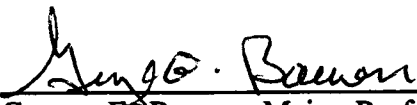
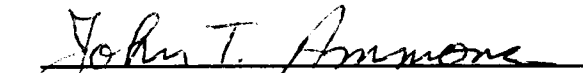
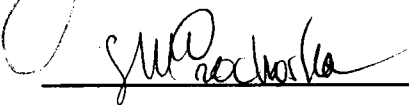


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**Wetland Protection Policies, Programs and Approaches:
Alternatives for Tennessee**

**A Thesis
Presented for the
Master of Science
Degree
The University of Tennessee, Knoxville**

**George Dodd Galbreath
August, 1992**

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ABSTRACT

Over 53% of wetlands in the United States since 1780 have been lost. Tennessee has been no exception with losses totaling 59%. The loss of wetlands means the loss of wetland benefits such as flood control, water quality, biodiversity, groundwater recharge, and wildlife habitat. The problem at present is how to protect wetlands.

In Tennessee two problems complicate the need to identify effective protection for wetlands. First, there appears to be a lack of information in Tennessee concerning wetland protection policy alternatives. Policy makers in the state are not exposed to national wetland policy experts or to experiences of other states in wetland protection efforts. Second, the policy process in Tennessee is thwarted by special interests who dominate wetland policy debates and prevent agreement and compromise for wetland protection policy.

This thesis study addressed these problems through four methods. One, the study identified the history and background of wetland losses and wetland policy in the United States and Tennessee as well as recent policy research. Second, a telephone survey was conducted of seven national wetland policy experts to help focus and provide direction to the study. Third, the study conducted a telephone survey of natural resource professionals and stakeholders in Tennessee to determine practical approaches to wetland protection. In addition areas of agreement were identified among the special interests and among a greater number of people interested in or affected by wetland policy issues.

Fourth, the study used a case study of one state with natural resource and wetland protection legislation to identify successful approaches for wetland protection.

From the data, the study presents four basic recommendations. First, Tennessee should develop new approaches for wetland policy by holistic natural resource management through a broad natural resource protection program that identifies critically threatened natural resources. Second, Tennessee should develop a wetland focus within its broad natural resource program that promotes no-net-loss policy, conservation education, "carrot and stick" protection, and overall fairness for affected parties. Third, private sector groups in Tennessee are asked to begin a coalition building, policy process to focus attention on natural resource issues, promote natural resource protection and develop specific action. Lastly, universities, the legislature, the state wetland task force and government agencies are asked to get more involved, pass and fund wetland protection policy, develop consistent guidelines and cooperate to solve resource problems respectively.

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CHAPTER ONE

INTRODUCTION

STUDY SUMMARY

The environmental movement of the 1970's created interest in environmental and natural resource protection. The most recognizable problems, air pollution (from industry and auto emissions) and water pollution (from industrial and municipal "point sources") were addressed first. Although environmental protection was de-emphasized by the Reagan Administration in the 1980's, landmark legislation created new policy directions for soil conservation, forest development and water quality. In recent years, new environmental concerns combined with the recognized loss of certain natural resources have highlighted the critical status of some individual resources and the interrelationship of all natural resources. Such is the case concerning *wetlands*.

Wetlands provide a broad range of natural resource benefits for society. Wetlands increase flood control, improve water quality, preserve biodiversity, provide wildlife habitat, and promote groundwater recharge and provide other societal benefits. However, these benefits have been recognized much too late. Historically, wetlands were thought to be wastelands. Many wetlands have been lost due to their potential as other land uses.

During colonial period of America, somewhere between 215 million and 221 million acres of wetlands were estimated to exist in the contiguous United States (Dahl, 1990; Morganweck, 1989). Between 1780 and 1980, it is estimated that 53 percent these wetlands have been converted to other land uses. Fifty percent or more of the original wetlands in twenty states have been lost (Dahl, 1990).

Historically, the federal government has developed many polices designed to protect wetlands through regulatory and non-regulatory means. Since 1980, the practice of "new federalism" has caused a shift of the responsibilities from federal government to state government. As a result, states now must react to federal policy and develop some of their own methods for protecting wetlands. Some states, such as Minnesota have developed comprehensive wetland protection programs. Although Tennessee is not a national leader in wetland protection, some feel Tennessee leads many southern states in rural, inland type wetland protection (Chapter 3, Survey Results).

In many states, wetland protection policy must be developed in a difficult policy environment. Inconsistent federal wetland definitions for jurisdictional wetlands and inconsistent national policy has created confusion and controversy. This factor combined with overzealous approaches to regulate wetlands has resulted in political resistance to wetland protection from special interests. Special interests have sought to de-emphasize wetland protection to protect narrowly focused priorities. Polarized viewpoints have resulted from political resistance on either end of the continuum of interests. Between these extremes lies a more moderate body of thought

that desires to balance resource protection (and social benefit) and personal rights. In order to identify the balance between social and personal benefits Tennessee, like many other states, is currently conducting a state wetland planning process.

Problem Statement

The problem addressed by this thesis is two fold. The first problem concerns a lack of information about the effectiveness and feasibility of alternative policy approaches for wetland protection. Although an abundance of policy research exists, most wetland policy research is narrowly focused. However some articles, research studies, national policy experts and professionals in Tennessee offer a wide range of untapped knowledge and expertise concerning wetland protection policy alternatives. The second problem is what appears to be an inability to develop wetland policy in a policy environment dominated by polarized interests. These dominant views, created by environmental and agricultural interests alike, prevent the policy process from functioning effectively. Thus, it is difficult for the views existing between the extremes to be heard. Without resolving the issues or identifying points of agreement, policy development and implementation will likely not occur.

