

**OKLAHOMA'S COMPREHENSIVE
WETLANDS CONSERVATION PLAN**

**Prepared by the
Oklahoma Conservation Commission**

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EXECUTIVE SUMMARY

Introduction

Oklahoma's Comprehensive Wetlands Conservation Plan provides the state with a focused strategy for identifying, understanding, managing, and enjoying one of Oklahoma's most versatile natural resources. The plan offers a comprehensive look at Oklahoma's wetlands and their future conservation needs. The plan identifies issues that are unresolved and the limitations on wetland data and science.

The need for a state wetlands strategy lies in the recognition that in Oklahoma, wetland conservation and management are shared responsibilities among local, state, and federal agencies as well as conservation organizations, private corporations, landowners, and other interest groups. Individually, no agency or group has been given either the exclusive mandate or resources to adequately protect wetlands. Wetlands conservation and management are accomplished only through cooperative and continued efforts of these groups and individuals.

The plan emphasizes that through discussion, information exchange, cooperation and sharing of resources a coordinated approach to wetland management can be accomplished. The plan recognizes that without willing cooperation from private landowners there is little hope of long term success for wetland protection. The plan promotes a voluntary approach to wetland management that uses education, technical assistance, and incentives to bring the private sector into wetland management as a willing partner. The plan identifies Oklahoma's goals for a comprehensive wetland strategy.

"The goals of the State of Oklahoma are to conserve, enhance, and restore the quantity and biological diversity of all wetlands in the state.

Assessment of Wetlands Issues

Definition of Wetlands

The plan recognizes that there are many definitions for wetlands used in the United States, but most are fundamentally alike and generally address the elements of hydrology, hydrophytic vegetation, and hydric soils. For a general definition of wetlands, the plan recommends that the definition for wetlands developed by the National Academy of Sciences be used as the state's general definition. The plan also recognizes that there are many reasons to define and categorize wetlands. When wetlands are defined for regulatory purposes by the federal or state government, the plan recommends that the state support the current Environmental Protection Agency (EPA) and U.S. Army Corps of Engineers' (Corps) wetland delineation procedures and definition. When wetlands are defined for landscape management, such as wetland habitat assessment, a broader interpretation of the definition is appropriate.

The plan recognizes the rich diversity of Oklahoma's wetland types and lists them as riparian corridor wetlands, swamps, bogs, marshes, oxbow lakes, closed depressions, playa lakes, forested wetlands, and shoreline zones.

Functional Uses of Wetlands

Oklahoma's wetlands are a valuable natural resource that, if maintained and properly managed, can provide important benefits to the public and the environment. Wetland functions are directly beneficial to people and the integrity of the environment where they are found. The functions associated with Oklahoma's wetlands are: water quality enhancement, reduction of flood impacts, biological productivity, groundwater influences, recreation, education, timber production, and agricultural production. The plan recommends a consistent statewide program to evaluate the quality and functions of wetlands and to monitor their condition.

Inventory of Wetlands

There are two predominant statewide wetland inventories in Oklahoma. These are the U.S. Fish and Wildlife Service's (USFWS) National Wetlands Inventory and the Natural Resource Conservation Service's (NRCS) Wetland Inventory completed for the swampbuster provisions of the 1985 Farm Bill.

The plan recommends that the State of Oklahoma develop a complete inventory of all wetlands for multiple needs. The state should pursue a cooperative effort with USFWS, EPA, NRCS, and the Corps to record soils, hydrology, and wetland data on a standardized base map that can be maintained in a Geographical Information System (GIS).

Standards for Beneficial Uses of Wetlands

The Oklahoma Water Resources Board (OWRB) has evaluated how Oklahoma's Water Quality Standards (OWQS) currently protect wetlands and how they might be modified to provide additional protection. Wetlands in Oklahoma receive some protection through the water quality standards. Oklahoma's environmental statutes do not specifically address wetlands. However, within the definition of "Waters of the State", marshes receive special mention as do all other bodies or accumulations of water. This affords wetlands some baseline protection by OWQS. However, to date, no enforcement action concerning wetlands has been based on the existing OWQS; therefore, it is uncertain if the current standards can adequately protect wetlands. The plan recommends that a technical workgroup be established to review and expand upon the recommendations of the OWRB evaluation. The work needs to be completed in time for inclusion in the 2000 water quality standards revision process.

Measures to Ensure Protection of Property Rights of Landowners

Because the majority of Oklahoma wetlands are in private ownership, private landowners are the state's most important wetland managers. The success of wetland conservation and management in

Oklahoma will ultimately be determined by private landowners. The plan's recommendation for insuring that private landowners be willing partners with the state rests on education, technical assistance, and incentive programs. The success of the USFWS's Partners for Wildlife Program and USDA's Wetland Reserve Program provide a solid foundation for the likelihood of this approach being successful.

Oklahoma currently has two pieces of legislation that attempts to address the issue of federal wetlands regulation in the state. This legislation, codified at 80 O.S. 1991, Section 1, Subsections C and D, deals with the issue of takings. No court cases testing this legislation have occurred since its passage.

Recommend Measures to Mitigate Wetland Losses

Successful mitigation of Oklahoma's wetlands losses will require a better characterization of wetland functions and a more thorough inventory of Oklahoma's wetland resources. The state must develop a more comprehensive monitoring system to track gains and losses of wetlands. The plan recommends that the state should look at establishing a wetland bank(s) to guide financial resources into constructive projects to restore, enhance, and create wetlands, in that order of priority. In Oklahoma, wetland banks are a new concept. The Oklahoma Department of Transportation is in the process of establishing a wetland bank for use in mitigating highway construction projects. This effort should serve as a model for the development of a statewide program.

Evaluation of Wetland Protection Measures

To achieve the level of wetland management consistent with the state's goals, 12 objectives have been identified. They are listed as follows:

- Objective 1** To promote the coordination of wetlands management in Oklahoma through discussion, information exchange, cooperation, and the sharing of resources.
- Objective 2** To establish a net gain wetlands policy for state-owned lands and a no net loss policy on state funded projects to encourage the restoration, enhancement, and creation of wetlands.
- Objective 3** To integrate wetlands management with other related resource issues on a watershed or hydroponic unit basis.
- Objective 4** To characterize the wetlands resource more completely and identify critical functions of the major type of Oklahoma wetlands.
- Objective 5** To adopt a classification system and water quality standards to identify and protect wetland functions and values.

- Objective 6** To provide technical assistance and other initiatives to landowners implementing management practices that conserve, enhance, and restore wetlands on private property.
- Objective 7** To develop information/education programs on Oklahoma's wetlands resources.
- Objective 8** To identify and prioritize unique or scarce wetland types and sites for acquisition or special protection.
- Objective 9** To identify wetland sites for restoration and enhancement; identify and develop funding sources to accomplish this work.
- Objective 10** To integrate wetlands conservation with Oklahoma's floodplain management program and create more wetland/urban riparian areas.
- Objective 11** To establish a comprehensive statewide wetlands mapping program.
- Objective 12** Research and develop techniques for protecting, enhancing, and constructing wetlands for pollutant control and/or mitigation. Developed techniques will be implemented to maximize beneficial uses of wetlands pollutant removal and mitigation capabilities.

Some of the key action items associated with these objectives are:

- ▶ The establishment of a state technical working group made up of representatives from state agencies that manage state lands and federal agencies that regulate or administer wetland programs.
- ▶ Promote a policy of "net gain" of wetlands on state-owned lands and a policy of no net loss on state funded projects.
- ▶ Pursue the establishment of a state wetland mitigation banking program.
- ▶ Incorporate a wetlands component into the overall watershed management plan for the state.
- ▶ Adopt a classification system for each wetland type and designate uses based on functions and values.
- ▶ Develop a recognition/awards program for landowners undertaking excellent wetlands conservation projects.
- ▶ Prepare a brochure/information sheet on potential economic uses of wetlands on private lands.
- ▶ Continue state participation in acquisition programs through the North American Waterfowl Management Plan administered by the Oklahoma Department of Wildlife Conservation.

- ▶ Continue to promote voluntary landowner assistance programs like the USFWS's Partners for Wildlife Program.
- ▶ Promote floodplain management as a method for conserving, enhancing, and restoring wetlands.
- ▶ Adopt the digital orthophoto quadrangle as the statewide base map for wetland inventory and database development.
- ▶ Monitor water quality enhancement and biological productivity on enhanced/constructed wetlands.

Strategy of Implementation

The State's Wetlands Conservation Plan gives a positive direction for meaningful wetlands management. Action items found in the plan are only building blocks for a successful wetland strategy. The action items have several mechanisms for implementation. Some can be accomplished by a governor's executive order, some can be completed through a memorandum of agreement between agencies, and some need to be implemented through the legislative process, undergoing full debates in both the House and Senate. Some parts of the strategy involve agencies taking the initiative to pursue an item that is good for the resource and the State of Oklahoma. The success of the strategy ultimately lies in the belief by both the public and the public servant that their efforts have a positive effect on the resource.

CHAPTER 1

INTRODUCTION AND GUIDING PRINCIPLES

INTRODUCTION

In May 1990, the Oklahoma Legislature directed the Oklahoma Conservation Commission (Commission) to prepare a wetlands management strategy for the state. Also during this time on the national level, the Environmental Protection Agency (EPA) was promoting the development of comprehensive state wetlands conservation plans. During Fiscal Years 1990 and 1991 the Commission received grant funds from EPA to develop Oklahoma's Wetlands Conservation Plan. The Commission gratefully acknowledges EPA's financial support in the development of this plan. The Commission also acknowledges the assistance of the many agencies, organizations, and individuals who provided input on the plan. Without their efforts and expertise, the plan could not have been prepared.

While this plan offers a comprehensive look at Oklahoma's wetlands and future conservation needs, it is clear that there are many unresolved issues and many limitations on wetlands data and science. Consequently, there are gaps in the plan that are identified and recommendations are made to fill those gaps. During the course of the planning process, wetlands policy has been a much debated natural resource issue both locally and nationally. The federal regulation of wetlands has gone through a number of changes. Efforts to reach consensus on a federal wetlands definition are continuing. Currently, the National Academy of Sciences has been enlisted by Congress to review the wetlands definition and delineation issue.

With so much confusion and change in federal wetlands policy and regulation, it is difficult to develop a state comprehensive wetlands plan which is consistent with the federal government's efforts. Nevertheless, wetlands are an important component of Oklahoma's natural resource. As the importance of wetlands continues to be demonstrated, the time has come to look at how Oklahoma manages this resource. The Commission hopes this plan will serve as the starting point for providing a more comprehensive approach to wetlands management.

GUIDING PRINCIPALS

The Commission has developed a number of policies that provide the overall framework for the plan. These policies are listed below:

1. Wetlands are an important component of the natural resource of the state.
2. Oklahoma's wetlands should be conserved and carefully managed. A policy of no net loss of wetlands functions and values should be pursued.
3. For purposes of this plan, the federal definition and delineation of wetlands will be used. The development of an independent state definition would only further confuse the issue.
4. A voluntary approach to wetlands management on private lands using education, technical assistance, and incentives is the preferred method of conserving Oklahoma's wetlands.
5. Wetlands should not be managed in isolation, but rather integrated with other related resource issues such as water quality, water quantity, flood control, recreation, and wildlife. Management should be done on a watershed or hydroponic unit basis.
6. All wetlands are not created equal. While wetlands provide many ecologically important functions and benefits, not all wetlands perform all functions. There is a need to develop a wetlands classification system that considers the state's diverse biogeographical areas. Unique, scarce, and highly beneficial wetlands should receive priority protection.
7. No federal, state, or local agency has exclusive authority over wetlands management. The Commission will develop a coordinated approach that taps the expertise of all natural resource management agencies as well as nongovernmental groups concerned with wetlands.

CHAPTER 2

OVERVIEW OF WETLANDS PROGRAMS AND AGENCIES

In Oklahoma, wetlands conservation and management are shared responsibilities among federal, state, and local agencies as well as conservation organizations, private corporations, landowners, and other interest groups. Individually, no agency or group has either the mandate or the resources to adequately protect wetlands. Wetlands conservation and management are accomplished only through cooperative and continued efforts of these groups and individuals.

This chapter provides a brief summary of the responsibilities of the state and federal agencies having major involvement in wetlands conservation and management. A more detailed discussion of each agency's responsibilities is provided in Appendix A. The plan recognizes that a number of other agencies, organizations, and educational institutions play significant roles in wetlands research, information/education, and management.

At the federal level, four agencies have the principal authority over wetlands. These agencies are the U. S. Army Corps of Engineers (Corps), the U.S. Fish and Wildlife Service (USFWS), the Environmental Protection Agency (EPA), and the Natural Resource Conservation Service (NRCS). At the state level there are also four agencies with wetland responsibilities. These agencies are the Oklahoma Conservation Commission (Commission), the Oklahoma Water Resources Board (OWRB), the Oklahoma Department of Environmental Quality (DEQ), and the Oklahoma Department of Wildlife Conservation (ODWC).

FEDERAL AGENCIES

U.S. Army Corps of Engineers

The Corps is the principal federal regulatory agency for wetlands. Authority for its program is outlined in Section 404 of the Clean Water Act, which established a permit program to regulate the discharge of fill materials into wetlands.

