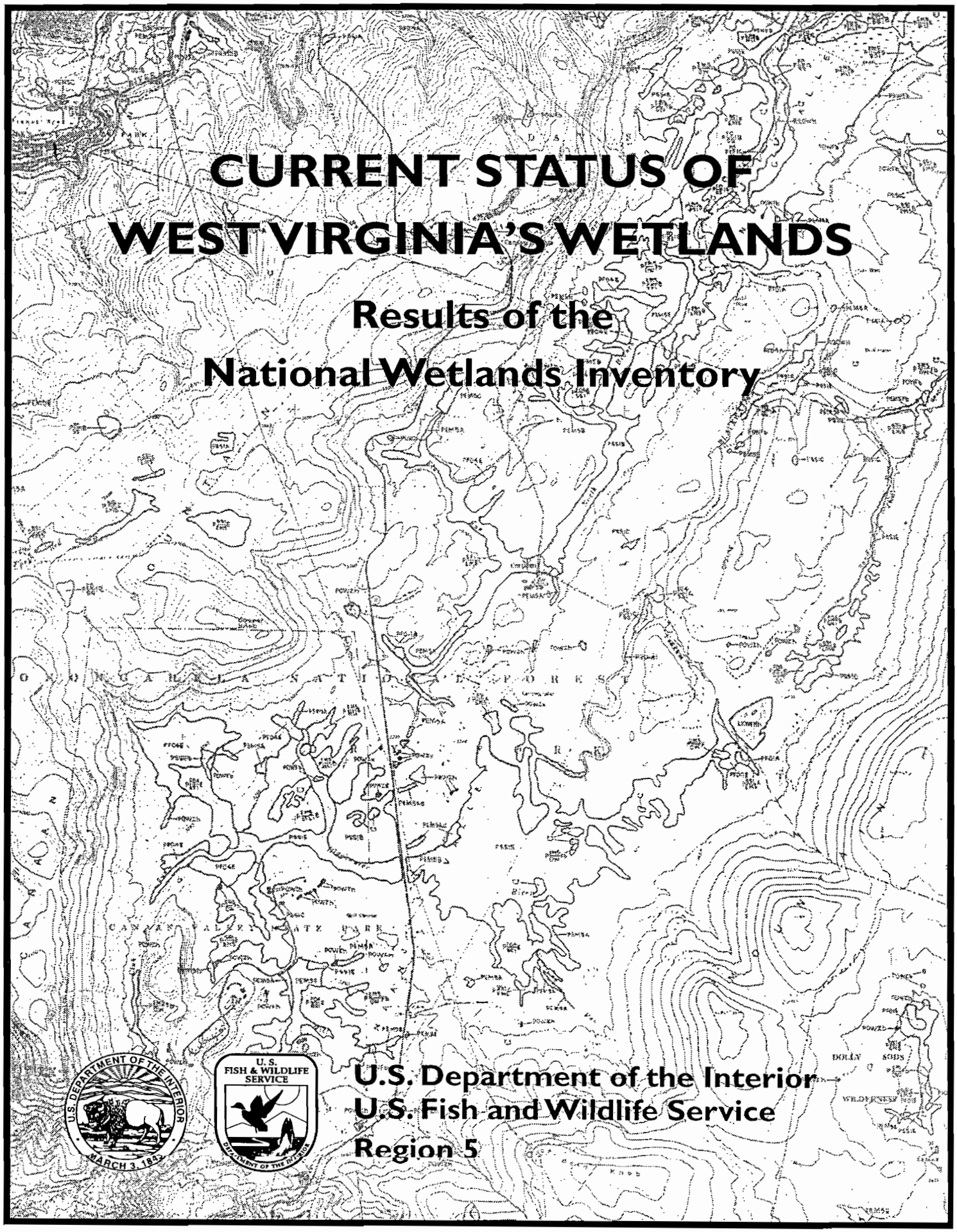

CURRENT STATUS OF WEST VIRGINIA'S WETLANDS

Results of the National Wetlands Inventory

U.S. Department of the Interior
U.S. Fish and Wildlife Service
Region 5

CURRENT STATUS OF WEST VIRGINIA'S WETLANDS

Results of the National Wetlands Inventory

by

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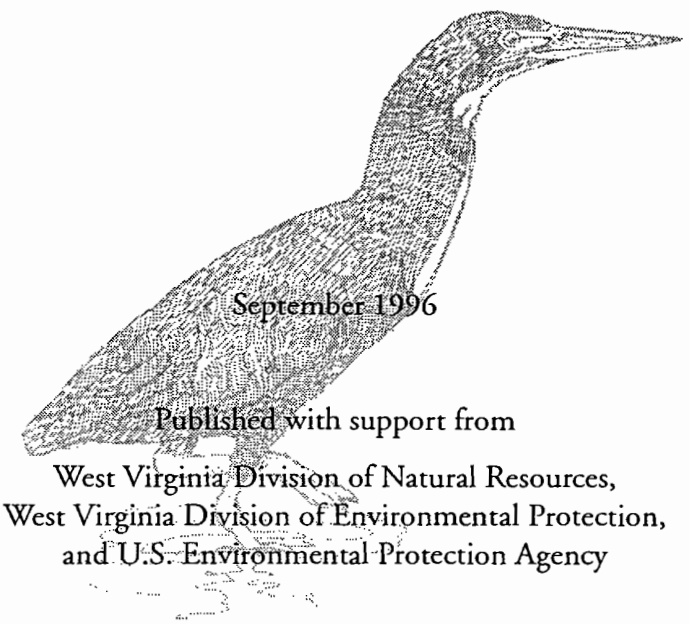

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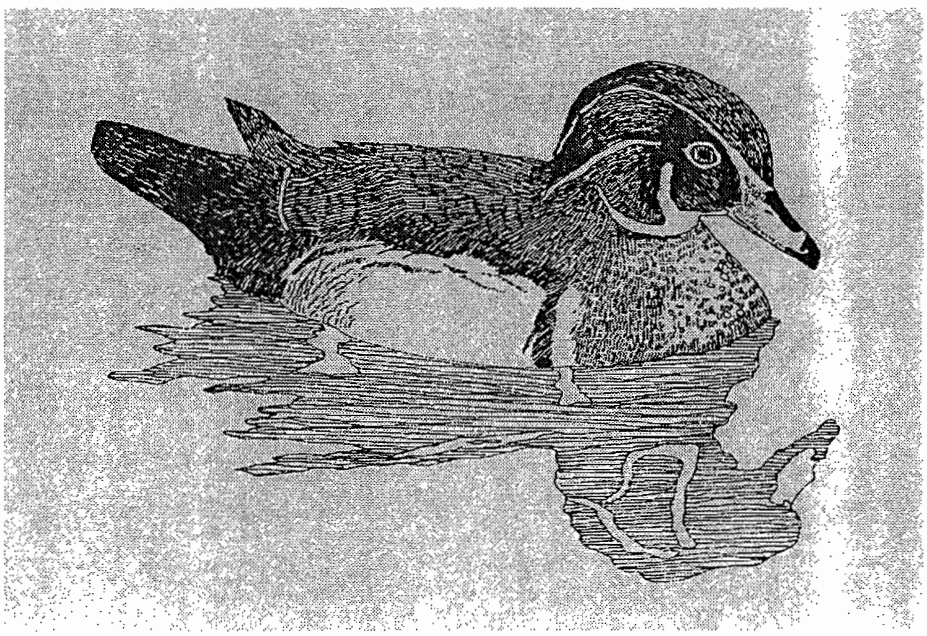
This report presents the findings of NWI mapping for West Virginia. Staff at the University of Massachusetts, Department of Forestry and Wildlife Management, were responsible for nearly all of the wetlands photointerpretation that serves as the foundation for the wetlands inventory. The following people worked on the project while at the University: Michael Broschart, Catherine Cornell, David Foulis, Amy Hogeland, John LeBlanc, Robert Popp, Gail Shaughnessy, Glenn Smith, Janice Stone, David Sumpter, and Bill Zinni. Their efforts are gratefully acknowledged. Among the many other persons contributing to this report and the completion of the wetlands inventory were Cheryl Bennett, Elaine Blok, Georgeann Keer, Chris Nichols, Linda Shaffer, Glenn Smith, Kurt Snider, Becky Stanley, Renee Whitehead, and Don Woodard. Individuals providing review comments on an earlier draft of this report included Roger Anderson, Chris Clower, Walt Kordek, Jim Rawson, John Schmidt, and Bill Tolin. Andrew Cruz prepared the wetland plant list presented in Appendix A. Paul Harmon provided information on wetland plants of concern to West Virginia's Natural Heritage Program. Stephen Carpenter provided the list of West Virginia's hydric soils.

Pam Dansereau, Mary O'Connor, and Jim Clark were instrumental in preparing this report for publication. Ms. Dansereau typed the draft manuscripts and assisted with editing and proofreading, while Ms. O'Connor typeset and designed the final manuscript. Mr. Clark prepared the map and figures used in this report.



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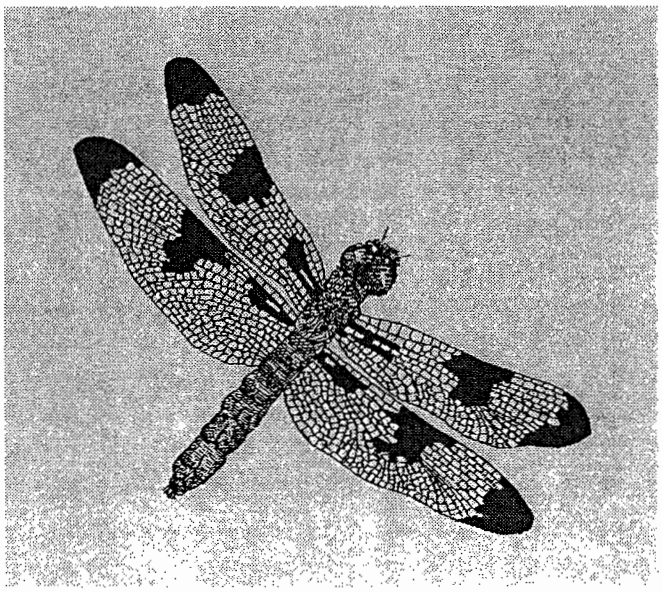

Chapter 1

Introduction

Wetlands are usually periodically flooded or saturated lands occurring between uplands and open waterbodies such as lakes, rivers, streams, and estuaries. Many wetlands, however, may be isolated from such waterbodies. These wetlands are located in areas with seasonally high water tables that are surrounded by upland. Wetlands are commonly referred to by a host of terms based on their location and characteristics, such as marsh, shrub swamp, bog, wet meadow, and hardwood swamp. These areas are important natural resources with numerous values, including fish and wildlife habitat, flood protection, erosion control, and water quality maintenance.

The U.S. Fish and Wildlife Service (Service) and the state of West Virginia have always recognized the importance of wetlands to waterfowl, other migratory birds, and wildlife. Their responsibility for protecting these habitats comes largely from international treaties concerning migratory birds, the Fish and Wildlife Coordination Act, the Clean Water Act, and state legislation. They have been active in protecting these resources through various programs. The Service's National Wildlife Refuge System was established to preserve and enhance migratory bird habitat in strategic locations across the country. Similarly, the state has established wildlife management areas throughout West Virginia. Both the Service and the state review federal projects and applications for federal permits that involve wetland alteration largely under authority of the Clean Water Act.

Since the 1950s, the Service and the state of West Virginia have been particularly concerned about wetland losses and their impact on fish and wildlife populations. In 1954, the Service conducted its first nationwide wetlands inventory which focused on important waterfowl wetlands. This survey was performed to provide information for considering fish and wildlife impacts in land-use decisions. The results of this inventory were published in a well-known Service report entitled *Wetlands of the United States*, commonly referred to as Circular 39 (Shaw and Fredine 1956). In the late 1970s, the state conducted a statewide wetlands inventory in West Virginia (Evans *et al.* 1982).

Since these surveys, wetlands have undergone many changes, both natural and human-induced. The conversion of wetlands for agriculture, residential, and industrial developments and other uses has continued, although federal legislation has helped reduce the amount of wetland destruction. During the early 1970s, the federal government assumed greater responsibility for wetlands through Section 404 of the federal Water Pollution Control Act of 1972 (later amended as the Clean Water Act of 1977) and by strengthening wetland protection under Section 10 of the Rivers and Harbors Act of 1899. Federal permits are now required for many types of construction in many wetlands. These laws have greatly improved the status of the Nation's wetlands, yet they are not specifically designed to protect wetlands. They regulate certain activities that adversely affect water quality. Other activities that modify or destroy wetlands are still allowed, since normal agricultural and forestry activities are exempt and some wetland types do not qualify as regulated wetlands following current field delineation procedures (Tiner 1993).

With increased public interest in wetlands and strengthened government regulation, the Service considered how it could contribute to this resource management effort, since it has prime responsibility for protection and management of the Nation's fish and wildlife and their habitats. The Service recognized the need for sound ecological information to make decisions regarding policy, planning, and management of the country's wetland resources, and established the National Wetlands Inventory Project (NWI) in 1974 to fulfill this need. The NWI aims to generate scientific information on the characteristics and extent of the Nation's wetlands. The purpose of this information is to foster wise use of U.S. wetlands and to provide data for making quick and accurate resource decisions.

Two very different kinds of information are needed: (1) detailed maps and (2) status and trends reports. First, detailed wetland maps are needed for impact assessment of site-specific projects. These maps serve a purpose similar to the U.S.D.A. Soil Conservation Service's soil survey maps, the National Oceanic and Atmospheric Administration's coastal and geodetic survey maps, and the U.S. Geological Survey's topographic maps. Detailed wetland maps are used by local, state, and federal agencies as well as by private industry and organizations for many purposes, including watershed management plans, environmental impact

assessments, permit reviews, facility and corridor sitings, oil spill contingency plans, natural resource inventories, wildlife surveys, and other uses. To date, wetland maps have been prepared for 88 percent of the Lower 48 States, 30 percent of Alaska, and all of Hawaii. Secondly, national and regional estimates of the current status and recent losses and gains of wetlands are needed in order to provide improved information for reviewing the effectiveness of existing federal programs and policies, for identifying national or regional problems, and for general public awareness. Technical and popular reports about the national trends have been recently published (Frayer *et al.* 1983; Tiner 1984; Dahl and Johnson 1991; Frayer 1991). Regional wetland trend reports that have included West Virginia or portions of the state have been published (Tiner and Finn 1986; Tiner 1987; Tiner *et al.* 1994).

West Virginia Wetlands Inventory

West Virginia's wetlands were mapped as part of the Service's National Wetlands Inventory Project which has produced a consistent and more up-to-date set of maps and other data for U.S. wetlands. The West Virginia wetlands inventory provides government administrators, private industry, and others with improved information for project planning and environmental impact evaluation, as well as for making land-use decisions. This inventory identifies the current status of West Virginia's wetlands and serves as the base from which future changes can be determined.