Value of the Study

This thesis was designed specifically to address problems in Tennessee. It uses knowledge of experts in the national wetland policy field and lessons learned from other states experienced in wetland policy. The study will also use and report

the opinions of state natural resource leaders and stakeholders in Tennessee concerning wetland protection issues. In addition, this research has occurred at a very timely period in the development of wetland policy for Tennessee. There will be an opportunity to share and distribute research findings to the Tennessee Wetland Plan Task Force before a state wetland plan is completed. This thesis should provide insights to help overcome obstacles and barriers in the planning and implementation process of the state wetland plan.

Study Purpose and Research Questions

The purpose of this study was to identify feasible and effective policy alternatives for wetland protection in Tennessee. In addition, potential areas of agreement were identified on wetland issues among special interests and stakeholders in Tennessee. Additional attention is directed on the policy process of another state in which successful wetland policies were developed, adopted and implemented. The focus of the study was based on the following research questions.

Primary Research Question

What are Tennessee's major wetland protection problems, constraints, issues and needs?

Secondary Research Questions

- (1) What are Tennessee's wetland protection policies and programs?
- (2) What legislation or programs have been identified as successful in the literature?

- (3) What kinds of wetland protection programs have been successful in other states? What techniques were used? Why was it successful?
- (4) What process occurred to initiate wetland protection programs and why were the programs successful?
- (5) What other approaches should be developed for wetland protection in Tennessee?

RESEARCH METHODOLOGY

This study was developed through the consideration of available information and expertise. First, an environmental scan was conducted to identify contacts and information sources. Information and data sources were provided by government officials, wetland specialists headquartered at the University of Tennessee, and from the researcher's experiences in graduate courses and professional natural resource work. A variety of research methodologies were considered. The research methodology was chosen based on available time to conduct the study, the controversial nature of the wetland issue, and the scope of the research product. Telephone Surveys and a case study were chosen due to the need to gain personal input from various policy interests and the opportunity to report on other successful state efforts.

Research Approach

The study was divided into five stages. First, a literature search was conducted relating to wetlands, wetland inventories, wetland policies, tools used to protect wetlands, surveys, case studies and other related information. Second, a

national experts telephone survey was developed to identify progressive wetlands policies and to help focus the study. Third, a state telephone survey of stakeholders, professionals and private citizens in Tennessee was developed to gain input for policy development and to gauge the practicality of certain wetland protection approaches. Fourth, a case study was conducted on one leading state in wetland protection as identified by the national survey. Fifth, the preliminary findings of these efforts was presented to a panel of policy specialists to test study conclusions.

Survey Design and Administration

The telephone surveys were developed using methodology and administrative techniques outlined in Don A. Dillman's, *Mail and Telephone Surveys: The Total Design Method* (1978). Drafts of the survey questions (See Appendix B) were developed and modified to reflect accuracy in questioning and responses. Both surveys were reviewed by the thesis committee chairman and a technical advisor. Three surveys were used as a pre-test that resulted in two revisions of the survey instrument.

Survey administration was prompted by direct call scheduling at the Tennessee Water Resources Research Center, University of Tennessee. However, a few respondents were gracious enough to return calls (one national expert called from a phone booth in Florida). None of the survey respondents were allowed to see the survey in advance. A statement of confidentiality and value of the study was read to

each respondent prior to the questioning (See Appendix B). Final results were tabulated and summarized by the researcher.

Case Study Design and Administration

The case study state, Minnesota, was chosen as a result of the national survey. The case study focused on two legislative acts that related to wetland policy in Minnesota. An abundance of research literature was available for one act but was limited for the more recent act passed in 1991. Data, brochures, legislative summaries, state annotated code and annual reports were used to develop conclusions about program components and successes. Six telephone interviews were conducted with Minnesota researchers, state program coordinators and organization representatives to gain further insights into policy development and success.

The Panel Review Process

The panel review process was designed to gain input on study conclusions and data gathered prior to developing final study conclusions. The panel consisted of one thesis committee member and a policy specialist. Preliminary conclusions were presented by the principal investigator and discussed by the group. The process consisted of an informal, round table discussion of the study findings and other potential conclusions. This process occurred prior to the thesis defense.

LIMITATIONS OF THE STUDY

This study will offer specific recommendations that address policy topic areas identified in the surveys and literature. The policy recommendations will primarily address protection options for rural, privately owned wetlands as opposed to wetlands in more urbanized areas. The policy recommendations are designed specifically on the basis of the political, ecological and economic policy environment of Tennessee and one should be careful when generalizing to other states.

THESIS ORGANIZATION

The thesis is structured in the following manner. Chapter Two addresses the literature review of wetland definition, wetland functions, the status and history of wetlands as a resource, wetland policy and existing policy research. Chapter Three addresses the survey results, case study materials, and the panel review. Chapter Four discusses insights and factors concerning the development of successful policy as well as recommendations for wetland policy in Tennessee.

CHAPTER TWO

HISTORICAL OVERVIEW AND RELATED LITERATURE

WETLANDS: DEFINITION, TYPES, FUNCTIONS AND VALUES

"'Wetlands' is the collective term for marshes, swamps, bogs and similar areas that often develop between open water and dry land" (Environmental Protection Agency (EPA), 1988, p. 1). Wetlands also includes land areas outside of the dry land and water interface such as prairie potholes, isolated depressions or wet drains. Because wetlands is a collective term, there are many ways that people define wetlands. For public policy development, the basis in which people define wetlands is important. There are two ways that wetlands are defined: definition by pre-developed standards or guidelines and definition by perception.

