium that was found in the wetland. If the wetland was drained, there is a potential for the uranium to be released to the surface water environment. Additional wetlands in the Colorado Front Range have been the subject of a reconnaissance survey to determine if they contain elevated concentrations of naturally-occurring uranium and other elements. The results of this study will be published in USGS Bulletin 1992.

Colorado. The U.S. Geological Survey studied the hydrologic relations between four wetlands and the South Fork Williams Fork in Colorado, part of the Colorado River basin. The study showed that ground-water discharge was the major function affecting wetland hydrology and the major source of water at all four wetlands, and therefore decreases in stream stage due to diversion of main channel surface-water flow would not affect the wetlands studied.



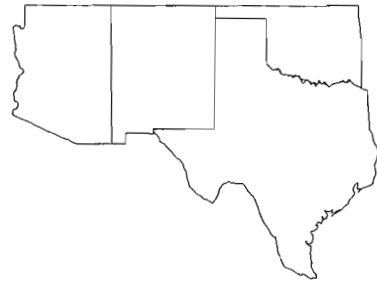
Office of Surface Mining

Wyoming. As part of its wetlands research program, the University of Wyoming has been awarded a \$197,000 study entitled "Constructed Vertical Flow Aerated Wetlands." The purpose of the study is to examine the effectiveness of a vertical flow wetland design to remove metals from mine drainage. This design is a passive, low maintenance treatment system which uses a vertical trickling filter. Most conventional constructed wetlands utilize horizontal flow and predominantly anaerobic processes to remove metals from mine drainage. The advantages of this vertical design are that aeration should enhance metals removal and increase both the pH and dissolved oxygen content of the effluent. Phase one of the project is a laboratory bench scale study to determine optimum flow-through rates for air and mine drainage, and to evaluate effects of effluent quality and gas composition. Phase two of the project is a one-year field verification of a wetland that has been constructed using optimum design values identified in phase one.





SOUTHWEST REGION



Fish and Wildlife Service

Oklahoma. As part of the **North American Waterfowl Management Plan**, the Atlantic Richfield Corporation donated a perpetual easement on 1,030 acres of bottomland hardwoods to the Oklahoma Department of Wildlife Conservation. This donation was added to a donation of 175 acres fee-title from Mr. Julian Glass, Jr., to initiate the Upper Verdigris Wetland Project. The Fish and Wildlife Service provided \$14,500 for construction of moist soil and green-tree impoundments through the Partners for Wildlife program while the Kansas Power and Light Company contributed \$9,000 for construction purposes.

Partners in Wildlife. The Service restored over 2,700 acres of wetlands on 30 sites in 1991 through its Partners for Wildlife program. Almost all of the wetland restoration accomplishments on private lands were in Texas and Oklahoma, where the Service has recently developed a good working relationship with landowners interested in wetland conservation on their property. In 1991, landowners provided \$184,000 in cost-sharing for wetland restoration activities, thereby allowing the Service cost/per acre to be \$126.

Texas. Drainage ditches were plugged to restore original water levels to 402 acres of wetlands, and low levees were built to manage 98 acres of greentree reservoirs to help bring waterfowl back into the area. On Mark Andrew's Ranch, wetland hydrology was restored on 56 wetland acres, and 30 acres of bottomland hardwoods were planted.

National Park Service

New Mexico. "Hog Canyon Riparian Restoration Project," in Dinosaur National Park, involves one of the few known populations of an orchid (*Sprianthes diluvialis*) recently listed as threatened. This riparian area has been impacted by grazing and channelization, resulting in degradation of the orchid's habitat. NPS and several cooperating Federal and State agencies established a monitoring program for use in identifying current conditions and potential management actions for the area. The result will be a management plan that includes alternatives for riparian restoration and management to enhance orchid habitat.

Bureau of Land Management

Arizona. Tule Creek contains the densest population of endangered Gila topminnow in the State of Arizona as well as a significant population of lowland leopard frogs. Desert tortoises are found in the upland habitat. This Riparian Habitat project was a Challenge/Cost Share Project with the Arizona Game and Fish Department. Three-quarters of a mile of riparian habitat and approximately 70 acres of upland habitat were fenced to enable riparian vegetation to become reestablished.



Arizona. Chalky Spring Riparian Enclosure was a Challenge/Cost Share Project with Maricopa County Parks and Recreation involving construction of a fenced enclosure to protect a half of mile of riparian habitat from degradation due to livestock and burro use. Local high schools use this area as an outdoor classroom for studying desert riparian ecosystems. The area is a potential reintroduction site for the endangered Gila Topminnow.

Arizona. BLM and the State of Arizona entered into a Memorandum of Understanding for the development of a riparian area exhibit that was placed in the Sonoma Desert Museum. The interpretive display is located in the popular beaver/otter viewing area and is visited by an international clientele of over 600,000 people annually.

New Mexico. The goal of the Placitas Arroyo Riparian Demonstration Area is to restore the depleted ground water table, create a viable wetland ecosystem, and restore a diverse vegetative community. Three spring areas were enclosed and native hydrophytic vegetation was planted with assistance provided by the Southwest chapter of Quail Unlimited, New Mexico State University, and a local rancher.

Bureau of Reclamation

Arizona. On a Colorado River backwater, five miles east of Yuma, Reclamation is undertaking a wetlands restoration project. It was originally formed as a result of a 3,000-foot training structure. This structure was placed in the river to divert the main flow of the lower Colorado River away from the protective levees. During construction, the area behind the training structure filled with sediment, thereby reducing the effectiveness of the area as a productive wetland. Reclamation is restoring this area by dredging portions of the backwater to a maximum depth of 20 feet, constructing islands, placing brush habitat for fish, placing raptor structures, and forming peripheral marsh areas.

California/Arizona. Reclamation is also working with the Fish and Wildlife Service, Bureau of Land Management, California Department of Fish and Game, and the Arizona Game and Fish Department to rehabilitate the Goose Flats (C-5) and A7 backwaters near Blythe, California. Reclamation is deepening the backwaters by dredging and placing permeable structures in the draining structure to ensure adequate water flow throughout the system.

Office of Surface Mining

Director's Award. Big Brown Mine, Texas Utilities Mining Company, Texas. This company received the OSM Director's award for outstanding environmental research related to protecting and enhancing water and wetland resources.

Take Pride in America

Texas. The Aransas National Wildlife Refuge worked with the Business Alliance Support of Critical Habitat for the Endangered Whooping Crane to provide a cost effective means of stabilizing shorelines to preserve critical habitat areas.



WESTERN REGION

Fish and Wildlife Service

California. As part of the **North American Waterfowl Management Plan**, on December 3, 1991 Interior Secretary Lujan dedicated the Llano Seco Ranch, Central Valley Habitat Joint Venture. The \$13.7 million project includes fee acquisition and perpetual conservation easements on 14,000 acres of wetlands, riparian, and agriculture lands. When completed, the project will protect 5,200 acres of existing wetlands and restore 5,200 acres of agriculture lands to wetlands. Funding for the project came from the Fish and Wildlife Service, The Nature Conservancy, California Fish and Game Department, and the National Fish and Wildlife Foundation. Ducks Unlimited and the Bureau of Reclamation have made commitments to help with future wetland restoration.



Almost 740 acres were acquired to help complete the **San Francisco Bay National Wildlife Refuge** to protect the wildlife resources of the south San Francisco Bay area and provide wildlife-oriented recreation, and preserve a natural area in close proximity to a large urban center. The marshes, mudflats, open water, and salt ponds form an ecosystem which supports a rich diversity of fish and wildlife. It is a major nesting and feeding area for waterfowl and shorebirds, and habitat for three endangered species.