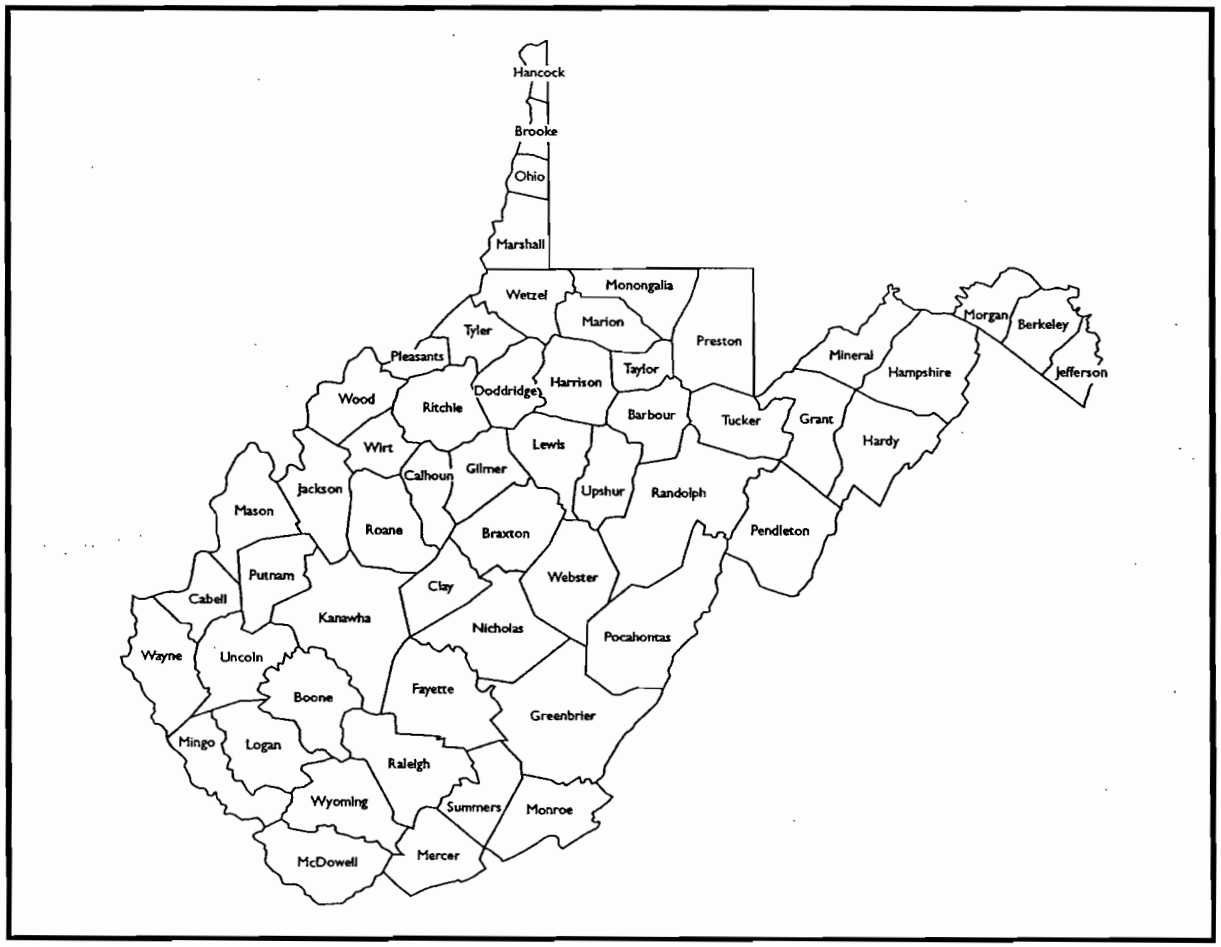

Figure 1-1. West Virginia's counties.

Description of the Study Area

West Virginia occupies 24,119-square miles of land (Hoffman 1992). The state is divided into 55 counties (Figure 1-1). The entire state falls within the Appalachian Highlands as defined by Hammond (1970).

The climate of West Virginia is characterized by cold winters and warm summers. Average winter temperature is around 32° F with coldest temperatures in the eastern part of the state (along the Blue Ridge Mountains) and warmest winter temperatures in southwestern West Virginia (Owenby *et al.* 1992). Summer temperatures average in the high 60s and low 70s. Annual precipitation averages from 36 to 50 inches, with precipitation relatively evenly distributed throughout the year. Monthly averages range from 3 to 5 inches. Most areas experience slightly more rainfall (up to 1 inch) in July. The area west of the Blue Ridge Mountains experiences the most rainfall, with annual averages approaching 50 inches. The least rainfall occurs in the northeastern part of the state where annual averages are about 36 inches. Some precipitation comes as snow in winter.

Purpose and Organization of this Report

The purpose of this publication is to report the findings of the Service's wetlands inventory of West Virginia. The discussion will focus on wetlands with a few references to deepwater habitats which were also inventoried. The following chapters will include discussions of wetland concept and classification (Chapter 2), inventory techniques (Chapter 3), and inventory results (Chapter 4). Appendix A contains a list of vascular plants associated with West Virginia's wetlands arranged by life form. Scientific names of plants follow the *National List of Scientific Plant Names* (U.S.D.A. Soil Conservation Service 1982). Appendix B is a list of wetland plants of special interest to West Virginia's Natural Heritage Program. Appendix C is a list of the state's hydric soils. A figure showing the general distribution of West Virginia's wetlands and deepwater habitats is provided as an enclosure at the back of this report.

Chapter 2

U.S. Fish and Wildlife Service's Wetland Definition and Classification System

Introduction

To begin inventorying the Nation's wetlands, the Service needed a definition of wetland and a classification system to separate wetlands into various types. The Service, therefore, examined recent wetland inventories throughout the country to learn how others defined and classified wetlands. The results of this examination were published as *Existing State and Local Wetlands Surveys (1965-1975)* (U.S. Fish and Wildlife Service 1976). More than 50 wetland classification schemes were identified. Of those, only one classification — the Martin *et al.* system (1953) — was nationally based, while all others were regionally focused. In January 1975, the Service brought together 14 authors of regional wetland classifications and other prominent wetland scientists to help decide if any existing classification could be used or modified for the national inventory or if a new system was needed. They recommended that the Service attempt to develop a new national wetland classification.

In July 1975, the Service sponsored the National Wetland Classification and Inventory Workshop, where more than 150 wetland scientists and mapping experts met to review a preliminary draft of the new wetland classification system. The consensus was that the system should be hierarchial in nature and built around the concept of ecosystems (Sather 1976). Four key objectives for the new system were established: (1) to develop ecologically similar habitat units, (2) to arrange these units in a system that would facilitate resource management decisions, (3) to furnish units for inventory and mapping, and (4) to provide uniformity in concept and terminology throughout the country (Cowardin *et al.* 1979).

The Service's wetland classification system was developed by a four-member team, i.e., Dr. Lewis M. Cowardin (U.S. Fish and Wildlife Service), Virginia Carter (U.S. Geological Survey), Dr. Francis C. Golet (University of Rhode Island) and Dr. Edward T. LaRoe (National Oceanic and Atmospheric Administration), with assistance from numerous federal and state agencies, university scientists, and other interested individuals. The classification system went through three major drafts and extensive field testing prior to its publication as *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin *et al.* 1979). Since its publication, the Service's classification system has been widely used by federal, state, and local agencies, university scientists, and private industry and non-profit organizations for identifying and classifying wetlands. At the First International Wetlands Conference in New Delhi, India, scientists from around the world adopted the Service's wetland definition as an international standard and recommended testing the applicability of the classification system in other areas, especially in the tropics and subtropics (Gopal *et al.* 1982). Thus, the system appears to be moving quickly towards its goal of providing uniformity in wetland concept and terminology.

Wetland Definition

Conceptually, wetlands usually lie between the better drained, rarely flooded uplands and the permanently flooded deep waters of lakes, rivers and coastal embayments. Wetlands generally include the variety of marshes, bogs, swamps, shallow ponds, and bottomland forests that occur throughout the country. They usually lie in upland depressions or on broad flats along rivers, lakes, and coastal waters where they are subject to periodic flooding. Some wetlands, however, occur on slopes where they are associated with groundwater seepage areas (Figure 2-1). To accurately inventory this resource, the Service had to determine where along this natural wetness continuum wetland ends and upland begins. While many wetlands lie in distinct depressions or basins that are readily observable, the wetland-upland boundary is not always easy to identify. This is especially true along many floodplains, on glacial till deposits, in gently sloping terrain, and in areas of major hydrologic modification. In these areas, only

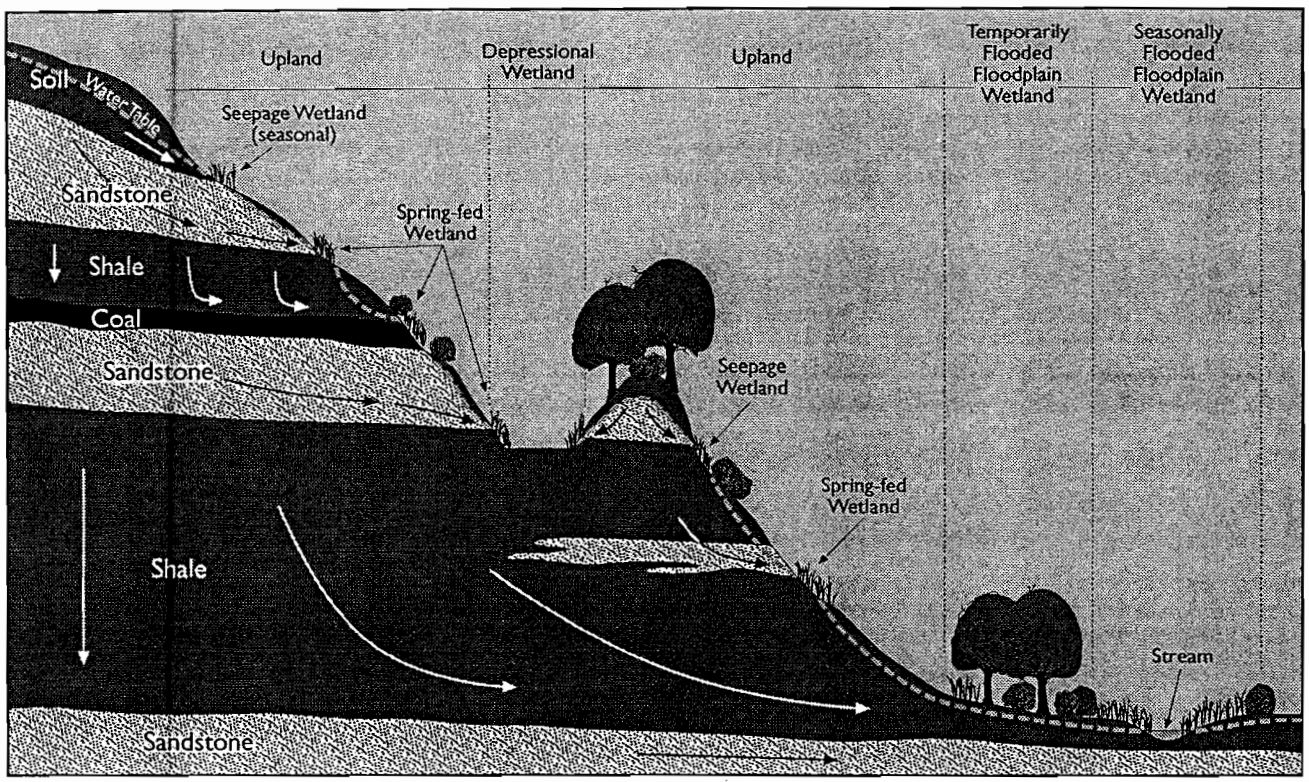

Figure 2-1. Wetlands develop at positions on the landscape where excess water is available. This cross-sectional diagram shows groundwater flow paths that create wetlands at different locations — valleys, depressions, and hillside slopes (vertical scale greatly exaggerated).

a skilled wetland ecologist or other specialist can accurately identify the wetland boundary. To help ensure accurate and consistent wetland determination, an ecologically based definition was constructed by the Service.

Historically, wetlands were defined by scientists working in specialized fields, such as botany or hydrology. A botanical definition would focus on the plants adapted to flooding or saturated soil conditions, while a hydrologist's definition would emphasize fluctuations in the position of the water table relative to the ground surface over time. Lefor and Kennard (1977) reviewed numerous definitions for inland wetlands used in the Northeast. Single parameter definitions in general are not very useful for identifying wetlands. A more complete definition of wetland involves a multi-disciplinary approach. The Service has taken this approach in developing its wetland definition and classification system.

In developing a multi-disciplinary definition of wetland, the Service first acknowledged that "There is no single, correct, indisputable, ecologically sound definition for wetlands, primarily because of the diversity of wetlands and because the demarcation between dry and wet environments lies along a continuum" (Cowardin *et al.* 1979). After all, a wealth of wetland definitions grew out of different needs for defining wetlands among groups or organizations with different interests, e.g., wetland regulators, waterfowl managers, hydrologists, flood control engineers and water quality experts. The Service has not attempted to legally define wetland, since each state or federal regulatory agency has defined wetland somewhat differently to suit its administrative purposes (Table 2-1). Therefore, according to existing wetland laws, a wetland is whatever the law says it is. The Service needed a definition that would allow accurate identification and delineation of the Nation's wetlands for resource management purposes.

The Service defines wetlands as follows:

"*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 purposes 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 undrained 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.*" (Cowardin *et al.* 1979)

Table 2-1. Definitions of "wetland" according to selected federal agencies.

Organization (Reference)	Wetland Definition	Comments
U.S. Fish and Wildlife Service (Cowardin, *et al.* 1979)	"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 purposes 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 undrained 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 is the official Fish and Wildlife Service definition and is being used for conducting an inventory of the Nation's wetlands. It emphasizes flooding and/or soil saturation, hydric soils and vegetation. Shallow lakes and ponds are included as wetland. Comprehensive lists of wetland plants and soils are available to further clarify this definition.
U.S. Army Corps of Engineers (Federal Register, July 19, 1977) and U.S. Environmental Protection Agency (Federal Register, December 24, 1980)	Wetlands are "those areas that are inundated or saturated by surface or ground water 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."	Regulatory definition in response to Section 404 of the Clean Water Act of 1977. Excludes similar areas lacking vegetation, such as tidal flats, and does not define lakes, ponds and rivers as wetlands. Aquatic beds are considered "vegetated shallows" and included as other "waters of the United States" for regulatory purposes.
U.S.D.A. Soil Conservation Service (National Food Security Act Manual, 1988)	"Wetlands are defined as areas that have a predominance of hydric soils and that are inundated or saturated by surface or ground water 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 is the Soil Conservation Service's definition for implementing the "Swampbuster" provision of the Food Security Act of 1985. Any area that meets hydric soil criteria is considered to have a predominance of hydric soils. Note the geographical exclusion for certain lands in Alaska.

In defining wetlands from an ecological standpoint, the Service emphasizes three key attributes of wetlands: (1) hydrology — the degree of flooding or soil saturation, (2) wetland vegetation (hydrophytes), and (3) hydric soils. All areas considered wetland must have enough water at some time during the growing season to stress plants and animals not adapted for life in water or saturated soils. Most wetlands have hydrophytes and hydric soils present, yet many are nonvegetated (e.g., tidal mud flats). The Service has prepared a list of plants occurring in the Nation's wetlands (Reed 1988) and the Soil Conservation Service has developed a national list of hydric soils (U.S.D.A. Soil Conservation Service 1991 — latest published version and now updated through the Internet) to help identify wetlands. Nearly 1,500 plant species may be found in West Virginia's wetlands (see Appendix A for list). Wetland plants of special interest to the West Virginia's Natural Heritage Program are enumerated in Appendix B. A list of West Virginia's hydric soils is given in Appendix C.

Particular attention should be paid to the reference to flooding or soil saturation during the growing season in the Service's wetland definition. When soils are covered by water or saturated to the surface, free oxygen is generally not available to plant roots. During the growing season, most plant roots must have access to free oxygen for respiration and growth; flooding at this time would have serious implications for the growth and survival of most plants. In a wetland situation, plants must be adapted to cope with these stressful conditions. If, however, flooding only occurs in winter when the plants are dormant, there is little or no effect on them. According to a recent report from the National Research Council, wetlands are typically saturated within 1 foot of the soil surface for at least 14 consecutive days during the growing season in most years (National Research Council 1995). They further recognized that there may be regional differences, but no data to the contrary presently exist.

