

FISHERY MANAGEMENT PLAN

LAKE ONALASKA

Upper Mississippi River National
Wildlife and Fish Refuge

Winona, Minnesota

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LAKE ONALASKA FISHERY MANAGEMENT PLAN

I. Introduction

A. Plan Purpose

Fishery management planning on the Upper Mississippi River National Wildlife and Fish Refuge provides the framework for cooperative management with state agencies directed toward meeting Master Plan goals and objectives which relate to fishery resources and to maintain these resources for the enjoyment of this and future generations.

B. Refuge Description

The refuge was established by an Act of Congress in 1924 for the broad purpose of providing for the needs of fish, migratory birds, other forms of wildlife, and to conserve flowers and aquatic plants. The refuge stretches 284 miles from Wabasha, Minnesota, to Rock Island, Illinois, along the Mississippi River. The 194,000 acres of Fish and Wildlife Service and U.S. Army Corps of Engineers' land that make up the refuge lie in the states of Minnesota, Wisconsin, Iowa and Illinois. For more efficient management of this long refuge, it is divided into five districts, with a separate manager responsible for each district (refuge headquarters is in Winona, Minnesota).

The Upper Mississippi River is divided into a series of step-like pools by dams and locks created by the Corps of Engineers to maintain navigation. Each pool is numbered corresponding to the dam creating the pool. Twelve pools, numbered from 4 through 14, are found in the refuge. These impoundments abruptly changed the river bottoms from an area of wide fluctuations in water levels to an area of semi-stabilized water. While spring floods still occur, the bottoms do not dry out in the summers to the extent they did under free-flowing river conditions. Each pool has three distinct zones. The upper end is in essentially normal river condition where the water levels were not raised to any extent. In this zone, marsh development is limited and the old condition of deep sloughs and wooded islands is found. In mid-pool, large areas of relatively shallow water developed and the old hay meadows became inundated. It is in this zone that the best marsh development occurred. Immediately above each dam the water was impounded to a depth which precluded marsh development. This zone is essentially deep open water with limited aquatic growth.

The refuge is largely confined to the flood plain and generally lies between the railroads that border the river. Bottomland varies from two to five miles wide between the mouth of the Chippewa River at the upper end of the refuge and the mouth of the Wisconsin River near Prairie du Chien, Wisconsin. Below Prairie du Chien, bottomlands become narrower. Below Clinton, Iowa, from Beaver Island to the southern extremity of the refuge, bottomlands are negligible except at the mouth of tributaries. Precipitous wooded hills, varying from 200 to 600 feet high, border the refuge from the Chippewa River to Clinton. Below Clinton, these hills give way to much more gradual slopes.

The natural vegetation of the river valley consists of bottomland deciduous forest, marsh and aquatic plants and, on a few scattered sand terraces, prairie-type species. The river lies roughly on the transition between eastern hardwood forest and western prairie. The bottoms are for the most part timbered. Most of the original timber along the river was found on islands and other sites protected from fire. The present expanses of forest are largely a product of fire control since settlement by whites. The riverbottom forest (roughly 45,000 acres) is comprised mainly of silver maple, american and red elm, red maple, basswood, swamp white oak, cottonwood, green ash, hackberry and river birch. Dense beds of nettle and poison ivy are common on many of the river islands. Emergent vegetation in the marshes includes such locally dominant species as river bulrush, the round stemmed bulrushes, cattail, phragmites, arrowhead and smartweeds. Wild rice occurs intermittently in the upper part of the river but is absent south of pool 10. The most common aquatics on the area are pondweeds, coontail, Elodea, wild celery and pond lilies. Floating vegetation includes primarily the duckweeds, abundant in most quiet water areas. Some meadows and sand prairies are present in various localities. The drier meadows are vegetated by such species as blue grass and big and little bluestem. Species such as yucca and gramma grass that are adapted to dry, sandy soils dominate on the arid sand prairies. On the marsh border, dikes and damper meadows, appear cord grass, reed canary grass, rice cut grass and sedges. About 540 species of vegetation are known on the refuge.

II. Relationship of Fishery Management to Refuge Objectives

A. Refuge Fishery and Aquatic Resources Objectives and Strategies

Master Plan goals and objectives which relate to fisheries resources are as follows:

Goal

To preserve and enhance the environmental quality, wild character, and natural beauty of the river's floodplain ecosystem.

Objectives

- To reduce the adverse impacts of sedimentation and turbidity entering the river ecosystem.
- To eliminate or reduce the adverse impacts of water quality degradation.
- To protect and reclaim refuge acreage base from encroachments unless adequately mitigated.
- To reduce the adverse impacts of navigation and channel maintenance to the river ecosystem.
- To eliminate or reduce the adverse impacts to the river ecosystem from spills or discharges of oil or hazardous substances.
- To preserve unique and/or representative ecotypes.
- To reduce adverse impacts to the refuge resulting from off-refuge developments.

Goal

To conserve and enhance the habitats of fish and other aquatic plant and animal life.

Objectives

- To maintain and enhance, in cooperation with the states, the habitat of fish and other aquatic life on the Upper Mississippi River.
- To assist the states in the continuing process of standardizing the management of sport and commercial fisheries in the Mississippi waters of the four states contiguous with the refuge.

B. Wildlife Uses and Production

1. Refuge Primary Purposes

The Upper Mississippi River Wild Life and Fish Refuge Act of 1924 states the purpose of the refuge is to maintain the lands:

(a) as a refuge and breeding place for migratory birds included in the terms of the convention between the United States and Great Britain for the protection of migratory birds, concluded August 16, 1916, and (b) to such extent as the Secretary of Agriculture may by regulations prescribe, as a refuge and breeding place for other wild birds, game animals, fur-bearing animals, and for the conservation of wild flowers and aquatic plants, and (c) to such extent as the Secretary of Commerce may by regulations prescribe as a refuge and breeding place for fish and other aquatic animal life.