Environmental Protection Agency

The EPA jointly administers and enforces the Section 404 program with the Corps. EPA has responsibility for the review and approval of water quality standards that directly impact wetlands. EPA provides funding to states to develop comprehensive wetlands management plans.

U.S. Fish and Wildlife Service

The USFWS has no direct regulatory authority over wetlands. Its primary role is review and consultation with other federal agencies when wetland mitigation is involved. The USFWS has a continuing land acquisition program that is directed primarily to the benefit of wetlands dependent wildlife. This land is managed through the National Wildlife Refuge System, which includes several refuges in Oklahoma.

Natural Resources Conservation Service

The NRCS of the U.S. Department of Agriculture administers wetlands programs that were initiated by Congress in the 1985 and 1990 Farm Bills. The purpose of the wetlands provisions is to discourage conversion of wetlands to agricultural use. NRCS is responsible for making wetlands determinations, mapping, and notifying landowners who participate in federal farm programs.

STATE AGENCIES

Conservation Commission

The Commission is responsible for preparing Oklahoma's Comprehensive Wetlands Conservation Plan. The Commission has a network of 88 local conservation district offices that are responsible for conservation of renewable natural resources. These offices maintain copies of the USFWS and the NRCS wetlands inventory maps as well as county soil surveys.

Department of Wildlife Conservation

The primary mission of the ODWC is to protect and manage the state's wildlife resources. Because of the importance of wetlands habitat to many wildlife species, the ODWC has a keen interest in wetlands protection. Like the USFWS, the ODWC is involved with wetlands mitigation on federal actions. The ODWC is involved in implementing the North American Waterfowl Management Plan. The ODWC manages land for wildlife, much of which has wetlands. The ODWC also reviews federal actions that impact wetlands in the state.

Water Resources Board

The OWRB is responsible for at least three programs that impact wetlands. First, the OWRB is responsible for the development of the state's water quality standards. Secondly, the OWRB is the state coordinator of the National Flood Insurance Program. In that role, the agency provides technical assistance to communities in implementing wise floodplain management strategies. Specifically, the OWRB reviews proposed development projects regarding their proximity to the 100-year floodplain, as delineated by the federal government, and regulates development on state-owned or -operated property in designated floodplain areas. A third wetlands-related program that

the OWRB administers is the management and administration of water rights for both stream and groundwaters in Oklahoma. Stream water withdrawals and appropriation, in particular, can have a substantial impact on wetland areas. The OWRB also maintains the Oklahoma Comprehensive Water Plan, a long range planning document for the future use and protection of the state's water resources, and supervises other state water planning activities. The current update of the Water Plan, due for submittal to the State Legislature and Governor in September 1995, includes specific recommendations aimed at wetlands protection and management. In addition, the OWRB serves as a depository for National Wetlands Inventory maps delineated by the U.S. Fish and Wildlife Service.

Department of Environmental Quality

The DEQ is responsible for reviewing and certifying that federal Section 404 dredge and fill permit applications do not violate water quality standards. The DEQ also maintains copies of the National Wetlands Inventory maps of the USFWS.

CHAPTER 3

GOALS AND OBJECTIVES

GOALS

The goals of the State of Oklahoma are to conserve, enhance, and restore the quantity, quality, and biological diversity of all wetlands in the state.

These are challenging goals. The cooperation and involvement of many diverse interests and individual points of view will be required to reach these goals. There must be a long-term commitment to these goals by all parties, and much will depend on expanding knowledge and understanding of wetlands and their functions in the ecosystem. Currently not all the answers necessary to manage wetlands are available, but by establishing these goals and setting out the objectives in this chapter, all parties can begin taking actions to better conserve this resource.

Accomplishing these goals will require a continuing partnership between the federal and state governments. The primary federal role will be to carry out an effective regulatory program. The state's role will be to provide the education, research, technical assistance, and incentives to improve wetlands conservation and management on state and private lands. With the vast majority of Oklahoma wetlands in private ownership, management decisions impacting the wetlands resource will be made by private landowners. Landowners must be active partners with the state to accomplish effective wetlands management.

The state must improve its knowledge of wetlands. Data collection and analysis, as well as long-term monitoring, of wetlands trends are critical. Improved inventories, mapping, and characterization of Oklahoma's wetlands are essential. This will require improved communications and cooperation among the various resource management agencies.

A strong, cooperative partnership between the public and the private sectors also must be forged. To date, wetlands management can be characterized as fragmented, confusing, and often inconsistent. It has been difficult for the private sector to understand and fully support the public policy towards wetlands. By clearly setting these goals and outlining objectives to reach the goal, this plan and strategy can serve as the framework for promoting improved wetlands conservation in the state.

OBJECTIVES

To achieve the wetlands goals, twelve objectives are recommended.

To promote the coordination of wetlands management in Oklahoma through discussion, information exchange, cooperation and the sharing of resources.

The ability to meet the long-term demands of a wide spectrum of wetland habitats is the result of sound wetland management. It is understandable that management decisions to meet the long-term demands of wetlands will be made by government agencies, individuals and private corporations. Through discussion and exchange of information in making management decisions, cooperative attitudes will make full use of the state's resources for the protection of Oklahoma's wetlands.

To establish a net-gain wetlands policy for state-owned lands and a no-net-loss policy for state-funded projects to encourage the restoration, enhancement, and creation of wetlands.

Before the state can expect its citizens to improve their wetlands conservation practices, it should ensure that it is doing the best possible job of wetlands management. The private sector should not be held to a higher standard than the state. This objective would require state agencies to replace any wetlands converted or destroyed as a result of a state-funded project. It would also encourage state agencies to work toward a net gain of wetlands on state-managed land. It is expected that federal agencies owning land in Oklahoma would adopt this objective.

To integrate wetlands with other related resource issues on a watershed or hydroponic unit basis.

Wetlands should not be managed as a separate resource. Wetlands are linked directly with water quality, water quantity, flood control, and wildlife management issues. The most effective approach to wetlands management is on a watershed or hydroponic unit basis where wetlands management is integrated with other related programs.

To characterize the wetlands resource more completely and identify the critical functions of the major types of Oklahoma wetlands.

While much is known about the characteristics of Oklahoma's wetlands more information is needed, particularly concerning wetlands functions. A better understanding of wetlands functions will provide resource managers an indicator of critical wetlands. It will also give the general public a better understanding of the importance of wetlands as a resource.

To develop a classification system and water quality standards to identify and protect wetlands functions and values.

Development of a wetlands classification system is an important step in the comprehensive management of Oklahoma wetlands. A classification system should also help the public's

understanding of wetlands and their functions and values. Because wetlands and water quality are integrally related, careful consideration should be given to how water quality standards may impact the use and protection of wetlands.

To provide technical assistance and other incentives to landowners implementing management practices that conserve, enhance, and restore wetlands on private property.

Since a majority of Oklahoma wetlands are in private ownership, it is important to sustain and enhance the benefits of wetlands ownership and management. This can best be achieved by providing private landowners with quality technical assistance, sound information, and other incentives.

To develop information/education programs on Oklahoma's wetlands resources.

There is a need for developing information on Oklahoma's wetlands resources for a variety of audiences. Much confusion exists about the importance of wetlands in the ecosystem. Educating citizens and providing a better understanding of the functions and values of wetlands will be the best way to ensure the long-term conservation of the wetlands resource.

To identify and prioritize unique or scarce wetlands types and sites for acquisition or special protection.

Available information on Oklahoma's exceptional wetlands is limited. Some of these wetlands deserve a higher level of protection because of their public benefits and ecological functions.

To identify wetland sites for restoration and enhancement; identify and develop funding sources to accomplish this work.

Opportunities exist to begin voluntary wetlands restoration and enhancement work through programs such as the U.S. Fish and Wildlife Service's Partners for Wildlife and the U.S. Department of Agriculture's Wetlands Reserve Program. Other opportunities for funding this type of work need to be explored with the private sector, nonprofit organizations, and the state legislature.

To integrate wetlands conservation with Oklahoma's floodplain management program and create more wetland greenbelt/riparian areas.

Floodplain management and wetlands conservation are closely linked. Opportunities to restore floodplains to natural conditions should be pursued where possible. Incorporating wetlands construction or enhancement in urban/suburban areas as part of greenbelts, riparian zones, parks, and stormwater management systems is encouraged.

To establish a comprehensive statewide wetlands mapping program.

As work proceeds on wetlands use classification and further refinement of wetlands delineation occurs, a statewide mapping effort on wetlands is needed. The mapping should be accomplished utilizing geographic information system technology.

Research and develop techniques for protecting, enhancing, and constructing wetlands for pollutant control and/or mitigation. Developed techniques will be implemented to maximize beneficial uses of wetlands pollutant removal and mitigation capabilities.

As knowledge is gained about wetlands' functions, uses, and their ability to act as natural purification systems, techniques can be developed to maximize those uses. Through research, constructed wetlands maybe useful as alternative pollutant removal mechanisms to improve Oklahoma's water quality and serve a double role as mitigation sites.

CHAPTER 4

ASSESSMENT OF WETLANDS ISSUES

The Oklahoma Legislature directed the Conservation Commission to prepare a wetlands management strategy (Title 27A of the Oklahoma Statutes, Section 3-2-108). The legislature specified several areas be addressed in the strategy, including define wetlands, enumerate their beneficial uses, identify and inventory wetlands within the state, and recommend standards for critical wetlands. This chapter assesses these four areas and serves as background information for the implementation plan that follows in Chapter 5.

DEFINITION OF WETLANDS

An Oklahoma Wetlands Definition

There are many definitions of "wetlands" in use in the United States. Most are fundamentally alike and generally address the three critical elements of wetlands hydrology, hydrophytic vegetation, and hydric soils. These definitions mirror a wide range of academic points of view and professional orientations. A unified federal definition of wetlands has been proposed and submitted to the U.S. Congress by the National Academy of Sciences. The reference definition developed by the National Academy of Sciences is as follows:

A wetland is an ecosystem that depends on constant or recurrent, shallow inundation or saturation at or near the surface of the substrate. The minimum essential characteristics of a wetland are recurrent, sustained inundation or saturation at or near the surface and the presence of physical, chemical, and biological features reflective of recurrent, sustained inundation or saturation. Common diagnostic features of wetlands are hydric soils and hydrophytic vegetation. These features will be present except where specific physicochemical, biotic, or anthropogenic factors have removed them or prevented their development.

It is recommended that for regulatory purposes the State of Oklahoma adopt the current Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers' (Corps) regulatory definition of wetlands:

Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances

do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

This definition is presently used by the federal government to regulate activities in wetlands. Because of the significant influence of federal wetlands programs and policies on Oklahoma's wetlands resource, the formulation and use of an independent state definition of wetlands was not pursued. It would be counterproductive and confusing to the regulated community to develop a state regulatory wetlands definition that would differ from the established federal definition.

There are many other ways to define and categorize wetlands. Wetlands are defined and delineated for a variety of scientific and economic purposes such as functional assessment, ecosystem management, and human use. Within the framework of regulation, the wetland definition and delineation is conservative and precise. In a landscape management context, such as wetlands habitat assessment, a broader wetlands definition is often used. Wetlands definitions for specialized purposes such as acquisition and inventory may include river channels, lake littoral zones, and floodplain zones that do not fit the classic character of vegetated wetlands or the precise regulatory definition.

In attempting to define wetlands, it must be understood that wetlands are transitional zones controlled by landscape and hydrology. They contain parts of both the aquatic and upland environments. Some, such as swamps, bogs, and marshes, are easily recognized as wetlands. Others, like bottomland hardwood forests and seasonally ponded depressions, lack permanent standing water and are less recognizable. This wide variation of physical characteristics has led to much confusion by the public about a wetland definition.

It is important to recognize that Oklahoma has a broad diversity of wetland types. These wetland types can provide a variety of uses and benefits. For the purposes of this plan, the Oklahoma wetland types targeted are as follows:

Riparian Corridors (Zones). These areas are on low, frequently flooded floodplains. Riparian corridors are found in the central and western parts of Oklahoma. They are frequently flooded and have saturated soils associated with high water tables. Vegetation is typically rushes and sedges with an overstory of willow, cottonwood, and tamarisk.

Swamps, Bogs, and Marshes. These areas are on low, frequently flooded floodplains in the southeastern part of the state. Soils are saturated and surface water stands well into the growing season. The understory vegetation is typically rushes and sedges with an overstory of bald cypress, overcup oak, and willow oak.

OxbowLakes. These areas are old river and streamchannels that have been cut off from the main channel. These oxbows have shallow to deep water that is typically devoid of woody vegetation. Green ash and willow line the banks of these areas and submergent and floating leafed plants are found in the water. Unlike closed depressions, these areas are seldom dry.

ClosedDepressions. These areas are found throughout the state where soils deposited by wind or water have blocked drainage patterns. They often have high water tables and seasonally

pond water for long durations. They may not stand water in dry years. The depressions are usually vegetated with cattails, smartweeds, and barnyard grass with an overstory of willow and button brush.