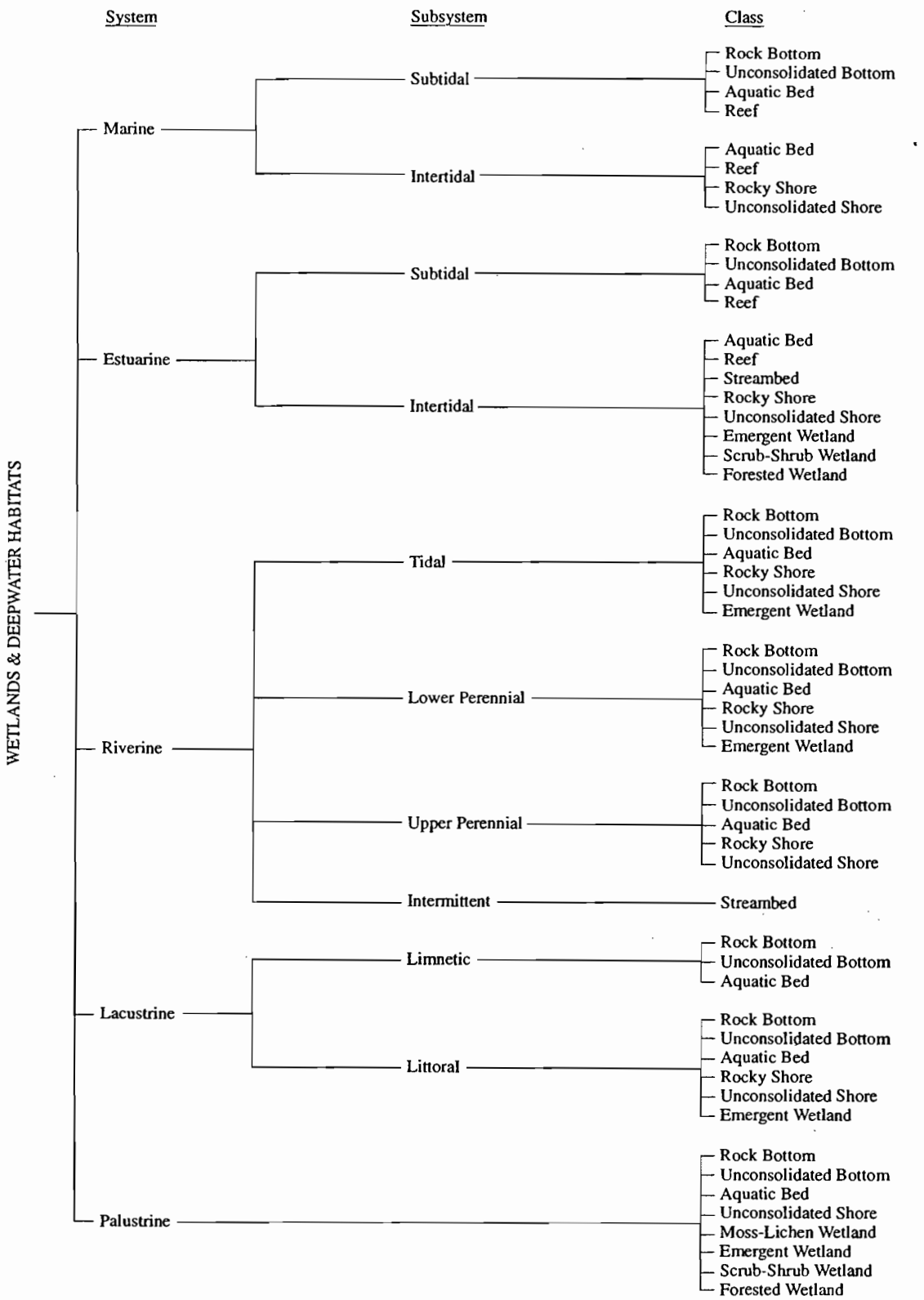

Figure 2-2. Classification hierarchy of wetlands and deepwater habitats (system through class) following the U.S. Fish and Wildlife Service's official classification system (Cowardin *et al.* 1979). The Palustrine system does not include any deepwater habitats.

Wetlands typically fall within one of the following four categories: (1) areas with both hydrophytes and hydric soils (e.g., marshes, swamps and bogs), (2) areas without hydrophytes, but with hydric soils (e.g., farmed wetlands), (3) areas without soils but with hydrophytes (e.g., seaweed-covered rocky shores), and (4) periodically flooded areas without soil and without hydrophytes (e.g., gravel beaches). All wetlands must be periodically saturated or covered by shallow water during the growing season, whether or not hydrophytes or hydric soils are present. Completely drained hydric soils that are no longer capable of supporting hydrophytes due to a change in water regime are not considered wetland. Areas with completely drained hydric soils are, however, good indicators of historic wetlands, which may be suitable for restoration.

The Service does not generally include permanently flooded deep water areas as wetland, although shallow waters are classified as wetland. Instead, these deeper waterbodies are defined as deepwater habitats, since water and not air is the principal medium in which dominant organisms live. Along the coast in tidal areas, the deepwater habitat begins at the extreme spring low tide level. In nontidal freshwater areas, this habitat starts at a depth of 6.6 feet (2 m) because the shallow water areas are often vegetated with emergent wetland plants.

Wetland Classification

The following section represents a simplified overview of the Service's wetland classification system. Consequently, some of the more technical points have been omitted from this discussion. When actually classifying a wetland, the reader is advised to refer to the official classification document (Cowardin *et al.* 1979) and should not rely solely on this summary.

The Service's wetland classification system is hierarchial or vertical in nature proceeding from general to specific, as noted in Figure 2-2. In this approach, wetlands are first defined at a rather broad level — the SYSTEM. The term SYSTEM represents "a complex of wetlands and deepwater habitats that share the influence of similar hydrologic, geomorphologic, chemical, or biological factors." Five systems are defined: Marine, Estuarine, Riverine, Lacustrine and Palustrine. The Marine System generally consists of the open ocean and its associated high-energy coastline, while the Estuarine System encompasses salt and brackish marshes, nonvegetated tidal shores, and brackish waters of coastal rivers and embayments. Freshwater wetlands and deepwater habitats fall into one of the other three systems: Riverine (rivers and streams), Lacustrine (lakes, reservoirs and large ponds), or Palustrine (e.g., marshes, bogs, swamps and small shallow ponds). Thus, at the most general level, wetlands can be defined as either Marine, Estuarine, Riverine, Lacustrine, or Palustrine (Figure 2-3). West Virginia's wetlands and deepwater habitats fall within the latter three systems, so the other two are not discussed any further.

Each system, with the exception of the Palustrine, is further subdivided into SUBSYSTEMS. The Lacustrine System is separated into two systems based on water depth: (1) Littoral — wetlands extending from the lake shore to a depth of 6.6 feet (2 m) below low water or to the extent of nonpersistent emergents (e.g., arrowheads, pickerelweed, or spatterdock) if they grow beyond that depth, and (2) Limnetic — deepwater habitats lying beyond the 6.6 feet (2 m) at low water. By contrast, the Riverine System is further defined by four subsystems that represent different reaches of a flowing freshwater or lotic system: (1) Tidal — water levels subject to tidal fluctuations, (2) Lower Perennial — permanent, flowing waters with a well-developed floodplain, (3) Upper Perennial — permanent, flowing water with very little or no floodplain development, and (4) Intermittent — channel containing nontidal flowing water for only part of the year. The Palustrine System has not been subdivided into subsystems.

The next level — CLASS — describes the general appearance of the wetland or deepwater habitat in terms of the dominant vegetative life form or the nature and composition of the substrate, where vegetative cover is less than 30 percent (Table 2-2). Of the 11 classes, five refer to areas where vegetation covers 30 percent or more of the surface: Aquatic Bed, Moss-Lichen Wetland, Emergent Wetland, Scrub-Shrub Wetland, and Forested Wetland. The remaining six classes represent areas generally lacking vegetation, where the composition of the substrate and degree of flooding distinguish classes: Rock Bottom, Unconsolidated Bottom, Reef (sedentary invertebrate colony), Streambed, Rocky Shore, and Unconsolidated Shore. Permanently flooded nonvegetated areas are classified as either Rock Bottom or Unconsolidated Bottom, while exposed areas are typed as Streambed, Rocky Shore or Unconsolidated Shore.

Each class is further divided into SUBCLASSES to better define the type of substrate in nonvegetated areas (e.g., bedrock, rubble, cobble-gravel, mud, sand, and organic) or the type of dominant vegetation (e.g., persistent or nonpersistent emergents, moss, lichen, or broad-leaved deciduous, needle-leaved deciduous, broad-leaved evergreen, needle-leaved evergreen, and dead

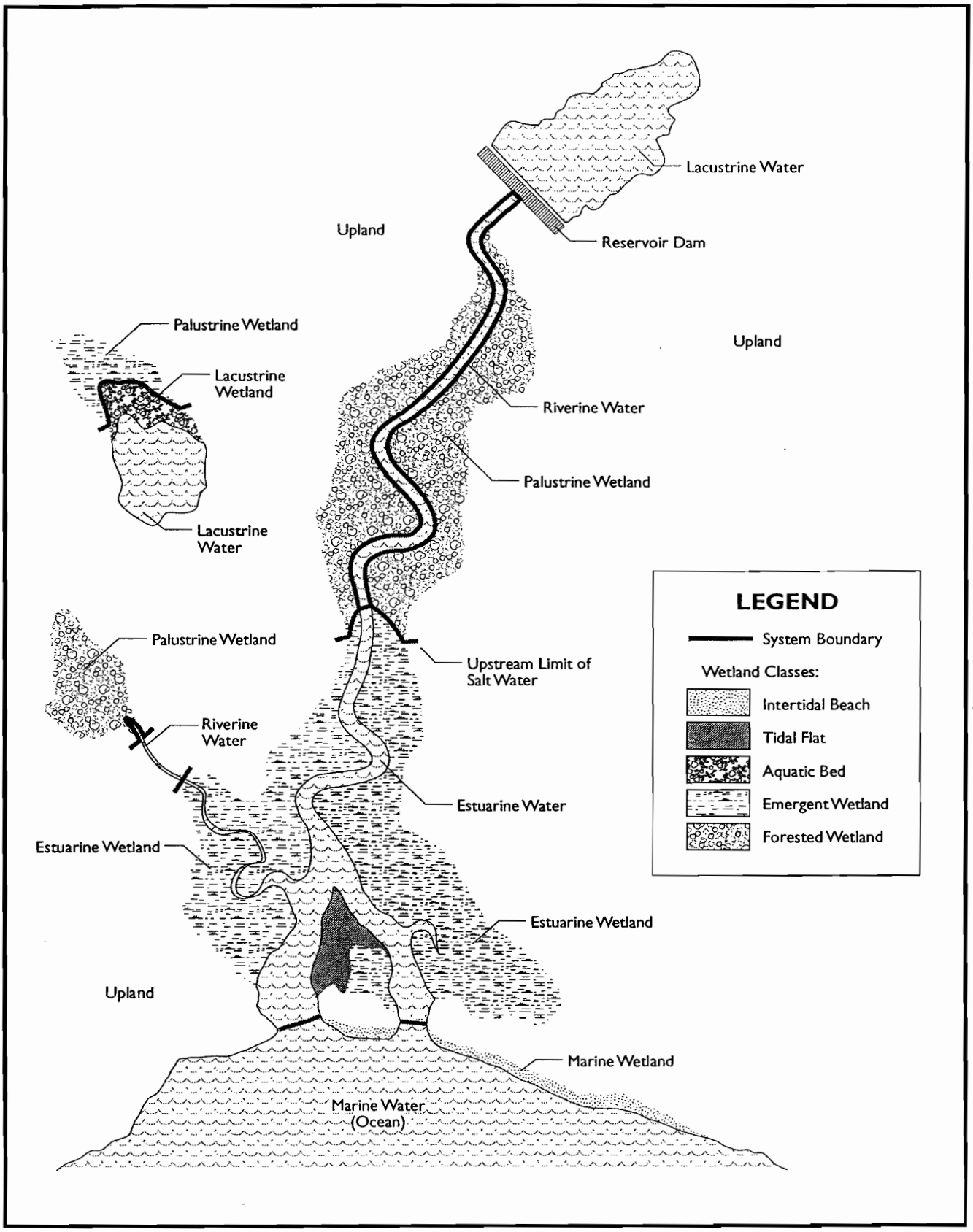

Figure 2-3. Diagram showing major wetland and deepwater habitat systems on the landscape. Predominant wetland classes are designated.

Table 2-2. Classes and subclasses of wetlands and deepwater habitats. (Cowardin *et al.* 1979)

Class	Brief Description	Subclasses
Rock Bottom	Generally permanently flooded areas with bottom substrates consisting of at least 75% stones and boulders and less than 30% vegetative cover.	Bedrock; Rubble
Unconsolidated Bottom	Generally permanently flooded areas with bottom substrates consisting of at least 25% particles smaller than stones and less than 30% vegetative cover.	Cobble-gravel; Sand; Mud; Organic
Aquatic Bed	Generally permanently flooded areas vegetated by plants growing principally on or below the water surface line.	Algal; Aquatic Moss; Rooted Vascular; Floating Vascular
Reef	Ridge-like or mound-like structures formed by the colonization and growth of sedentary invertebrates.	Coral; Mollusk; Worm
Streambed	Channel whose bottom is completely dewatered at low water periods.	Bedrock; Rubble; Cobble-gravel; Sand; Mud; Organic; Vegetated
Rocky Shore	Wetlands characterized by bedrock, stones or boulders with areal coverage of 75% or more and with less than 30% coverage by vegetation.	Bedrock; Rubble
*Unconsolidated Shore	Wetlands having unconsolidated substrates with less than 75% coverage by stone, boulders and bedrock and less than 30% vegetative cover, except by pioneer plants. (*NOTE: This class combines two classes of the 1977 operational draft system—Beach/Bar and Flat)	Cobble-gravel; Sand; Mud; Organic; Vegetated
Moss-Lichen Wetland	Wetlands dominated by mosses or lichens where other plants have less than 30% coverage.	Moss; Lichen
Emergent Wetland	Wetlands dominated by erect, rooted, herbaceous hydrophytes.	Persistent; Nonpersistent
Scrub-Shrub Wetland	Wetlands dominated by woody vegetation less than 20 feet (6 m) tall.	Broad-leaved Deciduous; Needle-leaved Deciduous; Broad-leaved Evergreen; Needle-leaved Evergreen; Dead
Forested Wetland	Wetlands dominated by woody vegetation 20 feet (6 m) or taller.	Broad-leaved Deciduous; Needle-leaved Deciduous; Broad-leaved Evergreen; Needle-leaved Evergreen; Dead

woody plants). Below the subclass level, DOMINANCE TYPE can be applied to specify the predominant plant or animal in the wetland community.

To allow better description of a given wetland or deepwater habitat in regard to hydrologic, chemical and soil characteristics and to human impacts, the classification system contains four types of specific modifiers: (1) Water Regime, (2) Water Chemistry, (3) Soil, and (4) Special. These modifiers may be applied to class and lower levels of the classification hierarchy.

Water regime modifiers describe flooding or soil saturation conditions and are divided into two main groups: (1) tidal and (2) nontidal. Tidal water regimes are used where water level fluctuations are largely driven by oceanic tides. By contrast, nontidal modifiers define conditions where surface water runoff, groundwater discharge, and/or wind effects (i.e., lake seiches) cause water level changes. Since West Virginia does not have any tidal wetlands, only nontidal water regime modifiers are presented and briefly defined in Table 2-3.

Table 2-3. Water regime modifiers, nontidal groups. (Cowardin *et al.* 1979)

Group	Type of Water	Water Regime	Definition
Nontidal	Inland freshwater and saline areas	Permanently flooded	Flooded throughout the year in all years
		Intermittently exposed	Flooded year-round except during extreme droughts
		Semipermanently flooded	Flooded throughout the growing season in most years
		Seasonally flooded	Flooded for extended periods in growing season, but surface water is usually absent by end of growing season
		Saturated	Surface water is seldom present, but substrate is saturated to the surface for most of the season
		Temporarily flooded	Flooded for only brief periods during growing season, with water table usually well below the soil surface for most of the season
		Intermittently flooded	Substrate is usually exposed and only flooded for variable periods without detectable seasonal periodicity (not always wetland; may be upland in some situations)
		Artificially flooded	Duration and amount of flooding is controlled by means of pumps or siphons in combination with dikes or dams

Water chemistry modifiers are divided into two categories which describe the water's salinity or hydrogen ion concentration (pH): (1) salinity modifiers and (2) pH modifiers. The latter modifiers are relevant to West Virginia. The pH modifiers are used for identifying acid (pH<5.5), circumneutral (5.5-7.4) and alkaline (pH>7.4) waters. Some studies have shown a good correlation between plant distribution and pH levels (Sjors 1950; Jeglum 1971). Moreover, pH can be used to distinguish between mineral-rich (e.g., fens) and mineral-poor wetlands (e.g., bogs).