2. Relationship of Wildlife Resources and Fisheries Resources in Refuge Management

Wildlife goals and objectives as stated in the Master Plan are:

Goal

To provide the life requirements of waterfowl and other migratory birds occurring naturally along the Upper Mississippi River.

Objectives

- To restore species that are in critical condition (such as canvasbacks) and to achieve national population or distribution objectives.
- To maintain or improve the habitat of migrating waterfowl using the Upper Mississippi River.
- To maintain or increase the current population and distribution of colonial nesting birds.
- To promote use by the maximum number of species of migratory birds at optimum population levels.
- To increase production of historically nesting waterfowl.

- To contribute to the achievement of national population and distribution objectives identified in the national waterfowl plan and flyway management plans.

Goal

To provide the life requirements of resident wildlife species.

Objectives

- To maintain or increase species diversity and abundance.
- To maintain furbearer populations at levels compatible with fisheries and waterfowl management and other objectives.

The Upper Mississippi River National Wildlife and Fish Refuge serves as an important migratory habitat for waterfowl and other migratory birds. Over 20 million use days are recorded for waterfowl each year. The refuge also provides valuable production habitat for the wood duck, mallard, great blue heron, bald eagle, and 122 other bird species, in addition to habitat for 57 mammal species and 35 species of reptiles and amphibians. Of the 27 species of special emphasis identified in the Regional Resource Plan, 18 occur on the refuge, and a significant contribution is made to several, including the wood duck, mallard, canvasback, tundra swan, American woodcock, great blue heron, mourning dove, bald eagle and Higgins' eye pearly mussel.

The sedimentation and deterioration of backwater habitats adversely impacts wildlife, as well as fisheries resources, and most management proposals for restoration and enhancement of refuge aquatic habitats will benefit both. Where potential conflicts occur, careful planning will be necessary to balance the needs of regionally and nationally important wildlife species with the needs of fish populations. In the planning process, the following fishery management objectives should be addressed:

1. Maintain water quality acceptable to fish.
2. Maintain habitat for spawning, nursery areas, food production and dwelling space.
3. Manage angler harvest (in concert with the states) in ways to ensure that recreational and commercial use of fish does not conflict with refuge objectives for species of special emphasis.

C. Public Use

1. Refuge Public Use Objectives

Master Plan public use goals associated with fishing are:

- a. To provide for public use benefits associated with fish, wildlife, and wild areas by preserving the Upper Mississippi River floodplain ecosystem for the enjoyment and use of this and future generations.

- b. To gain active public support for the preservation of the vulnerable floodplain ecosystem to provide a wide range of opportunities for compatible, wildlife/wildlands-oriented recreation.

2. Role of Sport Fishing

Sport fishing is the most popular wildlife-oriented recreational activity on the refuge, providing more public use days than all other activities combined. Although authority for fishery management has remained with the states, the public expects the U.S. Fish and Wildlife Service to maintain and enhance fishery resources on the refuge.

D. Commercial Fishing

Commercial fishing in refuge waters is regulated entirely by the states, except on the Spring Lake Unit in Illinois. Commercial activity is centered around carp, catfish, buffalo and freshwater drum and is of local and regional economic importance. Most refuge waters are open to the main river system, and use of commercial fishing as a tool to control rough fish populations is not practical.

E. Refuge Fisheries Management Authorities and Constraints

1. Upper Mississippi River Wild Life and Fish Refuge Act of 1924

While in committee, the purposes of the refuge, in order of apparent importance, were stated to be: (1) the maintenance and propagation of fish, particularly the smallmouth black bass, (2) the protection of migratory birds, (3) the preservation of the area for mussel propagation, (4) protection of fur-bearing and other game animals (5) the conservation of wild flowers and aquatic plants.

The language of the Act, as stated earlier, implies that the protection of migratory birds and their habitat was the primary purpose of the refuge. However, the Department of Commerce, though concerned only with fish and mussel propagation, and without authority to purchase land, received as much funding in 1924 for refuge purposes as did the Department of Agriculture. Thus, the legislative history and subsequent appropriations indicate that the refuge's primary purpose was to preserve the Upper Mississippi River for fish propagation.

The Act also limits management potential by making the refuge subservient to navigation and the improvement of navigation. Since all refuge waters except the Spring Lake Unit are considered navigable waters, the Service cannot restrict use of these waters.

2. Cooperative Agreement

Approximately 54 percent of the total refuge lands and waters were acquired by the government for the 9-foot navigation channel project and are managed as part of the refuge by the U.S. Fish and Wildlife Service under a 1963 cooperative agreement with the U.S. Army Corps of Engineers. Terms of the agreement make close coordination with

the Corps necessary where proposed habitat modifications involve lands held in fee title by that agency.

A complete history of the transfer of navigation project lands to the Service for wildlife management can be found in an Appendix to the Master Plan which covers the refuge's legal history.

3. State Authority

Toward the end of the 1930's, the four states began expressing interest in retaining or recovering control over activities on the Mississippi River. Wisconsin, although never disapproving of the refuge fishing regulations, insisted that fish and game within Wisconsin borders were state property and the refuge had no authority to establish the seasons for their taking.

Iowa claimed that its' grant of "lands subject to overflow" to the United States did not transfer rights to lands below the high water mark, and that Iowa could enact laws and regulations relating to wildlife as long as they didn't conflict with those of the United States. In 1943, Iowa amended its' statutory grant of exclusive jurisdiction to allow only "the exercise (of) jurisdiction."

Minnesota also withdrew its' grant of state lands that accreted within the refuge after April 7, 1943.

The refuge has traditionally adopted state hunting and fishing regulations and conceded to state authority in and on state public waters. In doing so, the lead role of the states in fishery management on the river has been recognized and reinforced.

By Service policy, any fisheries management action on the refuge must be fully acceptable to the state(s) involved and covered by a cooperative management agreement.