Partners in Wildlife. In 1991, the Service restored 7,029 acres of wetlands on 99 privately owned sites in California, Oregon and Washington through the Service's Partners for Wildlife program. FWS cost to restore these sites was less than \$99/acre. This was largely due to success in generating over \$600,000 in outside contributions from individual landowners, conservation groups, and State agencies to cost-share at least 50 percent.

California. Many high-quality wetlands in California's central valley were drained and precision leveled years ago to grow irrigated rice. Now with water in short supply and water quality more of a problem, in some cases, some landowners are considering other uses of the land, such as restoring wetlands. Leasing of hunting rights can provide income without all the rice production costs. "De-leveling" the flat fields to make sloughs, islands, and shallow flats takes considerable earth moving equipment. However, landowners appreciate the results restored wetlands provide for vital fall, winter, and spring habitat for migratory birds.

Oregon. A landowner in southwest Oregon restored a 38-acre shallow wetland last year with several nesting islands. This spring the natural looking wetland supported numerous broods of mallards and other ducks as well as other wetland birds that had not been in the area for some time. He is particularly proud of the nesting geese. At one time there were



11 broods of geese on one island. The landowner is also actively working with others in the basin to get them involved in restoring wetlands.

Washington. The Partners for Wildlife program works with ranchers to restore wetlands in range and wheat land. Steve Collins, a large wheat farmer, was assisted in opening up a silted in spring head and a shallow basin that was nearly silted full. Now he has two nice wetlands that maintain water most of the year. Several ranchers in Washington and Oregon have also cooperated in restoring riparian/wetland vegetation along eroded stream banks.

National Wetlands Conservation Awards.

Citizen's Committee To Complete The Refuge, Palo Alto, California. This group assisted in obtaining national legislation that added an additional 20,000 acres of coastal wetland to the San Francisco Bay National Refuge; worked with the Safeway Corporation to get 3 million grocery bags imprinted with a "Save Wetlands" logo and with a coupon to be clipped and sent, along with a \$1 contribution, to obtain more information about wetlands.

Nevada Waterfowl Association and Lahontan Valley Wetlands Coalition, Reno, Nevada. This joint effort of two organizations has resulted in fund-raising for purchase of rights to 31.8 acre feet of water to preserve 25,000 acres of prime valley wetlands; hundreds of volunteer hours of reviewing testimony and records and in testimony before Congress and the State Assembly; and working with The Nature Conservancy, which spent \$1 million to acquire 3,000 acre feet of water rights for the Stillwater Marsh. This was the first time water rights have been acquired and transferred for the preservation of wetlands within a Federal reclamation project.

Neal Nelson, Gustine, California. Mr. Nelson is personally responsible for management of over 7,800 acres of privately owned seasonal and permanent wetland habitat that include both riverbottom hardwood forests and a scattering of wildlife food plots. His successful management techniques have been adopted by other property owners, causing increases in both quality and quantity of wetlands; his enthusiastic support of the Fish and Wildlife Service's conservation easement program has encouraged other landowners to become part of the easement program.

Lakeview Soil and Water Conservation District, Lakeview, Oregon. By working to bring grant funds to the community, and by providing coordination between government agencies and private owners, this group was responsible for restoring a 350-acre wetland and providing improved fish passage for the Goose Lake/red-band trout, a candidate species for listing under the Endangered Species Act. Their interagency cooperative agreement is now being used as a model for similar proposed projects. This is the largest wetland restoration project in Oregon under the current Farm Bill.





Bureau of Reclamation

California. On November 26, 1989, the Secretary of the Interior announced a joint State-Federal commitment to wetlands and riparian habitat acquisition and enhancement in the Central Valley of California. This project is intended to not only mitigate for the habitat values and wetland acres lost at Kesterson Reservoir but create 4,464 acres of new wetlands and provide protection for an additional 6,239 acres of existing wetlands and riparian habitat found along the San Joaquin River. On October 9, 1990, a cooperative agreement was signed with the California Department of Fish and Game, the FWS, and Reclamation for implementing the Kesterson Mitigation Plan/San Joaquin Basin Action Plan. The Plan is equally cost shared among the participants and represents a major project carried out under Reclamation's new wetlands and riparian habitat initiative. It also supports the North American Waterfowl Management Plan's Central Valley Habitat Joint Venture.

California. On December 19, 1990, Reclamation's Lower Colorado Region signed a cooperative agreement with Eastern Municipal Water District (EMWD) in southern California to explore and evaluate the use of multipurpose wetlands in conjunction with EMWD's reclaimed water reuse program. After completing a phase I report that demonstrated the feasibility of incorporating wetlands into EMWD's program, Reclamation and EMWD entered into a second agreement to proceed with the design, construction, and operation of both pilot and demonstration scale wetlands. The research portion of this cooperative project will be 50/50 cost shared. The construction of the demonstration scale wetlands will be paid for by EMWD since the wetlands will contribute to EMWD's overall environmental enhancement requirement under their Small Reclamation Project's (Public Law 84-984) loan agreement.

California. Reclamation, the Fish and Wildlife Service, the California Department of Fish and Game, and the Grasslands Water District have been working together to identify the water needs for California's wildlife refuges in the Central Valley and the Modoc National Wildlife Refuge in northeastern California. A draft report, which identifies the most reasonable alternatives, is currently under review.

California. Three field surveys of Upper Klamath Lake wetlands were carried out in fiscal year 1991 to determine the role of wetlands in reducing nutrient concentrations in a hypereutrophic lake. Historic wetlands areas and changes were mapped for the years 1940, 1968, and 1989 using a Geographic Information System (GIS) and a combination of aerial photographs, Soil Conservation Service soil surveys, and National Wetlands Inventory maps.

Washington. Reclamation has entered into a cooperative agreement with Washington State University to conduct a survey of naturalized insects associated with purple loosestrife, a nuisance plant species that has invaded extensive areas of wetlands in central Washington. Following this survey, Reclamation will work with the Washington State University and the Service on the trial introduction of insect(s) for the biological control of this plant which has no food or habitat value for wildlife.



Bureau of Land Management

California. The Consumnes River is part of the Central Valley Wetlands Project. This area contains 20% of the wintering waterfowl in the continental U.S. and the highest priority wetlands nationally for wintering habitat preservation. The BLM is actively pursuing several environmental initiatives that will have a major impact on wetlands in the Central Valley. The first is the Consumnes River Preserve project, jointly undertaken by BLM, Ducks Unlimited, The Nature Conservancy and others. This project involves acquiring and enhancing wetlands on some 15,000 acres.

California. Afton Canyon Natural Showcase Area, a 41,000-acre wetland riparian area, was designated an Area of Critical Environmental Concern, in 1980. The area's many ponds, marshes and streams provide habitat for a wide variety of wildlife. As one of the few places that a major river surfaces in the Mojave Desert, the canyon is a major way station for migratory birds. Management objectives emphasize improving riparian habitat and maintaining its size, improving wildlife habitat, providing low-impact recreational use compatible with wildlife, and scenic values. These objectives will be achieved through monitoring, land acquisition, firearms restrictions, tamarisk eradication, restricting vehicle use, rehabilitation of closed routes, livestock exclusion fencing and visitor education.