The third group of modifiers — soil modifiers — are presented because the nature of the soil exerts strong influences on plant growth and reproduction as well as on the animals living in it. Two soil modifiers are given: (1) mineral and (2) organic. In general, if a soil has 20 percent or more organic matter by weight in the upper 16 inches, it is considered an organic soil, whereas if it has less than this amount, it is a mineral soil. For specific definitions, please refer to Appendix D of the Service's classification system (Cowardin *et al.* 1979) or to *Soil Taxonomy* (Soil Survey Staff 1975).

The final set of modifiers — special modifiers — were established to describe the activities of people or beaver affecting wetlands and deepwater habitats. These modifiers include: excavated, impounded (i.e., to obstruct outflow of water), diked (i.e., to obstruct inflow of water), partly drained, farmed, and artificial (i.e., materials deposited to create or modify a wetland or deepwater habitat).

Chapter 3

National Wetlands Inventory Mapping Techniques

Introduction

The National Wetlands Inventory Project utilizes remote sensing techniques with supplemental field investigations for wetland identification and mapping. Mid- to high-altitude aerial photography ranging in scale from 1:40,000 to 1:80,000 serves as the primary remote imagery source, with 1:58,000 being the most frequently used scale in the Northeast. Future work will utilize large scale photography, especially 1:40,000 color infrared photography acquired by the National Aerial Photography Program.

Once suitable aerial photography is obtained, there are seven major steps in preparing wetland maps: (1) field investigations, (2) photointerpretation, (3) review of existing wetland information, (4) quality assurance, (5) draft map production, (6) interagency review of draft maps, and (7) final map production. Steps 1, 2, and 3 encompass the basic data collection phase of the inventory. After publication of final wetland maps for West Virginia, the Service began compiling acreage data on the state's wetlands and deepwater habitats. The procedures used to inventory West Virginia's wetlands are discussed in the following sections.

Mapping Photography

For mapping West Virginia's wetlands, the Service used 1:58,000 color infrared photography. Most of this imagery was acquired from the spring of 1980 to the spring of 1986. Thus, the effective period of this inventory can be considered early 1980s. The minimum mapping unit for wetlands is about 1-3 acres. This means that most wetlands larger than this size should be mapped. Some smaller, conspicuous wetlands (e.g., farm ponds) are also mapped. Small seepage wetlands and linear sloping wetlands are typically not mapped, mainly due to their size or narrow shape. Also, farmed wetlands were not identified during this inventory, since these wetlands usually require field assessments to separate them from effectively drained wetlands (former wetlands) and this was beyond the scope of this survey.

Photointerpretation and Collateral Data

Photointerpretation was performed by the Department of Forestry and Wildlife Management, University of Massachusetts, Amherst. All photointerpretation was done in stereo using mirror stereoscopes. Other collateral data sources used to aid in wetland detection and classification included: (1) U.S. Geological Survey topographic maps and (2) U.S.D.A. Soil Conservation Service soil surveys.

Wetland photointerpretation, although extremely efficient and accurate for inventorying wetlands, does have certain limitations. Consequently, some problems arose during the course of the survey. Additional field work or use of collateral data was necessary to help overcome these constraints. These problems, their resolution, and other limitations of the inventory are discussed below.

1. Identification of freshwater aquatic beds and nonpersistent emergent wetlands. Due to the primary use of spring photography, these wetland types were not interpretable. They were generally classified as open water, unless vegetation was observed during field investigations. This is also true for some marshes that may have been flooded by extreme high water in spring.

2. Inclusion of small upland areas within delineated wetlands. Small islands of higher elevation and better drained uplands naturally exist within many wetlands. Due to the minimum size of mapping units, small upland areas may be included within designated wetlands. Field inspections and/or use of larger-scale photography may be used to refine wetland boundaries when necessary.

3. Farmed wetlands were not delineated. Accurate photointerpretation of such wetlands usually requires examination of several years of aerial photographs, which was beyond the scope of this project. The U.S.D.A. Natural Resources Conservation Service (formerly Soil Conservation Service) has conducted an inventory of these wetlands and recently converted wetlands for administering the Swampbuster provision of the Food Security Act of 1985. Contact the NRCS State Office for this information on prior-converted cropland and farmed wetlands.

4. Due to the aerial photography used, many small seepage wetlands and linear sloping wetlands along natural drainageways were not mapped. The former areas are commonly found at toes of slopes and at benches along slopes. Readers are reminded that the minimum mapping unit for this wetlands inventory ranges between 1-3 acres in size which precludes mapping of these small or narrow wetlands.

Field Investigations

Ground-truthing surveys were conducted to gain confidence in detecting and classifying wetlands from aerial photography. Hundreds of sites throughout the state were visited.

Draft Map Production

Upon completion of photointerpretation, two levels of quality assurance were performed: (1) regional quality control and (2) national consistency quality assurance. Regional review of each interpreted photo was accomplished by the Regional Office's NWI staff to ensure identification of all wetlands and proper classification. By contrast, national quality control by the NWI Center at St. Petersburg, Florida, entailed spot-checking of photos to ensure that national standards had been successfully followed. Once approved by quality assurance, draft large-scale (1:24,000) wetland maps were produced by the Center's support service contractor using Bausch and Lomb zoom transfer scopes.

Draft Map Review

Draft maps were sent to the following agencies for review and comment:

1. U.S. Fish and Wildlife Service, West Virginia Field Office;
2. U.S. Army Corps of Engineers, Huntington and Pittsburgh Districts;
3. U.S.D.A. Natural Resources Conservation Service (formerly Soil Conservation Service);
4. U.S. Environmental Protection Agency, Region III; and
5. West Virginia Division of Natural Resources.

In addition, the Regional Office's NWI staff conducted field checks and a thorough examination of draft maps to ensure proper placement of wetland polygons and labels as well as accurate classification.

Final Map Production

All comments received were evaluated and incorporated into the final maps, as appropriate. Final maps were published from 1981 through 1994, with most of the maps published in 1990.

Wetland Map Digital Database

Upon publication of the original set of final NWI maps and funding from the state of West Virginia, the Service began construction of a statewide wetland map database by digitizing NWI maps. The database and its general applications are described by Tiner and Pywell (1983). The database was completed in 1994. This database can generate county and statewide wetland acreage summaries and, through use of geographic information systems, can produce color-coded wetland maps for specific areas. Acreage summaries were produced for the following geographical areas in West Virginia: state, each county, and major watersheds. The latter represent USGS hydrologic units with boundaries derived from the USGS hydrounit file (digitized from the 1:500,000-scale hydrologic unit map). Watershed boundaries, therefore, are approximate. In addition, the database produced a small-scale state wetland map (shown as an enclosure at the back of this report).

Chapter 4

Wetlands Inventory Results

Introduction

The wetlands inventory led to the production of several products. First, a series of large-scale maps show the results of the inventory. The maps were digitized for geographic information system (GIS) applications. Through GIS, wetland acreage summaries were generated for various categories. The results of the inventory were also summarized in two reports — a technical report, *Current Status of West Virginia's Wetlands: The Results of the National Wetlands Inventory*, and a public information booklet, *West Virginia's Wetlands: Uncommon, Valuable Wildlands.*

National Wetlands Inventory Maps

A total of 495 large-scale (1:24,000) wetland maps were produced. These maps identify the size, shape, and type of wetlands and deepwater habitats in accordance with NWI specifications. The minimum mapping unit for wetlands ranges between approximately 1-3 acres. Because of this scale limitation, many small seepage wetlands were not inventoried. In addition, farmed wetlands were intentionally not mapped, due to technical limitations of detecting such areas on a single set of aerial photographs. An evaluation of NWI maps in Massachusetts determined that these maps had accuracies exceeding 95 percent (Swartwout *et al.* 1982), but map accuracy may be less than this where small wetlands represent a significant amount of the wetland resource and in areas with an abundance of wetlands that are difficult to photointerpret and, therefore, escape detection through standard NWI mapping procedures. Final maps have been available since 1980. Figures 4-1 and 4-2 show examples of the large-scale map.

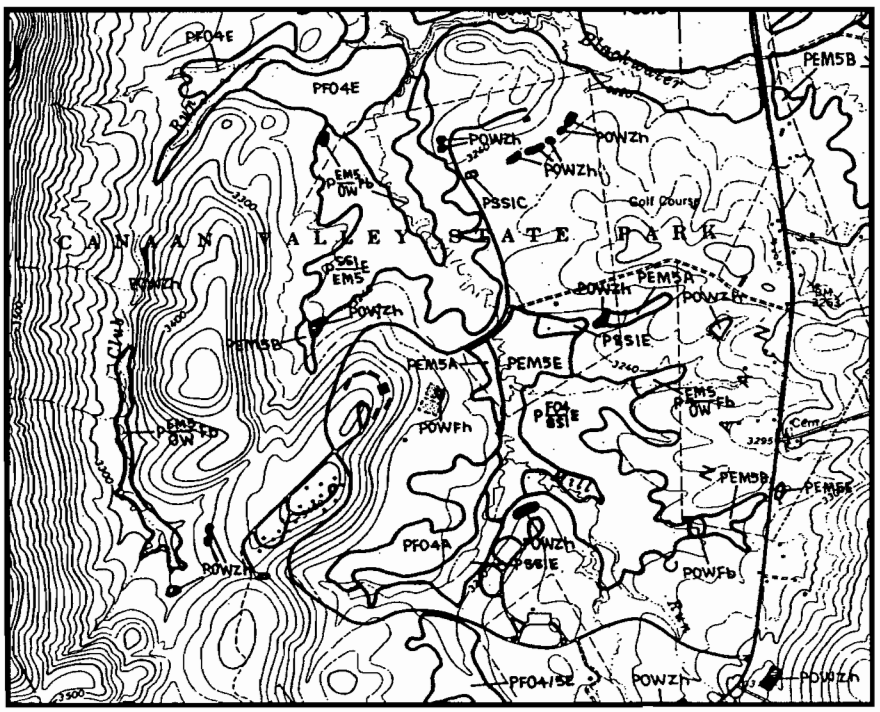

Figure 4-1. Example of a portion of an NWI map (full-scale 1:24,000).

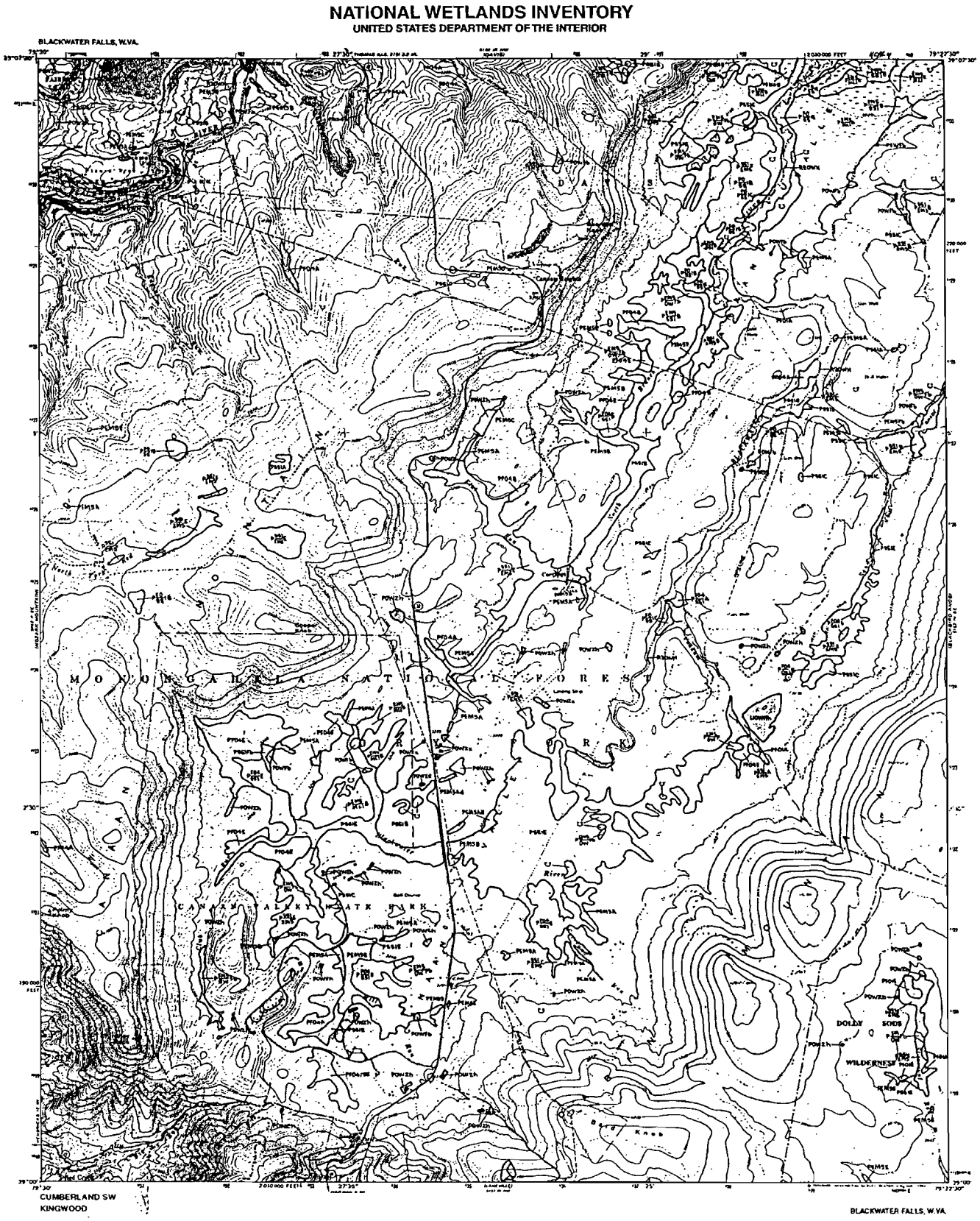

Figure 4-2. Example of a National Wetlands Inventory map (reduced). Note that legend is not shown.

Wetland and Deepwater Habitat Acreage Summaries

How many acres of wetlands are in West Virginia? Estimates of West Virginia's wetland acreage vary due to different survey techniques. The most commonly used number — 102,000 acres — came from a 1987 U.S. Fish and Wildlife Service report (Tiner 1987). This figure was produced by analyzing wetlands on 144 four-square mile study plots — roughly 2 percent of the state — and then making a statewide projection. This number may overestimate the extent of wetlands in the state. Estimates based on soil mapping (i.e., totalling the acreage of hydric soil map units) are even higher (over 170,000 acres) because these units include an undetermined amount of drained former wetlands and nonwetlands due to mapping procedures. In 1982, the state of West Virginia inventoried nearly 46,000 acres including vegetated wetlands and nonchannel waterbodies (e.g., ponds, lakes, and reservoirs) (Evans *et al.* 1982). In the present survey, the Service recently mapped roughly 57,000 acres of wetlands in West Virginia as part of the National Wetlands Inventory. This inventory used aerial photointerpretation techniques to identify wetlands for preparing 1:24,000-scale wetland maps for the entire state. Due to inherent limitations of these techniques, the maps are conservative. They underestimate the extent of wetlands for several reasons — they typically show large wetlands (more than 1-3 acres in size), farmed wetlands are not designated, and many West Virginia wetlands are small and are not mapped. The number also does not include shallow rivers which technically qualify as wetlands.

The total statewide wetland acreage is likely to be somewhere between 57,000 and 102,000 acres — representing less than 1 percent of the state's land area. Only through conducting a comprehensive inventory with extensive field checking can a more exact acreage be determined. Regardless of the true number, wetlands are, without question, an uncommon resource in the state.

State Totals

According to this survey, West Virginia possesses roughly 57,000 acres of wetlands and 109,000 acres of deepwater habitats, excluding smaller rivers and streams that either appear as linear features on wetlands maps or wetlands that were not identified due to their small size. About 0.4 percent of the state's land surface is represented by wetlands, whereas 0.7 percent is occupied by deepwater habitats. Aquatic habitats, therefore, represent about 1 percent of the state. The general distribution of West Virginia's wetlands and deepwater habitats is shown as an enclosed map at the back of this report.