Playa Lakes. These areas are found only on the high plains. They are depressional areas that have no outlets and seasonally pond water for long durations during years with high rainfall. These areas are vegetated with blue lake weed and smartweed.

Forested Wetlands. These areas are found on frequently to recently flooded floodplains in the eastern third of the state. They have soils saturated by high water tables that remain at or near the surface for long periods. Vegetation is typically sphagnum moss, rushes, and sedges with an overstory of water oak, willow oak, overcup oak, and green ash.

Shoreline Zones. These areas are semi-permanently flooded lake and pond fringes that are typically dominated by cattail, bulrush, willow, and button brush.

Other Federal Wetland Definitions

The Natural Resources Conservation Service's (NRCS) definition of wetlands as found in the federal Food Security Act is:

Wetlands are defined as areas that have a predominance of hydric soils that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions, except lands in Alaska identified as having a high potential for agricultural development and a predominance of permafrost soils.

This definition was developed for use in the regulation of the Swampbuster provisions of the Food Security Act of 1985. The basic wetland conditions used with this definition are:

- ▶ Wetland
- ▶ Fanned Wetland
- ▶ Prior Converted Wetland
- ▶ Converted Wetland
- ▶ Artificial Wetland

All of these wetlands conditions meet the basic NRCS wetlands definition, but they exist in several different hydrologic conditions.

The U.S. Fish and Wildlife Service's (USFWS) wetlands definition is:

Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For the purpose of this classification wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes; (2) the

substrate is predominantly untrained hydric soil, and, (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year.

This definition was developed by Lewis Cowardin and others (1979). It recognizes five wetland systems. These systems are further broken into subsystems and classes that describe substrate, vegetation, and hydrology.

There are only three wetland systems identified within the state. These are the lacustrine, riverine, and palustrine systems.

The lacustrine system includes wetlands and deepwater habitats that are greater than 20 acres in size and are located in topographic depressions or dammed stream channels. They have less than 30 percent areal vegetation coverage and are not saline. There are two subclasses; the littoral zone, which extends from the shore to a depth of 2 meters below low water, and the limnetic subsystem, which is always greater than 2 meters deep. Wetlands are associated with the littoral subclass. The pelagic zone is considered deepwater habitat.

The riverine system includes all wetlands and deepwater habitats contained within a channel with two exceptions: (1) wetlands dominated by trees, shrubs, persistent emergents, or emergent mosses or lichens; and (2) habitat with ocean derived saline waters. There are four subclasses of the riverine system. These are tidal, lower perennial, upper perennial, and intermittent. Oklahoma harbors riverine wetlands within all but the tidal subsystem.

The palustrine system includes all non-tidal wetlands dominated by trees, shrubs, and persistent emergents. It also includes all wetlands lacking such vegetation but with all of the following four characteristics: (1) areas less than 20 acres, (2) no active wave-formed or bedrock shoreline features, (3) water depths less than 2 meters at low water, and (4) no ocean-derived salinity. The palustrine system includes most habitats generally recognized as wetlands, including marshes, swamps, bogs, and similar areas.

In conclusion, as shown by the different federal definitions and the various classification types, agreement on a single wetlands definition is difficult. By adopting the EPA/Corps regulatory wetlands definition, Oklahoma will be consistent with the federal regulatory program, which, hopefully, will reduce confusion. When the National Academy of Sciences completes its work on defining wetlands and makes its recommendations to the federal government, the federal wetlands definition may be modified again. Should this occur, it is recommended that Oklahoma's wetlands definition be changed to remain consistent with the federal definition.

FUNCTIONAL USES OF WETLANDS

Historically, wetlands were considered to be wastelands that should be drained as soon as possible for farming or for residential or industrial development. Wetlands were not considered valuable resources, and their complex ecological and hydrological functions were, for the most part, unrecognized.

Only recently have wetlands been recognized as valuable natural resources that, if maintained and properly managed, can provide important benefits to the public and the environment. For example, wetlands can protect or enhance water supplies, improve water quality, reduce flooding, provide valuable habitat for wildlife, and contribute to the biological diversity and stability of the ecosystems upon which we all depend.

Environmental Benefits

Wetland functions are directly beneficial to people and to the integrity of the environment where they are found. Not every wetland will perform all of the possible functions, and not all functions are performed equally well in every wetland. The degree to which a wetland performs a function is related to, and defined by, a complex web of interrelations among the wetland's characteristics and its landscape setting, upstream contributors, downstream receivers, and biotic interactions. The functions associated with Oklahoma wetlands are:

Water Quality Enhancement. Wetlands have a limited capacity to enhance the physical and chemical condition of water from a base condition by:

Sediment/Toxic Substance Retention. Reducing the concentration of suspended and bed-load sediment, and attendant toxicant load, through energy dissipation, precipitation, ionization, and/or biotic bonding.

Nutrient Removal/Transformation. Reducing the concentration or modifying the form of nitrogen, phosphorus, and potassium ions through oxidation, reduction, assimilation, or other biochemical processes.

Reduction of Flood Impacts. Wetlands reduce the volume and physical energy of water below a base condition, through:

Flood Peak Reduction. Wetlands influence regional water-flow regimes by intercepting storm runoff and temporarily storing excess surface waters, thereby reducing storm runoff peak discharges by storing and slowly releasing runoff over a longer period of time.

Erosion Potential Reduction. Wetlands in the natural state are usually vegetated. This vegetation reduces the velocity of flood waters and wave action, thereby lessening the potential for erosion of shorelines and floodplain areas. The root systems of wetlands vegetation bind the floodplain and shoreline soils to further resist erosive forces.

Biological Productivity. Wetlands provide habitat, including food, water, cover, and reproductive features, that supports a diverse array of wetland-dependent or indicative species and populations. Examples include:

Aquatic Species. Vertebrate and invertebrate species that complete their life cycles in water.

Resident - Species that typically spend all life stages in an area or habitat of analogous physical conditions.

Transient - Species that typically move in response to changing habitat conditions and/or with specific life stage requirements.

Semiaquatic Species. Vertebrate and invertebrate species that spend certain life stages in water.

Wetlands Wildlife Species. Vertebrate species, typically mammals, birds, amphibians, and reptiles, that spend most or all of their life stages above the water's surface, but are heavily dependent on aquatic or wetland conditions to fulfill basic needs.

Resident - Species whose annual requirements are met within a single home range.

Migratory - Species whose annual life stage requirements are met by a series of distant ranges accessed by predictable relocation.

Vegetation. Species of plants typically adapted to periodically anaerobic soil conditions.

Food Chain Support. Providing primary and secondary productivity that support faunal communities within the wetland and in adjacent and downstream waterbodies.

Groundwater Influences. Wetlands significantly influence shallow water aquifers within their vicinity by:

Groundwater Recharge. Retaining water and allowing for its percolation into the underlying aquifer.

Low Flow Augmentation. Releasing water to adjacent streams or water bodies during dry periods of the year and during drought.

Groundwater Discharge Buffering. Enhancing the quality of groundwater discharge by providing a biochemical water treatment system.

Direct Human Benefits

In addition to the societal benefits provided by normal wetlands functions, several direct human benefits can be derived from wetlands and their functions through managed use. Opportunities for human uses compatible with sustained wetlands conditions include:

Recreation. Use for play, amusement, relaxation, and/or physical and mental refreshment.

Education. Use for training and developing knowledge and skills.

Timber Production. Providing the potential for profitable production of wetland endemic trees through management that is compatible with sustained wetland conditions.

Agricultural Production. - Providing the potential for agricultural resource management consistent with sustained wetland conditions.

In summary, the detailed knowledge of individual wetland functions and quality that would allow land managers to quantify actual or potential benefits is lacking. Wetlands scientists recognize that hydrology is the most significant factor influencing wetlands character, functions, and interactions. There is a major need for a consistent statewide program to evaluate the quality and functions of wetlands and to monitor their condition.

INVENTORY OF WETLANDS

There are two predominant statewide wetlands inventories in Oklahoma. These are the USFWS National Wetlands Inventory and the NRCS Wetlands Inventory completed for the Swampbuster provisions of the 1985 Farm Bill. There are several other referenced inventories that estimate the extent of Oklahoma wetlands resources, but none can be directly compared to each other for two fundamental reasons:

1. Differences in defining and delineating the wetlands resource base.
2. Differences in the accuracy of the methods employed in the inventory.

It is for these reasons that it is difficult to develop acreage estimates of Oklahoma's past or present wetlands.

The USFWS inventory was completed using a combination of infra-red photography and ground truthing. This national inventory recognized five wetland systems. Of the five systems, only three exist in Oklahoma. These are the lacustrine, riverine, and the Palustrine systems. The riverine and Palustrine systems identify the majority of Oklahoma's wetlands, while the lacustrine system primarily identifies deepwater habitats such as lakes and ponds. In its report to Congress entitled Wetlands Losses in the United States 1780's to 1980's, the USFWS estimated there are 950,000 acres of wetlands and deepwater habitats in Oklahoma. This estimate is based on a wetlands definition that is broader than the current federal jurisdictional definition, which Oklahoma will use as its state definition, and includes deepwater habitats. Because this inventory excluded cropland and did not identify converted wetlands, it cannot be viewed as a comprehensive statewide inventory.

An estimate of the state's "wetlands" (i.e., areas that have a high potential of meeting the federal wetlands definition) may be made based on the NRCS county level wetlands inventory. This inventory was completed in 1990 using photo interpretation of multiple years of the Consolidated Farm Service Agency (CFSA) slides in combination with soils information and National Wetlands Inventory data. This inventory indicates a wetlands acreage estimated at 687,000 acres. An analysis of this inventory indicates 25 percent of Oklahoma's wetlands occur in the western third of the state, 14 percent in the central third of the state, and 61 percent in the eastern third of the state. This inventory is scheduled to be reviewed and updated

on a 5-year interval, and acreage estimates of wetlands on both agricultural lands and non-agricultural lands will be further refined.

To obtain accurate and reliable estimates of the extent and location of Oklahoma's wetlands, the delineation of wetlands on a standard base map and the transfer of the information into a geographic database should be undertaken. It is recommended that the state enter into a cooperative effort with USFWS, EPA, NRCS, and the Corps to record both soils and wetlands data on a standard base map that can be transferred to digital format and entered into a geographic information system (GIS). GIS will enable more efficient updating, research, and analysis of wetlands data.

Inventories of Priority Wetlands in Oklahoma

The following tables give information on wetland areas that have a high priority for protection, restoration, or acquisition.

The *USFWS Region II Wetlands, Regional Concept Plan* identified the following wetland areas as priorities for acquisition under the 1986 Emergency Wetlands Resource Act (P.L. 99-645).

Site Name	Counties	Estimated Acres
Deep Fork River	Okmulgee, Okfuskee, Creek, Lincoln	60,000
Clear Boggy	Atoka, Choctaw, Bryan	6,000
Muddy Boggy Creek	Atoka, Choctaw	6,000
Gaines Creek	Latimer	1,400
Glover River	McCurtain	43,000
Salt Fork River	Alfalfa, Grant	4,500
Cimarron Terrace	Kingfisher	15,000
McKinney Creek	McCurtain	1,400
Illinois River	Adair, Cherokee, Delaware	16,000
Little/Glover River	McCurtain	20,000
Castor Playa	Cimarron	150
Gate Playa	Beaver	500
Four Corners Playa	Texas	450

For the North American Wildlife Management Plan's Playa Lake Joint Venture, the Oklahoma Department of Wildlife Conservation has identified playas in the following counties and has targeted 75 of them for protection.

County	Number of Playa Basins	Total Acres	Number Farmed	Number of Playas Excavated/Modified
Cimarron	163	2,309	89	26
Texas	587	4,524	382	43
Beaver	435	2,048	256	18
TOTAL	1,185	8,881	727	87

Characteristics of these playas are highly variable. Playas range from those that are rarely wet, to those that perennially hold water. Basin size varies from less than 1 acre to greater than 200 acres. A large proportion of the playas in Oklahoma are fanned.

Other Wetland Inventories

In 1953 a precursor to the National Wetlands Inventory (NWI) was devised. The results of this inventory and an illustrated description of wetland types were published as USFWS Circular 39 (Shaw and Fredine 1956). This circular was the most common document used for wetlands identification and remained in effect until 1978. The present system developed by Lewis Cowardin and others was officially adopted by the USFWS in 1979, and the current NWI was developed under this system.

Another estimate of Oklahoma's wetlands was developed by L. G. Duck and J.B. Fletcher in 1945. Their study used climax vegetation criteria and estimated that Oklahoma had approximately 2.2 million acres of "bottomland timber" in presettlement times.

Besides the county level wetlands inventory that NRCS conducted for implementing the Farm Bills, it also estimated wetland acres as part of the National Resource Inventory process. This estimate was based on wetland and deepwater habitat types as identified in the USFWS wetland classification system. This 1992 inventory estimates Oklahoma's wetlands and deepwater habitat acres at 1,432,000 acres. Of this acreage 460,000 acres were identified as Palestine systems, 650,000 acres as lacustrine systems, and 321,000 acres as riverine systems.