For the purpose of law and science, standards and guidelines are used to determine which land is a wetland. For example, Section 404 of the Clean Water Act defines a wetland as "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" (EPA, 1988, p. 1). These scientific and technical guidelines define the characteristics of wetlands. State environmental and resource agencies in Tennessee have used the following definition:

Wetlands are areas which have hydric soils and a [50%] dominance of obligate hydrophytes [and are also areas with] obligate hydrophytes and non-hydric soils [emphasis added]. Some exceptions include farm ponds, non-hydric soil lands farmed prior to 1977 and other lands farmed without the need for drainage practices prior to 1977. (Tennessee House of Representatives, 1985, p. 8)

Therefore, from a legal and scientific standpoint, wetlands are areas that support hydrophytic vegetation, contain hydric soils, and have certain hydrological characteristics (i.e., they are saturated near or above the surface with water). In most definitions, each of these factors is important. In fact, the *1989 Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (currently under revision), focused attention on the use of these criteria for wetland delineation.

Hydrology¹, and the characteristics of hydrology is "the engine that drives a wetland" (Don Porter, Personal Communication, May 11, 1992). Without hydrology, a wetland would not exist. Wetness, a characteristic of hydrology, is the primary factor by which wetlands are identified as wetlands. The point that divides wet and dry land and differentiates wetlands from non-wetlands has been very controversial (Walker and Richardson, 1991). Controversy over the wetland boundaries based on wetness is part of the reason inconsistent federal wetland definitions jurisdictional purposes.

Wetness and hydrology has been the basis for past and current definitions of wetlands. *Saturation*, one form of wetness, can occur *within* the soil as the ground

¹ The term *hydrology* will be used throughout this section to describe the process of water movement through air and soil. This term is used (or mis-used) in this manner quite frequently in the literature. When properly used *hydrology* describes the *science* of water movement not the process of water movement.

water rises to the surface causing it to become "thoroughly wet" or "full of moisture" (Webster, 1984, p. 1044). The depth to which water exists below the surface is a primary characteristic of saturation and is sometimes used as a cutoff point between non-wetlands and wetlands. For example, to define jurisdictional wetlands, the *1989 Federal Wetland Manual* directed that saturation occur within 6 to 18 inches of the surface, whereas the 1991 proposed manual requires saturation to the surface.

Inundation, another form of wetness, occurs at the surface and is caused by "overflow" or "coverage by flooding" (Webster, 1984, p. 636). Inundation and saturation of water are often together to add another dimension to wetland delineation. For example, the *1989 Federal Manual* requires that saturation or inundation occur for 7 consecutive days during the growing season. A proposed version of the new manual recommends wetness by inundation for 15 consecutive days or wetness produced *by saturation* for 21 consecutive days during the growing season. Although both criteria are used, the former definition allows for more flexibility in the time period required for saturation and inundation. These definitions of wetlands, indicate that the extent and type of wetness is important as well as the time period in which the wetness exists.

Although wetness is the primary characteristic of wetlands, it is not a fool proof way of identifying wetlands. Some have described the usefulness of wetness and hydrology for wetland definition in this manner. "Hydrology, the main determinant of wetland creation, is the least exact" indicator (Walker and Richardson, 1991, p. 6). This point is exemplified by the fact that droughts, or seasonally dry

periods can make wetland delineation identification very difficult during certain times of the year.

Because wetness can fluctuate with climatic change, other indicators are used in wetland identification. Hydric soils are indicators of wetness hydrology and occur due to hydrology. Hydric soils are created by floods or saturation of soil by water. This wetness, for extended periods, creates anaerobic conditions within the soil, that allow recognition of the soil by its dis-colorization, texture or composition (Walker and Richardson, 1991). Like many soils, hydric soils have been classified and mapped through soil surveys. Likewise, hydrophytic plants or water loving plants also exist due to varying degrees of hydrology. For example, certain types of trees such as bald cypress and tupelo gum thrive in *inundated* areas, whereas other trees such as the cottonwood and red gum, thrive in water *saturated* areas with frequent but temporary overflows (Goolsby and Young, 1983). Hydrophytic plants are also indicators of wetlands but are much less reliable due to the fact that a majority of hydrophytic vegetation can also be found in non-wetland areas (Walker and Richardson, 1991).

Wetlands definitions are not always developed with distinct parameters. An average person may identify a wetland by his or her perceptions. Some have found that people's perceptions are important when developing public policy (Ortman, 1989). Because hydrology or water is the primary characteristic of wetlands, people's perceptions of wetland definitions are based on the presence or prevalence of water. For example, some people envision a wetland as an area covered by shallow water

with an abundance of water tolerant trees or plants such as a marsh or swamp. If land is not *inundated* by water and it doesn't contain the characteristic wetland plants (plants commonly associated with wetlands), then in many cases, the public does not perceive it as a wetland, even if it meets certain scientific criteria as described previously. Without education, the public will continue to value only those wetland types that they perceive to be a true wetland. This is the basis for much of the controversy surrounding public acceptance of wetland definitions.

Too much emphasis has been placed on the use of wetland definitions for protection policy purposes. Scientists have already identified good definitions for wetlands. Unfortunately these definitions have been weakened through the political process. For example, in recent months the federal wetland definition has been narrowed to exclude certain types of wetlands from jurisdictional protection (Walker and Richardson, 1991). As a result, the importance of many types of wetlands excluded from the jurisdictional definition has been de-emphasized. Also, the public and many critics of wetland policy have become confused about which types of wetlands should be protected.