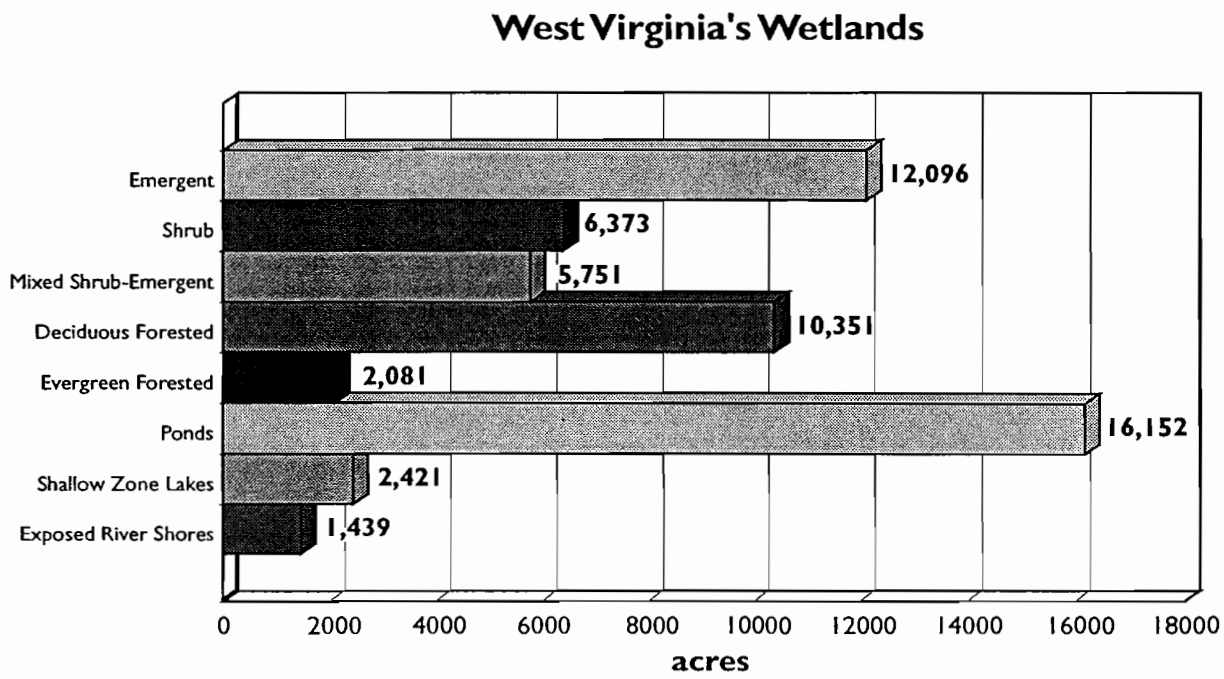

Figure 4-3. Extent of wetland types in West Virginia based on NWI mapping.

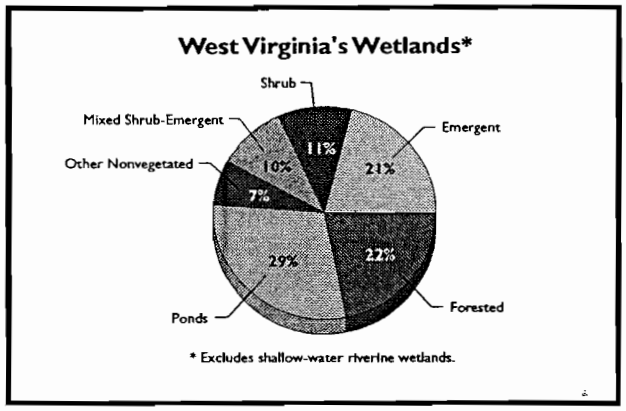

Figure 4-4. Percent of West Virginia's wetlands represented by major types.

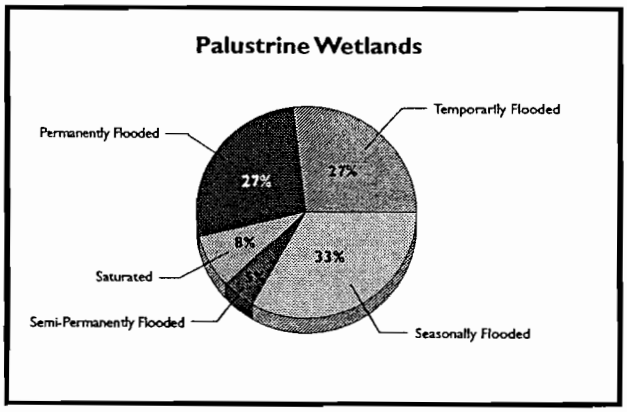

Figure 4-5. Percent of West Virginia's palustrine wetlands based on water regime.

Nearly all (99%) of the state's wetlands fall within the palustrine system. West Virginia's wetlands are mostly comprised of ponds, forested wetlands, and emergent wetlands. Ponds represent 29 percent (16,152 acres) of the state's wetlands (Figures 4-3 and 4-4). Twenty-two percent (12,432 acres) of West Virginia's freshwater wetlands are forested wetlands. Eighty-three percent of the forested wetlands are dominated by broad-leaved deciduous species, with the remaining forested wetlands dominated by evergreen species (2,081 acres). Emergent wetlands with 12,096 acres are nearly as abundant as the forested wetlands. Scrub-shrub wetlands make up 11 percent (6,373 acres) of the freshwater wetlands, while mixture shrub-emergent wetlands are similarly abundant (5,751 acres or 10%). Shallow open water zones of lakes and exposed river shores make up the rest of West Virginia's wetland acreage. From a hydrologic standpoint, most of the palustrine wetlands are seasonally flooded, temporarily flooded, and permanently flooded (Figure 4-5).

Deepwater habitats in West Virginia total about 109,000 acres (Figure 4-6). Rivers and streams are the predominant waterbodies in the state occupying 68,319 acres or almost 63 percent of the state's deepwater habitats. (Note: This figure includes shallow water portions of rivers, since they were not separated from deeper waters during this inventory.) Lakes and reservoirs accounted for 40,585 acres or about 37 percent of the state's deepwater habitats.

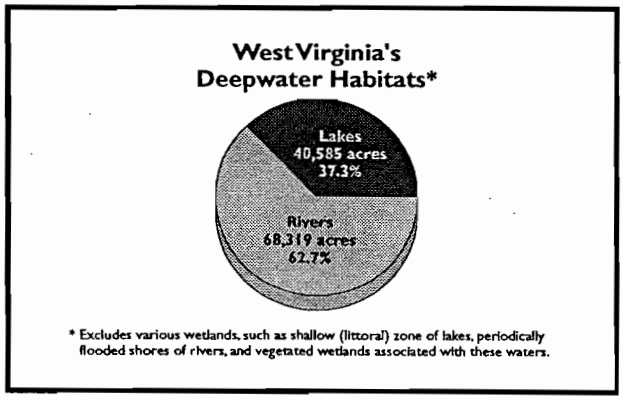

Figure 4-6. West Virginia's deepwater habitats.

County Totals

Acreage of wetlands and deepwater habitats for each county are presented in the following paragraphs. Wetland distribution is not uniform in West Virginia. Most of the state's wetlands can be found in Tucker County's Canaan Valley (Table 4-1). Greenbrier County, with the Meadow River wetlands, is the second-ranked county. About 30 percent of the state's wetlands occur in these two counties. Other counties with over 1,000 acres of wetland include Randolph, Preston, Pocahontas, Nicholas, Grant, Mason, Fayette, Berkeley, Jefferson, and Hampshire.

Table 4-1. Wetland acreage of the 55 West Virginia counties based on National Wetlands Inventory mapping. Percentages of each county represented by wetland and ranking based on wetland acreage are also given. State total may vary slightly from those in figures due to computer roundoff.

County	Land Area (Sq. Miles)	Land Area (Acres)	Wetland Acreage	% of County Represented by Wetland	Rank by Wetland Acreage
Barbour	343	219,520	928	0.42	15
Berkeley	321	205,440	1,372	0.67	10
Boone	503	321,920	305	0.09	37
Braxton	513	328,320	548	0.17	30
Brooke	90	57,600	232	0.40	41
Cabell	282	180,480	550	0.30	29
Calhoun	280	179,200	76	0.04	55
Clay	346	221,440	118	0.05	50
Doddridge	321	205,440	100	0.05	54
Fayette	667	426,880	1,441	0.34	9
Gilmer	340	217,600	150	0.07	48
Grant	480	307,200	1,760	0.57	7
Greenbrier	1,025	656,000	6,990	1.07	2
Hampshire	644	412,160	1,106	0.27	12
Hancock	84	53,760	118	0.22	51
Hardy	585	374,400	894	0.24	17
Harrison	417	266,880	909	0.34	16
Jackson	464	296,960	567	0.19	28
Jefferson	209	133,760	1,308	0.98	11
Kanawha	901	576,640	568	0.10	27
Lewis	389	248,960	383	0.15	34
Lincoln	439	280,960	156	0.06	45
Logan	456	291,840	188	0.06	43
Marion	535	342,400	522	0.15	32
Marshall	312	199,680	370	0.19	35
Mason	305	195,200	1,460	0.75	8
McDowell	433	277,120	312	0.11	36
Mercer	420	268,800	648	0.24	24
Mineral	329	210,560	932	0.44	14
Mingo	424	271,360	109	0.04	52
Monongalia	363	232,320	619	0.27	25
Monroe	473	302,720	781	0.26	19
Morgan	230	147,200	605	0.41	26
Nicholas	650	416,000	3,593	0.86	3
Ohio	106	67,840	108	0.16	53
Pendleton	698	446,720	754	0.17	21
Pleasants	131	83,840	151	0.18	47
Pocahontas	942	602,880	2,472	0.41	6
Preston	651	416,640	2,950	0.71	5
Putnam	346	221,440	741	0.33	22
Raleigh	608	389,120	994	0.26	13
Randolph	1,040	665,600	3,474	0.52	4
Ritchie	454	290,560	270	0.09	39
Roane	484	309,760	166	0.05	44
Summers	353	225,920	768	0.34	20
Taylor	174	111,360	531	0.48	31
Tucker	421	269,440	9,494	3.52	1
Tyler	258	165,120	191	0.12	42
Upshur	355	227,200	740	0.33	23
Wayne	508	325,120	262	0.08	40
Webster	556	355,840	498	0.14	33
Wetzel	359	229,760	126	0.05	49
Wirt	235	150,400	155	0.10	46
Wood	367	234,880	817	0.35	18
Wyoming	502	321,280	298	0.09	38
State Total	24,121	15,437,440	56,678	0.37	

Barbour County

Barbour County had 928 acres of wetlands mapped. This amounts to 0.42 percent of the County's land area.

Palustrine Wetlands	
Open Water	387
Dead Forested	4
Emergent	297
Deciduous Scrub-Shrub	61
Evergreen Scrub-Shrub	5
Mixed Emergent/Shrub	42
Deciduous Forested	90
Evergreen Forested	9
Mixed Forested	6
Total Palustrine Wetlands	**901**
Riverine Wetlands	20
Lacustrine Wetlands	7
TOTAL WETLANDS	928
Lacustrine Waters	257
Riverine Waters	1,217
TOTAL DEEPWATER HABITATS	1,474

Berkeley County

Berkeley County had 1,372 acres of wetlands mapped. This amounts to 0.67 percent of the County's land area.

Palustrine Wetlands	
Open Water	542
Dead Forested	1
Emergent	258
Deciduous Scrub-Shrub	33
Emergent/Deciduous Scrub-Shrub	39
Deciduous Forested	496
Total Palustrine Wetlands	**1,369**
Riverine Wetlands	3
TOTAL WETLANDS	1,372
Lacustrine Waters	232
Riverine Waters	185
TOTAL DEEPWATER HABITATS	417

Boone County

Boone County had 305 acres of wetlands mapped. This amounts to 0.09 percent of the County's land area.

Palustrine Wetlands	
Open Water	243
Emergent	16
Deciduous Scrub-Shrub	9
Deciduous Forested	14
Total Palustrine Wetlands	**282**
Riverine Wetlands	23
TOTAL WETLANDS	305
Riverine Waters	718
TOTAL DEEPWATER HABITATS	718

Braxton County

Braxton County had 548 acres of wetlands mapped. This amounts to 0.17 percent of the County's land area.

Palustrine Wetlands	
Open Water	187
Dead Forested	28
Emergent	6
Deciduous Scrub-Shrub	3
Emergent/Deciduous Scrub-Shrub	1
Deciduous Forested	21
Total Palustrine Wetlands	246
Riverine Wetlands	11
Lacustrine Wetlands	291
TOTAL WETLANDS	548
Lacustrine Waters	2,179
Riverine Waters	518
TOTAL DEEPWATER HABITATS	2,697

Brooke County

Brooke County had 232 acres of wetlands mapped. This amounts to 0.40 percent of the County's land area.

Palustrine Wetlands	
Open Water	159
Emergent	24
Deciduous Scrub-Shrub	3
Emergent/Deciduous Scrub-Shrub	1
Deciduous Forested	42
Total Palustrine Wetlands	229
Riverine Wetlands	3
TOTAL WETLANDS	232
Lacustrine Waters	964
Riverine Waters	1,538
TOTAL DEEPWATER HABITATS	2,502

Cabell County

Cabell County had 550 acres of wetlands mapped. This amounts to 0.30 percent of the County's land area.

Palustrine Wetlands	
Open Water	238
Emergent	43
Deciduous Scrub-Shrub	88
Emergent/Deciduous Scrub-Shrub	7
Deciduous Forested	174
TOTAL WETLANDS	550
Lacustrine Waters	11
Riverine Waters	4,458
TOTAL DEEPWATER HABITATS	4,469

Calhoun County

Calhoun County had 76 acres of wetlands mapped. This amounts to 0.04 percent of the County's land area.

Palustrine Wetlands	
Open Water	45
Emergent	3
Deciduous Scrub-Shrub	3
Deciduous Forested	22
Total Palustrine Wetlands	73
Riverine Wetlands	3
TOTAL WETLANDS	76
Riverine Waters	622
TOTAL DEEPWATER HABITATS	622

Clay County

Clay County had 118 acres of wetlands mapped. This amounts to 0.05 percent of the County's land area.

Palustrine Wetlands	
Open Water	68
Emergent	8
Deciduous Scrub-Shrub	4
Deciduous Forested	16
Total Palustrine Wetlands	96
Riverine Wetlands	22
TOTAL WETLANDS	118
Lacustrine Waters	19
Riverine Waters	1,064
TOTAL DEEPWATER HABITATS	1,083

Doddridge County

Doddridge County had 100 acres of wetlands mapped. This amounts to 0.05 percent of the County's land area.

Palustrine Wetlands	
Open Water	88
Emergent	8
Deciduous Scrub-Shrub	2
Deciduous Forested	2
TOTAL WETLANDS	100
Lacustrine Waters	26
TOTAL DEEPWATER HABITATS	26

Fayette County

Fayette County had 1,441 acres of wetlands mapped. This amounts to 0.34 percent of the County's land area.

Palustrine Wetlands	
Open Water	647
Dead Forested	6
Emergent	179
Deciduous Scrub-Shrub	134
Emergent/Deciduous Scrub-Shrub	34
Deciduous Forested	258
Total Palustrine Wetlands	1,258
Riverine Wetlands	179
Lacustrine Wetlands	4
TOTAL WETLANDS	1,441
Lacustrine Waters	762
Riverine Waters	3,055
TOTAL DEEPWATER HABITATS	3,817

Gilmer County

Gilmer County had 150 acres of wetlands mapped. This amounts to 0.07 percent of the County's land area.

Palustrine Wetlands	
Open Water	133
Emergent	9
Deciduous Scrub-Shrub	2
Deciduous Forested	4
Total Palustrine Wetlands	148
Riverine Wetlands	2
TOTAL WETLANDS	150
Riverine Waters	101
TOTAL DEEPWATER HABITATS	101

Grant County

Grant County had 1,760 acres of wetlands mapped. This amounts to 0.57 percent of the County's land area.