Oregon. Contained within the 51,000-acre Warner Wetlands Habitat Area are thousands of acres of wetland habitats designated as the Warner Wetlands Area of Critical Environmental Concern. This area is home to a variety of waterfowl and shorebirds. Untainted marshes and sloughs, hundreds of miles of unobstructed lake and channel shorelines, undrained swamps, holes and meadows make up this outstanding complex of wetland and upland habitats. Located in the vicinity of Lakeview, Oregon, along the path of the Pacific Flyway, this area hosts hundreds of thousands of waterbirds on their annual migrations. Thousands of other birds use the valley's wetlands as their summer nesting grounds. Sandhill cranes and long-billed curlews are among the many species of birds to be found there. Multiple uses in the ACEC include managed livestock grazing, fish and wildlife-related recreation and cultural resource values. The University of Nevada (Reno) maintains an archeological site there to research the pre-history of this unique area and several other colleges and organizations have used the Warner Wetlands as a field classroom for the study of biology, ecology, ornithology, botany and geology. Public interest in the wetlands is high and many organizations, including the Izaak Walton League, The Nature Conservancy, Ducks Unlimited, the Audubon Society, Friends of Wildlife and the National Wildlife Federation, have offered funding support, volunteer labor and other assistance to achieve wetland objectives.

Oregon. The pristine New River Area of Environmental Concern is located on the Oregon coast near Coos Bay and is centered around the New River, which is less than 100 years old, making it the youngest river in the U.S. The river supports a wide array of wildlife species because of its interaction with the marine environment. Four species of wildlife that use the area are designated as either threatened or endangered on State or Federal lists; the American peregrine falcon, Arctic peregrine falcon, bald eagle and the Aleutian Canada goose. The river provides critical rearing habitat for juvenile salmonids.



Geological Survey

California. The U.S. Geological Survey continues to conduct field investigations of the estuary and wetlands of San Francisco Bay that reveal complex patterns of sediment transport, erosion, and accumulation. Analyses of long continuous sediment cores are revealing climatic patterns to wetland change and human influence.

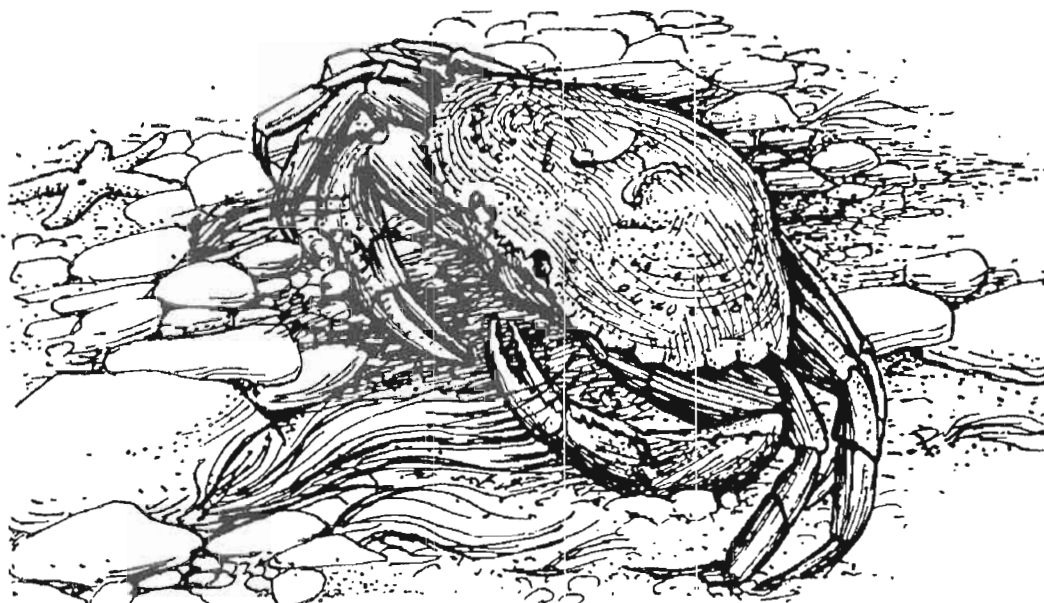
Oregon. The U.S. Geological Survey has begun a study in Oregon which is focused on defining current water-quality conditions of a wetland and on quantifying the pollutants entering the wetland from the Eugene urban area.

Minerals Management Service

California. The Minerals Management Service is funding the University of Santa Barbara to explore long-term environmental and socio-economic consequences of offshore oil and gas production. The University of Santa Barbara is addressing two Framework Issues pertinent to wetlands: 1) residual effects of oil spills and the recovery of coastal wetlands from oiling; and 2) the effects of channelization of wetlands from pipeline emplacement and navigation.

Take Pride in America

Oregon. Brad Keller, a BLM Biologist in the Prineville District, was the driving force behind the Bridge Creek Watershed Riparian Project. This project was undertaken in cooperation with the Izaak Walton League and drew 500 volunteers over a 3-day work period. Tasks completed included wildlife enhancement structures, instream structures, tree planting, grass seeding and creating fishery ponds. BLM employees from across the state turned out for this special event, which created a spirit of high morale and pride in Oregon.



APPENDIX A

(RETYPE)

THE WHITE HOUSE

Office of the Press Secretary

For Immediate Release

August 9, 1991

FACT SHEET PROTECTING AMERICA'S WETLANDS

The President announced today a comprehensive plan for improving the protection of the nation's wetlands. Wetlands serve an important role in flood control; they help filter wastes for fish, birds and animals; and they are an important recreational resource.

Three quarters of the remaining wetlands are privately owned, and the pressure to serve other valid human needs often comes in conflict with conservation. A coordinated wetlands policy requires balancing all these interests.

The President believes we must look beyond regulation to encourage wetlands protection. We must enhance public understanding of the value of wetlands as well as support non-regulatory programs that encourage private, state and local actions to conserve wetlands.

The Administration has a three-part plan to slow and eventually stop the net loss of wetlands, taking a significant step toward the President's goal of no net loss of wetlands:

1. Strengthen wetlands acquisition programs and other efforts to protect wetlands.
2. Revise the interagency manual defining wetlands to ensure that it is workable; and
3. Improve and streamline the current regulatory system.

Wetlands Expansion Measures

Since taking office, the Bush Administration has proposed:

The purchase of approximately 450,000 acres, at a cost of over \$200 million, of critical wetlands habitat;

THE WHITE HOUSE

Office of the Press Secretary, August 9, 1991, (continued)

A 48 percent overall funding increase for wetlands protection efforts in the FY 1992 budget to \$709 million

A nearly three-fold increase, from \$16 million in FY 1989 to \$45 million in FY 1992, for wetlands R&D programs;

The establishment, under the provisions of the 1990 Farm Bill, of a 600,000 acre wetlands reserve.

To ensure further progress towards the no net loss goal, the Administration today proposed several new initiatives to enhance wetlands protection on Federal and private lands. These include:

Fully funding the Wetlands Reserve Program in the 1990 Farm Bill. The 1990 Farm Bill authorized the purchase of up to 1 million acres of wetlands. The Administration will work for this amount in FY 1993 and future budgets.

Initiating an Administration-wide wetlands restoration and creation program on Federal lands. Many agencies, including Interior, EPA, Defense, Commerce, and Energy, have the potential to engage in restoration and creation programs. These activities will be strengthened and coordinated through a standing interagency task force that will develop an overall policy for the most effective use of new and existing Federal resources.

Continuing to make wetlands a priority in the allocation of Land and Water Conservation Funds (LWCF). The Administration will seek to maintain or increase funding for this program. Moreover, it will target a portion of State LWCF funds to wetlands.