A map of the general distribution of hydric soils is shown in Figure 1. (Figure 1 is not included in electronic format.) This map serves as a general reference of the location and distribution of soils that are subject to hydric conditions, which commonly support wetlands. This map was developed using the NRCS's STATSCO soil database.

Matrices showing a comparison and contrast of wetland classifications and inventories can be found in Appendix E.

(Figure 1 - Oklahoma Hydric Soil Distribution Map not included)

STANDARDS FOR BENEFICIAL USES AND WETLANDS

As part of the development of the Comprehensive Wetlands Conservation Plan, the Oklahoma Water Resources Board (OWRB) evaluated how Oklahoma's Water Quality Standards (OWQS) currently protect wetlands and how they might be modified to provide additional protection. The OWRB report, entitled *Wetlands Protection through the Oklahoma Water Quality Standards, 1991*, is included as Appendix B. A brief summary is provided here.

Wetlands in Oklahoma receive some protection through the water quality standards. Oklahoma's environmental statutes do not specifically address wetlands. However, within the definition of "Waters of the State," marshes receive special mention as do all other bodies or accumulations of water. Specifically, O.S. 82 § 1084.2 defines "waters of the state" as:

All streams, lakes, ponds, marshes, watercourses, waterways, wells, springs, irrigation systems, drainage systems, and all other bodies or accumulations of water, surface and underground, natural or artificial, public or private, which are contained within, flow through, or border upon this state or any portion thereof, except privately owned reservoirs used in the process of cooling water for industrial purposes, provided that water released from any such reservoir into a stream system of the state shall be and become waters of the state.

Because wetlands can be considered "waters of the state," they are afforded baseline protection by OWQS. All waters in Oklahoma are designated with the beneficial uses of agriculture, industrial, municipal process and cooling water, and aesthetics. Unless otherwise specified, waters of the state are assumed to be capable of supporting the beneficial uses of, and maintaining the criteria associated with, agriculture, aesthetics, warm water aquatic community and primary body contact recreation as defined in the OWQS.

Oklahoma's Antidegradation Policy establishes that no water quality degradation that will interfere with the attainment or maintenance of an existing or designated beneficial use shall be allowed. The 1991 OWQS define degradation as *any condition caused by the activities of man which result in the prolonged impairment of any constituent of the aquatic environment*. Water quality is also defined as *physical, chemical, and biological characteristics of water which determine diversity, stability, and productivity of the climax biotic community or affect human health*.

Based upon these definitions and Oklahoma's Antidegradation Policy, no human activity may cause the prolonged impairment of the physical, chemical, or biological characteristics of the aquatic environment of any water of the state. This protection does not strictly prohibit activities in a particular wetland but does limit them.

As shown in the preceding discussion, wetlands are afforded a certain level of protection by the existing OWQS (1991). However, to date, no enforcement action concerning wetlands has been based on the OWQS; therefore, it is uncertain if the current standards can adequately protect wetlands. There are numerous problems with the existing standards, including the lack of a federal unified definition for wetlands and no language specifically mentioning wetlands in the OWQS. [M]arshes and ...

accumulations of water, underground and surface... are the only language addressing wetlands found in the definition of the waters of the state. This ambiguous language may seriously impair the effectiveness of the OWQS regarding protection of wetlands.

Wetlands could be further impaired when the OWQS numerical criteria exceed the published criteria. An example of this is found in the following sections of the water quality standards:

(C) *Except for naturally occurring conditions, the dissolved oxygen criteria are set forth in the following table. (785:45-5-12, p.2)*

and:

(A) *Turbidity from other than natural sources shall be restricted to not exceed the following numerical limits... (785:45-5-12, p.9)*

Language of this nature confuses and may allow degradation of wetlands.

The OWRB report presents extensive discussion of the current Oklahoma water quality standards, water quality standards used by other states to protect wetlands, and recommendations for modification of the OWQS for additional protection of wetlands. The OWRB proposed language would specifically address wetlands by establishing wetlands as a beneficial use with subcategories for different types of wetlands and numerical and narrative criteria for the protection of that use. Because of the manpower and cost required for documenting attainable beneficial uses for the water quality standards, priorities must be established for inclusion of a wetland into Appendix A of the OWQS. To this end, all wetlands identified as critical (e.g., those wetlands with rare or endangered species, that are part of a recharge of an aquifer, that are located or border upon a state or federal park or wildlife refuge, or perform some unique or essential hydrological function) should be incorporated into Appendix A or a separate appendix of the OWQS as soon as is legally and administratively possible. Adoption of that language would be a bold step toward protecting the state's wetlands.

Before any change in the OWQS can occur, several scientific and legal questions must be addressed. OWRB proposed several types of subcategories of wetland beneficial uses, including riverine, palustrine, managed, and temporal wetlands. Other categories that may be required include restored, mitigated, and constructed wetlands. Constructed wetlands as wastewater treatment works, while exempted from the OWQS, also serve as wildlife attractants and habitat. Care must be taken to protect wildlife in these treatment works from acute or chronic toxic conditions and to prevent exposure of wildlife to bio-accumulating chemicals.

The legal relationships among the Code of Federal Regulation, the Clean Water Act, and state law for establishing a beneficial use of wetland needs to be addressed. Specifically, how will selected criteria such as dissolved oxygen for wetlands that may be less stringent than the assumed habitat limited aquatic community criteria fit current EPA guidance.

Before the state proceeds with a major modification of the water quality standards to further protect wetlands, a number of issues need to be explored. These include:

1. Attainability methods and minimum criteria should be used for delineation of each wetland class. Existing and attainable uses of wetlands are yet undefined because of the lack of a unified federal definition for wetlands. Base line conditions for most wetlands in the state are poorly defined, severely limiting the state's ability to identify destructive impacts.
2. Implementation strategies for permitting discharges to wetlands should be developed. With less stringent dissolved oxygen criteria (reflecting the natural condition) discharge to a natural wetland may become an attractive alternative.
3. Streamflow assumptions for modeling purposes should be reviewed with a background flow.
4. Mixing zones, zone of passage, etc., need to be developed for wetlands.
5. Hydrological modification as a result of a discharge should be avoided. Flow sufficient to erode a channel should be disbursed to avoid this.
6. Nitrogenous and toxic discharges to wetlands associated with aquifer recharge zones should receive further study.
7. A decision should be made as to whether wetlands are a subcategory of the fish and wildlife propagation beneficial use or stand alone as a beneficial use.
8. If wetland is a stand-alone beneficial use, then a decision should be made as to whether fish and wildlife propagation is a secondary beneficial use.
9. Since wetlands frequently trap significant quantities of sediments, numeric or narrative toxicity criteria for those deposits needs to be explored.
10. Biocriteria for wetlands need to be developed, including regional reference sites and appropriate measures of water quality, hydrological integrity, community diversity, tolerance, and biological integrity.

It is proposed that a technical working group be established to review and expand upon the OWRB's recommendations. This group's work needs to be reviewed by appropriate legal staff to ensure enforceability of any revised wetland standards. The work needs to be completed in time for inclusion in the 2000 water quality standards revision process.

CHAPTER 5

WETLANDS MANAGEMENT STRATEGY AND IMPLEMENTATION PLAN

This chapter outlines recommendations for ensuring the protection of private property rights and measures to mitigate wetlands losses. The final section of the chapter recommends measures to protect wetlands and includes proposed action items to meet the ten objectives of the plan.

MEASURES TO ENSURE PROTECTION OF PROPERTY RIGHTS OF LANDOWNERS

The majority of Oklahoma wetlands are in private ownership. This makes private landowners Oklahoma's most important wetlands managers. The transitional nature of wetlands, a widespread lack of understanding of wetland functions and benefits, and mixed messages from the federal government on wetlands policy and regulation, have left many private property owners confused and concerned. Federal wetland regulation has served as a rallying point for a diverse group of individuals and organizations with much of the focus being on *allegations* of the taking of private property without just compensation. A number of federal court decisions that continue to define the scope of the federal government's regulatory role in wetlands have been rendered since the passage of the Federal Clean Water Act. While the state has an interest in this issue, the federal courts and changes to Federal law will ultimately provide resolution.

At the state level, the Oklahoma Legislature in 1993 passed House Bill 1235, which attempts to address the issue of federal wetlands regulation in the state. This legislation, codified at 80 O.S. Supp. 1993, Section 1, Subsections C and D, reads as follows:

- C. *Any land which has been classified as a wetland by the Secretary of the Army and which is being considered for acquisition by fee, over the objection of the landowner, may be acquired only after consent of a majority of the Legislature of this state. Provided, the Oklahoma Department of Transportation and the Oklahoma Turnpike Authority shall be exempt from this requirement.*

- D. *Any restricted use of land in this state as a result of the classification of such land as a wetland by the Secretary of the Army shall constitute an acquisition of an easement pursuant to the provisions of this section and such easement, if over the objection of the landowner, may be acquired only after approval of a wetlands plan by the Legislature of this state which included just compensation by the acquiring authority.*

At the time of this writing these provisions have not been tested in court.

The success of wetlands conservation and management in Oklahoma will ultimately be determined by private landowners. Private landowners must be willing partners with the state. This can best be accomplished by increasing the opportunities in education, technical assistance, and incentive programs.

Education

It is important that landowners have a clear understanding of federal wetlands regulations. Periodic changes in the federal regulatory environment have made it difficult to communicate this information effectively. The federal regulatory agencies, with assistance from state and local natural resource agencies and interested organizations, need to improve outreach efforts on wetlands regulations to private landowners. Another important educational component is to provide landowners with a better understanding of the functions and values that wetlands provide both on and off site. The perception of wetlands as wastelands or nuisance areas remains common. Expanded educational efforts to demonstrate the importance of wetlands as a resource and key ecological component are needed both with private landowners and the general public. The use of demonstration sites to show landowners how wetlands conservation relates to them should also be expanded.

Technical Assistance

As more is learned about the functions and benefits of wetlands, federal, state, and local natural resource agencies must expand technical assistance to landowners. Prompt assistance **is** needed from federal or state agency representatives when landowners have questions about wetlands on their property and what management or use options are available. Technical assistance should also involve new and better ways to create, restore, and enhance wetlands on private property. Conservation planning assistance to landowners should include wetlands as an important component of the resource base.

Incentive Programs

Providing landowners with incentives rather than punitive regulations is the preferred approach to wetlands conservation. Acquisition by the state of unique or critically important wetlands should be accomplished through a willing seller/willing buyer system. Other options for wetlands conservation through the sale of conservation easements or the reduction of property taxes on wetland acres need to be explored. Voluntary programs such as the USFWS Partners for Wildlife Program and the USDA Wetland Reserve Program need to be expanded in Oklahoma, and could serve as models for conservation of wetlands on private lands.

RECOMMENDED MEASURES TO MITIGATE WETLANDS LOSSES

Mitigation of wetland losses is a challenging area. Successful mitigation of wetland losses will require a better characterization of wetland functions and a more thorough inventory of Oklahoma's wetlands resources. These are objectives outlined previously in the plan. It is also critical to the state's mitigation effort that a more comprehensive monitoring system be established to track gains and losses of wetlands. Another important mitigation recommendation, found in the first objective of the plan, is for the state to work towards a net gain of wetlands on state-owned land. In conjunction with that objective, the state should look at establishing a wetland bank(s). The creation of a state wetlands banking system could guide financial resources into constructive projects to restore, enhance, and create wetlands. Wetlands mitigation in Oklahoma should concentrate on restoring wetlands or enhancing existing wetlands rather than creating wetlands.

This section will recommend measures the state can take to mitigate past and present wetlands losses. It begins with definitions of mitigation and wetlands mitigation and reviews the federal definition of mitigation and the current role of the federal government in wetlands mitigation. The use of wetlands banks as a mitigation tool will be evaluated also.

Definition of Mitigation

The definition of mitigate as found in Webster's Dictionary is:

(1) *to cause to become less harsh or hostile, (2) to make less severe or painful.*

Wetlands Mitigation

The Wildlife Society in its technical publication, *Mitigation Banking and Wetlands Categorization* (1994), defines mitigation as:

Replacement of the form and function of the wetland that will be impacted detrimentally.

The key element of this definition is *form and function*. *Form* refers to the physical components of the wetland (i.e., size, shape, vegetation). Most current mitigation efforts are based largely on replacement of form. *Function* may include any number of the benefits and uses of wetlands as outlined in the subchapter, "Functional Uses of Wetlands." Mitigating the loss of wetlands functions can be a difficult and complex task due to the broad variety of wetland types, their geographic distribution, and the diverse nature of wetland functional values. The interrelationships of wetland units within a geographic or watershed area and their interdependencies on associated terrestrial environments make mitigation evaluations difficult.

There is a growing body of scientific research on restoration, enhancement, creation, and management of some wetland types. Similarly, there is a growing information base on how to effectively mitigate certain wetland functions (i.e., waterfowl, wetland mammals and fish, and timber production). Less is known, however, on other functions such as flood storage, groundwater recharge, and water quality

improvement. As additional research is conducted on wetland functions, efforts to mitigate lost functions should improve.