Palustrine Wetlands	
Open Water	375
Dead Forested	1
Emergent	296
Deciduous Scrub-Shrub	222
Emergent/Deciduous Scrub-Shrub	488
Deciduous Forested	206
Evergreen Forested	98
Mixed Forested	8
Total Palustrine Wetlands	1,694
Riverine Wetlands	45
Lacustrine Wetlands	21
TOTAL WETLANDS	1,760
Lacustrine Waters	1,671
Riverine Waters	397
TOTAL DEEPWATER HABITATS	2,068

Greenbrier County

Greenbrier County had 6,990 acres of wetlands mapped. This amounts to 1.07 percent of the County's land area.

Palustrine Wetlands	
Open Water	623
Dead Forested	6
Emergent	2,411
Deciduous Scrub-Shrub	461
Emergent/Deciduous Scrub-Shrub	938
Deciduous Forested	2,482
Evergreen Forested	4
Mixed Forested	19
Total Palustrine Wetlands	**6,944**
Riverine Wetlands	45
Lacustrine Wetlands	1
TOTAL WETLANDS	6,990
Lacustrine Waters	195
Riverine Waters	2,127
TOTAL DEEPWATER HABITATS	2,322

Hampshire County

Hampshire County had 1,106 acres of wetlands mapped. This amounts to 0.27 percent of the County's land area.

Palustrine Wetlands	
Open Water	537
Dead Forested	2
Emergent	153
Deciduous Scrub-Shrub	104
Emergent/Deciduous Scrub-Shrub	37
Deciduous Forested	198
Total Palustrine Wetlands	**1,031**
Riverine Wetlands	75
TOTAL WETLANDS	1,106
Lacustrine Waters	41
Riverine Waters	2,172
TOTAL DEEPWATER HABITATS	2,213

Hancock County

Hancock County had 118 acres of wetlands mapped. This amounts to 0.22 percent of the County's land area.

Palustrine Wetlands	
Open Water	86
Emergent	19
Deciduous Scrub-Shrub	3
Deciduous Forested	7
Evergreen Forested	1
Total Palustrine Wetlands	**116**
Lacustrine Wetlands	2
TOTAL WETLANDS	118
Lacustrine Waters	2,311
Riverine Waters	1,173
TOTAL DEEPWATER HABITATS	3,484

Hardy County

Hardy County had 894 acres of wetlands mapped. This amounts to 0.24 percent of the County's land area.

Palustrine Wetlands	
Open Water	307
Emergent	270
Deciduous Scrub-Shrub	33
Emergent/Deciduous Scrub-Shrub	9
Deciduous Forested	172
Total Palustrine Wetlands	**791**
Riverine Wetlands	103
TOTAL WETLANDS	894
Lacustrine Waters	43
Riverine Waters	854
TOTAL DEEPWATER HABITATS	897

Harrison County

Harrison County had 909 acres of wetlands mapped. This amounts to 0.34 percent of the County's land area.

Palustrine Wetlands	
Open Water	675
Dead Forested	2
Emergent	143
Deciduous Scrub-Shrub	14
Emergent/Deciduous Scrub-Shrub	28
Deciduous Forested	46
Total Palustrine Wetlands	908
Riverine Wetlands	1
TOTAL WETLANDS	909
Lacustrine Waters	186
Riverine Waters	757
TOTAL DEEPWATER HABITATS	943

Jackson County

Jackson County had 567 acres of wetlands mapped. This amounts to 0.19 percent of the County's land area.

Palustrine Wetlands	
Open Water	442
Emergent	53
Deciduous Scrub-Shrub	13
Emergent/Deciduous Scrub-Shrub	1
Deciduous Forested	57
Total Palustrine Wetlands	566
Riverine Wetlands	1
TOTAL WETLANDS	567
Lacustrine Waters	3,772
Riverine Waters	255
TOTAL DEEPWATER HABITATS	4,027

Jefferson County

Jefferson County had 1,308 acres of wetlands mapped. This amounts to 0.98 percent of the County's land area.

Palustrine Wetlands	
Open Water	235
Emergent	656
Deciduous Scrub-Shrub	25
Emergent/Deciduous Scrub-Shrub	31
Deciduous Forested	357
Total Palustrine Wetlands	1,304
Riverine Wetlands	4
TOTAL WETLANDS	1,308
Lacustrine Waters	81
Riverine Waters	1,354
TOTAL DEEPWATER HABITATS	1,435

Kanawha County

Kanawha County had 568 acres of wetlands mapped. This amounts to 0.10 percent of the County's land area.

Palustrine Wetlands	
Open Water	354
Dead Forested	1
Emergent	85
Deciduous Scrub-Shrub	18
Emergent/Deciduous Scrub-Shrub	1
Deciduous Forested	89
Total Palustrine Wetlands	548
Riverine Wetlands	20
TOTAL WETLANDS	568
Lacustrine Waters	136
Riverine Waters	5,111
TOTAL DEEPWATER HABITATS	5,247

Lewis County

Lewis County had 383 acres of wetlands mapped. This amounts to 0.15 percent of the County's land area.

Palustrine Wetlands	
Open Water	297
Emergent	63
Deciduous Scrub-Shrub	6
Emergent/Deciduous Scrub-Shrub	11
Deciduous Forested	6
TOTAL WETLANDS	383
Lacustrine Waters	480
Riverine Waters	192
TOTAL DEEPWATER HABITATS	672

Lincoln County

Lincoln County had 156 acres of wetlands mapped. This amounts to 0.06 percent of the County's land area.

Palustrine Wetlands	
Open Water	124
Emergent	18
Deciduous Scrub-Shrub	4
Emergent/Deciduous Scrub-Shrub	1
Deciduous Forested	9
TOTAL WETLANDS	156
Riverine Waters	738
TOTAL DEEPWATER HABITATS	738

Logan County

Logan County had 188 acres of wetlands mapped. This amounts to 0.06 percent of the County's land area.

Palustrine Wetlands	
Open Water	144
Emergent	4
Deciduous Scrub-Shrub	5
Deciduous Forested	16
Total Palustrine Wetlands	**169**
Riverine Wetlands	19
TOTAL WETLANDS	188
Riverine Waters	881
TOTAL DEEPWATER HABITATS	881

Marion County

Marion County had 522 acres of wetlands mapped. This amounts to 0.15 percent of the County's land area.

Palustrine Wetlands	
Open Water	350
Emergent	79
Deciduous Scrub-Shrub	19
Emergent/Deciduous Scrub-Shrub	15
Deciduous Forested	48
Evergreen Forested	2
Total Palustrine Wetlands	**513**
Riverine Wetlands	9
TOTAL WETLANDS	522
Lacustrine Waters	86
Riverine Waters	1,404
TOTAL DEEPWATER HABITATS	1,490

Marshall County

Marshall County had 370 acres of wetlands mapped. This amounts to 0.19 percent of the County's land area.

Palustrine Wetlands	
Open Water	221
Dead Forested	6
Emergent	45
Deciduous Scrub-Shrub	8
Emergent/Deciduous Scrub-Shrub	1
Deciduous Forested	27
Total Palustrine Wetlands	**308**
Riverine Wetlands	62
TOTAL WETLANDS	370
Lacustrine Waters	261
Riverine Waters	3,558
TOTAL DEEPWATER HABITATS	3,819

Mason County

Mason County had 1,460 acres of wetlands mapped. This amounts to 0.75 percent of the County's land area.

Palustrine Wetlands	
Open Water	597
Dead Forested	8
Emergent	175
Deciduous Scrub-Shrub	91
Emergent/Deciduous Scrub-Shrub	33
Deciduous Forested	551
Total Palustrine Wetlands	1,455
Lacustrine Wetlands	5
TOTAL WETLANDS	1,460
Lacustrine Waters	5,797
Riverine Waters	2,803
TOTAL DEEPWATER HABITATS	8,600

McDowell County

McDowell County had 312 acres of wetlands mapped. This amounts to 0.11 percent of the County's land area.

Palustrine Wetlands	
Open Water	253
Emergent	12
Deciduous Scrub-Shrub	14
Emergent/Deciduous Scrub-Shrub	25
Deciduous Forested	1
Total Palustrine Wetlands	305
Riverine Wetlands	7
TOTAL WETLANDS	312
Riverine Waters	304
TOTAL DEEPWATER HABITATS	304

Mercer County

Mercer County had 648 acres of wetlands mapped. This amounts to 0.24 percent of the County's land area.

Palustrine Wetlands	
Open Water	440
Dead Forested	9
Emergent	99
Deciduous Scrub-Shrub	49
Emergent/Deciduous Scrub-Shrub	5
Deciduous Forested	46
TOTAL WETLANDS	648
Lacustrine Waters	254
Riverine Waters	209
TOTAL DEEPWATER HABITATS	463

Mineral County

Mineral County had 932 acres of wetlands mapped. This amounts to 0.44 percent of the County's land area.

Palustrine Wetlands	
Open Water	376
Dead Forested	10
Emergent	172
Deciduous Scrub-Shrub	34
Emergent/Deciduous Scrub-Shrub	25
Deciduous Forested	292
Mixed Forested	11
Total Palustrine Wetlands	920
Riverine Wetlands	12
TOTAL WETLANDS	932
Lacustrine Waters	451
Riverine Waters	325
TOTAL DEEPWATER HABITATS	776

Mingo County

Mingo County had 109 acres of wetlands mapped. This amounts to 0.04 percent of the County's land area.

Palustrine Wetlands	
Open Water	52
Emergent	5
Deciduous Scrub-Shrub	2
Deciduous Forested	26
Total Palustrine Wetlands	85
Riverine Wetlands	24
TOTAL WETLANDS	109
Lacustrine Waters	164
Riverine Waters	1,488
TOTAL DEEPWATER HABITATS	1,652

Monongalia County

Monongalia County had 619 acres of wetlands mapped. This amounts to 0.27 percent of the County's land area.

Palustrine Wetlands	
Open Water	434
Emergent	98
Deciduous Scrub-Shrub	20
Emergent/Deciduous Scrub-Shrub	18
Deciduous Forested	28
Evergreen Forested	2
Total Palustrine Wetlands	600
Riverine Wetlands	7
Lacustrine Wetlands	12
TOTAL WETLANDS	619
Lacustrine Waters	1,587
Riverine Waters	1,878
TOTAL DEEPWATER HABITATS	3,465

Monroe County

Monroe County had 781 acres of wetlands mapped. This amounts to 0.26 percent of the County's land area.

Palustrine Wetlands	
Open Water	372
Emergent	254
Deciduous Scrub-Shrub	87
Emergent/Deciduous Scrub-Shrub	29
Deciduous Forested	38
Total Palustrine Wetlands	780
Riverine Wetlands	1
TOTAL WETLANDS	781
Lacustrine Waters	93
Riverine Waters	69
TOTAL DEEPWATER HABITATS	162

Morgan County

Morgan County had 605 acres of wetlands mapped. This amounts to 0.41 percent of the County's land area.

Palustrine Wetlands	
Open Water	332
Dead Forested	11
Emergent	33
Deciduous Scrub-Shrub	24
Emergent/Deciduous Scrub-Shrub	2
Deciduous Forested	201
Total Palustrine Wetlands	603
Riverine Wetlands	2
TOTAL WETLANDS	605
Lacustrine Waters	38
Riverine Waters	486
TOTAL DEEPWATER HABITATS	524

Nicholas County

Nicholas County had 3,593 acres of wetlands mapped. This amounts to 0.86 percent of the County's land area.

Palustrine Wetlands	
Open Water	486
Dead Forested	9
Emergent	200
Deciduous Scrub-Shrub	512
Emergent/Deciduous Scrub-Shrub	332
Deciduous Forested	276
Mixed Forested	5
Total Palustrine Wetlands	**1,820**
Riverine Wetlands	121
Lacustrine Wetlands	1,652
TOTAL WETLANDS	3,593
Lacustrine Waters	981
Riverine Waters	1,436
TOTAL DEEPWATER HABITATS	2,417

Ohio County

Ohio County had 108 acres of wetlands mapped. This amounts to 0.16 percent of the County's land area.

Palustrine Wetlands	
Open Water	93
Emergent	9
Deciduous Forested	3
Total Palustrine Wetlands	**105**
Riverine Wetlands	2
Lacustrine Wetlands	1
TOTAL WETLANDS	108
Lacustrine Waters	1,758
TOTAL DEEPWATER HABITATS	1,758

Pendleton County

Pendleton County had 754 acres of wetlands mapped. This amounts to 0.17 percent of the County's land area.

Palustrine Wetlands	
Open Water	291
Dead Forested	2
Emergent	181
Deciduous Scrub-Shrub	27
Emergent/Deciduous Scrub-Shrub	18
Deciduous Forested	48
Evergreen Forested	2
Total Palustrine Wetlands	**569**
Riverine Wetlands	185
TOTAL WETLANDS	754
Lacustrine Waters	39
Riverine Waters	587
TOTAL DEEPWATER HABITATS	626

Pleasants County

Pleasants County had 151 acres of wetlands mapped. This amounts to 0.18 percent of the County's land area.

Palustrine Wetlands	
Open Water	70
Emergent	45
Deciduous Scrub-Shrub	14
Deciduous Forested	11
Total Palustrine Wetlands	**140**
Riverine Wetlands	5
Lacustrine Wetlands	6
TOTAL WETLANDS	151
Lacustrine Waters	2,656
Riverine Waters	329
TOTAL DEEPWATER HABITATS	2,985

Pocahontas County

Pocahontas County had 2,472 acres of wetlands mapped. This amounts to 0.41 percent of the County's land area.

Palustrine Wetlands	
Open Water	235
Dead Forested	3
Emergent	700
Deciduous Scrub-Shrub	420
Evergreen Scrub-Shrub	11
Emergent/Deciduous Scrub-Shrub	144
Deciduous Forested	563
Evergreen Forested	215
Mixed Forested	87
Total Palustrine Wetlands	2,378
Riverine Wetlands	94
TOTAL WETLANDS	2,472
Lacustrine Waters	21
Riverine Waters	1,453
TOTAL DEEPWATER HABITATS	1,474

Preston County

Preston County had 2,950 acres of wetlands mapped. This amounts to 0.71 percent of the County's land area.

Palustrine Wetlands	
Open Water	647
Dead Forested	5
Emergent	718
Deciduous Scrub-Shrub	428
Emergent/Deciduous Scrub-Shrub	352
Deciduous Forested	505
Evergreen Forested	182
Mixed Forested	105
Total Palustrine Wetlands	2,942
Riverine Wetlands	8
TOTAL WETLANDS	2,950
Lacustrine Waters	313
Riverine Waters	1,563
TOTAL DEEPWATER HABITATS	1,876

Putnam County

Putnam County had 741 acres of wetlands mapped. This amounts to 0.33 percent of the County's land area.

Palustrine Wetlands	
Open Water	334
Emergent	143
Deciduous Scrub-Shrub	31
Emergent/Deciduous Scrub-Shrub	9
Deciduous Forested	156
Total Palustrine Wetlands	673
Lacustrine Wetlands	68
TOTAL WETLANDS	741
Lacustrine Waters	100
Riverine Waters	2,462
TOTAL DEEPWATER HABITATS	2,562

Raleigh County

Raleigh County had 994 acres of wetlands mapped. This amounts to 0.26 percent of the County's land area.

Palustrine Wetlands	
Open Water	520
Dead Forested	2
Emergent	45
Deciduous Scrub-Shrub	193
Emergent/Deciduous Scrub-Shrub	15
Deciduous Forested	183
Evergreen Forested	1
Mixed Forested	23
Total Palustrine Wetlands	982
Riverine Wetlands	12
TOTAL WETLANDS	994
Lacustrine Waters	765
Riverine Waters	914
TOTAL DEEPWATER HABITATS	1,679

Randolph County

Randolph County had 3,474 acres of wetlands mapped. This amounts to 0.52 percent of the County's land area.