Continuing and expanding the existing satellite monitoring program to periodically assess national wetland trends. Satellite imagery provides up-to-date information on the status and trends of wetlands, and can help in conducting periodic change analysis of high-value wetland areas. The Administration is accelerating and improving our national inventory of wetlands, with more geographically targeted reporting, and monitoring of the ecological health of our wetlands.

Expanding research on wetlands. Several agencies independently conduct research on wetlands. The Administration is establishing a process to coordinate, consolidate and establish priorities for wetlands research.

THE WHITE HOUSE

Office of the Press Secretary, August 9, 1991, (continued)

Focusing public outreach and education programs on informing the regulated community about Federal wetlands regulations.

Revising the existing Executive Order on wetlands to emphasize wetlands stewardship on Federal lands and the acquisition of valuable wetlands. The Administration will revise the Executive Order to include a commitment to the no net loss goal.

Delineation Manual

On January 10, 1989, the Environmental Protection Agency, the Army Corps of Engineers, the Fish and Wildlife Service, and the Soil Conservation Service issued a joint Federal manual for the Identification and Delineation of Wetlands to address inconsistencies in practice among the agencies. The Manual established the technical criteria and procedures used to define a wetland.

In response to public comments and field hearings, the Administration is sending to the Federal Register today a revised Manual that will incorporate changes to clarify the scope and application of the Manual. The revised Manual will be issued as a proposal and as guidance to the agencies; the public will be invited to comment on the Manual before it is made final.

Streamlining Wetlands Regulations and Adding Flexibility

Under section 404 of the Clean Water Act a landowner must receive a permit from the Corps of Engineers before adding dredged or fill material to a wetland. The Administration will take the following actions to improve the workability of the 404 regulatory program.

A. Streamline the Permitting Process

To streamline the regulatory process, the Administration proposes a number of reforms to ensure more timely decisions and effective coordination among agencies. These include requirements to:

Issue a regulatory guidance letter providing that meetings and other interactions between the public, applicant and Federal government will be coordinated through a single agency, the Army Corps of Engineers. The Corps would serve as the project manager, and will be responsible for all consultations with other agencies on the permit applications and for determining the final permit condition;

THE WHITE HOUSE

Office of the Press Secretary, August 9, 1991, (continued)

Encourage attendance by all interested agencies at the pre-application meetings with the permittee and early consultation on the types and location of mitigation that will be required if wetland losses occur;

Initiate a wetlands delineation training program for private consultants and better train agency field staff on wetlands functions, values and delineation, using cross-agency training programs to the extent appropriate;

Deem permits approved within six months if an agency does not extend the deadline for good cause as determined by the Corps of Engineers;

Require consulting agencies to provide site specific information when commenting on individual permits;

Replace consulting agency appeals of individual permits with appeals based on resources or issues of national significance; and

Expand the use of general permits.

B. Wetlands Categorization

The Administration will establish an interagency technical committee to define a limited number of major wetland categories based on function, value, and the relative scarcity or abundance of different wetlands. The technical committee will complete its work within 18 months and will consult with outside experts in defining the categories.

C. Mitigation Banking

The technical committee will also refine the details of a market-oriented mitigation banking system based on the categories it defines. The mitigation banking system will be designed to provide adequate incentives for the private restoration or creation of wetlands that can be used to mitigate the effects of developed wetlands. The mitigation banking system will:

Allow permit applicants to satisfy compensatory mitigation requirements through the use of "mitigation credits;"

Presume satisfaction of permit conditions if the mitigation credits are from the same or from a higher wetland category; and

THE WHITE HOUSE

Office of the Press Secretary, August 9, 1991, (continued)

Replace the preference for on-site mitigation for all wetlands except those in the highest wetland category with a preference for mitigation within States or within major hydrological units which may cross State lines.

D. Permit Conditions for Wetlands

The Administration proposes to maintain the process known as sequencing for the high-value wetland category. Permit applicants involving wetlands in the remaining categories will be required to offset wetland losses through compensatory mitigation. States with less than a 1 percent historic rate of wetlands development will be able to satisfy permit requirements through minimization. The Administration will also establish general permits for low-value wetlands.

E. Increasing State Role

To increase the role of States in the wetlands permitting process, the Administration will issue guidance to encourage greater use of Regional and State General Permit Programs. States which assume delegation of the 404 program will be given flexibility, to the extent allowed by current law, to tailor the wetland categories based on State resources. State programs would be approved as long as the program achieves on balance the same environmental benefits as the Federal program.

The Administration also supports legislation to allow permitting of wetlands near navigable waters by States that assume responsibility for the permit program.

F. Modifying the Coverage of the Program

The Administration supports legislation to expand the scope of the 404 program to include other activities which may destroy wetlands besides the addition of fill material. The Administration will also take steps to exempt man-made wetlands which are not used for purposes of mitigation and whose creation was not subsidized by the Federal government. The Administration will also clarify that normal farming, ranching and silvicultural activities generally are exempt from the 404 program, and that lands exempted from the Swampbuster program are similarly not covered.

APPENDIX B

Wetlands Restoration Symposium - Abstracts Department of the Interior, Washington D.C. July 16, 1991

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WETLANDS RESTORATION ON FEDERAL LANDS

- 8:30 AM **WETLANDS STEWARDSHIP**
Honorable Manuel Lujan, Jr., Secretary of the Interior
Introductions: June M. Whelan, Special Assistant to the Secretary
- 9:00 **DIVERSITY OF WETLANDS RESTORATION PROJECTS**
Moderator: John Turner, Director, Fish and Wildlife Service
Restoration of Salt Marsh at Cape Cod National Seashore
John Portnoy, National Park Service, Cape Cod National Seashore, MA
Bottomland Hardwood Complexes in the Southeast
Tim Wilkins, Fish and Wildlife Service, Yazoo, MS
Restoration in the Prairie Pothole Region
Dick McCabe, Bureau of Reclamation, Bismarck, ND
- 10:00 - 10:15 **Break**
- 10:15 - 10:45 **WETLANDS CHALLENGES IN THE '90s**
Teresa Gorman, Office of Policy Development, White House
- 10:45 - 12:00 **WETLANDS RESTORATION IN A MULTIPLE-USE ENVIRONMENT**
Moderator: Susan Lamson, Director of External Affairs,
Bureau of Land Management
Wetlands Restoration/Enhancement in an Arid Environment
Wayne Elmore, Bureau of Land Management, Prineville, OR
Fresh Water Wetlands
Bob Jackson, Bureau of Indian Affairs, Minneapolis, MN
Mined Land Reclamation
W. Hord Tipton, Office of Surface Mining, Washington, D.C.
OCS - Gulf of Mexico Wetlands Study
Dr. Robert M. Rogers, Minerals Management Service, New Orleans, LA
- 12:00 - 1:30 **Lunch (DOI Buffet Room)**
FEDERAL-STATE RELATIONS Speaker: Honorable Mike Hayden,
Assistant Secretary - Fish, Wildlife & Parks
- 1:30 - 1:45 **VALUES OF WETLANDS**
Honorable Frank A. Bracken, Deputy Secretary of the Interior
- 1:45 - 3:00 **STATE OF THE ART IN WETLANDS RESTORATION**
Moderator: Scott Sewell, Dep. Asst. Secretary, Fish, Wildlife & Parks
Wetland Restoration on Agriculture Lands
Gene Whitaker, Fish and Wildlife Service, Washington, D.C.
Louisiana Coastal Wetlands
Dr. Richard (Rick) P. Stumpf, U.S. Geological Survey, St. Petersburg, FL
Constructed Wetlands to Treat Acid Mine Drainage
Dr. Harry (Hank) Edenborn, Bureau of Mines Research Center, Pittsburgh, PA
Wetlands Restoration: Shipshoal Project
Carolita Kallaur, Minerals Management Service, Herndon, VA
- 3:00 - 3:15 **Break**
- 3:15 - 3:45 **NORTH AMERICAN WATERFOWL MANAGEMENT PROGRAM**
Bob Streeter - North American Waterfowl and Wetlands Office, Washington, DC
- 3:45 - 4:15 **COASTAL AMERICA**
Michael R. Deland, Chairman, Council on Environmental Quality (Invited)
- 4:15 **CLOSING REMARKS - Future of DOI Initiatives,** June M. Whelan



**MANUEL LUJAN, JR.
SECRETARY OF THE INTERIOR
"INTERIOR'S WETLANDS STEWARDSHIP"**

When I took office as Secretary of the Interior just over two years ago, I established a very basic goal: to leave our Nation's cultural, historic, and natural resources in better condition than when I entered office.