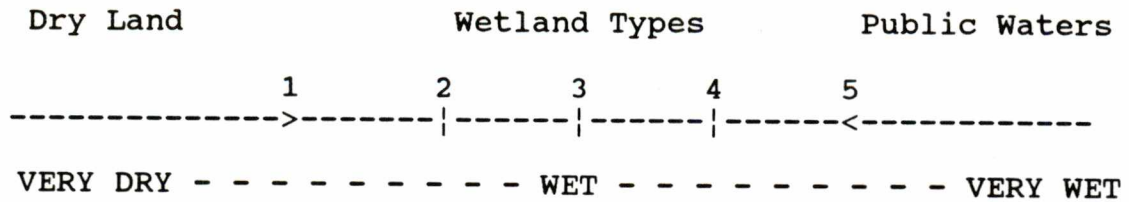
Classification helps avoid confusion and de-emphasis of certain wetland types that are not addressed by current policy goals. Some states use classification to prioritize the importance of wetlands. First, wetlands are identified using a standard definition supported by scientific methods. Then, defined wetlands are classified along various characteristics (e.g., length and degree of wetness, and vegetation present). In this manner certain types of wetlands are automatically protected by

regulatory and non-regulatory approaches while other classes of wetlands (i.e., more controversial, less valuable wetland types) are protected by only non-regulatory means.

For example, Minnesota classifies a wetland into one of 8 categories. Wetland types 1-2 are protected by non-regulatory means. Wetland types 3 through 5 (usually more valuable wetland systems) are protected through regulatory and non-regulatory means. Regulatory protection is more politically feasible in this manner because of the lack of controversy surrounding the more recognizable wetland types in classes 3 and above. Therefore, when wetlands are differentiated from dry lands their identification as a wetland is not as controversial.

Figure 2.1 explains the use of classification best. On one end of the continuum are dry lands. On the other end of the continuum are "public waters" (Minnesota Statutes, 1991). In the middle of this continuum are wetland types. Type 1 wetlands are mildly wet or are saturated land areas. Type 5 wetlands are very wet land areas usually inundated with water. Regulatory methods (as well as non-regulatory methods) have been used to protect the more wet or easily recognizable wetlands (types 3-5) which are the least controversial, more highly valued wetland types. The dryer wetland types (types 1-2) are more controversial to protect because they are not as limited by wetness for other landuses. Therefore, only non-regulatory methods should be used for these wetland types. In this manner, highly valued wetlands are protected by more strict means and lesser valued wetlands are protected by less strict, more publicly acceptable means.

Figure 2.1



The Wetness Continuum for Wetland Types

It should be noted that the previous example has been simplified for explanatory purposes. One other factor, woody vegetation, also adds an additional consideration in the choice of protection methods. For example, wetlands such as shrub swamps and wooded swamps have less wetness than type 5 wetlands and are subjected to only seasonal inundation. Some states choose to protect wooded swamps by regulatory methods along with other classes of wetlands (i.e., land areas that are very wet). In any event, classification promotes flexible approaches for wetland protection while maintaining an emphasis on the existence of all wetland types.

Wetland Types

As indicated in the previous section there are numerous wetland types. These types can be placed in two classes: (1) inland wetlands and (2) coastal wetlands (EPA, 1988). Inland wetlands include bogs, swamps, isolated depressions, marshes, and wet meadows. Coastal wetland types are characterized by shallow areas along ocean

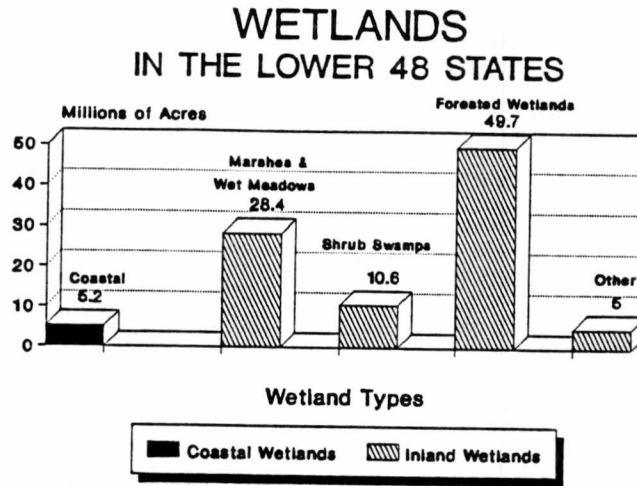
coastlines, usually where saltwater and freshwater meet. In the context of wetland acreage, inland wetlands are the predominant wetland type.

Tennessee wetlands are obviously the inland type. They include fresh water meadows; shallow fresh water marshes; shrub swamps with "semi-permanent water regimes most of the year; wooded swamps or forested wetlands; and open fresh water [except farm ponds]; and bogs" (Tennessee Department of Conservation (TDC), 1988, p. 4). Wetlands in Tennessee are predominantly in the forested wetland (bottomland hardwood) category (Dean, 1987). Various types and distributions of wetlands in Tennessee and the United States are indicated in Figures 2.2 and 2.3 and 2.4.

Wetland Functions and Values

The functions and values of wetlands determine their importance to society. One survey participant in this study described wetlands as "producing a flow of goods, benefits and services." These functions and products produce social benefits that can be separated into two categories: direct benefits and indirect benefits (Leitch, 1981; cited in Baltezore, et al., 1990). Direct benefits are based on dollar values that are usually accrued to individuals that market wetland products.