Palustrine Wetlands	
Open Water	399
Dead Forested	7
Emergent	782
Deciduous Scrub-Shrub	270
Evergreen Scrub-Shrub	17
Emergent/Deciduous Scrub-Shrub	243
Deciduous Forested	1,003
Evergreen Forested	605
Mixed Forested	25
Total Palustrine Wetlands	3,351
Riverine Wetlands	123
TOTAL WETLANDS	3,474
Lacustrine Waters	26
Riverine Waters	1,682
TOTAL DEEPWATER HABITATS	1,708

Ritchie County

Ritchie County had 270 acres of wetlands mapped. This amounts to 0.09 percent of the County's land area.

Palustrine Wetlands	
Open Water	180
Emergent	22
Deciduous Scrub-Shrub	4
Emergent/Deciduous Scrub-Shrub	13
Deciduous Forested	48
Total Palustrine Wetlands	267
Riverine Wetlands	3
TOTAL WETLANDS	270
Riverine Waters	222
TOTAL DEEPWATER HABITATS	222

Roane County

Roane County had 166 acres of wetlands mapped. This amounts to 0.05 percent of the County's land area.

Palustrine Wetlands	
Open Water	154
Emergent	9
Deciduous Scrub-Shrub	2
Deciduous Forested	1
TOTAL WETLANDS	166
Lacustrine Waters	100
TOTAL DEEPWATER HABITATS	100

Summers County

Summers County had 768 acres of wetlands mapped. This amounts to 0.34 percent of the County's land area.

Palustrine Wetlands	
Open Water	334
Emergent	128
Deciduous Scrub-Shrub	66
Emergent/Deciduous Scrub-Shrub	15
Deciduous Forested	201
Total Palustrine Wetlands	744
Riverine Wetlands	10
Lacustrine Wetlands	14
TOTAL WETLANDS	768
Lacustrine Waters	1,536
Riverine Waters	2,830
TOTAL DEEPWATER HABITATS	4,366

Taylor County

Taylor County had 531 acres of wetlands mapped. This amounts to 0.48 percent of the County's land area.

Palustrine Wetlands	
Open Water	121
Emergent	26
Deciduous Scrub-Shrub	16
Emergent/Deciduous Scrub-Shrub	14
Deciduous Forested	11
Total Palustrine Wetlands	188
Riverine Wetlands	8
Lacustrine Wetlands	335
TOTAL WETLANDS	531
Lacustrine Waters	1,155
Riverine Waters	425
TOTAL DEEPWATER HABITATS	1,580

Tucker County

Tucker County had 9,494 acres of wetlands mapped. This amounts to 3.52 percent of the County's land area.

Palustrine Wetlands	
Open Water	299
Dead Forested	3
Emergent	2,663
Deciduous Scrub-Shrub	2,475
Evergreen Scrub-Shrub	3
Emergent/Deciduous Scrub-Shrub	2,565
Deciduous Forested	648
Evergreen Forested	760
Mixed Forested	17
Total Palustrine Wetlands	9,433
Riverine Wetlands	61
TOTAL WETLANDS	9,494
Lacustrine Waters	68
Riverine Waters	1,378
TOTAL DEEPWATER HABITATS	1,446

Tyler County

Tyler County had 191 acres of wetlands mapped. This amounts to 0.12 percent of the County's land area.

Palustrine Wetlands	
Open Water	85
Emergent	31
Deciduous Scrub-Shrub	10
Emergent/Deciduous Scrub-Shrub	1
Deciduous Forested	63
Total Palustrine Wetlands	190
Riverine Wetlands	1
TOTAL WETLANDS	191
Lacustrine Waters	524
Riverine Waters	2,203
TOTAL DEEPWATER HABITATS	2,727

Upshur County

Upshur County had 740 acres of wetlands mapped. This amounts to 0.33 percent of the County's land area.

Palustrine Wetlands	
Open Water	416
Dead Forested	3
Emergent	93
Deciduous Scrub-Shrub	97
Emergent/Deciduous Scrub-Shrub	94
Deciduous Forested	21
Evergreen Forested	8
Total Palustrine Wetlands	732
Riverine Wetlands	8
TOTAL WETLANDS	740
Lacustrine Waters	76
Riverine Waters	533
TOTAL DEEPWATER HABITATS	609

Wayne County

Wayne County had 262 acres of wetlands mapped. This amounts to 0.08 percent of the County's land area.

Palustrine Wetlands	
Open Water	164
Emergent	25
Deciduous Scrub-Shrub	19
Deciduous Forested	54
TOTAL WETLANDS	262
Lacustrine Waters	1,725
Riverine Waters	2,770
TOTAL DEEPWATER HABITATS	4,495

Webster County

Webster County had 498 acres of wetlands mapped. This amounts to 0.14 percent of the County's land area.

Palustrine Wetlands	
Open Water	126
Emergent	50
Deciduous Scrub-Shrub	81
Emergent/Deciduous Scrub-Shrub	35
Deciduous Forested	129
Evergreen Forested	4
Mixed Forested	2
Total Palustrine Wetlands	427
Riverine Wetlands	71
TOTAL WETLANDS	498
Lacustrine Waters	80
Riverine Waters	903
TOTAL DEEPWATER HABITATS	983

Wetzel County

Wetzel County had 126 acres of wetlands mapped. This amounts to 0.05 percent of the County's land area.

Palustrine Wetlands	
Open Water	50
Emergent	30
Deciduous Scrub-Shrub	5
Emergent/Deciduous Scrub-Shrub	1
Deciduous Forested	22
Total Palustrine Wetlands	108
Riverine Wetlands	18
TOTAL WETLANDS	126
Riverine Waters	2,176
TOTAL DEEPWATER HABITATS	2,176

Wirt County

Wirt County had 155 acres of wetlands mapped. This amounts to 0.10 percent of the County's land area.

Palustrine Wetlands	
Open Water	106
Emergent	17
Deciduous Scrub-Shrub	8
Emergent/Deciduous Scrub-Shrub	8
Deciduous Forested	14
Total Palustrine Wetlands	153
Riverine Wetlands	2
TOTAL WETLANDS	155
Riverine Waters	1,211
TOTAL DEEPWATER HABITATS	1,211

Wood County

Wood County had 817 acres of wetlands mapped. This amounts to 0.35 percent of the County's land area.

Palustrine Wetlands	
Open Water	362
Emergent	166
Deciduous Scrub-Shrub	44
Emergent/Deciduous Scrub-Shrub	20
Deciduous Forested	223
Total Palustrine Wetlands	815
Riverine Wetlands	1
Lacustrine Wetlands	2
TOTAL WETLANDS	817
Lacustrine Waters	6,140
Riverine Waters	739
TOTAL DEEPWATER HABITATS	6,879

Wyoming County

Wyoming County had 298 acres of wetlands mapped. This amounts to 0.09 percent of the County's land area.

Palustrine Wetlands	
Open Water	186
Dead Forested	1
Emergent	30
Deciduous Scrub-Shrub	24
Emergent/Deciduous Scrub-Shrub	34
Deciduous Forested	10
Total Palustrine Wetlands	285
Riverine Wetlands	12
Lacustrine Wetlands	1
TOTAL WETLANDS	298
Lacustrine Waters	426
Riverine Waters	489
TOTAL DEEPWATER HABITATS	915

Watershed Totals

The following section summarizes the results of the wetlands inventory of West Virginia's watersheds. U.S. Geological Survey hydrologic units were used to define the "watersheds" (U.S. Geological Survey, 1974). Using the system, 32 "watersheds" are present in West Virginia (Figure 4-7). Names have been assigned to these hydrologic units based on the major rivers draining each geographic area. The data are approximate acreages as watershed boundaries were derived from the U.S.G.S. hydrounit file which was originally digitized from a 1:500,000 scale map. Acreage data presented are for polygons shown on NWI maps and do not include acreages of narrow streams and wetlands mapped as linear features, or wetlands and waterways that were too small to depict on NWI maps. Linear miles of streams are also provided — these numbers represent only the miles of narrow streams mapped as linear features and do not include mileage of rivers and larger streams.

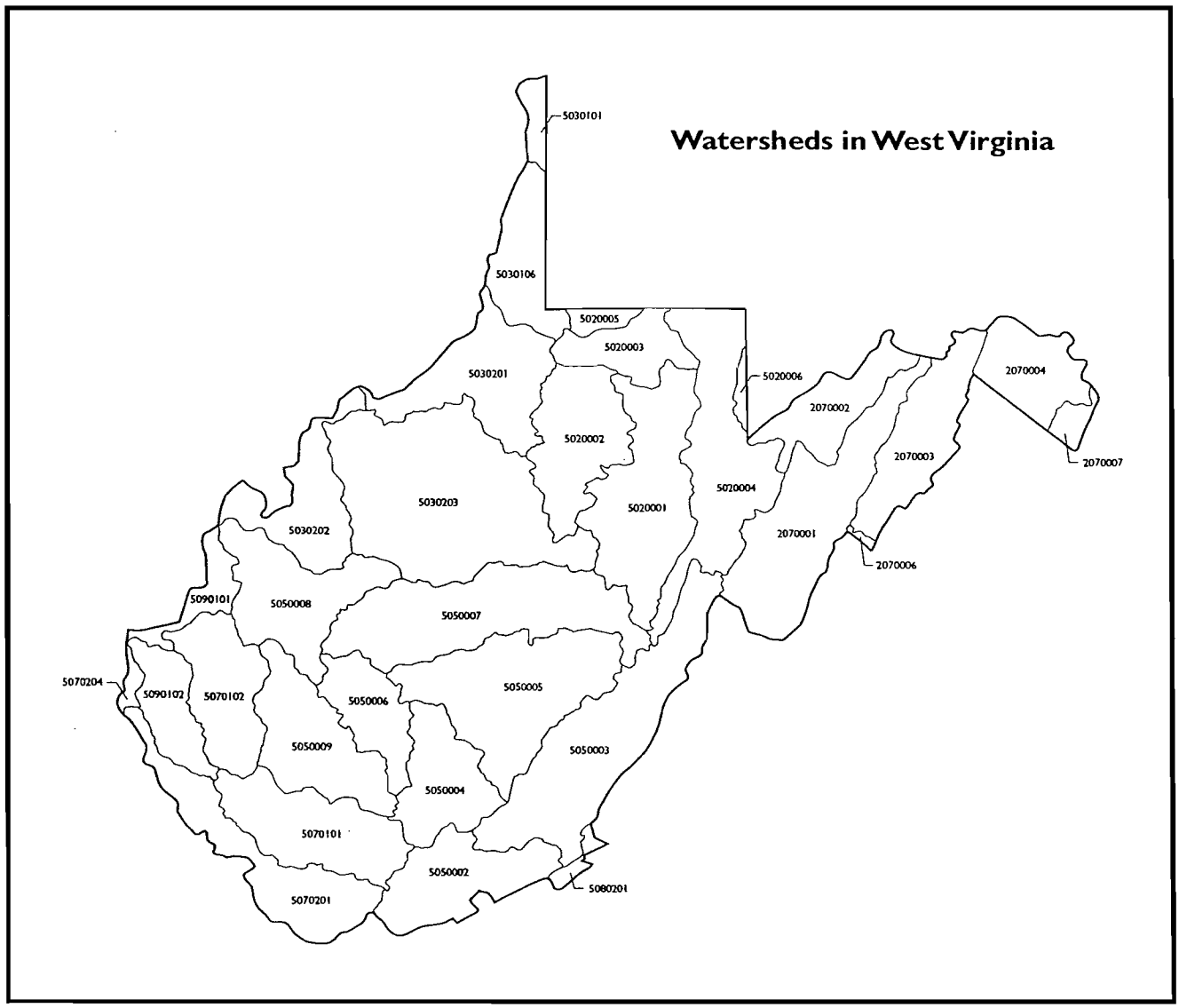

Figure 4-7. West Virginia's major watersheds (hydrologic units) as defined by the U.S. Geological Survey (1974).

South Branch of Potomac River Watershed
(U.S.G.S. Hydrologic Unit 02070001)

Palustrine Wetlands	
Forested, Dead	1.8
Emergent	506.1
Scrub-Shrub	90.1
Emergent/Scrub-Shrub	36.4
Forested, Deciduous	305.7
Forested, Evergreen	2.0
Nonvegetated	717.0
Total Palustrine Wetlands	1,659.1
Riverine Wetlands	233.5
TOTAL WETLANDS	1,892.6
Lacustrine Waters	95.9
Riverine Waters	3,019.6*
TOTAL DEEPWATER HABITATS	3,115.5

**272.1 miles of linear streams were also mapped.*

North Branch of Potomac River – Patterson Creek Watershed
(U.S.G.S. Hydrologic Unit 02070002)

Palustrine Wetlands	
Forested, Dead	10.9
Emergent	404.0
Scrub-Shrub, Deciduous	259.7
Emergent/Scrub-Shrub	501.8
Forested, Deciduous	430.1
Forested, Evergreen	94.1
Forested, Mixed	19.5
Nonvegetated	640.9
Total Palustrine Wetlands	2,361.0
Riverine Wetlands	10.0
Lacustrine Wetlands	21.2
TOTAL WETLANDS	2,392.2
Lacustrine Waters	1,966.6
Riverine Waters	711.2*
TOTAL DEEPWATER HABITATS	2,677.8

**115.9 miles of linear streams were also mapped.*

Cacapon River – North River – Little Cacapon River Watershed
(U.S.G.S. Hydrologic Unit 02070003)

Palustrine Wetlands	
Forested, Dead	9.6
Emergent	156.0
Scrub-Shrub, Deciduous	84.6
Emergent/Scrub-Shrub	21.6
Forested, Deciduous	205.5
Nonvegetated	570.0
Total Palustrine Wetlands	1,047.3
Riverine Wetlands	74.4
TOTAL WETLANDS	1,121.7
Lacustrine Waters	57.4
Riverine Waters	1,781.7*
TOTAL DEEPWATER HABITATS	1,839.1

**145.6 miles of linear streams were also mapped.*

Sleepy Creek – Meadow Brook – Back Creek – Opequon Creek Watershed
(U.S.G.S. Hydrologic Unit 02070004)

Palustrine Wetlands	
Forested, Dead	0.8
Emergent	501.4
Scrub-Shrub, Deciduous	63.6
Emergent/Scrub-Shrub	59.8
Forested, Deciduous	820.6
Nonvegetated	965.5
Total Palustrine Wetlands	2,411.7
Riverine Wetlands	5.6
TOTAL WETLANDS	2,417.3
Lacustrine Waters	316.5
Riverine Waters	2,175.3*
TOTAL DEEPWATER HABITATS	2,491.8

**175.1 miles of linear streams were also mapped.*

North Fork of Shenandoah River Watershed
(U.S.G.S. Hydrologic Unit 02070006)

Palustrine Wetlands	
Emergent	2.7
Nonvegetated	4.2
TOTAL WETLANDS	6.9

No deepwater habitat acreage*

**1.0 mile of linear streams was also mapped.*

Lower Shenandoah River Watershed
(U.S.G.S. Hydrologic Unit 02070007)

Palustrine Wetlands	
Emergent	433.4
Scrub-Shrub, Deciduous	15.0
Emergent/Scrub-Shrub	11.7
Forested, Deciduous	241.2
Nonvegetated	92.5
Total Palustrine Wetlands	793.8
Riverine Wetlands	3.6
TOTAL WETLANDS	797.4
Lacustrine Waters	80.8
Riverine Waters	1,332.9*
TOTAL DEEPWATER HABITATS	1,413.7

**12.3 miles of linear streams were also mapped.*

Bullpasture River Watershed
(U.S.G.S. Hydrologic Unit 02080201)

Palustrine Wetlands	
Emergent	30.4
Scrub-Shrub, Deciduous	19.2
Emergent/Scrub-Shrub	4.4
Forested, Deciduous	10.9
Nonvegetated	30.1
TOTAL WETLANDS	95.0

No deepwater habitat acreage*

**15.3 miles of linear streams were also mapped.*

Tygart Valley River – Buckhannon River – Middle Fork River Watershed
(U.S.G.S. Hydrologic Unit 05020001)