As custodian of the Nation's 500 million acres of parks, wildlife refuges, multiple use public lands and their natural resources, the Interior Department has an important role to play in the management of wetlands. As steward of these public treasures, Interior's mission is to balance the need to develop some of these resources while preserving our fragile environment.

Wetlands can be found throughout Interior's land and water resources, in wildlife refuges, in the National Park System, and on Bureau of Land Management's public lands. The Department has a vast endowment of wetlands resources, and our programs and bureaus offer us a unique opportunity to restore, protect, enhance, and even create wetlands.

Our Fish and Wildlife Service manages nearly 500 wildlife refuges covering 90 million acres, with over 30 million acres of wetlands. The Service has a long and distinguished history in preserving and restoring wetlands as a part of our natural heritage.

The Bureau of Land Management administers 21 million acres of wetlands, commonly adjoining rivers, streams, lakes, reservoirs, and marshes. Much of their wetlands are riparian, lying along rivers and streams, providing critical habitats for a variety of species. Reclamation supplies 10 trillion gallons of water each year to 23 million people in 17 states. Testing water quality and researching the impact of development in and around wetlands is carried out by the U.S. Geological Survey.

Constructing wetlands is one aspect of the Bureau of Mines' diverse activities. The Bureau has helped to create over 300 man-made wetlands. Our Office of Surface Mining works with the mining industry in reclaiming developed areas, and this activity includes wetlands restoration. The Minerals Management Service regulates offshore energy and mineral development, with an eye to ensuring that these activities are sensitive to the needs of marine and wetland habitats.

The 354 units of the National Park Service includes large tracts of wetlands, most notably the Everglades National Park. Our Bureau of Indian Affairs has trust responsibilities for 54 million acres, which includes almost one million acres of wetlands.

Of all the resources entrusted to the Interior Department, the most valuable is our Nation's environmental legacy. All life on this planet is sustained by the environment, and we have learned that wetlands are an essential part of our fragile environment.



**FRANK A. BRACKEN
DEPUTY SECRETARY OF INTERIOR
"THE MANY BENEFITS OF WETLANDS"**

Wetlands serve many functions and have many values in addition to the important biological and ecological values with which we are all familiar. Wetlands perform many key functions: flood conveyance, flood storage, sediment control, recreation, water supply, food production, and water quality. In addition, they also provide many opportunities for education and research.

Wetlands are increasingly important in restoring and maintaining ground and surface water supplies to support the growth of urban centers where ground water supplies are dwindling. Wetlands retain rainwater which in turn percolates into aquifers and provides critical groundwater supplies. They are also important hydrologically. In times of drought they provide needed water supplies due to ground-water discharge. In times of excess rainfall, they serve as areas of recharge to ground water. Wetlands serve as recreation sites for fishing, hunting, observing and photographing wildlife.

Because of their high natural biological productivity, both tidal and inland wetlands have unrealized food production potential for harvesting of marsh vegetation and aquaculture. Wetlands serve as spawning grounds and nurseries to a variety of fish that have significant commercial value and enormous recreational value. Tidal, coastal and inland wetlands provide education opportunities for nature observation and scientific study.

These benefits have not always been recognized. In their natural state, wetlands for years were frequently considered unproductive, worthless, and breeding grounds for mosquitos. As a result, many wetlands have been drained and filled to provide land for urban expansion, or sprayed with pesticides to protect public health. They have also served as convenient dumping grounds for trash and other waste.

Not until the wetlands habitat and the wildlife it supports became increasingly scarce, did we come to realize that wetlands have many valuable attributes.



**J. MICHAEL HAYDEN
ASSISTANT SECRETARY FISH AND WILDLIFE AND PARKS
"WETLANDS OF INTERNATIONAL SIGNIFICANCE"**

During my tenure as Governor, of Kansas, we were able to facilitate the designation of Cheyenne Bottoms, one of the best and most beautiful wetland complexes anywhere. We were able to have Cheyenne Bottoms -- we call it the jewel of the prairies -- designated as an official RAMSAR site, a wetland of true international importance.

RAMSAR, or the Convention on Wetlands of International Importance, is the major international and inter-governmental body that works to stem the global decline in wetlands. There are 62 member countries and several in the process of joining.

The Convention develops criteria and guidelines to assist countries in wisely using their wetland resources -- regardless of the specific wetland functions and values. The Convention has a conservation fund to assist developing countries in the research, management and conservation of wetlands ... including inventory assistance such as FWS has given Costa Rica and Poland; training such as FWS has provided to Latin America, near East and Asian countries; and, restoration assistance for wetlands of international importance.

The Convention meets every three years. In between, it is run by its standing committee -- the chairman at present is John Turner, Director of the United States Fish and Wildlife Service. The Committee has a strong influence in guiding the direction of the convention and assuring its technical credibility of its decisions.

There are now ten United States sites designated as wetlands of international importance: Izenbek Lagoon NWR and State Game Range (Alabama); Forsythe National Wildlife Refuge (New Jersey); Okefenokee NWR (Georgia-Florida); Ash Meadow NWR (Nebraska); Everglades National Park (Florida); Chesapeake Bay Estuarine Complex (Virginia-Maryland); Cheyenne Bottoms State Game Area (Kansas); Cache-Lower White Rivers Joint Venture Area (Arkansas); Horicon Marsh/Horicon NWR (Wisconsin); Catahoula Lake (Louisiana)

The Cheyenne bottoms site in Kansas is a state-managed area. It is regarded as one of the most important sites in the western hemisphere for migratory shorebirds. 45% of the North American shorebird population stops here during migration. Cheyenne bottoms is a critical habitat for whooping cranes as well as for winter Bald Eagles.



MICHAEL R. DELAND
CHAIRMAN, COUNCIL ON ENVIRONMENTAL QUALITY
"COASTAL AMERICA - PARTNERSHIP IN ACTION"

Restoration of wetlands, and restoration of degraded or altered ecosystems in general, is a critical element on our environmental agenda, a critical trust we hold for future generations, and an important discipline in environmental protection.

And that is a mandate from President Bush's as well. To quote: "... it is unjust to allow the natural splendor bestowed upon us to be compromised. Recovery, restoration and renewal, that is our moral imperative ..."

As you know, Coastal America, is a Presidential initiative to bring about restoration and renewal of our nation's valuable -- and threatened -- coastal living resources.

Coastal America is an interagency effort involving multiple bureaus within the Department of Interior as well as the Environmental Protection Agency, the Corps of Engineers, and the National Oceanic and Atmospheric Administration, with CEQ's overall coordination.