One important mitigation issue cited in The Wildlife Society's report is the failure of many created wetland projects. It strongly recommends that regulatory agencies require natural wetland restoration or enhancement for mitigation rather than new wetland creation. Its research indicated that many created wetlands failed because the developer lacked knowledge or did not correctly employ existing information in creating the wetlands. Restoration of a damaged or degraded wetland is much more likely to succeed than attempting to create a wetland in a former terrestrial environment.

Federal Wetlands Mitigation Procedure

A broad definition of the term mitigation was developed by the President's Council on Environmental Quality in the National Environmental Policy Act regulations and includes:

- (a) *avoiding the impact altogether by not taking a certain action or parts of an action;*
- (b) *minimizing impacts by limiting the degree or magnitude of the action and its implementation;*
- (c) *rectifying the impact by repairing, rehabilitating, or restoring the affected environment;*
- (d) *reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and*
- (e) *compensating for the impact by replacing or providing substitute resources or environments. (40 CFR Part 1508.20 -(a-e))*

This definition was adopted by the USFWS in its 1981 mitigation policy. This policy established recommendations on mitigating the adverse impacts of land and water developments on fish, wildlife, their habitats, and uses (wetlands being a significant habitat).

With the passage of the federal Clean Water Act and the 1985 and 1990 Farm Bills, wetlands mitigation efforts have become institutionalized. The regulations under Section 404 of the Clean Water Act administered by the Corps and the Swampbuster provisions of the Farm Bills administered by NRCS require mitigation when wetlands are impacted. Under these laws, the USFWS has primary mitigation responsibilities. The Corps and NRCS consult with the USFWS or give the USFWS sole authority to determine appropriate mitigation measures.

The USFWS follows the planning goals and guidelines developed in its mitigation policy when evaluating impacts on wetlands and other habitat. The USFWS has designated four resource

categories for wetlands and other important habitats. The designation criteria and the mitigation goal for each category are described below:

Resource Category 1.

Designation Criteria. Wetland habitat to be impacted is of high value and is unique or irreplaceable on a national basis or in the ecoregion.

Mitigation Goal. No loss of existing wetland habitat value.

Resource Category 2.

Designation Criteria. Wetland habitat to be impacted is of high value and is relatively scarce or becoming scarce on a national basis or in the ecoregion.

Mitigation Goal. No-net-loss of wetland habitat value while minimizing loss of in-kind habitat value.

Resource Category 3.

Designation Criteria. Wetland habitat to be impacted is of high to medium value and is relatively abundant on a national basis.

Mitigation Goal. No-net-loss of wetland habitat value while minimizing loss of in-kind habitat value.

Resource Category 4.

Designation Criteria. Wetland habitat to be impacted is of medium to low value.

Mitigation Goal. Minimize loss of wetland habitat value.

In assessing impacted wetlands and other habitats for mitigation or management needs, the USFWS has developed the Habitat Evaluation Procedures (HEP), which are used for quantifying impacts and formulating mitigation and management recommendations.

When mitigation is necessary, priority is given to doing the mitigation on the same property or within the project area. If this is not possible, the second priority is to do the mitigation in proximity to the affected site within the watershed. When both of these alternatives do not exist, the third priority is to accomplish the mitigation somewhere in the same ecoregion.

The U. S. Fish and Wildlife Service Mitigation Policy is included in Appendix C.

Wetlands Mitigation Banking

One of the new management concepts in mitigation is the establishment of wetlands banks. A definition of wetland mitigation banks as developed by The Wildlife Society is:

The accounting procedure used to determine the wetland acreages lost, protected, restored, or created including credits and debits of various accounts.

Wetlands mitigation banking is defined by The Wildlife Society as:

The philosophy and process through which negotiated development and permit approvals result in acquisition and protection or restoration of natural wetlands, creation of wetlands, and the accounting procedure by which losses or gains are recorded or monitored.

Wetlands mitigation banks are rapidly gaining in popularity on the national level. The Corps reported 13 banks in existence in 1988. By the end of 1992, there were over 100. Sixty percent of the banks were related to highway construction projects.

Wetlands banks have gained in popularity because of the regulatory uncertainty surrounding wetlands. Regulation of wetlands at the federal level has been confusing and complex over the past decade. In addition, as described previously in this section, mitigation of wetlands losses is a relatively new and challenging science. Consequently, wetland banks can offer developers a simplified solution to mitigating wetland losses. When wetlands losses are unavoidable on a project site and if the site is not a Resource Category One site, the developer can receive credits by restoring, enhancing, or creating wetlands offsite either directly or by paying a dollar amount into the bank.

The use of wetlands mitigation banks holds much promise in improving wetlands conservation and management. It provides developers and the regulated community with a degree of certainty and timeliness. It also provides a funding mechanism to create, restore, and enhance the wetlands resource. Much remains to be learned in mitigation techniques and the operation of wetlands banks, but the positives far outweigh the negatives.

In Oklahoma, wetland banks are a new concept. At the present time, the Oklahoma Department of Transportation is exploring the establishment of a wetlands bank for use in mitigating highway construction projects. This effort should provide a good demonstration of the wetlands banking concept and serve as a model for the development of additional banks.

RECOMMENDED MEASURES TO PROTECT WETLANDS

Objective No. 1

To promote the coordination of wetlands management in Oklahoma through discussion, information exchange, cooperation and the sharing of resources.

Actions

1. Establish an Oklahoma Wetlands Technical Working Group by the Office of the Secretary of Environment.
2. The Technical Working Group will include representatives from the Oklahoma Department of Wildlife Conservation (ODWC), the Oklahoma Water Resources Board (OWRB), the Oklahoma State Department of Agriculture (OSDA), School Lands Commission (SLC), Oklahoma Department of Transportation (ODT), and the Oklahoma Department of Environmental Quality (DEQ). Federal agencies on the Council would include representatives from the Environmental Protection Agency (EPA), the U. S. Fish and Wildlife Service (USFWS), the Natural Resources Conservation Service (NRCS), and the U. S. Army Corps of Engineers (Corps). Other agencies, organizations, and individuals with an interest in wetlands management would be welcome to participate with the Council.
3. The Technical Working Group will serve in the role of coordinating and collecting technical data on the status of wetlands within Oklahoma.
4. Pursue and monitor the implementation of Oklahoma's Comprehensive Wetlands Conservation Plan.

Objective No. 2

To establish a net gain wetlands policy for state-owned lands and a no-net-loss policy on state funded projects to encourage the restoration, enhancement, and creation of wetlands.

Actions

1. Promote by Governor's executive order, legislation establishing a policy of "net-gain" of wetlands on state-owned land and a policy of "no-net-loss" of wetlands on any state-funded projects.
2. Promote the inclusion of a wetlands component on all resource management plans for state-owned lands and state-funded projects, utilizing the Oklahoma Wetlands Technical Working Group.

3. Establish through the Oklahoma Wetlands Technical Working Group a system to coordinate, review, and monitor the impacts of state-funded actions on wetlands and establish an overall monitoring program for wetlands gains and losses in the state.
4. Utilize the Oklahoma Wetlands Technical Working Group to pursue the establishment of a state wetlands mitigation banking program (using the Oklahoma Department of Transportation's current efforts as a demonstration).

Objective No. 3

To integrate wetlands management with other related resource issues on a watershed or hydrologic unit basis.

Actions

1. Encourage the state's Watershed Management Committee to incorporate a wetlands component into the overall watershed management strategy for the state.
2. Encourage, through the Oklahoma Wetlands Technical Working Group, federal agencies to coordinate their wetlands management and program activities on a watershed or hydrologic unit basis.
3. Develop partnerships with the EPA, the Commission, and other agencies to carry out demonstration projects in three watersheds (Salt Creek, Little Washita, and Willow Creek) to show how wetlands conservation practices can be developed and implemented in a watershed context. (Action funded by EPA and work is underway.)
4. Encourage the NRCS to include wetlands restoration, enhancement, and creation in their implementation of the upstream flood control program (Public Law 566).

Objective No. 4

To characterize the wetlands resource more completely and identify the critical functions of the major types of Oklahoma wetlands.

Actions

1. Seek state funding and/or personnel, through the Oklahoma Wetlands Technical Working Group, to assist the efforts of NRCS to re-map wetlands at the county level.
2. Encourage and provide funding to Oklahoma universities to prepare a literature review of research on Oklahoma wetland characteristics and critical functions.
3. Prepare technical characteristics and critical functions for each wetlands type in each ecoregion of the state. Included in this effort would be the development of criteria for and a listing of "reference" wetlands by wetland type and ecoregion. This would be a university project.

Objective No. 5

To adopt a classification system and water quality standards to identify and protect wetland functions and values.

Actions

1. The Oklahoma Wetlands Technical Working Group will review and refine the OWRB's recommendation for the use of water quality standards in wetlands protection. Proposed changes in the water quality standards should be developed in time for the 1997/2000 revision of the Oklahoma Water Quality Standards.
2. Adopt a classification system for each wetland type and designate uses for each based on functions and values, utilizing the technical work group (described in 4.1 above).

Objective No. 6

To provide technical assistance and other incentives to landowners implementing management practices that conserve, enhance, and restore wetlands on private property.

Actions

1. Establish, through the Oklahoma Wetlands Technical Working Group, a training program for federal, state, and local resource managers on how to provide landowners with technical assistance for restoration, enhancement, and creation of wetlands on private property.

2. Coordinate the state training program with the Corps to certify state and local personnel in wetlands delineation using the 1987 Corps of Engineers delineation manual.
3. Conduct wetlands management workshops for landowners, utilizing personnel from appropriate state and federal agencies. Workshops would be conducted on a regional basis.
4. Conservation district offices will be provided as a local point of contact for landowners to receive information about wetlands technical assistance.
5. Work with the NRCS and local conservation districts to incorporate a wetlands component in conservation or ecosystem based assistance plans with private landowners.
6. Coordinate, through the Oklahoma Wetlands Technical Working Group, a recognition/awards program for landowners undertaking excellent wetlands conservation projects.
7. Identify private organizations that provide technical assistance on wetlands restoration, enhancement, and creation, and coordinate their efforts with state and federal efforts.
8. Prepare pamphlets for landowners on wetlands regulations, functions and values of wetlands, and management practices for wetlands conservation.
9. Work with the NRCS National Plant Material Centers, the Forestry Division of OSDA, and other public and private agencies to develop and make plant materials available for use in restoring, enhancing, and creating wetlands.
10. Promote, through the Oklahoma Wetlands Technical Working Group, the USFWS Partners for Wildlife Program, the NRCS Wetlands Reserve Program, and other programs that provide incentives to landowners to restore, enhance, and create wetlands.
11. Explore state funding opportunities to establish a state wetlands reserve program and/or a cost share program to provide landowners with funds to restore, enhance, or create wetlands.
12. Initiate a study to examine the feasibility of granting tax incentives for landowners with designated wetlands on their property as a tool for conserving wetlands on private property.

Objective No. 7

To develop information/education programs on Oklahoma's wetlands resources.

Actions

1. Prepare an informational video on Oklahoma wetlands issues and management in cooperation with USFWS, NRCS, the Commission, and the ODWC and distribute it statewide. (Action completed by the OSU Cooperative Extension.)
2. Develop a wetlands teacher guide to assist in teaching about Oklahoma's wetlands resources. (Action completed by the Commission.)
3. Conduct workshops on Oklahoma's wetlands resources for teachers, utilizing state and federal agency personnel. (Initial workshop conducted in April 1994 by the Commission).
4. Prepare a brochure on Oklahoma's Partners for Wildlife Program (a private lands habitat improvement effort) in cooperation with the Commission, ODWC, OSU Cooperative Extension, NRCS, and Ducks Unlimited, Inc., and distribute it statewide. (Action completed by the USFWS).
5. Develop "wetlands treasure trunks" (resource materials) for use by teachers and for use at natural resource days and outdoor classrooms. (Action completed by the Commission.)
6. Coordinate the development of a wetlands video library through the Oklahoma Wetlands Technical Working Group.
7. Become an official sponsor of National Project WET (Water Education for Teachers) in Oklahoma that will provide water and wetlands related activity guides, workshops, and related materials to teachers and students. (Action completed by the Commission.)
8. Produce a wetlands video highlighting the state's wetlands resources and distribute it statewide. (Action completed by the Cherokee Nation.)
9. Utilize the Oklahoma Environmental Education Coordinating Committee to pursue other opportunities for developing and distributing wetlands educational materials to teachers, students, and the general public.
10. Encourage communities where rapid growth may threaten wetlands functions to apply for a planning grant and assistance from EPA and the Corps in order to undertake a joint wetlands Advanced Identification Study (ADID) to guide future regulatory decisions. This effort would be promoted by the Oklahoma Wetlands Technical Working Group.

11. Conduct a public outreach effort, in cooperation with other agencies, to promote the implementation of the wetlands conservation management plan. The effort will identify barriers to the acceptance and implementation of the plan through public forums/town meetings. (Action funded by EPA--the Commission is scheduled to begin the project in January 1995.)
12. Prepare a brochure/information sheet for urban planners, developers, and other members of the regulated community about wetlands regulations and information sources. This effort will be coordinated by the Oklahoma Wetlands Technical Working Group.
13. Prepare a brochure/information sheet on potential economic uses of wetlands on private lands. This effort will be coordinated by the Oklahoma Wetlands Technical Working Group.
14. Prepare a summary report for public distribution of Oklahoma's Comprehensive Wetlands Conservation Plan following EPA approval.
15. Develop and implement education materials on the uses and benefits of constructed wetlands.
16. Develop and implement a volunteer monitoring program for Oklahoma's wetland resources.