III. Lake Onalaska Fishery Management

This plan is designed as an interim management scheme which outlines initial strategies necessary for the development of a long range management plan.

The plan identifies projects designed to ultimately enhance the fishery of Lake Onalaska by outlining tasks and proposals in three principal areas.

These include:

1. Public access and information improvements
2. Studies
3. Habitat management

Completion of the tasks outlined in this plan span a three year period.

A. Description of Area

1. Background History

Lake Onalaska, located in Navigational Pool 7, was formed in 1937 by

the closure of Lock and Dam 7 at Dresbach, Minnesota. Prior to flooding, the present day lake basin was a floodplain meadow with intermittent stands of bottomland hardwoods and scattered farms and marshes. Before the closure of the dam the trees were cut and today, submerged and partly submerged stump fields are found in various locations of the lake (Dexter et. al. 1978). The lake comprises the lower one-third of Pool 7 and lies lateral to and east of the main channel of the Mississippi River (Figure 1). A chain of barrier islands extend along the west side of the lake. Lock and Dam 7, an earthen dike and French Island constitute its' southern boundary. The two spillways in this dike and the Lock and Dam serve as outlets for lake water. Discharge through Lock and Dam 7 is maintained by the U.S. Army Corps of Engineers. The Black River Delta and Wisconsin floodplain constitute the lakes northern and eastern boundaries. Inflow to Lake Onalaska is from the Mississippi River, Black River and Halfway Creek. Water from the Mississippi River enters the lake through several channels that traverse the chain of islands on the west side. Approximately 20-30% of the main channel flow passes through the lake under most flow conditions, entering via Summers and Proudfoot Chutes (Dexter et. al. 1978). A lesser amount of water enters the northern portion of the lake from the Black River with minimal additions from Halfway creek (Office of Inland Lake Renewal, Wisconsin DNR 1977). Additional information regarding inflow volumes from these sources can be found in the Final Report (Phase I) on the Dynamics of Polychlorinated Biphenyls in the Upper Mississippi River (Dexter et. al. 1978). However, despite numerous biological and physical studies of Pool 7, hydrological information for Lake Onalaska is generally lacking.

Three major islands, Rosebud, Red Oak Ridge and Bell, are located within the lake. The lake basin contains little topographic detail and is generally less than five feet in depth at the normal pool elevation of 638 msl. At this elevation, the lake is approximately 5400 acres.

Lake sediments range from medium sand to organic muck. Organic sediments are superimposed on a layer of sand and range from six inches to three feet in depth. The upper and central portion of the lake has a fine sandy bottom (Claflin 1977). Extensive aquatic plant communities occur throughout the lake and provide food and shelter for a wide variety of fish and wildlife species. Arrowhead, pickerel weed and yellow lotus are the dominant emergents in the upper portion of the lake, while cattail, river bulrush, reed canary and burreed are abundant in shallow water areas. Submerged aquatics include luxurious beds of wild celery, sago pondweed, water milfoil, coontail, etc.. Personnel from the La Crosse field station of the Northern Prairie Wildlife Research Center (NPWRC) are monitoring the distribution and abundance of wild celery in support of their studies of the migrational ecology of diving ducks. These studies have revealed that more than 500 tons (dryweight) of wild celery tubers are produced in Lake Onalaska in a single season. At present, wild celery covers an area of approximately 3500 surface acres (Korschgen pers. comm.). Water samples taken by the Water Quality Monitoring Group of the Wisconsin DNR and River Studies Center of the University of Wisconsin-La Crosse in July 1976, showed alkalinity