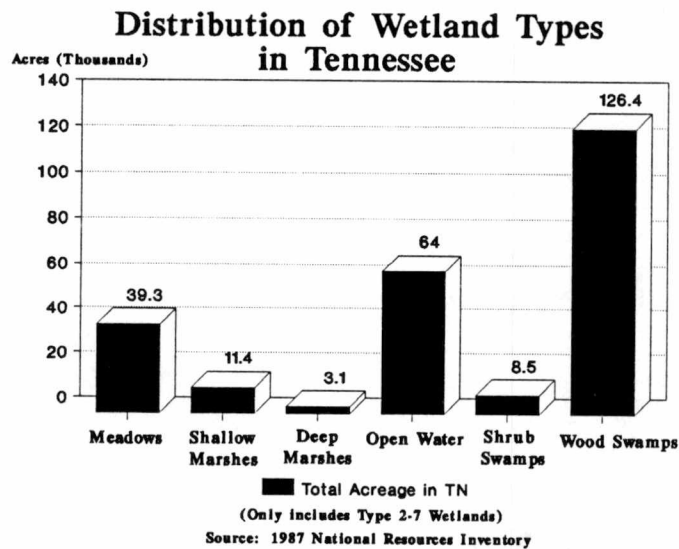
Figure 2.2



SOURCE: Wetlands of the United States:
Current Status and Recent Trends

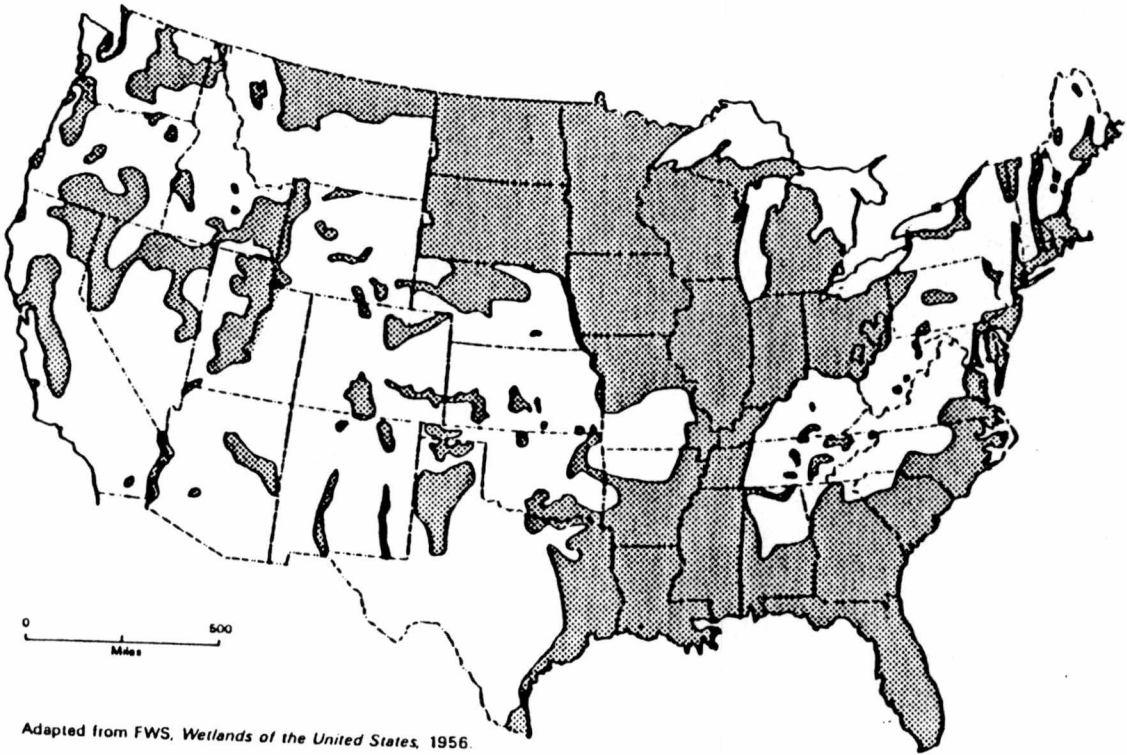
Wetland Types and Distributions in the United States

Figure 2.3



Inland Wetland Types in Tennessee

Figure 2.4



Adapted from FWS, *Wetlands of the United States*, 1956.

Wetland Distribution in the United States

Note: Shaded areas represent regions with high potential for wetlands.

The products produced by wetlands include animal furs and meat, wood, low impact farm production (where no alteration of hydrology occurs) and recreational uses. As indicated below, the indirect social benefits from wetlands in many cases far outweigh the direct benefits. In most cases, landowners do not receive compensation for indirect benefits. Indirect benefits from wetlands are listed as follows:

<i>flood control</i>	<i>scientific</i>
<i>erosion control</i>	<i>shoreline protection</i>
<i>waste assimilation</i>	<i>aesthetics</i>
<i>nutrient recycling</i>	<i>recreation</i>
<i>firebreaks</i>	<i>global nitrogen and sulfur cycling</i>
<i>historical value</i>	<i>ecological diversity</i>
<i>forestry</i>	<i>water supply</i>
<i>primary productivity</i>	<i>education</i>
<i>wildlife habitat</i>	<i>groundwater recharge</i>
<i>endangered species habitat</i>	<i>biological diversity</i>

Baltezore, et al., (1990)

THE STATUS OF WETLANDS IN THE UNITED STATES

In *Wetlands, Losses in the United States, 1780's to 1980's* the following statement is made: "overstatement or misrepresentations of the remaining wetland acreage are usually the result of emotional arguments rather than factual data" (p. 2). This has been the case with some studies and has caused a great deal of damage for credible efforts to bring attention to wetland losses. Several studies however, present factual, well documented estimates and reports of the current and historical distribution of wetlands (Dahl, 1990; Morganweck, 1989; Tiner, 1984).

One of the better studies was developed in partial fulfillment of the requirements of Section 401(a) of the Emergency Wetlands Resources Act of 1986 (Dahl, 1990). In this report, the distribution of wetlands over a 200 year period was estimated using best information and study techniques available. Dahl concluded that in the colonial period of this country, almost 392 million acres of wetlands existed (221 million in the contiguous U.S.). In 1780, wetlands in the lower 48 states represented approximately 11% of total land area.

By 1980, the interior of the United States had encountered rapid settlement and population growth. The impact on wetlands also occurred rapidly. After 200 years, 53% of the wetlands in the contiguous U.S. were estimated lost. Approximately 104 million acres of wetlands existed in 1980, 274 million acres in the 50 states. In 1980, wetlands represented 5% of the United States land area as opposed to 11% in 1780. Eleven states lost from 67% to 91% of their wetlands by 1980.