Objective No. 8

To identify and prioritize unique or scarce wetlands types and sites for acquisition or special protection.

Actions

1. Coordinate a review and literature search of recent academic and agency research to compile a list of candidate sites to be investigated as unique or scarce wetlands. This effort will be coordinated by the Oklahoma Wetlands Technical Working Group.
2. Provide coordination of existing federal, state, and private wetlands acquisition programs and develop a state database to keep records of such acquisitions. This effort will be coordinated by the Oklahoma Wetlands Technical Working Group.

3. Continue state participation in acquisition programs through the North American Waterfowl Management Plan, as administered by ODWC.
4. Maintain updated information on wetland-dependent rare and endangered species through the Oklahoma Department of Wildlife Conservation, US Fish and Wildlife Service, and the Oklahoma Biological Survey (Oklahoma Natural Heritage Inventory), and on high quality or unique wetland plant communities through the Oklahoma Biological Survey (Oklahoma Natural Heritage Inventory). This information will be maintained in a digitized format on a geographic information system when applicable.
5. Explore funding sources with the legislature to acquire unique or scarce wetlands. This effort will be coordinated by the Oklahoma Wetlands Technical Working Group.

Objective No. 9

To identify wetland sites for restoration and enhancement; identify and develop funding sources to accomplish this work.

Actions

1. Conduct a review of the NRCS inventory of farmed and prior converted wetlands to identify potential wetlands sites for restoration. This action will be coordinated by the Oklahoma Wetlands Technical Working Group.
2. Utilize the network of local conservation districts to identify potential restoration or enhancement sites in their counties. This action will be coordinated by the Commission.
3. Continue to promote the USFWS Partners for Wildlife Program. USFWS will be the lead agency for this action.
4. Seek funding for USDA's wetlands reserve program for the state. This action will be promoted by the Oklahoma Wetlands Technical Working Group.
5. Identify funding sources from related natural resource programs (i.e., nonpoint source management, floodplain management, upstream flood control) that could be used for wetlands restoration and enhancement. This action will be promoted by the Oklahoma Wetlands Technical Working Group.

6. Explore funding sources with the legislature to provide cost share funds for landowners. This action will be promoted by the Oklahoma Wetlands Technical Working Group.
7. Identify potential funding mechanisms such as the CFSA, ACP program.

Objective No. 10

To integrate wetlands conservation with Oklahoma's floodplain management program and create more wetland urban riparian areas.

Actions

1. Conduct two riparian restoration demonstration projects in cooperation with other agencies to identify workable techniques and opportunities and obstacles to future riparian restoration efforts. (The Commission has received EPA funds for these projects and work is underway in Cherokee and Grady Counties.)
2. Develop a state riparian policy, in cooperation with other agencies, to guide future efforts for riparian conservation, restoration, and enhancement. (The Commission has received EPA funds for this project, and work is scheduled to begin in 1995.)
3. Develop criteria for evaluating, conserving, restoring, and enhancing riparian areas on an ecoregion basis. This action will be undertaken as part of No. 2 above. (The Commission has received EPA Funds for this project and work is scheduled to begin in 1995.)
4. Develop a proposal to do a riparian restoration project along a 17-mile reach of the Washita River in Carter and Johnston Counties. (Proposal has been prepared by the Commission, ODWC, and the Forestry Services Division of OSDA. Funding is pending through The Trust for Public Land.)
5. Conduct a riparian restoration and enhancement project in an urban watershed through a Section 319 Clean Water Act project. (Project pending EPA approval and funding to the Commission in Fiscal Year 1995.)
6. Promote floodplain management as a method for conserving, enhancing, and restoring wetlands. This action will be coordinated by the ORWB.
7. Enhance the flood storage benefits of Oklahoma's wetlands.

Objective No. 11

To establish a comprehensive statewide wetlands mapping program.

Actions

1. Adopt, through the Wetlands Technical Working Group, the U. S. Geological Survey's digital orthophoto quadrangle as the statewide basemap for wetlands inventory and database development. All wetlands delineations would be recorded on this map.
2. Request the state legislature to authorize the Oklahoma Conservation Commission to develop and maintain a statewide, geo-referenced wetland inventory. This action would be promoted by the Oklahoma Wetlands Technical Working Group.
3. Support and seek funding of the effort by Oklahoma State University to produce in a digital format the USFWS National Wetlands Inventory maps for Oklahoma. This action would be coordinated by the Oklahoma Wetlands Technical Working Group.
4. Convert Oklahoma's county soil surveys to a digital format for use in the identification and inventory of hydric soils. The NRCS would be the lead agency for this project with assistance from the Commission.
5. Transfer the county level NRCS wetland inventory to a digital format for inclusion in a statewide wetland database. The Oklahoma Wetlands Technical Working Group will identify funding sources among state and federal agencies for this project.

Objective No. 12

Research and develop techniques for protecting, enhancing, and constructing wetlands for pollutant control and/or mitigation. Developed techniques will be implemented to maximize beneficial uses of wetlands pollutant removal and mitigation capabilities.

Actions

1. Conduct a literature review to determine the use of wetlands, natural and constructed, in control of pollutants.
2. Develop protocols for wetland enhancement, protection, and/or construction, including furnishing engineering services to aid in the design and construction of wetlands.

3. Develop constructed or enhanced wetlands to control nutrients, toxins, sediment, and erosion impacts to waterbodies.
4. Water quality enhancement and biological productivity will be monitored for enhanced/constructed wetlands.
5. Develop Wetland Management Plans, on a watershed basis if necessary, to ensure proper maintenance and use of wetland for pollutant control and/or mitigation.

APPENDIX A

WETLANDS PROGRAMS AND AGENCIES

At the federal level there are four agencies with the principal authority over wetlands. These agencies are the U. S. Army Corps of Engineers (Corps), the U. S. Fish and Wildlife Service (USFWS), the Environmental Protection Agency (EPA), and the Natural Resources Conservation Service (NRCS). The role that each of these agencies plays in wetlands management will be examined. In addition, a review of the authorities, responsibilities, and programs of the four state agencies that are also involved in wetlands management is provided. The state agencies are the Oklahoma Conservation Commission (Commission), the Oklahoma Water Resources Board (OWRB), the Oklahoma Department of Environmental Quality (DEQ), and the Oklahoma Department of Wildlife Conservation (ODWC).

FEDERAL AGENCIES

U. S. Army Corps of Engineers

The most significant federal regulatory program affecting wetlands is Section 404 of the Clean Water Act. This section establishes a permit program to regulate the discharge of dredge and fill material into the waters of the United States. These discharges must comply with certain environmental requirements and guidelines. The Corps was given the primary responsibility for the permit program. However, the Section 404 program is jointly administered by the Corps and the EPA with several state and federal agencies having advisory roles in the permitting process. Although Section 404 permitting is the most important regulatory program affecting wetlands, the section was not established specifically for wetlands protection. It is not a comprehensive wetlands protection and management program.

The key to Section 404's impact on wetlands is that wetlands are defined as "waters of the United States." Through court decisions the definition of "waters of the United States" has expanded. Initially Section 404 was being applied primarily to navigable waters. Currently wetlands, in many cases, are considered "waters of the United States" and are subject to the provisions of the 404 permitting program.

Section 404's protection of wetlands is limited to physical alterations associated with the disposal of dredged and fill materials in wetlands areas. The Section 404 program does not control other types of alterations to wetlands. Examples of alterations not covered by Section 404 are wastewater discharge into wetlands, hazardous waste disposal into wetlands, pumping groundwater that impacts water levels, or diversion of surface water from wetlands. In August 1993, regulations modifying the definition of "discharge of dredged material" were published in the Federal Register. This revision clarified that even the redeposit of dredged material incidental to any activity occurring in "waters of the United States" including mechanized landclearing, ditching, channelization, or other excavation is a discharge under the Act and therefore requires authorization under Section 404.

Before a permit is issued it must meet certain environmental guidelines. The environmental guidelines are prepared by the EPA in conjunction with the Corps (Section 404(b)(1) of the Clean Water Act). These guidelines prohibit discharge into the waters of the United States unless the following apply: (1) there is no available, practicable alternative having less impact on the aquatic ecosystem; (2) the discharge will not violate other applicable laws (i.e., water quality standards, toxic effluent standards, Endangered Species Act); (3) the discharge will not significantly degrade the water; and (4) all appropriate and practicable steps must be taken to mitigate the impacts.

The Corps issues two types of Section 404 permits - individual and general. The general permits are either nationwide or regional in coverage. The general permits cover and allow certain activities without specific permit approval. Examples of a general permit are survey activities, including core sampling and seismic exploratory operations, and minor road crossing fills that do not restrict flows and involve the discharging of less than 200 cubic yards of fill material. During review of an individual permit application, a public notice is issued, and there is an opportunity for a public hearing to review the proposed activity.

There has been some controversy over the years about the extent of coverage the Section 404 permitting has on wetlands. Three areas of contention have been the extent of geographic coverage, the types of regulated alterations, and the types of regulated discharges.

Geographic Coverage. Through a number of court cases it has been generally confirmed that the Section 404 program applies broadly to waters of the United States and not just to navigable waters.

Types of Regulated Alterations. Section 404 relates only to the discharge of dredged or fill material. Wetlands are subject to many types of alterations besides filling (i.e., the diversion or removal of water supply).

Types of Regulated Discharges. Virtually any activity that discharges dredged or fill material into wetlands may be subject to a Section 404 permit. However, there can often be controversy over what constitutes dredged or fill material. In addition, several activities are specifically exempted from Section 404 regulation:

1. Normal farming, silviculture, and ranching practices.
2. Maintenance, including emergency reconstruction of recently damaged structures such as dikes, dams, and levees.
3. Construction or maintenance of farm or stock ponds or irrigation ditches or the maintenance of drainage ditches.

4. Construction of temporary sedimentation basins on a construction site which does not include placement of fill material into the waters of the United States.
5. Construction or maintenance of farm or forest roads for moving mining equipment if best management practices are followed.
6. Is the proposed project contrary to the public interest?

When the Corps receives a Section 404 permit application they must weigh a number of factors in their evaluation. Some of the criteria include:

1. Does the permit application meet the environmental guidelines of Section 404(b)(1)?
2. Does the proposed permit activity violate the state's water quality standards?
3. What is the extent of public needs?
4. If there are unresolved conflicts of resource use, can a reasonable alternative location or different method be used to accomplish the proposed project?
5. What is the extent and permanence of the effects of the project on public and private uses?

Attempting to balance these criteria can be a difficult and controversial job. Since permit applications are circulated to a number of federal and state agencies for review and are also subject to a public notice, the Corps must often weigh a number of points of view before making a decision to approve or deny a permit.

Enforcement of the Section 404 program is a joint responsibility of the Corps and EPA. Since the Corps issues the permits, it has the primary responsibility for monitoring and enforcing compliance with permit conditions. It also can pursue action against unpermitted discharges. EPA primarily targets its enforcement against nonpermitted discharges. Much of the enforcement of the Section 404 program is dependent upon the public making the Corps or EPA aware of potential violations.

In Oklahoma, the Section 404 program is administered by the Tulsa District Office of the Corps. For additional information on the Section 404 program, contact:

U. S. Army Corps of Engineers, Tulsa District
Regulatory Section
P.O. Box 61
Tulsa, Oklahoma 74121-0061
918/669-7400

Natural Resources Conservation Service

In 1985 Congress passed the Food Security Act, commonly known as the 1985 Farm Bill. Included in the conservation title of the Act was a wetlands protection program which has come to be called "Swampbuster". The purpose of the Swampbuster provisions was to discourage the conversion of wetlands to agriculture use. Congress established disincentives in the form of loss of certain USDA farm program benefits. Affected benefits include price and income supports, crop insurance, Farmers Home Administration loans, Commodity Credit Corporation storage payments, Conservation Reserve Program annual payments, and other USDA commodity-related payments. In other words, if a farmer was participating in, for example, the price support program and chose to convert a wetland to crop production (after the farm bill was passed), he was subject to losing those price support payments. The NRCS was given the responsibility for determining wetlands and areas converted from wetland to agricultural use.

For the purpose of this program, wetlands were defined as *areas that have a predominance of hydric soils and that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support and under normal circumstances do support, a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions.* Along with this definition, two other wetlands definitions were adopted - farmed wetlands and converted wetlands. A wetland is an area that was manipulated (drained, filled, or woody vegetation removed) and is used to produce an agricultural commodity. The alterations had to have been made prior to December 23, 1985. A farmed wetland is still wet enough to meet wetlands criteria. Any drainage systems installed prior to December 23, 1985, can be maintained, but additional work that might impact the wetlands is restricted. A fanned wetland can continue to be fanned without loss of USDA program benefits. A converted wetland is one which has been drained, dredged, filled, leveled, or otherwise manipulated, including any activity that results in impairing or reducing the flow, circulation, or reach of water, that makes possible the production of an agricultural commodity. The conversion must have taken place after December 23, 1985. The production of agricultural commodities on these areas can result in loss of USDA benefits.