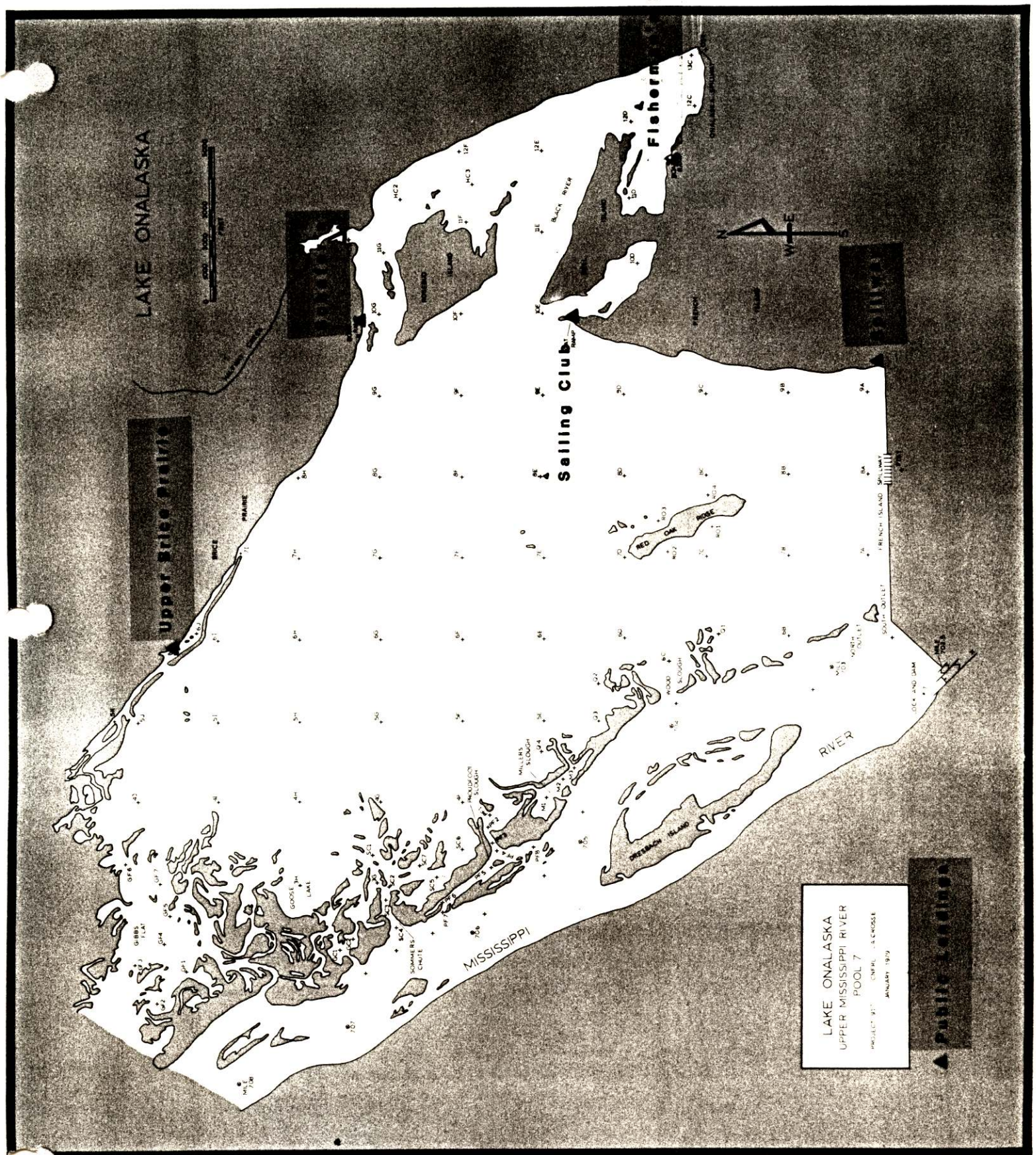


Figure 1. Lake Onalaska and Public Landings.

at 119 ppm, a pH of 7.4 and no thermal stratification (Holzer and Ironside 1977).

Water chemistry information, albeit lacking, compares with that of the Mississippi River.

Claflin (1977) reported that nutrients accumulate in Lake Onalaska faster than they can be transported from it and that the trapping efficiency of the lake has accelerated eutrophication.

Dissolved oxygen levels recorded during the winter of 1977 by Wisconsin DNR showed that the main body of the lake and the old Black River Channel maintained high oxygen levels. At stations closer to shore and in areas of dense vegetation, reduced DO levels were recorded. Severe DO depletions occurred during winter at Halfway Creek and near the Sailboat Club. In general, however, the lake maintained oxygen levels high enough to sustain the fishery during the winter (Holzer and Ironside 1977). Similar findings of DO in the lake were recorded during the winter of 1978 (Mississippi Work Unit - Annual Report 1978).

2. Multi-Resource Role

Lake Onalaska plays an important role in the community, serving as a recreational paradise for fishermen, sailboaters, hunters and nature buffs. The nearly 100,000 residents of the Greater La Crosse Area are very outdoor oriented and extremely interested in issues regarding the lake. In addition to providing countless hours of sport and commercial fishing and many other forms of recreation for local residents and tourists, it supports a rich and diverse fauna and flora and presently serves as a nationally significant habitat for fish and wildlife.

Presently, the lake serves as the most significant migrational stop-over area for canvasbacks on the entire continent. Canvasback numbers have reached peaks of as high as 107,500 in 1978. Although peak numbers have declined annually since, the lake still provides migrational habitat for approximately 50-75% of the entire canvasback population. The extensive wild celery beds and abundant invertebrates provide sufficient food resources for diving ducks. Waterfowl use days on the lake during the fall period of 1978-1982 averaged over 2,300,000 (NPWRC survey data).

Numerous other bird species can be found in the area throughout the year. The shallow emergent marshes in the upper portion of the lake and Halfway Creek are excellent feeding habitat for egrets and great blue herons and provide nesting and brood habitat for coots, black terns, wood ducks, mallards and hooded mergansers. Common and black terns, ring-billed gulls, cormorants and swans are commonly observed on the lake during the year. A variety of shorebird species are found during migration on the exposed sandbars on the west side of the lake.

Hinke (1964) reported Lake Onalaska to be the most important fishery area in Pool 7, having had the highest reported catch rate of any of

the 7 pools censused by UMRCC.

Holzer (1977) reported Lake Onalaska is well suited for largemouth bass and bluegills. He further stated the growth of bluegills in Lake Onalaska is excellent with substantial numbers of trophy bluegills in the 7 to 9 inch size range. Rach (1977) reported growth rates similar to that in other bodies of water in the same geographical area and that his study showed no indication of stunting.

Held (1983) reported that the impact of changes in the aquatic habitat of Lake Onalaska on fishes has been an apparent shift in species dominance within the fish community and that the general direction of this shift has been to the detriment of the most popular species of sport fishes.

A winter harvest survey conducted on Lake Onalaska in 1976-1977 showed 25,402 anglers fished a total of 96,519 hours (Rach 1977). Other recreational uses of the lake include canoeing, sailing, cross country skiing, snowmobiling, picnicing, swimming, hunting, trapping and general nature viewing. The lake hosts winter ice fishing derbies, sailing regattas, retriever trials and bass tournaments as well.

3. Literature

Published and unpublished literature for Lake Onalaska has been identified and summarized in Jackson, et. al., 1981. Additional information concerning water chemistry and other physical parameters is available in Dawson, et. al. (in press). As discussed in Section III. D. 3, several resource biologists are presently completing data analysis which, upon completion, will expand the current information base on the lake.

An overview of physical characteristics and the distribution and transport of PCB's was reported by Dexter, et. al. in 1978. Several aspects of lake hydrology and sedimentation are discussed in that report.

Thomas Claflin of the River Studies Center of the University of Wisconsin-La Crosse, assessed the eutrophic state, rate of sedimentation and distribution of rooted aquatic macrophytes in a rehabilitation feasibility study in 1977. Claflin also discussed hydrological aspects of the lake in an environmental assessment study of Pool 7 for the U.S. Army Corps of Engineers in 1973. Several studies have reported information on the fisheries of the lake and are discussed under Section III. C. 1., description of the fisheries.