Some states have large concentrations of wetlands. Alaska, for example, is estimated to have the greatest concentration of wetlands in a state (45% of its land area). In 1980, Alaska had 62% of all the wetlands in the United States. Three gulf states; Florida, Louisiana, and Texas; and one northern state **Minnesota** (the case study state), had 34% of all wetlands in the lower 48 states. These states, including Alabama, Georgia, North Carolina, South Carolina and Mississippi, Maine, Michigan and Wisconsin account for 75% of wetlands in the contiguous United States.

Inland wetlands have been the primary type of wetlands lost in the United States. Morganweck (1989) reported that annual wetland losses have averaged 440,000 acres of

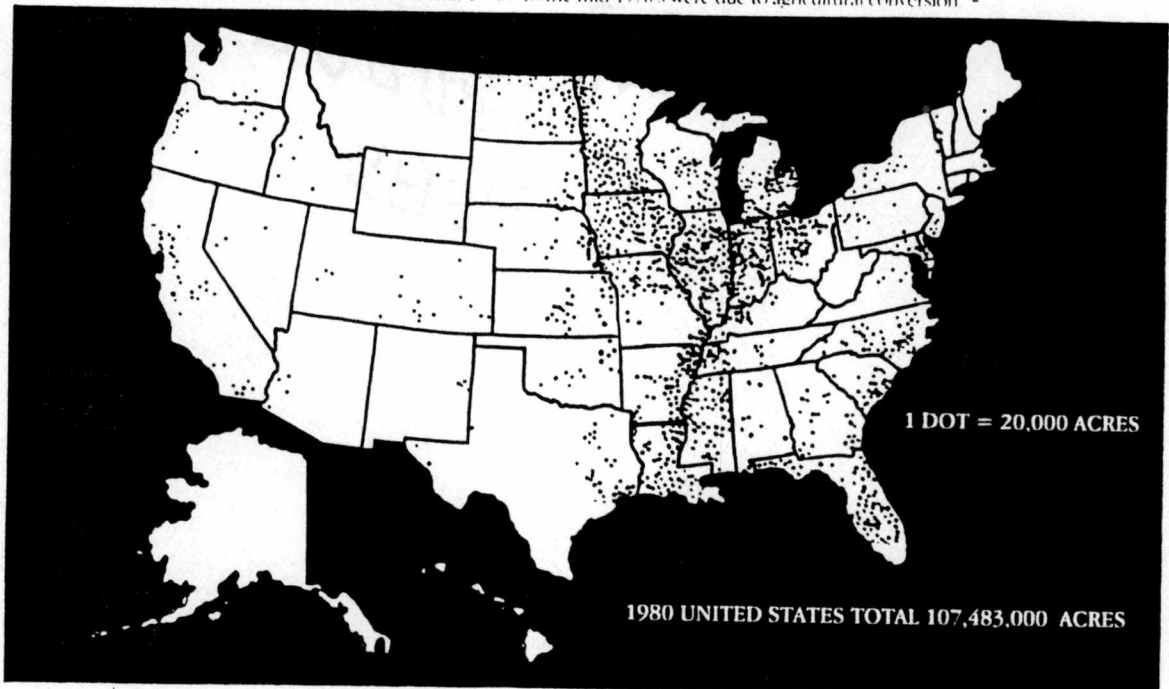
for inland wetlands and 18,000 acres for coastal wetlands. Today, losses are estimated to be greatly reduced from those in the 1970's. However, losses are still estimated to be between 100,000 and 300,000 acres per year (Heimlich, 1991). Morganweck reported that between the 1950's and 1970's a major portion of wetlands were lost. The hardest hit wetland types included forested or bottomland hardwood wetlands in the Mississippi River Valley and shrub wetlands in North Carolina. In addition, inland marshes were hardest hit in the Prairie pothole region of Minnesota, the Dakotas, the Nebraska "sandhills and rain water basins"(p. 7), and the Florida Everglades. Coastal wetlands were greatest in the gulf states. Figure 2.5 indicates regions where most wetland losses occurred.

Wetland losses were due to several factors. Land drainage for agriculture has been the primary catalyst for 87% of the national wetland losses (Morganweck, 1989, p. 7; EPA, 1988; Walker and Richardson, 1991). Minnesota, the Dakotas, Florida and states along the Mississippi River floodplain have been specifically affected by drainage of land for agriculture (Morganweck, 1989). Coastal wetland losses have occurred due to urban dredge and fill type residential development. One other major factor of coastal losses has been submergence of wetlands by coastal waters, particularly in Louisiana. Urban and other development accounted for 8% and 5% of total losses, respectively (Steiner, 1991)

Figure 2.5

**EXTENT AND LOCATION OF ARTIFICIALLY DRAINED AGRICULTURAL
LAND IN THE UNITED STATES, 1985**

(Courtesy of U.S. Department of Agriculture Economic Research Service.) Frayer et al. estimated that 87 percent of the wetland losses from the mid-1950's to the mid-1970's were due to agricultural conversion.²²



Regional Wetland Losses

Wetland ownership is also an important factor to consider in the status of wetlands. Seventy-five percent of the wetlands remaining in the continental U.S. are privately owned (Heimlich, 1991; Morganweck, 1989). Estimates indicate that one half of one percent of those wetlands in 1989 were protected under some type of conservation use. Approximately 24 million acres of wetlands in the U.S. were held in some form of government ownership by 1989 (Morganweck, 1989).

Wetlands in Tennessee

Information concerning the status of wetlands in Tennessee is based on data from several sources. Dahl (1990) indicated that in 1780, Tennessee had an estimated 1.9 million acres of wetlands. Tennessee's wetlands were and still are primarily concentrated in the western portion of the state. Just over 70% (1.4 million acres) existed in the low gradient stream valley and drainage areas of west Tennessee (Tennessee Wildlife Resources Agency (TWRA), 1990; TDC, 1988). Other estimates indicate that 77% of the wetlands in West Tennessee have been lost, 19% in Middle Tennessee and 4% in East Tennessee (Dean et al, 1987).