The NRCS is responsible for making wetland determinations, mapping the wetlands, and notifying the landowner. In Oklahoma, wetland determinations and mapping was started in 1989. To accomplish the task, NRCS primarily used aerial photographs, soil surveys, and the USFWS National Wetlands Inventory maps. Aerial color slides from the Consolidated Farm Service Agency (CFSA) files were reviewed from several different flyovers (generally three years between 1985 and 1990 depending on availability). Wet areas showing up in the photographs were checked against the county soil survey and the USFWS wetlands map. When all data confirmed the likelihood of wetlands, NRCS then mapped the area as wetlands. Mapped wetlands were delineated as either wetlands, farmed wetlands, or converted wetlands. In most Oklahoma counties NRCS attempted to map all wetlands. However, of greatest importance to the program were wetlands within cropped areas or adjacent to cropped areas. In some areas of the state where little cropland exists, CFSA does not maintain color slides. In those areas NRCS did not do wetlands mapping.

Following completion of the wetlands maps, each NRCS Field Office reviewed the determinations. The NRCS district conservationist determines if the inventories are complete and correctly display wetlands on farm maps. The wetland inventories can be altered at the district level based on local knowledge or an on-site determination. After this review, landowners participating in USDA programs are notified of the wetland determinations on their land. They are given a 15-day review

period before the map becomes final. The landowner may request an on-site visit to confirm the presence of wetlands and may appeal a wetlands determination if he disagrees with the NRCS findings. In Oklahoma, NRCS is still in the process of reviewing maps at the district level and notifying landowners of their wetlands determinations.

In November 1990, Congress passed a new 5-year Farm Bill (the Food, Agriculture, Conservation and Trade Act of 1990). Wetlands protection remained a part of the Act, but Congress made several important changes. In the 1985 Farm Bill, benefits could be denied when a wetland was converted and a commodity crop planted. The 1990 Farm Bill changed this "trigger" to the actual act of draining, dredging, or filling a wetland that makes crop production possible, even if a crop is not planted. Other important changes include graduated penalties to landowners who unintentionally violate Swampbuster provisions (instead of the loss of all benefits). Wetlands determinations be delineated on a map and certified as accurate, and no benefits can be denied without an on-site inspection. Congress also established a new wetlands program in the 1990 bill - the Wetlands Reserve Program. This program establishes a one million acre wetlands reserve through voluntary enrollment of 30-year or permanent easements. Landowners would receive payments for the easements, not to exceed the fair market value of the land, minus the fair market value of the land encumbered by the easement. A bid system will be used with payments being made in one lump sum payment or in ten equal, annual payments. At the present time it is difficult to determine the impact of the changes in the wetlands provisions of the 1990 Farm Bill because new rules and regulations have not been adopted.

It is difficult to assess the effectiveness of the 1985 and 1990 Farm Bill in reducing the conversion of wetlands to agricultural use. One reason is that NRCS is only now completing wetlands mapping and determinations. In Oklahoma, some landowners have been denied USDA benefits due to wetlands conversion, but these cases are under appeal. Nationwide, the Environmental Law Institute reported in 1990 that 427 producers were determined ineligible for program benefits. Of those, 393 appealed and only 71 were actually denied benefits. It should also be noted the NRCS wetlands program only impacts producers who participate in USDA programs. Farmers not participating in these programs are not subject to any of the NRCS wetlands conversion restrictions. Certainly the Swampbuster provisions of the past two Farm Bills have elevated the awareness of wetlands at the local level. Despite the lack of hard information, one could conclude that wetlands conversion to agricultural use has been reduced nationwide as a result of the 1985 and 1990 Farm Bills.

For additional information concerning the wetlands provisions of the 1985 and 1990 Farm Bills, contact:

Natural Resources Conservation Service
Ecological Services Staff
USDA Agricultural Center Building
Stillwater, Oklahoma 74074
405/624-4426

Environmental Protection Agency

The EPA is involved with wetlands protection through the federal Clean Water Act. Two sections of the Act have particular impact on wetlands - Section 404, which relates to the permitting program (discussed previously), and Section 401, which relates to water quality standards and certification.

As discussed previously, the Section 404 permitting program is the principal federal regulatory mechanism for protecting wetlands. It is jointly administered by the Corps and EPA. EPA has specific responsibilities in the administration of the Section 404 program. EPA reviews and comments on all Section 404 permit applications submitted to the Corps. Section 404(b)(1) of the Clean Water Act gives EPA the responsibility for preparing environmental guidelines used for evaluating the impacts of a proposed permit activity. EPA may deny a Section 404 permit under certain conditions (Section 404(c)). The Corps and EPA also have joint enforcement of the Section 404 program. The Corps has prime enforcement over permit conditions while EPA focuses its enforcement effort on nonpermitted discharges.

A second section of the Clean Water Act having implications for wetlands protection is Section 401, which relates to water quality standards. Water quality standards are developed and enforced by the states with EPA guidance, review, and oversight. Discharges into "waters of the U.S." or "waters of the state" must meet water quality standards. Since wetlands are defined as waters of the U. S., water quality standards can be applied. An example of this application involves the Section 404 dredge and fill permit. Before the Corps can issue a Section 404 permit the state must certify (under Section 401) that no water quality standards violations will occur. Some states use this as a tool for wetlands protection.

Recent EPA guidance directs states to specifically apply water quality standards to wetlands by doing the following:

1. Including wetlands in the definition of "waters of the state."
2. Designating uses of all wetlands.
3. Adopting aesthetic narrative criteria and appropriate numeric criteria for wetlands.
4. Adopting narrative biological criteria for wetlands.
5. Applying the state's Antidegradation policy and implementation methods to wetlands.

One other major EPA initiative in wetlands protection is to promote the development of state comprehensive wetlands management plans. EPA has made funds available to states for this purpose. Oklahoma received such a grant in August 1990.

For additional information on the Environmental Protection Agency and its role in wetlands management, contact:

U. S. Environmental Protection Agency, Region 6
Federal Activities Branch
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733
214/655-2263

U.S. Fish and Wildlife Service

The USFWS has a long history of involvement in wetlands management and protection and federal activities that may affect federally-listed threatened or endangered species. With the exception of lands administered by the National Wildlife Refuge System, however, the USFWS has no direct regulatory authority of wetlands. Through review and consultation efforts with the Corps and other federal construction agencies [(Section 10 and Section 404 permitting programs; activities within the purview of the Fish and Wildlife Coordination Act), the U.S. Department of Agriculture (Farm Bill and related activities), and the Federal Energy Regulatory Commission (licenses for hydropower)], the USFWS acts as a primary advisor in the activities of other Federal agencies.

The USFWS has a continuing land acquisition program that is directed primarily to the benefit of wetland dependent and threatened and endangered fish and wildlife resources. Over 90 million acres of lands are administered by the National Wildlife Refuge System, of which 34 million acres are wetlands. In Oklahoma, the USFWS has received appropriations from Congress to acquire bottomlands along the Deep Fork in Okmulgee County and along the Little River in McCurtain County.

Through efforts of its National Wetlands Inventory, the USFWS is responsible for producing detailed wetland maps and reporting on the status and trend of the nation's wetlands. This is a nationwide inventory mapping system which identifies and classifies wetlands and deepwater habitats using infra-red aerial photography. Oklahoma's inventory has been completed and maps are now available for the state. Maps are produced on standard USGS topographic quadrangle maps (7.5 minute series) and are available for review in each local conservation district office in the state. This inventory, along with the NRCS countywide wetlands inventory, is the best documentation available for Oklahoma wetlands.

The USFWS has prepared a number of reports over the years documenting the loss of wetlands. Most recent is a report to Congress entitled Wetlands Losses in the United States 1780's to 1980's. For Oklahoma, the report estimates a loss of 67 percent of all wetlands. According to the report, Oklahoma was estimated to have 949,700 acres of wetlands in 1980, which represents 2.1 percent of the state's total surface area.

One of the important legislative initiatives on wetlands conservation was the passage of the Emergency Wetlands Resource Act. Besides providing additional funding for wetlands acquisition and protection, the Act directed the USFWS to prepare a National Wetlands Priority Conservation Plan. As a part of the national plan, the Service prepared an Oklahoma Wetlands Priority Plan. This plan was distributed in May of 1990 as a part of the Region 2 Wetlands Regional Concept Plan. The plan identifies 13 priority wetland areas involving nearly 175,000 acres. This planning document provides general direction and guidance as to the types and location of wetlands that warrant priority consideration for the protection through acquisition from willing sellers.

Another important piece of wetlands legislation is the North American Wetlands Conservation Act of 1989. The purpose of this act is to protect, enhance, restore, and manage an appropriate distribution and diversity of wetland ecosystems and other habitat for migratory birds; to maintain current improved distributions of migratory bird populations; and to sustain an abundance of waterfowl and other migratory birds consistent with goals of the North American Waterfowl Management Plan.

The USFWS also has initiated a new program, Partners for Wildlife, designed to provide technical and financial assistance for the restoration of wetlands and other important habitats on private lands in Oklahoma. Through the cooperation of the U. S. Department of Agriculture and various state conservation agencies, the USFWS began its private land effort in 1990 with the enrollment of 10 landowners. Assistance to landowners included cost sharing for improvements around existing areas of wetlands, reimbursing costs associated with construction of earthen dikes, installing water control devices, and providing materials and technical advice for attracting wildlife to shallow water areas. The USFWS expects to expand its assistance in the coming years to include bottomland hardwood reforestation along with the restoration of moist soil and green tree units.

For additional information on the North American Waterfowl Management Plan or other wetlands programs of the USFWS, contact:

U. S. Fish and Wildlife Service
Ecological Services
222 S. Houston, Suite A
Tulsa, Oklahoma 74127
918/581-7458

STATE AGENCIES

Oklahoma Conservation Commission

In 1990 the Oklahoma Legislature designated the Commission as the state agency responsible for preparing Oklahoma's wetlands management strategy. The strategy shall:

1. Define wetlands.
2. Enumerate the beneficial uses of wetlands.
3. Identify and inventory wetlands within the state.
4. Recommend measures to mitigate losses of wetlands.
5. Provide measures to protect wetlands.
6. Define standards for critical wetlands.
7. Define measures to ensure the protection of property rights of landowners.

Through the Conservation District Act of 1971, the Commission was designated as the state agency responsible for the conservation of renewable natural resources. The Commission has a network of 88 conservation districts that are the local governmental units responsible for this effort. Conservation districts cover the entire state.

Local conservation district offices have copies of the county soil surveys as well as the wetlands inventory maps of both the USFWS and the NRCS. The district offices are the best sources of wetland information at the local level. Conservation planning provides an opportunity to educate landowners about wetlands and to incorporate management practices for wetlands protection.

For additional information about the Commission's wetlands program, contact:

Oklahoma Conservation Commission
2800 N. Lincoln Boulevard, Room 160
Oklahoma City, Oklahoma 73105
405/521-2384

Oklahoma Department of Wildlife Conservation

The ODWC has as its mission the management, protection and enhancement of wildlife resources and habitat for scientific, educational, recreational, aesthetic, and economic benefits to present and future generations of citizens and visitors to Oklahoma. Because of the importance of wetlands habitat to many wildlife species, the ODWC has a keen interest in wetlands protection and has a number of wetland programs in place.

First, the Department is actively involved in implementing the North American Waterfowl Management Plan. This includes participation in the Playa Lakes Joint Venture in the panhandle and the Eastern Oklahoma Wetlands Plan, which is a part of the Lower Mississippi Valley Joint Venture. As a part of the Eastern Oklahoma effort, the ODWC has begun a wetlands acquisition project in the Deep Fork bottomlands west of the existing Okmulgee Wildlife Management Area.

Secondly, the ODWC has a number of Wildlife Management Areas (WMA) across the state. Many of these WMAs have wetlands. The ODWC has several wetlands habitat development projects underway or completed. These include enhancement through the construction of moist soil or greentree reservoirs and annual millet seeding of lake mudflats. Restoration projects include restoring water hydrology and/or vegetation such as the planting of bottomland hardwoods.

Thirdly, the ODWC promotes similar wetlands habitat development projects on other public lands (i.e., Corps reservoirs, National Wildlife Refuges, and U. S. Forest Service lands).

Besides these programs, the ODWC has a role similar to the USFWS in reviewing federal actions that can impact wetlands. The ODWC reviews and comments on the Corps Section 404 dredge and fill permit applications and Section 401 water quality certifications. In addition, the ODWC has an advisory role on actions impacting endangered species. Like the USFWS, the ODWC does not have direct regulatory authority for wetlands management.

A MOA exists between the U.S. Fish and Wildlife Service and the ODWC under the authority of the federal Fish and Wildlife Coordination Act. The MOA establishes respective agency responsibilities for land and water habitat improvement and recognizes the ODWC as the state agency responsible for wildlife resources including wetlands.