B. Resource Threats and Conflicts

1. Fish and Wildlife Habitat

Although the impacts of sedimentation have been reported in several publications, the sedimentology of the lake is not well documented. Claflin (1977) reported that the lake experienced a loss of approximately 31% of its original volume since the closure of the dam. Sedimentation rates in his study were calculated by measuring water

depths at 1100 points in the lake and comparing the elevation at those points with those that were determined for the same locations prior to closure of the dam. Although several other reports have used this figure in discussing various physical and biological parameters of the lake, recent analysis of the same data by NPWRC and Columbia National Fishery Research Laboratory (CNFRL) using computer facilities at the Minnesota Land Information Center, contradict the sedimentation rates reported by Claflin. Their analysis indicated the average sedimentation/erosion value for the entire lake as .07 feet of sedimentation. Certain critical areas of sediment deposits have resulted in degradation of fish and wildlife habitat and hampered public access. Large quantities of sediment are deposited in the Sommers Chute area and along the barrier islands south of this chute. The original channel of Halfway Creek has also experienced severe sedimentation.

Regardless of the actual magnitude of sedimentation, it is generally recognized as a serious threat to the lake. Addressing the problem is another matter. A comprehensive hydrological study to determine sedimentation rates, lake flow patterns, and impacts on fish and wildlife resources is necessary before major corrective measures can be recommended and undertaken. However, in FY 85, the Fish and Wildlife Service will conduct experimental dredging to determine the fishery enhancement value of this practice for future application. Areas to be experimentally dredged will be determined by the Wisconsin DNR, Fish and Wildlife Service, Corps of Engineers and the Lake Onalaska Protection and Rehabilitation District.

In addition to upland erosion and sedimentation, other major threats to the aquatic resources of the Upper Mississippi River stem from point and non-point source pollution, navigation related activities and other encroachments on fish and wildlife habitats. Contaminants from industrial effluents and urban and agricultural run-off have substantially affected the aquatic biota of the UMR (Jackson et. al. in press).

Although these threats to the aquatic resources of Lake Onalaska and the UMR are of real concern to resource managers of the Upper Mississippi River National Wildlife and Fish Refuge, it is beyond the scope of this plan to address these issues.

2. Public Use Levels

Although public use levels are presently not considered to be of major consequence most of the year, increased demands are apparent. Perhaps the major concern at the present time, relative to conflicts between public use and fish and wildlife resources, involves disturbances to migrant canvasbacks. Preliminary steps to minimize waterfowl disturbances are in progress and detailed in this report. More complete records of public use should be maintained in an effort to evaluate trends and thereby permit the formulation of recommendations necessary to manage this multi-use resource.

C. Description of Fisheries

1. Fisheries Composition

Several investigators have described the fishery resources of Lake Onalaska. Most recently, under contract with the U.S. Fish and Wildlife Service, Dr. John Held compared the population and community structure of fishes of Lake Onalaska from similar sampling methods in 1982 and 1976-77. His report discusses changes in total species composition, relative abundance, distribution and growth histories and represents the most comprehensive analysis of the fisheries, to date. This investigation revealed a decrease in frequency of occurrence for most species from 1977 to 1982 with major declines in white crappie (75.0%), golden shiner (40.5%) and spottail shiner (38.6%). No significant differences in fish distribution and average size of sport fish between the 1977-1982 sample were observed.

In a basic lake inventory completed by the Wisconsin Department of Natural Resources in 1976, 41 species of fish were sampled. The survey revealed largemouth bass as the most abundant game fish and bluegills as the most abundant panfish. Spotted sucker and carp were the two major non-game commercial species (Holzer and Ironside, 1977).

Additional information in the fishery resources of Lake Onalaska can be found in the fishery management recommendations prepared by Fishery Assistance Biologist. This report identified several problems associated with the Lake Onalaska fishery. These included an apparent decline in the quality of the sport fishery as well as a decline in the abundance of some commercial fish species. In addition, nutrient enrichment and sedimentation were recognized as the primary causes of habitat loss in some areas of the lake.

2. Sport and Commercial Fishing

Historic records of harvest for the lake are lacking. The Upper Mississippi River Conservation Commission (UMRCC) periodically conducted creel surveys on the Upper Mississippi River after the formation of the lock and dam system. These surveys were conducted on a pool by pool basis and report extremely large harvests of bluegills from the lake during the winter season (Rach 1977). A creel census conducted in 1962 and 1963 on Pool 7 reported a projected total of 445,123 fish creeled at an overall catch rate of 1.41 fish per hour. Lake Onalaska was reported to be among the most heavily fished areas (Finke 1964). In that survey, bluegill made up 62% of the catch (41% by weight) followed by crappies at 17% (17% by weight). Largemouth bass was the most common large game species.

Rach and Meyer (1982) estimated the winter bluegill harvest from the lake in 1976-77 by creel census. The total estimated harvest for the 17 week fishery (22 November - 18 March) was 233,061 bluegills. More recent harvest estimates are not available.

D. Management Needs and Recommendations

1. Description of Existing Facilities

Five public boat landings around the lake occur in the refuge and are maintained through various leases and cooperative agreements between the Corps and local governments.

The Upper Brice Prairie Landing provides excellent access to the upper portion of the lake. It has space for approximately 60 car trailer units, but generally reaches this capacity only on the opening days of fishing and hunting. Comfort stations, trash receptacles and two concrete boat launching pads are available.

Another excellent access, maintained by LaCrosse County, is located at the northern tip of French Island. The Sailing Club or Nelson Landing, as it is called, can accommodate 45 car-trailers units, however, it has no restroom facilities or other improvements. This landing is adjacent to Nelson Park and the Sailing Club which leases Corps land at the extreme tip of the island for docking sailboats. Three smaller landings receive less use. The Spillway Landing is located at the junction of the lock and dam dike and French Island and is maintained also by LaCrosse County. The landing is unimproved and provides only limited parking, however, because of its' location it receives little use. Schaefer's and the Fisherman Road Landings provide access to the east side of the lake. Both are relatively unimproved and provide only limited parking. At least two other sites along Fisherman Road are used occasionally for launching boats but are not established landings.