Palustrine Wetlands	
Forested, Dead	12.9
Emergent	647.1
Scrub-Shrub, Deciduous	274.8
Scrub-Shrub, Evergreen	4.8
Emergent/Scrub-Shrub	217.8
Forested, Deciduous	1,056.0
Forested, Evergreen	56.6
Forested, Mixed	16.6
Nonvegetated	1,046.2
Total Palustrine Wetlands	3,332.8
Riverine Wetlands	104.9
Lacustrine Wetlands	341.3
TOTAL WETLANDS	3,779.0
Lacustrine Waters	1,467.8
Riverine Waters	3,341.1*
TOTAL DEEPWATER HABITATS	4,808.9

**235.0 miles of linear streams were also mapped.*

West Fork River – Tenmile Creek – Elk Creek Watershed
(U.S.G.S. Hydrologic Unit 05020002)

Palustrine Wetlands	
Forested, Dead	2.2
Emergent	379.5
Scrub-Shrub, Deciduous	31.2
Emergent/Scrub-Shrub	55.6
Forested, Deciduous	57.9
Nonvegetated	1,252.1
Total Palustrine Wetlands	1,778.5
Riverine Wetlands	0.8
TOTAL WETLANDS	1,779.3
Lacustrine Waters	712.5
Riverine Waters	1,220.2*
TOTAL DEEPWATER HABITATS	1,932.7

**186.2 miles of linear streams were also mapped.*

Monongahela River Watershed
(U.S.G.S. Hydrologic Unit 05020003)

Palustrine Wetlands	
Emergent	194.1
Scrub-Shrub, Deciduous	56.4
Emergent/Scrub-Shrub	55.1
Forested, Deciduous	60.4
Forested, Evergreen	4.0
Nonvegetated	662.8
Total Palustrine Wetlands	1,032.8
Riverine Wetlands	0.5
Lacustrine Wetlands	9.9
TOTAL WETLANDS	1,043.2
Lacustrine Waters	175.2
Riverine Waters	2,220.1*
TOTAL DEEPWATER HABITATS	2,395.3

**61.9 miles of linear streams were also mapped.*

Cheat River Watershed
(U.S.G.S. Hydrologic Unit 05020004)

Palustrine Wetlands	
Forested, Dead	8.9
Emergent	3,324.6
Scrub-Shrub, Deciduous	2,741.3
Scrub-Shrub, Evergreen	19.1
Emergent/Scrub-Shrub	2,878.9
Forested, Deciduous	968.0
Forested, Evergreen	1,367.9
Forested, Mixed	79.5
Nonvegetated	776.4
Total Palustrine Wetlands	12,164.6
Riverine Wetlands	126.0
Lacustrine Wetlands	2.5
TOTAL WETLANDS	12,293.1
Lacustrine Waters	1,702.0
Riverine Waters	4,080.7*
TOTAL DEEPWATER HABITATS	5,782.7

**265.0 miles of linear streams were also mapped.*

Dunkard Creek Watershed
(U.S.G.S. Hydrologic Unit 05020005)

Palustrine Wetlands	
Emergent	35.1
Scrub-Shrub, Deciduous	12.6
Emergent/Scrub-Shrub	10.2
Forested, Deciduous	9.2
Nonvegetated	111.8
TOTAL WETLANDS	178.9
Lacustrine Waters	1.9
Riverine Waters	157.4*
TOTAL DEEPWATER HABITATS	159.3

**11.4 miles of linear streams were also mapped.*

Youghiogheny River Watershed
(U.S.G.S. Hydrologic Unit 05020006)

Palustrine Wetlands	
Emergent	495.8
Scrub-Shrub, Deciduous	403.1
Emergent/Scrub-Shrub	226.5
Forested, Deciduous	287.7
Forested, Evergreen	208.6
Forested, Mixed	74.3
Nonvegetated	56.5
TOTAL WETLANDS	1,752.5
Lacustrine Waters	173.2
Riverine Waters	0.0*
TOTAL DEEPWATER HABITATS	173.2

**11.9 miles of linear streams were also mapped.*

Raccoon Creek (PA) Watershed
(U.S.G.S. Hydrologic Unit 05030101)

Palustrine Wetlands	
Emergent	40.0
Scrub-Shrub, Deciduous	5.3
Emergent/Scrub-Shrub	1.2
Forested, Deciduous	26.7
Forested, Evergreen	0.7
Nonvegetated	185.5
Total Palustrine Wetlands	259.4
Lacustrine Wetlands	2.2
TOTAL WETLANDS	261.6
Lacustrine Waters	1,708.3
Riverine Waters	887.2*
TOTAL DEEPWATER HABITATS	2,595.5

**26.1 miles of linear streams were also mapped.*

Fish Creek – Grave Creek – Wheeling Creek – Enlow Fork (PA) Watershed
(U.S.G.S. Hydrologic Unit 05030106)

Palustrine Wetlands	
Forested, Dead	5.8
Emergent	61.7
Scrub-Shrub, Deciduous	8.8
Emergent/Scrub-Shrub	2.7
Forested, Deciduous	51.1
Nonvegetated	394.9
Total Palustrine Wetlands	525.0
Riverine Wetlands	71.0
Lacustrine Wetlands	1.0
TOTAL WETLANDS	597.0
Lacustrine Waters	2,233.8
Riverine Waters	1,730.2*
TOTAL DEEPWATER HABITATS	3,964.0

**110.9 miles of linear streams were also mapped.*

Fishing Creek – Middle Island Creek Watershed
(U.S.G.S. Hydrologic Unit 05030201)

Palustrine Wetlands	
Emergent	122.7
Scrub-Shrub, Deciduous	31.2
Emergent/Scrub-Shrub	3.6
Forested, Deciduous	132.2
Nonvegetated	276.3
Total Palustrine Wetlands	566.0
Riverine Wetlands	20.9
Lacustrine Wetlands	7.8
TOTAL WETLANDS	594.7
Lacustrine Waters	2,670.9
Riverine Waters	2,995.0*
TOTAL DEEPWATER HABITATS	5,665.9

**184.8 miles of linear streams were also mapped.*

Big Run Watershed
(U.S.G.S. Hydrologic Unit 05030202)

Palustrine Wetlands	
Forested, Dead	8.2
Emergent	246.9
Scrub-Shrub, Deciduous	89.3
Emergent/Scrub-Shrub	13.6
Forested, Deciduous	280.5
Nonvegetated	930.3
Total Palustrine Wetlands	1,568.8
Riverine Wetlands	2.7
Lacustrine Wetlands	5.0
TOTAL WETLANDS	1,576.5
Lacustrine Waters	7,356.6
Riverine Waters	305.4*
TOTAL DEEPWATER HABITATS	7,662.0

**171.4 miles of linear streams were also mapped.*

Little Kanawha River Watershed
(U.S.G.S. Hydrologic Unit 05030203)

Palustrine Wetlands	
Forested, Dead	28.8
Emergent	120.0
Scrub-Shrub, Deciduous	43.8
Emergent/Scrub-Shrub	47.8
Forested, Deciduous	216.6
Nonvegetated	928.7
Total Palustrine Wetlands	**1,385.7**
Riverine Wetlands	11.5
Lacustrine Wetlands	290.3
TOTAL WETLANDS	1,687.5
Lacustrine Waters	757.9
Riverine Waters	2,847.8*
TOTAL DEEPWATER HABITATS	3,605.7

**591.3 miles of linear streams were also mapped.*

Bluestone River – East River – Indian Creek Watershed
(U.S.G.S. Hydrologic Unit 05050002)

Palustrine Wetlands	
Forested, Dead	9.0
Emergent	232.0
Scrub-Shrub, Deciduous	105.0
Emergent/Scrub-Shrub	29.1
Forested, Deciduous	181.7
Nonvegetated	809.6
Total Palustrine Wetlands	**1,366.4**
Riverine Wetlands	2.2
Lacustrine Wetlands	13.7
TOTAL WETLANDS	1,382.3
Lacustrine Waters	1,790.8
Riverine Waters	1,441.6*
TOTAL DEEPWATER HABITATS	3,232.4

**148.9 miles of linear streams were also mapped.*

Greenbrier River Watershed
(U.S.G.S. Hydrologic Unit 05050003)

Palustrine Wetlands	
Forested, Dead	3.4
Emergent	1,034.8
Scrub-Shrub, Deciduous	371.0
Emergent/Scrub-Shrub	210.7
Forested, Deciduous	711.5
Forested, Evergreen	45.6
Forested, Mixed	39.8
Nonvegetated	785.2
Total Palustrine Wetlands	**3,202.0**
Riverine Wetlands	122.9
TOTAL WETLANDS	3,324.9
Lacustrine Waters	272.0
Riverine Waters	4,173.0*
TOTAL DEEPWATER HABITATS	4,445.0

**351.3 miles of linear streams were also mapped.*

Upper Reach of New River Watershed
(U.S.G.S. Hydrologic Unit 05050004)

Palustrine Wetlands	
Emergent	179.9
Scrub-Shrub, Deciduous	221.1
Emergent/Scrub-Shrub	23.0
Forested, Deciduous	298.2
Forested, Evergreen	1.4
Forested, Mixed	18.0
Nonvegetated	817.1
Total Palustrine Wetlands	**1,558.7**
Riverine Wetlands	143.8
Lacustrine Wetlands	3.9
TOTAL WETLANDS	1,706.4
Lacustrine Waters	757.1
Riverine Waters	3,159.5*
TOTAL DEEPWATER HABITATS	3,916.6

**121.1 miles of linear streams were also mapped.*

Meadow River Watershed
(U.S.G.S. Hydrologic Unit 05050005)

Palustrine Wetlands	
Forested, Dead	20.1
Emergent	2,479.8
Scrub-Shrub, Deciduous	1,184.0
Scrub-Shrub, Evergreen	7.6
Emergent/Scrub-Shrub	1,253.7
Forested, Deciduous	2,777.5
Forested, Evergreen	170.4
Forested, Mixed	69.9
Nonvegetated	1,002.3
Total Palustrine Wetlands	8,965.3
Riverine Wetlands	197.7
Lacustrine Wetlands	1,652.9
TOTAL WETLANDS	10,815.9
Lacustrine Waters	1,123.7
Riverine Waters	2,986.1*
TOTAL DEEPWATER HABITATS	4,109.8

**318.3 miles of linear streams were also mapped.*

Upper Reach of Kanawha River – Lower Reach of New River Watershed
(U.S.G.S. Hydrologic Unit 05050006)

Palustrine Wetlands	
Emergent	37.5
Scrub-Shrub, Deciduous	14.8
Emergent/Scrub-Shrub	1.2
Forested, Deciduous	61.7
Nonvegetated	203.9
Total Palustrine Wetlands	319.1
Riverine Wetlands	28.6
TOTAL WETLANDS	347.7
Lacustrine Waters	423.3
Riverine Waters	3,062.8*
TOTAL DEEPWATER HABITATS	3,486.1

**102.3 miles of linear streams were also mapped.*

Elk River Watershed
(U.S.G.S. Hydrologic Unit 05050007)

Palustrine Wetlands	
Forested, Dead	0.8
Emergent	52.3
Scrub-Shrub, Deciduous	48.5
Emergent/Scrub-Shrub	9.2
Forested, Deciduous	138.5
Forested, Evergreen	0.4
Forested, Mixed	1.5
Nonvegetated	360.0
Total Palustrine Wetlands	611.2
Riverine Wetlands	97.3
Lacustrine Wetlands	0.9
TOTAL WETLANDS	709.4
Lacustrine Waters	1,560.6
Riverine Waters	2,835.3*
TOTAL DEEPWATER HABITATS	4,395.9

**357.0 miles of linear streams were also mapped.*

Lower Reach of Kanawha River Watershed
(U.S.G.S. Hydrologic Unit 05050008)

Palustrine Wetlands	
Emergent	230.3
Scrub-Shrub, Deciduous	59.3
Emergent/Scrub-Shrub	11.0
Forested, Deciduous	526.1
Nonvegetated	678.7
Total Palustrine Wetlands	1,505.4
Lacustrine Wetlands	67.6
TOTAL WETLANDS	1,573.0
Lacustrine Waters	273.1
Riverine Waters	5,745.1*
TOTAL DEEPWATER HABITATS	6,018.2

**221.0 miles of linear streams were also mapped.*

Coal River Watershed
(U.S.G.S. Hydrologic Unit 05050009)

Palustrine Wetlands	
Forested, Dead	0.3
Emergent	41.3
Scrub-Shrub, Deciduous	59.1
Emergent/Scrub-Shrub	12.8
Forested, Deciduous	109.7
Forested, Mixed	4.5
Nonvegetated	454.0
Total Palustrine Wetlands	681.7
Riverine Wetlands	36.3
TOTAL WETLANDS	718.0
Lacustrine Waters	321.7
Riverine Waters	1,391.9*
TOTAL DEEPWATER HABITATS	1,713.6

**187.5 miles of linear streams were also mapped.*

Upper Reach of Guyandotte River Watershed
(U.S.G.S. Hydrologic Unit 05070101)

Palustrine Wetlands	
Forested, Dead	3.6
Emergent	40.7
Scrub-Shrub, Deciduous	32.9
Emergent/Scrub-Shrub	37.7
Forested, Deciduous	23.9
Nonvegetated	342.8
Total Palustrine Wetlands	481.6
Riverine Wetlands	21.1
Lacustrine Wetlands	1.0
TOTAL WETLANDS	503.7
Lacustrine Waters	567.3
Riverine Waters	1,243.7*
TOTAL DEEPWATER HABITATS	1,811.0

**227.0 miles of linear streams were also mapped.*

Lower Reach of Guyandotte River Watershed
(U.S.G.S. Hydrologic Unit 05070102)

Palustrine Wetlands	
Emergent	44.0
Scrub-Shrub, Deciduous	8.5
Emergent/Scrub-Shrub	1.1
Forested, Deciduous	58.1
Nonvegetated	334.3
Total Palustrine Wetlands	446.0
Riverine Wetlands	2.1
TOTAL WETLANDS	448.1
Riverine Waters	1,835.8*
TOTAL DEEPWATER HABITATS	1,835.8

**161.8 miles of linear streams were also mapped.*

Tug Fork Watershed
(U.S.G.S. Hydrologic Unit 05070201)

Palustrine Wetlands	
Emergent	14.6
Scrub-Shrub, Deciduous	14.3
Emergent/Scrub-Shrub	24.8
Forested, Deciduous	19.4
Nonvegetated	322.9
Total Palustrine Wetlands	396.0
Riverine Wetlands	26.3
TOTAL WETLANDS	422.3
Lacustrine Waters	23.4
Riverine Waters	1,890.6*
TOTAL DEEPWATER HABITATS	1,914.0

**197.2 miles of linear streams were also mapped.*

Big Sandy River Watershed
(U.S.G.S. Hydrologic Unit 05070204)

Palustrine Wetlands	
Emergent	10.0
Scrub-Shrub, Deciduous	0.4
Forested, Deciduous	10.5
Nonvegetated	43.8
TOTAL WETLANDS	64.7
Riverine Waters	387.6*
TOTAL DEEPWATER HABITATS	387.6

**21.8 miles of linear streams were also mapped.*

Guyan Creek – Sixteenmile Creek Watershed
(U.S.G.S. Hydrologic Unit 05090101)

Palustrine Wetlands	
Emergent	51.3
Scrub-Shrub, Deciduous	108.3
Emergent/Scrub-Shrub	25.7
Forested, Deciduous	188.4
Nonvegetated	139.7
TOTAL WETLANDS	513.4
Lacustrine Waters	1,234.3
Riverine Waters	3,166.0*
TOTAL DEEPWATER HABITATS	4,400.3

**50.1 miles of linear streams were also mapped.*

Twelvepole Creek Watershed
(U.S.G.S. Hydrologic Unit 05090102)

Palustrine Wetlands	
Emergent	17.9
Scrub-Shrub, Deciduous	15.0
Forested, Deciduous	36.5
Nonvegetated	114.3
TOTAL WETLANDS	183.7
Lacustrine Waters	1,735.5
Riverine Waters	398.3*
TOTAL DEEPWATER HABITATS	2,133.8

**110.3 miles of linear streams were also mapped.*

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