Tennessee like many other states in the region has had substantial losses of wetlands. Table 2.1 compares original wetland acres, current wetland acres, and wetlands lost in Tennessee, states bordering the Mississippi River, and Minnesota (the case study state). Tennessee lost 59% of its wetlands leaving approximately 800,000 acres by 1980 (Dahl, 1990; Mitch and Gooselink, 1987 cited in Dean, et al., 1987). Tennessee is tied with Mississippi for 12th place in losses of original wetland acreage per

state. Although wetland losses in Tennessee were not as great as other states (Minnesota lost over 5 times the acreage lost in Tennessee, totaling 6.3 million acres) the losses have been significant. In comparison to other states, Tennessee ranks 27th in the nation in the amount of wetland acres remaining.

Table 2.1
Wetland Losses

State ¹	Wetland Acres (in thousands)		% Wetland Acres Lost
	1780's	1980's	
<i>Tennessee</i>	<i>1,937</i>	<i>787</i>	<i>-59%</i>
<i>Minnesota</i>	<i>15,070</i>	<i>8,700</i>	<i>-42%</i>
Missouri	4,844	643	-87%
Kentucky	1,566	300	-81%
Arkansas	9,849	2,764	-72%
Mississippi	9,872	4,067	-59%
Florida	20,325	11,038	-46%
Louisiana	16,195	8,784	-46%
Conterminous U.S.	221,130	104,374	-53%

¹ Tennessee and Minnesota are highlighted due to the emphasis placed on them in this study.

Source: Dahl (1990).

Losses of wetlands in the state have been primarily due to hydrologic alteration of the major tributaries in West Tennessee and the resulting conversion of land for agricultural uses (TWRA, 1990; TDC, 1988; Dean, et al., 1987). Between 1918 and 1928, drainage projects were numerous in West Tennessee. Extensive channelization and

dredging projects, particularly in the Obion and Forked Deer Rivers, resulted in the destruction of natural hydrologic processes, grade de-stabilization of streams and subsequent alteration of the hydrology of adjoining properties (TWRA, 1990). Over 900,000 acres, two thirds of the bottomland wetlands of West Tennessee, were converted to agriculture after drainage activities. In addition, many of the riparian wetland habitats of Tennessee and Cumberland rivers were altered due to TVA and Corps of Engineers lake projects.

Recent studies of losses indicate the pattern and types of wetlands lost. Bottomland hardwoods, the most common wetland type, were reduced by two thirds by 1981 (Christie and Abernathy, 1987 cited in TWRA, 1990). For example, a Tennessee state department ecological study determined that only 56% of the river miles sampled in West Tennessee were bordered by forested tracts of 100 acres plus in size. The U.S. Fish and Wildlife Service indicated that in 1960 in the Obion River area of West Tennessee, only 55% of original forested land remained; by 1974, 42%; and by 1980, 37%. It has been estimated that some tributaries in West Tennessee lost in excess of 80% of their original wetlands (TWRA, 1990; Parsons and Talley, 1983 cited in Dean, et al., 1987). Additional studies in the Jackson South Quadrangle in Madison County indicate that 66% of original bottomland hardwoods were converted for cropland (Dean, et al., 1987).

As in the case of wetlands at the national level, the status of wetland ownership is important. In Tennessee, most wetland areas are privately owned (TWRA, 1990). Thus, the state is heavily dependent on private owner stewardship for wetland protection.

WETLAND POLICIES AND TOOLS

Policies represent the scope and intent of government actions to address certain issues. Tools are specific mechanisms used by states to implement policy or legislation. Policies and tools for wetland protection are as varied as the levels of government that develop and use them.

The Federal Government

Federal policy and tools are developed to express public purpose, benefit the general welfare, and offer guidance to lower level government. The federal government defines its policy through executive actions and legislation. Often the legislation and federal agency rules determine the specific strategies that the federal government will use to protect wetlands.

Federal legislation provides much of the guidance for federal priorities that states accept and adapt to their existing resource needs. In the history of federal legislative policy, greater emphasis was placed on direct federal involvement. Due to the philosophy of new federalism, much of the direct involvement by the federal government has decreased. This has resulted in a shift of responsibility to the states. However, where natural resource policy is concerned this shift has not fully developed because many states lack the resources to implement federally mandated standards and guidelines. The following section addresses policies and tools historically used by the federal government prior to and after new federalism policies.

Federal Policies

The federal government has had a long history concerning wetland policy (See Table 2.2) Federal wetland policy dates back to the mid 1880's and originally focused on wetland conversion. The Swampland Acts "offered marshy 'wastelands' to the states if they would drain and develop them for 'productive' uses" (Walker and Richardson, 1991, p. 2). Drainage policies continued into the 1900's to address very real concerns of land availability for food production in a rapidly growing nation. The U.S. Department of Agriculture even created guidelines and staff positions to assist agricultural wetland conversion. In fact, Congress continued to authorize other federally managed wetland drainage through 1944.

New philosophies developed concerning wetlands in the mid to late 1900's resulting most likely over fears of waterfowl habitat losses. The first program for wetland preservation was passed in 1934. In the late fifties, legislation for U.S. Fish and Wildlife Service purchase and easement programs was passed. In recent years the environmental movement catalyzed water quality program development that benefited wetlands and that expanded existing regulatory protection efforts used by the Corp of Engineers.

The first serious efforts to protect wetlands came in the late 70's and mid 80's. Direct and indirect incentives for converting wetlands by drainage programs, commodity subsidy programs and preferential tax relief were ended. More recently the 1986 Emergency Wetlands Acquisition Act created support for a national waterfowl management plan and increased non-regulatory efforts to protect wetland.