As we proceed toward the "no net loss" goal, two things are abundantly clear. First, we must learn more about how we can restore some of the millions of acres of wetlands that have been converted in the past. All too often, we focus on the losses of wetlands. How do we add more to the side of the ledger representing gains?

And second, while the majority of wetlands are in private hands, I am firmly convinced that the Federal Government can and should play a leadership role in managing the vast Federal estate. We should set a powerful example of wise stewardship.

The challenges are great -- the questions many. You know them better than I, but several key questions bear mention. Firstly, as we work toward restoration, how do we judge our efforts? How should we define success? Should we focus on the creation of basic plant communities, or must we be more careful to ensure that restored wetlands are actually used by birds, fishes and other animals in the same way as undisturbed sites. Do we need, as some have recommended, to set aside a set of reference wetlands that we can use for comparison purposes? And secondly, as we attempt the difficult task of recreating these complex natural systems, are there some that -- because they are so complex as to be unrestorable in the short term-- should be left alone for the long term? Do we know enough about restoring wetlands to rely exclusively upon these techniques to make up for continuing losses, or should we proceed more carefully?

Coastal America's goal is simple and as daunting as tackling the most critical coastal problems - habitat loss and degradation, nonpoint source pollution and contaminated sediments.

Coastal America signals a new level of collaboration between the resource and regulatory agencies at the federal level and between the Federal Government and states, local governments and the private sector.



TERESA A. GORMAN
WHITE HOUSE OFFICE OF POLICY DEVELOPMENT
"DEVELOPING A WETLANDS STRATEGY"

In 1990 as chairman of the Domestic Policy Council's Task Force on Wetlands, I participated in several regional meetings on wetlands policy. At these meetings, task force members heard from several wetland experts who stated that some of the best and most cost-effective opportunities to restore and create wetlands occur on Federal lands. This advise will be recognized in the formulation of the Administration's wetlands policy. We are optimistic that a Federal lands wetlands restoration and creation committee, with able leadership from the Interior Department, will aggressively set about to restore and create useful wetland systems throughout the land.



Diversity of Wetlands Restoration Projects

John Turner Director, Fish and Wildlife Service, Department of the Interior, Washington, DC

Restoring drained and degraded wetlands, to allow them to once again provide their important functions and values for the public, is a goal of all Department of the Interior Bureaus. Examples of the diversity of ongoing wetland restoration activities will be discussed by the presenters on this panel. We also need to recognize the diverse restoration activities of private landowners throughout our country.

With the active encouragement and assistance of the Fish and Wildlife Service (Service) over 7,000 private landowners have restored and preserved over 140,000 wetland acres during the last four years. The Service, using funds specifically appropriated for restoring wetlands, only pays for the actual restoration work and often only a portion of the cost. Although land rights for some of the restorations are provided through a Farmers Home Administration program, for most of them the private landowner donates to the Federal government an interest in the land. The 10-year cooperative agreements to perpetual easements assure that the public will realize the wetland benefits from the public funds expended.

The assistance and cooperation of Agricultural Stabilization and Conservation Service and the Soil Conservation Service has played a crucial role in the success of the Service's private lands program. In particular, the SCS has provided engineering design assistance for many of the restorations. Soil and Water Conservation Districts, Ducks Unlimited, and many other public and private conservation organizations also assist as partners throughout the country helping to enlist landowner cooperators and in providing funds when there are not enough Federal funds available.

Stewardship of wetlands is being strongly embraced by private citizens throughout the country. Last year several country singers contributed their time and talents to help raise the public's awareness of the values of wetlands by making public service spots for use by local TV stations. A public service TV spot by Jim Davis and his Garfield the Cat character encouraging private landowners to restore wetlands on their property, as he did on his farm in Indiana, is now being shown by local TV stations in key wetland states.

In recognition of the work of private landowners the Service has initiated a program of "National Wetlands Conservation Awards to the Private Sector." Last year the 9 individual and cooperative winners were collectively responsible for:

- Preserving over 156,000 acres of wetlands.
- Restoring over 1,720 acres of wetlands.
- Improving wetland functional values on over 75,650 acres of wetlands.
- Purchasing 3,032 acre feet of water to maintain Nevada wetlands.

The Service looks forward to working ever more closely with private landowners in the coming years through our **Partners for Wildlife, North American Waterfowl Management Plan**, and other programs.



Restoring Bottomland Hardwood Wetlands in the Lower Mississippi Valley

Tim Wilkins, Manager, Yazoo National Wildlife Complex, Rt. 1, Box 286,
Hollandale, MS 38748; 601-839-2618

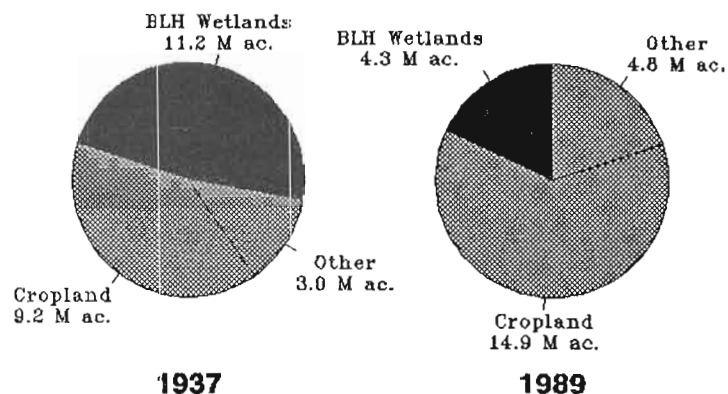
Bottomland hardwoods reforestation is a very new and somewhat ironic wetlands restoration effort. Prior to the arrival of the first European settlers the Lower Mississippi Valley (Valley was almost entirely covered by dense bottomland hardwood forests and cypress-tupelo swamps that were frequently flooded. Only 20 percent of the original forest remains. Although many acres of productive agricultural lands have been created, it is apparent that many of the cleared areas were better suited for forest than cropland. A growing number of Valley residents now realize the benefits of restoring the hardwood forests to slow the runoff of flood waters, trap sediments, improve water quality, and improve habitat for a wide diversity of wildlife populations.

The Yazoo National Wildlife Refuge has areas reforested to bottomland hardwoods approximately 20 years old. Serious reforestation efforts began in 1981 on the Yazoo and since has expanded to FmHA transfer/easement properties and on other privately owned lands under the Fish and Wildlife Service's Private Lands program and the Agricultural Stabilization and Conservation Service's Conservation Reserve Program. In 1991, Yazoo refuge staff assisted private landowners in planting approximately 1,800 acres. Throughout the Mississippi Valley the Fish and Wildlife Service in 1991 directly assisted private landowners in the planting of over 6,620 acres of bottomland hardwoods.

Planting techniques, soil types, soil moisture, site preparation and timing are important factors to consider when planting bottomland hardwoods. As a general rule bottomland hardwoods should be seeded or planted, direct seeding of acorns is generally the most efficient, during the fall and winter to allow root system development before summer's dry, hot days set in. Yazoo Refuge staff have modified corn planters to plant acorns.

The reforested hardwood wetlands offer excellent habitat diversity and are important to numerous wildlife species, especially neotropical migrants. Given time the replanted wetlands will develop all the original wetland functions and values of the original forests.