In addition to these public landings, two commercial resorts on Brice Prairie have boat launching facilities. The entire west side of French Island and almost all of the Brice Prairie shoreline are inhabited by permanent residents. Most of these residents maintain boat docks in the lake through a permit with the Corps.

2. Management Constraints

Several major factors complicate management of Lake Onalaska. Although implementation of the fishery management recommendations identified in this plan will contribute to an improved fisheries, a multi-agency effort of substantial magnitude is necessary to address the real management problems of the lake.

The factors contributing to the degradation of water quality and sedimentation are from off-refuge sources, encompassing watersheds of hundreds of square miles. Corrective action would require a major change in national environmental policy and legislation.

Furthermore, the Service has traditionally recognized the rights of the state of Wisconsin to fish in navigable waters of the refuge. Water levels are maintained by the Corps of Engineers and although the erratic water level fluctuations common to the main channel of the Mississippi River are not extreme on the lake, water level changes do occur at times when aquatic plant growth and animal populations may be vulnerable.

The present data base regarding the physical and biological conditions of the lake will be substantially enlarged upon the completion and reporting of past and present investigations and further enable management agencies to recommend and implement corrective measures of greater magnitude than those outlined in this interim plan.

Finally, most of the lake basin, shoreline and islands are owned by the U.S. Army Corps of Engineers and managed under a cooperative agreement.

3. Study Needs/Proposals

As previously mentioned, the NPWRC is mapping the distribution and abundance of wild celery in Lake Onalaska. In addition, water quality and depths are being monitored to evaluate the impacts of sedimentation and turbidity on submerged aquatic vegetation.

In conjunction with their PCB studies on the Upper Mississippi River, the CNFRL collected information on the hydrology and water quality of the lake. At the present time their data has not been published, but will be compiled together with NPWRC studies into a resource atlas. The National Coastal Ecosystems Team (NCET) and Minnesota Land Management Information Center (MLMIC) are in the process of developing prototype maps for this publication. The document will describe numerous physical, chemical, and biological parameters of the lake and permit the development of additional management recommendations in the future.

Another study, currently in progress, will provide information to an important data gap regarding the interrelationship of fishery resources and aquatic macrophytes. Dense submerged aquatic plant communities have not permitted adequate sampling of fish to determine the role these communities serve in fish ecology. This study, being conducted by Mr. Earl Chilton, Ohio State University, is examining the role of four submergent plant species in providing invertebrate habitat and the function they serve in the ecology of macrophyte-invertebrate associations in the lake.

Kawatski and Schall (1980) studied the changes in macrophyte and macroinvertebrate populations of three areas of the lake following mechanical removal of aquatic macrophytes.

Fisheries studies being conducted by the LaCrosse National Fishery Research Laboratory (LNFRL) in Pool 7 and Lake Onalaska indicate macrophyte beds are extremely important to juvenile northern pike and largemouth bass. The relationship of submerged aquatic plant communities in the development of larval fishes will continue to be evaluated by fisheries ecologists at LNFRL.

The Wisconsin Department of Natural Resources has initiated a large-mouth bass exploitation study and creel census for Lake Onalaska. Tag returns from bass marked during 1983 will be used to determine fishing exploitation, bass movements, and provide catch-and-release data from bass tournaments. A creel census will provide bass harvest data including numbers of bass caught, size, where caught, and when (spring, summer, fall, and winter).

To date, information regarding the fisheries of Lake Onalaska is based largely on summer samples and relatively small sample sizes. Densely vegetated areas have not been adequately sampled, due to the lack of an effective sampling technique. Until these communities are adequately sampled, their role in the ecology of the Lake Onalaska fishery will remain uncertain.

The studies presently being conducted on Lake Onalaska will provide an important data base for future management of the lake. However, several aspects of the hydrological and biological dynamics of the lake necessitate additional investigation and are essential to developing a long range strategy for preserving the integrity of the lake.

Recommendations:

The following study proposals are recommended.

1. Conduct an extensive study to determine major sources of water and sediment, flow patterns and characteristics and various chemical parameters of Lake Onalaska. Identify modifications in lake hydraulics that would prolong productivity of lake for diving ducks and sport fish and enhance habitat conditions for fish and wildlife.
2. Conduct surveys to determine seasonal sport and commercial fish harvest and composition to more adequately evaluate and monitor the fishery. A pool-wide recreational use survey similar to those conducted by UMRCC should be designed and undertaken with the cooperation of the Wisconsin and Minnesota Natural Resource Departments.
3. Support and coordinate with LNFRL, CNFRL, NPWRC, and WIDNR existing and future biological studies, particularly of fisheries. Provide refuge input to state and federal fisheries biologists regarding data gaps and additional study needs.
4. Fishery Enhancement Projects
 - a. Public Access Improvements

At the present time adequate access points exist on Lake Onalaska to accommodate the current volume of public use. Access for ice fishermen is curtailed along Brice Prairie due to the private ownership of the strip of land between the county road and the refuge shoreline. It should be reemphasized that all existing landings on the lake are located on Corps fee-title land and are under lease to local governments. Furthermore,

the language of these leases, as it relates to maintenance and improvements, is ambiguous and needs clarification. For example, at the present time management of the Upper Brice Prairie Landing is a cooperative venture between the Corps, FWS, Town of Onalaska and LaCrosse County. The Corps maintains and practices that maintenance and improvement of landing facilities, including parking, ramps, litter and silt removal is the responsibility of the lease.