Lastly, the ODWC is a primary source of information about the state's wetlands. Through the ODWC Information and Education Division, a wide variety of wetlands information is disseminated to the public.

For additional information about the wetlands program of the ODWC, contact:

Oklahoma Department of Wildlife Conservation
1801 Lincoln Boulevard
Oklahoma City, Oklahoma 73105
405/521-3851

Oklahoma Water Resources Board

The OWRB is the state agency responsible for the preparation of Oklahoma's water quality standards. At the present time Oklahoma does not have water quality standards that have been specifically developed for wetlands. However, the statutory (and Standards) definition of waters of the state includes wetlands (termed *marshes*) and as such they receive certain protection. A few examples of Standards pertaining to wetlands include narrative and numerical toxic criteria, aesthetics, chlorides, dissolved oxygen, and anti-degradation. Some wetlands are afforded additional protection if they are contained within a listed special protection area such as a state or national park, wilderness area, or wildlife management area. The EPA is now promoting the idea of states developing water quality standards specifically for wetlands. Should this occur, it will provide the state with an additional tool for regulating impacts to wetlands. (See Appendix B entitled *Wetlands Protection Through Oklahoma's Water Quality Standards* for an in-depth review of this issue).

The OWRB also administers the National Flood Insurance Program for the state. Effective regulation of development in floodplains can protect many wetlands since a majority of Oklahoma's wetlands occur in floodplain areas.

For additional information about the OWRB, contact:

Oklahoma Water Resources Board
3800 North Classen
Oklahoma City, Oklahoma 73118
405/530-8900

Oklahoma Department of Environmental Quality

The DEQ has a number of responsibilities related to the state's water quality. One of the principal authorities of DEQ related to wetlands protection is that of water quality certification (Section 404 of the federal Clean Water Act). When the Corps processes a Section 404 dredge and fill permit application, one of the steps is for DEQ to certify that the proposed action will not violate the water quality standards of the state. If DEQ determines a violation will occur, the Section 404 permit can be denied.

Another responsibility is the water quality interchange between wetlands and groundwater. With Oklahoma's strong dependence upon ground water as a major source of household water, DEQ has authority over the standards for safe drinking water.

The DEQ has permitting responsibilities where constructed wetlands are designed for municipal waste water treatment facilities.

The DEQ also maintains the original maps of the USFWS wetlands inventory. These maps are available to the public at the DEQ Oklahoma City office.

For additional information about the DEQ, contact:

Oklahoma Department of Environmental Quality
NE 10th and Stonewall, Room 1114
Oklahoma City, Oklahoma 73105
405/271-4468

APPENDIX D

A GUIDE TO WETLANDS TERMINOLOGY

This glossary contains information which may assist you in understanding specific points contained in the document. It also represents an opportunity to better understand terminology associated with wetlands science.

Aerobic - A condition in which molecular oxygen is a part of the environment.

Anaerobic - A condition in which molecular oxygen is (effectively) absent from the environment

Annual - Occurring yearly or, as in annual plants, living for only one year.

Artificial wetlands - Wetlands created by the activities of man, either purposefully or accidentally.

Best management practices - A set of guidelines or standards detailing the methods employed in the conduct of an activity (e.g., agricultural production, soil conservation, wetlands management) to reduce its impact upon the system.

Biodiversity - The number of species in an area; species richness.

Bog - A shrub peatland dominated by ericaceous shrubs (Family Ericaceae), sedges, and peat moss (*Sphagnum* spp.) and usually having a saturated water regime or a forested peatland dominated by evergreen trees (usually spruces and firs) and/or larch (*Larix laricina*).

Bottomland hardwood forests - Hardwood forests of periodically flooded lowlands and alluvial floodplains along streams and rivers, with diverse vegetation that varies in species composition and growth characteristics along the gradients of flooding frequency and soils saturation.

Comprehensive wetland determination - A type of wetland determination that is based on the strongest possible evidence, requiring the collection of quantitative data for all three wetland identification criteria.

Criteria - Technical requirements upon which a judgment or decision may be based.

Deepwater habitat - Any open water area in which the mean water depth exceeds 6.6 feet at mean low water in nontidal and freshwater tidal areas, or is below extreme low water at spring tides in salt and brackish tidal areas, or the maximum depth of emerging vegetation, whichever is greater.

Delineation manual - A set of procedures for precisely determine the boundaries of wetlands; based on hydrology, soils, and vegetation.

Density - The number of individuals per unit area.

Disturbed area - An area where vegetation, soil, and/or hydrology have been significantly altered, thereby making a wetland determination difficult.

Disturbed condition - As used herein, this term refers to areas in which indicators of one or more characteristics (vegetation, soil, and/or hydrology) have been sufficiently altered by man's activities or natural events so as to make it more difficult to recognize whether or not the wetland identification criteria are met.

Drained, effectively - A condition where ground or surface water has been removed by artificial means to the point that an area no longer meets the wetland hydrology criterion.

Duration (of inundation or soil saturation) - The length of time that water stands above the soil surface (inundation), or that water fills most soil pores near the soil surface; as used herein, "duration" refers to a period during the growing season.

Emergent vegetation - A rooted herbaceous plant that has parts extending above the water's surface.

Enhancement - To improve; in the context of wetlands the process of improving the function capability and therefore the quality of the wetlands that have been degraded by past activities.

Flooded - A condition in which the soil surface is temporarily covered with flowing water from any source, such as streams overflowing their banks, runoff from adjacent or surrounding slopes, inflow from high tides, or any combination of sources.

Flooding, frequent - Flooding is likely to occur often during usual weather conditions (i.e., more than a 50 percent chance of flooding in any year, or more than 50 times in 100 years).

Flora - A list or manual of all plant species that may occur in an area.

Frequency (of inundation or soil saturation) - The periodicity of coverage of an area by surface water saturation of the soil; it is usually expressed as the number of years the soil is inundated or saturated during part of the growing season of the prevalent vegetation (e.g., 50 years per 100 years) or as a 1-, 2-, 5-year etc., inundation frequency.

Function - The action for which wetlands are specifically fitted, appropriately the nature of wetlands; e.g. many wetlands perform the function of retaining and transforming nutrients performing a function similar to a kidney in living organism.

Ground water - That portion of the water below the surface of the ground whose pressure is greater than atmospheric pressure.

Growing season - The portion of the year when soil temperatures are above biologic zero (41°F) as defined by "Soil Taxonomy;" the following growing season months are assumed for each of the soil temperature regimes: (1) thermic (February-October); (2) mesic (March-October); (3) frigid (May-September); (4)

cryic (June-August); (5) pergelic (July-August); (6) isohyperthermic (January-December); (7) hyperthermic (February-December), (8) isothermic (January-December) and (9) isomesic (January-December).

Habitat - The environment occupied by individuals of a particular species, population, or community.

Hardpan - A very dense soil layer caused by compaction or cementation of soil particles by organic matter, silica, sesquioxides, or calcium carbonate, for example.

Hydric soil - A soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part.

Hydrology - The science dealing with the properties, distribution, and circulation of water.

Hydrophytic vegetation - Plant life growing in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content.

Indicator - An event, entity, or condition that typically characterizes a prescribed environment or situation; indicators determine or aid in determining whether or not certain stated circumstances exist or criteria are satisfied.

Inundation - A condition in which water temporarily or permanently covers a land surface.

Jurisdictional wetland - An area determined to have the characteristic hydrology, vegetation, and soils typical of wetlands; therefore the area is subject to various regulations such as section 404 of the Clean Water Act.

Levee - A natural or manmade feature of the landscape that restricts movement of water into or through an area.

Long duration (flooding) - A duration class in which inundation for a single event ranges from 7 days to 1 month.

Manmade wetland - Any wetland area that has been purposely or accidentally created by some activity of man; also called artificial wetlands.

Map unit - A portion of a map that depicts an area having some common characteristic.

Mitigation - The lessening or moderating of negative effects; in regards to wetlands, actions that result in reducing the loss or degradation of wetlands in an area.

Mitigationbank - An area established for the purpose of offsetting unavoidable losses of wetlands; acreages (or other units based on function) are "withdrawn" from the bank to compensate for ones that have been lost.

Nonhydric soil - A soil that has developed under predominantly aerobic soil conditions.

Nonpoint source pollution - Pollution not associated with a specific locality such as a discharge pipe, drain, etc.; broadbased input of pollutants.

Nonwetland - Any area that has sufficiently dry conditions that hydrophytic vegetation, hydric soils, and/or wetland hydrology are lacking; it includes upland as well as former wetlands that are effectively drained.

Normal circumstances - Refers to the soil and hydrology conditions that are normally present, without regard to whether the vegetation has been removed.

Obligate wetland species - A plant species that is nearly always found in wetlands; its frequency of occurrence in wetlands is 99% or more.

Organic soil - A soil is classified as an organic soil when it is: (1) saturated for prolonged periods (unless artificially drained) and has more than 30 percent organic matter if the mineral fraction is more than 50 percent clay, or (2) never saturated with water for more than a few days and having more than 34 percent organic matter.

Periodically - Used herein, to define detectable regular or irregular saturated soil conditions or inundation, resulting from ponding of ground water, precipitation, overland flow, stream flooding, or tidal influences that occur(s) with hours, days, weeks, months, or even years between events.

Permanently flooded - A water regime condition where standing water covers the land surface throughout the year (but may be absent during extreme droughts).

Permeability - The quality of the soil that enables water to move downward through the profile, measured as the number of inches per hour that water moves downward through the saturated soil.

Plant community - The plant populations existing in a shared habitat or environment.

Playa - Periodically flooded wetland basin common in parts of the Southwest.

Ponded - A condition in which free water covers the soil surface, for example, in a closed depression; the water is removed only by percolation, evaporation, or transpiration.

Poorly drained - A condition in which water is removed from the soil so slowly that the soil is saturated periodically during the growing season or remains wet for long periods greater than 7 days.

Population - A group of individuals of the same species that occurs in a given area.

Potentially hydric soils - Wetness limited soil map units that (1) are similar to hydric soils in taxonomy and water properties, (2) are not classified as hydric because they fail to demonstrate sufficient depth of saturation, flooding frequency, drainage rates or other essential criterion, and (3) may exhibit site specific morphological properties or inclusions of hydric soils upon field evaluation.

Problem area wetland - A wetland that is difficult to identify because it may lack indicators of wetland hydrology and/or hydric soils, or its dominant plant species are more common in nonwetlands.

Quantitative - A precise measurement or determination expressed numerically.

Range - The set of conditions throughout which an organism (e.g., plant species) naturally occurs.

Riparian - Areas that are associated with the banks of streams, rivers, or lakes.

Saturated - A condition in which all easily drained voids (pores) between soil particles are temporarily or permanently filled with water, significant saturation during the growing season is considered to be usually one week or more.

Soil - Unconsolidated material on the earth's surface that supports or is capable of supporting plants out-of-doors.

Soil horizon - A layer of soil or soil material approximately parallel to the land surface and differing from adjacent genetically related layers in physical, chemical, and biological properties or characteristics (e.g., color, structure, and texture).

Soil permeability - The ease with which gases, liquids, or plant roots penetrate or pass through a layer of soil.

Soil surface - The upper limits of the soil profile; for mineral soils, the upper limits of the highest mineral horizon (A-horizon); for organic soils, the upper limit of undecomposed organic matter.

Somewhat poorly drained - A condition in which water is removed slowly enough that the soil is wet for significant periods during the growing season.

Succession - The orderly replacement of one plant community by another.

Surface water - Water present above the substrate or soil surface.

Topography - The configuration of a surface, including its relief and the position of its natural and manmade features.

Transition zone - The area in which a change from wetlands to nonwetlands occurs. The transition zone may be narrow or broad.

Typical - That which normally, usually, or commonly occurs.

Upland - Any area that does not qualify as a wetland because the associated hydrologic regime is not sufficiently wet to elicit development of vegetation, soils, and/or hydrologic characteristics associated with wetlands. Such areas occurring in floodplains are more appropriately termed nonwetlands.

Very long duration (flooding) - A duration class in which inundation for a single event is greater than 1 month.

Very poorly drained - A condition in which water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season.

Water mark - A line on vegetation or other upright structures that represents the maximum height reached in an inundation event.

Water table - The zone of saturation at the highest average depth during the wettest season; it is at least six inches thick and persists in the soil for more than a few weeks.

Wetland boundary - The point on the ground at which a shift from wetlands to nonwetlands occurs.

Wetland determination - The process by which an area is identified as a wetland or nonwetland.

Wetland hydrology - In general terms, permanent or periodic inundation or prolonged soil saturation sufficient to create anaerobic conditions in the soil.

Wetland type - A category of wetlands on similar physical characteristics, such as vegetation, geomorphology, and/or hydrology.

Wetlands - As used herein, areas that under normal circumstances have hydrophytic vegetation, hydric soils, and wetland hydrology.

Wetland(s) characterization - Describing the typical distinguishing attributes of a wetland type (e.g., deep floodplain basins) or wetlands of a particular geographic area (e.g., playa lakes region), including biological, geomorphological, hydrological, climatological, and chemical parameters; and socioeconomic and ecological processes and effects.

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