Where the Original 24 Million Acres of Bottomland Hardwoods Have Gone (in millions of acres)





Restoration of Salt Marshes at Cape Cod National Seashore

J.W. Portnoy, National Park Service, Cape Cod National Seashore, South Wellfleet, MA 02663;
508-349-378

Salt marshes and estuaries of the Atlantic U.S. coast comprise some of the most productive biological systems on earth, fixing both tidal and solar energy into foods which sustain both coastal and nearshore wildlife and fisheries. However, many of these coastal habitats have been degraded by human actions, such as diking, drainage and filling with both apparent and insidious consequences for estuarine plants and animals. More than half the native salt marshes of what is now Cape Cod National Seashore have been altered since European settlement by diking and drainage for mosquito control and road or railway construction. These alterations have led to major shifts in vegetation, from salt marsh to freshwater and upland species, and to the deterioration of water quality, signaled by oxygen depletion, sulfate mobilization and acidification, and often accompanied by fish kills. Multidisciplinary NPS research into the effect of diking, together with a growing public appreciation for wetland values, has prompted a wide range of public and private interests to undertake the restoration of two outer Cape Cod coastal systems. With the long (300-yr) history of development in the Cape region, a principal lesson of the restoration experience has been the importance of understanding and accommodating the complex social environment: a complicated mosaic of land ownership, jurisdiction, socio-economic use and management objectives. Despite ten years of research and a hard-won management consensus, the actual reintroduction of seawater to diked systems awaits funding for the physical modification of existing impediments to tidal flow.

Ship Shoal Project, Gulf of Mexico Task Force

Carolita Kallaur, Minerals Management Service, Herndon, Va.

A joint Federal/Multi-State Task Force was formed in January 1987 by the MMS and the States of Alabama, Louisiana, Mississippi, and Texas. Coastal land loss of Louisiana is excessive, and a major portion of the state's economy is dependent on the high levels of productivity associated with the coastal and wetland environments. Protection and restoration of coastal and wetland environments in Louisiana are priorities for local, State and Federal agencies.

During 1989-1991, the Gulf of Mexico Task Force conducted an assessment of the development potential of Ship Shoal as a near-term leasable offshore sand deposit in the Gulf of Mexico. The study concluded that use of sand from Ship Shoal is economic and environmentally preferable to onshore supplies for possible restoration and nourishment of the Isles Dernieres barrier islands. Techniques and methods developed and used for this project form a model for future, similar studies in other areas. The assessment concept and methods for characterization of Ship Shoal involved an integrated approach including geological, engineering, environmental and economic assessments. The Task Force will formally submit the report to the members State Governors and the Secretary of the Interior. Plans are being made to hold public meetings in Terrebonne and Lafourche Parishes to discuss the report and its findings with the general public and to solicit their views concerning future activities.



Restoration in the Prairie Pothole Region

Richard D. McCabe, Wildlife Biologist, Bureau of Reclamation, P.O. Box 1017, Bismarck, North Dakota 58502; 701-250-4725.

For over 15 years, the Bureau of Reclamation has been restoring wetlands in the Prairie Pothole Region of North Dakota to be used as wildlife habitat mitigation and enhancement on the Garrison Diversion Unit. This process, whereby previously drained wetland complexes are purchased and restored, involves close coordination between biologists and engineers of Reclamation, the Fish and Wildlife Service, the Soil Conservation Service and many State agencies. To date Reclamation has purchased and is developing over 40 tracts of land on 22,000 acres within North Dakota.

Since 1986, wetlands have also been restored or created under a wetland trust in which Reclamation will contribute a total of 12 million dollars and the State of North Dakota will provide 10 percent matching funds. Interest revenues from deposit of these monies are used to benefit the wetland resource in the prairie pothole region.

With the drought over the past five years in North Dakota, many wetlands have been enhanced by providing water from Reclamation canals. Along the 73-mile McClusky Canal, water was delivered to wetlands on both public wildlife areas and on private lands. Landowners received free water and in exchange wildlife had exclusive use of the wetlands until waterfowl nesting was complete. After that the landowners could use the wetlands for livestock grazing. This was a win-win situation for both wildlife and the landowners.

Reclamation's "Wetlands Initiative" program is currently being implemented in North Dakota with the restoration and creation of small wetlands on the Lonetree Wildlife Management Area. The increase in the number and values of prairie pothole wetlands provided by this program will be an important step toward reaching the objectives of the North American Waterfowl Management Plan.



Wetlands Restoration/Enhancement in an Arid Environment

Wayne Elmore, Bureau of Land Management, Prineville, Oregon 97754

The Bureau of Land Management manages 23.7 million acres of riparian-wetland areas. Presently the agency is being guided by a 1987 policy statement and the recently released documents, "Riparian-Wetland Initiative for the 1990's and Fish and Wildlife 2000".

Important sections of Fish and Wildlife 2000 which directs the management on approximately 20 million acres of wetlands are: Enhancement of natural areas; Acquisitions: Stock ponds and reservoirs; and Man-made wetlands. Education, cooperation, volunteers, and a focus on the natural system are the primary goals. Some examples of project areas include the Prairie Potholes region in Montana, Central Valley joint venture and Dos Palamas area in California, the Warner Wetlands and Gerber Marsh areas in Oregon and the Blanca wetlands in Colorado. Opportunities to use the Land and Water Conservation Fund and land exchanges have allowed the Bureau to acquire several areas of outstanding natural value.

The Riparian Initiative for the 1990's outlines the management direction on 180,000 miles of stream and 3.7 million acres of riparian/wetland areas. One of the Bureau's main goals is to achieve proper functioning condition on 75% of these areas by 1997. Proper functioning condition is achieved when adequate vegetation is present to dissipate high water flows, thereby reducing erosion and improving water quality, and sediment filtering which develops to, improve floodwater retention and groundwater recharge. The use of grazing management strategies to restore riparian/wetland areas are the primary method applied in rangeland areas, however, the use of physical structure is also incorporated. The analysis of basic stream function and site potential form the base for decisions on treatment selection.

The proper management of riparian/wetland areas is one of the top priorities of the Director of the BLM for Public Land Management. The development of these programs and others are an example of that commitment.



Fresh Water Wetlands

Bob Jackson, Bureau of Indian Affairs, Minneapolis, Minnesota

The Bureau of Indian Affairs, Minnesota Area Reservations and Inter-Tribal organizations formed an inter-agency waterfowl management task force in 1988 to annually develop waterfowl enhancement projects, initiatives and strategies in conjunction with the North American Waterfowl Management Plan and its Joint Venture goals and objectives.

This waterfowl and wetland enhancement initiative, entitled "Circle of Flight," received a Congressional appropriation of \$600,000 in FY 1991.

Sixteen reservations, the Great Lakes Indian Fish and Wildlife Commission, and the 1854 Authority, with a reservation and ceded territory land base of over 31 million acres in Michigan, Minnesota, and Wisconsin, began new development activities to continue increasing, enhancing, and managing waterfowl populations and wetland habitat throughout the Great Lakes Region.

Development activities include establishing wildlife management areas and refuges on tribal lands; restoring wetland sites; constructing new impoundments with nesting islands; wild rice enhancement; maintenance on existing dike/levee systems; purple loosestrife intensive treatment/removal; wetland acquisition; and installation of wood duck boxes.

Educational materials developed included a display which was featured at the Minnesota State Fair, Circle of Flight posters, and Save Our Wetlands buttons.

Minneapolis Area Reservations are key partners with other international Federal, Provincial, territorial and state agencies, and private conservation organizations to conserve and enhance wetlands and to further the goals outlined in the North American Waterfowl Management Plan.



OCS - Gulf of Mexico Wetlands Study

Dr Robert Rogers, Minerals Management Service., New Orleans, La.

The MMS has sponsored a series of studies related to the onshore impacts of offshore oil and gas development on coastal wetlands in the north central Gulf of Mexico. The rationale for these studies was that wetlands have value: that wetland management is possible; and that improved knowledge is useful to understand, predict, mitigate, and avoid undesirable impacts.