Public access on the Minnesota side of Pool 7 is limited to several small privately owned sites. A potential access at Dresbach, Minnesota is available and has been considered by Minnesota DNR for acquisition, however, this site will be lost if action is not expedited. The refuge should continue its' efforts to obtain an access point somewhere between Dakota and Dresbach. An access at this location would reduce disturbance to canvasbacks and support the current public information efforts in that regard. It would provide direct access to the west side of the lake and open hunting area without crossing the lake from existing landings.

The following discussion considers public access improvements and needs on a site by site basis and recommendations for implementation or change. Most Lake Onalaska landings were zoned as low density recreation areas in the Corps' Land Use Allocation Plan.

Sailing Club Landing

This landing provides adequate parking for present and future needs. Although a concrete pad or planks might facilitate boat launching, the solid gravel base that is present is considered adequate. Access to the open water portion of the lake is adequate at present, however, construction of the airport runway extension restricts flowage between French and Bell Islands and sedimentation in the access route appears to have accelerated. The LaCrosse Sailing Club has received a Corps permit to dredge 100 cubic yards of silt from an area immediately in front of the sailboat slips in 1983. The club was also granted a Corps permit in 1982 to mechanically remove vegetation from the vicinity of the slips. Any future dredging in the immediate vicinity of the launching site should be accomplished by the leasee as was done at the Spillway Landing in 1982.

An information kiosk is planned for installation at this landing in FY 84 to disseminate information to the public. No other actions are planned or deemed necessary at the present time or anticipated in the future, assuming the lease with LaCrosse County is maintained.

Spillway Landing

Virtually no expansion of this landing is possible nor deemed necessary, however, more adequate parking could be made available through improvements of the existing site. These improvements,

however, should be proposed by LaCrosse County if desired, in accordance with the conditions of their lease with the Corps. The Fish and Wildlife Service will seek approval to install a single face informational kiosk and landing sign in FY 84. Canvasback information panels at this kiosk would direct hunters using the landing along the dike to the main channel (open hunting area) and thereby reduce waterfowl disturbances in the vicinity of Red Oak Island. Installation of a directional sign by the County at the junction of Lakeshore and Spillway Drives will be formally recommended to improve visibility of this landing.

All maintenance responsibilities should rest with the leasee, as currently is the case. In 1982 the leasee dredged material from an area 200 feet by 60 feet to a depth of two feet, thereby permitting ready boat access to the lake.

Fisherman's Road Landing

As in the case of the Sailing Club and Spillway Landings, this landing is under lease to LaCrosse County. Because of its' location and the area of the lake it offers access to, it serves as an important access point, particularly to ice fishermen. Parking and ramp improvements should be proposed by the leasee as deemed necessary and reviewed for action and approval by FWS/COE.

The Fish and Wildlife Service will seek authorization to install an informational kiosk at this site in FY 84. Water depth beyond the immediate launching area is sufficient to facilitate motor operation.

Schafer's Landing

This landing is leased to the Town of Onalaska, however, routine maintenance by the leasee has not been accomplished on a regular basis. Federal ownership in the landing area is insufficient to permit expansion of the parking area, necessary to facilitate turning, backing, etc., when the landing is congested. Litter removal, ramp maintenance and vegetation control (problematic in the summer) in a 50-foot zone in front of the landing should be the leasee's responsibility, however, the language of the lease is subject to interpretation and should be modified to more explicitly outline the leasee's responsibilities.

The refuge will seek authorization to install an information kiosk and landing sign in FY 84. Installation of a directional sign by the County on County Z to improve the visibility of this landing will also be recommended. Access to the lake

beyond the leased area becomes heavily vegetated during the latter part of summer. While boat traffic generally maintains a channel relatively free of vegetation in most years, the Fish and Wildlife Service will mechanically control vegetation on an annual basis beginning in FY 84 to provide an open channel to the main portion of the lake. Continued sedimentation will require channel maintenance at some time in the future.

Upper Brice Prairie Landing

This is the major boat landing on Brice Prairie providing access to a popular hunting area in Gibbs Lake and to the north central portion of the lake. Adequate parking, boat launching ramps and comfort stations are present. This landing is also under lease to the Township of Onalaska, however, maintenance of the comfort stations is by the refuge through a service agreement.

Access to the main portion of the lake is via a channel between the Brice Prairie shoreline and a long barrier island which has become severely eroded at several points. The channel was dredged in 1969 through the efforts of a group of Brice Prairie residents. Although channel depth is adequate for boat access at the present time, a break in the barrier islands would accelerate filling. Rip-rapping the critical areas along this island would protect the channel. An information kiosk was installed at the landing in 1983. In addition to general refuge information to be displayed at this kiosk, a series of interpretive panels have been designed to alert refuge users of the importance of the lake to canvasbacks. The panels will outline the area of heaviest canvasback use that boats should avoid.

Public Access Recommendations

1. Coordinate with the U.S. Army Corps of Engineers, Town of Onalaska and LaCrosse County, efforts to clarify the leasee's maintenance and improvement responsibilities on the Lake Onalaska landings.
2. Install information kiosks at the Sailing Club, Fisherman's Road, Schafer's and Spillway Landings (FY 84). Provide refuge information, including regulations, map and special interest items (i.e. canvasback interpretive panels) via information kiosks.
3. Annually maintain a boat access route from Schafer's Landing to the open portion of the lake by mechanically removing vegetation. If control methods are deemed ineffective, dredging an access channel may be required.
4. Coordinate an erosion control project with the COE for critical areas along the barrier island to protect the boat access channel from the Upper Brice Prairie Landing.

5. Cooperate with the Township of Onalaska, LaCrosse County, and Lake Onalaska Protection and Rehabilitation District in future access management activities and plans.

6. Continue and support efforts to acquire a public landing along the Minnesota side of Pool 7 to facilitate access to the west side of Lake Onalaska. Potential access sites will be identified in the Upper Mississippi River National Wildlife and Fish Refuge Master Plan.

7. More access sites for ice fishing are needed to better facilitate parking and pedestrian access. Several suitable sites along Brice Prairie could be acquired for this purpose through fee acquisition, easement or some other means. Potential sites will be identified in the Master Plan.

b. Public Information Efforts/Proposals

As previously discussed (Section D. 4a), structures will be installed at most landings on Lake Onalaska to provide refuge information to the public.

In addition, a special refuge leaflet, similar to the pool maps, will be designed specifically for Lake Onalaska and be made available to the public through the same means as other refuge information.

At the present time, a refuge sign at an overlook along Highway 53 in the City of Onalaska is outdated and needs replacement. A new sign at this site is recommended to inform motorists and wayside users of the fact that the lake is part of a National Wildlife Refuge. In addition, another excellent overlook along the Apple Blossom Drive near LaCrescent, Minnesota would provide an ideal site for a refuge sign of the same design.

Public Information Recommendations

1. Install information kiosks at landings as previously discussed to display refuge information.
2. Develop informational leaflet for Lake Onalaska and distribute to the public.
3. Replace existing refuge sign along Wisconsin overlook and install new sign at Minnesota overlook. Coordinate both with respective state Departments of Transportation.

c. Habitat Management

Although a biologically sound and complete data base from which to identify corrective strategies is lacking, several habitat management practices can be initiated to improve and help protect the resource values of Lake Onalaska.

Corrective action to protect island erosion within the lake has not been taken in the past. With the exception of the southern tip of Red Oak Ridge, all islands in the lake are owned in fee-title by the U.S. Army Corps of Engineers. Several small, unnamed islands north of Red Oak Ridge have nearly disappeared and require stabilization to protect them from completely eroding. The Service is programming \$36,000 in FY 85 to begin island protection measures. Priority for islands to be protected should be established by a multi-agency group with representation from Northern Prairie Wildlife Research Center. Other critical areas of shoreline and streambank erosion should be identified by the Corps, FWS and Wisconsin DNR and protective measures recommended. The structural design of the protective measures should consider potential fisheries enhancement as well.

In areas where sedimentation has deteriorated fishery habitat values, as reported by recent investigators, experimental basin modification should be undertaken.

A multi-agency group with representation from the FWS, COE, WIDNR, MNDNR and the Lake Onalaska Protection and Rehabilitation District should determine where experimental dredge cuts would potentially improve fish habitat. A range of sizes and depths should be considered to provide for future recommendations on improving fish habitat in river lakes. Depending upon the location of these cuts, public access could be improved, however, the primary purpose will be for fishery habitat.

The feasibility of minimizing sediment and nutrient deposition on Halfway Creek through trapping should be determined. Sedimentation and nutrient rich water in this area (east of Rosebud Island) have deteriorated fish and wildlife habitat.

Until the hydrological study recommended in this plan is completed, and the experimental habitat management actions recommended above are evaluated, additional major habitat projects should not be undertaken. The public access and information recommendations, when implemented, will enhance public fishing opportunities on Lake Onalaska. Together with the completion of existing studies and those proposed in this plan, a sufficient data base will exist to provide for additional management recommendations for preserving the fish and wildlife values of Lake Onalaska.

Recommendations:

1. Identify and protect critical island and streambank areas where erosion threatens fish and wildlife values. Coordinate with fisheries biologists for a design that will simultaneously enhance fish habitat. Islands and streambank areas needing immediate protection will be identified in FY 84, and rip-rapping will be done in FY 85.

2. Dredge experimental cuts in areas identified by resource agencies as deteriorated fish habitat for the purpose of evaluating effects on fish and wildlife populations and potential for larger scale implementation. Design and location of dredge cuts will be determined in FY 84 and dredging will be done in FY 85.

3. Recommend future habitat enhancement projects as determined necessary following the completion of existing studies and those recommended in this plan.

4. Monitor changes in fish and wildlife habitat and populations in concert with NPWRC, CNFRL, LNFRL and WIDNR to recognize practices necessary to maintain and improve habitat values.

d. Other Improvement/Actions

Additional steps for potential lake improvements can be taken without special funding.

Siltation at the upper and lower ends of a culvert in the dike crossing the old Black River channel along Upper Brice Prairie has impeded water flow. This material will be removed in FY 84.

A four foot diameter tube under the LaCrosse Municipal Airport's runway extension between French and Bell Islands may be restricted and reducing or entirely blocking water flow. The refuge will determine whether this tube requires cleaning. In addition, the status and adequacy of this structure relative to lake hydraulics in this area will be determined. Maintenance responsibility will be clarified and any necessary cleaning/dredging will be done in FY 84. Modifications necessary to correct and maintain flow will be recommended.

The refuge will be cooperating with the Lake Onalaska Protection and Rehabilitation District in FY 84 on small scale experimental use of aqua-screen for vegetation control.

E. Allocation of Resources

Table 1 on the following page outlines unit tasks proposed in this plan and the estimated manpower and costs for a three year period.

Table 1. Allocation of Resources

UNIT TASK	FY85		FY86		FY87		3 YEAR TOTAL COST
	FTE	COST (000)	FTE	COST (000)	FTE	COST (000)	
<u>1. Public Access</u>							
a. Kiosks		.5		1.0			1.5
b. Channel Maintenance		2.5		2.5		2.5	
c. Rip-rap		12.5					12.5
<u>2. Public Information</u>	.5		.5				
a. Leaflet		.5					.5
b. Signs				3.2			3.2
c. Kiosk displays		1.0		1.0		1.0	3.0
<u>3. Studies</u>	.5		.5				
a. Hydrological						100.0	100.0
b. Recreational Use Survey		10.0		10.0			20.0
c. Fisheries Ecology				25.0		25.0	50.0
<u>4. Habitat Management</u>							
a. Erosion Control		36.0		12.0		12.0	60.0
b. Experimental Dredge Cuts				155.0			155.0
c. Monitor & Evaluate	1.0			15.0		15.0	30.0
TOTAL	2.0	63.0	1.0	224.7		155.5	435.7

46%

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