The first of these study efforts was designed to investigate the causes of wetland loss and particularly what contribution to this was due to the direct and indirect impacts of offshore activities. These impacts included pipeline canals, navigable channels, and onshore infrastructure. Water, plants, sediments, soils, landscapes, history, and industry were studied by a coordinated team of experts over a two-year period to develop a consensus of the relative contribution to habitat alteration of natural and man-induced factors.

This wetland loss study overlapped another study effort investigating the impacts of Outer Continental Shelf (OCS) pipeline canals and navigation channels on barrier islands, beaches and their associated wetlands. The main objective of this study was to document shoreline and habitat changes related to pipeline emplacement techniques (e.g. push ditch, flotational canal, directional drilling). Another aspect of this program was a study of impacts of the discharge of OCS-produced water in coastal areas.

The final study in this series was designed to investigate the efficiency of marsh management techniques in light of a wide variety of environmental conditions that may exist in wetlands. A study of the overall coastal marsh in a variety of physiographic settings was carried out over a 2-year period. The analysis of wetland mitigation was an effort to better understand how marsh management is used to reduce the loss of wetlands, to preserve existing productive marsh, and to improve the health and continuity of marshes in the future.



Wetland Restorations on Agricultural Lands

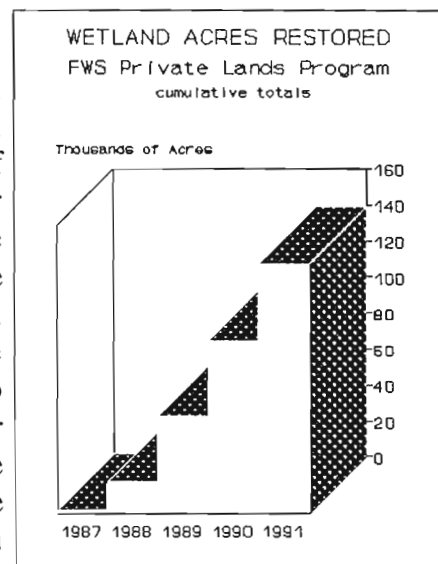
Gene Whitaker, U.S. Fish and Wildlife Service, Private Lands Branch, Mail Stop ARLSQ 400, Department of the Interior, Washington, DC 20040; 703-358-2161

Historically the Service had several small pilot programs to restore wetlands on private lands. Over the past 30 years the Service implemented an easement acquisition program that has acquired easements to protect over 3 million acres of privately owned wetlands. However, following the passage of the 1985 Farm Bill, the Service began working much closer with personnel and private farmers on several programs. They found that many farmers and other private landowners were interested in, and recognized the values of wetlands.

Initially, the Service's north central region saw opportunities to restore wetlands on lands farmers had entered into USDA's Cropland Reserve Program (CRP). Starting in a couple counties in Minnesota, cards were sent to all farmers with lands in the CRP asking if they would be interested in having some of their wetlands restored. **Nearly 40 percent of the cards were returned** and the program was under way.

In Fiscal Year 1987, the Service dedicated a little less than \$1.5 million to restoring wetlands on private lands. In FY 88, Congress provided an additional 1.2 million for wetland restoration. This year, the Service received nearly \$8 million to restore wetlands on private lands. To date, over 7,000 private landowners have been assisted in restoring nearly 140,000 wetland acres.

Although the Service started restoring wetlands on lands in the CRP and on easements obtained through a program with the Farmers Home Administration (FmHA), now about half the restorations are on lands where the private landowner simply wants the wetlands back. The FWS, with the assistance of the Soil Conservation Service, plans the restorations and pays up to 100 percent of the restoration cost. Other organizations or agencies, or even the landowner, often pay a portion of the construction costs. No funds are spent for land rights. Ten-year and longer contractual agreements, over half are for over 25 years, are provided by the landowner. For about a third of the restorations, FmHA provides permanent protection through conservation easements or transfer of property rights. The Service has been amazed at the desire of private landowners to get wetlands restored. In most areas, there are waiting lists for FWS assistance.





Coastal Wetlands Studies in Louisiana and Florida

Richard P. Stumpf, US Geological Survey, Center for Coastal Geology, St. Petersburg, Florida 33701

The US Geological Survey's Geologic Division is conducting studies to identify the critical processes that can cause erosion of coastal wetlands. Projects involve work in Louisiana beginning in Fiscal Year 1989 and in Florida and the Great Lakes beginning in Fiscal Year 1991. These studies have four principal objectives: 1) to collect baseline data on erosion and wetlands characteristics; 2) to identify the critical processes promoting wetlands loss, including sediment supply, meteorological forcing, salt water intrusion, and subsidence; 3) to assist in the evaluation of wetland management practices that relate to the identified processes; and 4) to provide technology transfer through professional papers and data bases. Research in these areas involves cooperative work with State geological surveys, State universities, and interaction with other agencies, such as the Fish and Wildlife Service. These studies are beginning to identify the interaction of human impacts with natural processes causing wetland loss.

Use of Constructed Wetlands for the Treatment of Acid Mine Drainage

Dr. Harry M. Edenborn, Pittsburgh Research Center, Bureau of Mines, Pittsburgh, Pennsylvania

Over the past ten years, studies have indicated that biogeochemical processes occurring in wetlands can effectively improve the water quality of acidic coal mine drainage.

Bureau of Mines research has concentrated on the chemical and biological processes that occur in both the aerobic (oxygen bearing) and anaerobic (non-oxygen bearing) sections of constructed wetlands. In aerobic sections of wetlands, bacteria facilitate the removal of iron and manganese. In anaerobic portions of the wetlands, bacterial sulfate chemical reactions raises the pH (reduces acidity) and precipitates metals. Current wetland designs incorporate both aerobic and anaerobic processes to optimize water treatment efficiency.

Over 400 constructed wetlands have been built in the United States to treat acidic mine drainage. Approximately 20 percent of these systems discharge water that meet all regulatory standards. At the rest of the sites, the water requires supplemental chemical treatment, but at reduced levels. Generally, chemical requirements are sufficiently reduced to recover the costs of wetland construction in less than one year.



North American Waterfowl Management Plan

Robert G. Streeter, Deputy Director, North American Waterfowl and Wetlands Office,
US Fish and Wildlife Service, Washington, D.C. 20240

The Plan was signed in May 1986 by the Secretary of the Interior and the Minister of the Environment for Canada. A Tripartite Agreement was signed with Mexico in 1988 by Canada, the United States, and Mexico.

In the Plan, the countries recognized the continuing loss of habitat and declines in waterfowl populations. They agreed that a united continental effort was required to restore this valuable resource to levels that existed in the 1970's.

By design, the Plan is a broad policy framework that describes the scope and goals, identifies problems facing our waterfowl populations, sets general guidelines for addressing problems, and establishes some population and habitat goals for waterfowl in North America. The Plan is a partnership effort based on the joint venture concept, including private, State/Provincial, and Federal interest. The Plan also focuses on the many ongoing and planned waterfowl management efforts continent-wide and stimulates new efforts.

The North American Wetlands Conservation Act was signed in December 1989 by President Bush and provides Federal cost-share funding to support the North American Waterfowl Management Plan.

The Act establishes sources of funding projected to provide more than \$25 million annually to be matched by other US non-federal funds. At least 50% and no more than 70% of these funds must go to wetland conservation projects in Canada and Mexico.

A North American Wetlands Conservation Council has been established to recommend projects for funding to the Migratory Bird Conservation Commission.