Table 2.2
History of Federal Wetlands Policies and Tools

Year	Legislation/Agency	Effect
1849, 1850, 1860	Swampland Act	Federal Government granted 64.9 million acres to states provided that the proceeds for their sale be used to convert wetlands to farmland.
1899	River and Harbor Act	Established the U.S. Army Corps of Engineers (the Corps) and empowered it to regulate construction activities in navigable waters.
1902	Reclamation Act	Established and staffed positions in USDA to investigate methods and problems involved in agricultural drainage.
1934	Migratory Bird Hunting Stamp Act	Collected fees from duck stamp sales to pay landowners for wetland preservation.
1944	Flood Control Act	Authorized the Corps to construct major drainage outlets for draining agricultural lands.
1957	North Dakota Wetlands Act	Required landowners to obtain a permit for wetland drainage.
1958	Small Wetlands Acquisition Program (SWAP)	Protected wetlands through permanent easements and purchases.
1972	Federal Water Pollution Control Act Amendments	Section 404 authorized the Corps to issue permits for the discharge of dredge and fill materials into navigable waters. In 1975, the definition of navigable waters was broadened to include wetlands.
1972	Water Bank Program	Protected wetland and adjacent upland acreage in the Prairie Pothole region through a system of 10-year renewable contracts.
1977	Executive Order 11990	Established wetland protection as official U.S. Government policy and ended all direct federal assistance for wetland conversion.
1977	Clean Water Act	Federal Water Pollution Control Act amended and became known as the Clean Water Act. The act was amended to include a regulatory definition for wetlands that continues to be used.
1979	Fish and Wildlife Service (FWS)	FWS published <i>Classification of Wetlands and Deepwater Habitats of the United States</i> which defined wetlands and provided guidelines for their identification.

-Table continued on next page

Table 2.2
History of Federal Wetlands Policies and Tools

Year	Legislation/Agency	Effect
- Table cont.		
1985	Food Security Act	Denied federal-assistance program participation to farmers who altered wetlands for agricultural purposes (swampbuster program).
1986	Tax Reform Act	Abolished preferential capital gains tax rates and removed other incentives to convert wetlands to farmland through drainage.
1986	Emergency Wetlands Acquisition Act	Established the National Wetland Priority Conservation Plan aimed at fulfilling U.S. obligations under the 1986 North American Waterfowl Management Plan (NAWMP).
1987	"No-Net-Loss" Act	Created a wetland bank which cannot carry a deficit exceeding 2,500 wetland acres.
1987	The Corps	Published <i>Corps of Engineers Wetlands Delineation Manual</i> that gave optional technical guidelines used in identifying and delineating wetlands under Section 404.
1989	North American Wetlands Conservation Act and Coastal Wetlands Conservation and Restoration Act	Created a wetland trust fund to finance coastal wetland programs and wetland acquisition under NAWMP.
1989	The Corps, EPA, FWS, and SCS	Adopted the <i>Federal Manual for Identifying and Delineating Jurisdictional Wetlands</i> which provided mandatory technical criteria, field indicators, and determination methods for identifying wetlands under federal jurisdiction.
1990	The Corps and EPA	Signed a memorandum of agreement clarifying environmental criteria used in evaluating compliance with Section 404 guidelines.
1991	EPA	EPA released revisions of the 1989 manual to Congress. Revisions are not finalized.

Source: Adapted from Baltezore, et al. (1991) and Walker and Richardson (1991).

Although great strides were made in the late 1980's for wetland protection the early 1990's produced controversy that would stall progress. In 1989, four federal agencies (EPA, FWS, SCS, and the Corps) agreed to a more broad, national wetland definition that was to promote coordinated wetland protection efforts. Important protection policy gains were also made concerning coastal wetlands, wetland banking, wetland acquisition, and farm subsidy reduction to land users who converted wetlands. However, controversy over the new definition has greatly slowed progress both at the federal and state levels. Many states have even stopped efforts to protect wetlands due to fears that federal wetland policy may change.

Federal Tools

Some of the tools used by the federal government are nearly as old as its policies. Early tools were developed for reasons other than protection of wetland functions. Most, such as the U.S. Fish and Wildlife Service easement program, were designed to preserve one function, habitat. The range of tools used by the federal government include regulatory and non-regulatory. The previous Table 2.2 also lists federal tools discussed in the following paragraphs.

The most notable *regulatory* tool used by the federal government has been the Corps of Engineer 404 Permit Program². Section 404 of the Clean Water Act (CWA) "regulates the discharge of dredge and fill material into the waters of the United States"

² Michigan is currently administering the 404 Permit Program instead of the Corp of Engineers. States are given an opportunity to accept primacy in place of the federal government (Steiner, et. al, 1991).

(EPA Office of Wetlands Protection, 1989, p. 1) and thereby protects these waters from harmful discharges. Since 1972, the program has included permits for dredging or filling of wetlands. It should be noted that Section 404 does not address drainage or pumping of groundwater, which "are conducted without discharges into the waters of the United States" (p. 2) or losses specifically brought about by agricultural conversion (Heimlich, 1991). Therefore, inland wetlands are not adequately protected through the 404 Permit Program.

The 401 permit process, another federal *regulatory* tool, can be used by states to protect wetlands through water quality impact reviews (Steiner, et al., 1991). Section 401 of the CWA allows states to certify activities conducted in their state that require federal licenses or permits. However, like Section 404, some wetlands may be affected by drainage and ground water pumping activities that may not impact water quality, thus limiting the impact of the 401 certification. Some have recommended that 401 certification ideally be used in conjunction with other land use regulation activities (Steiner, et al., 1991).

Acquisition, a class of *non-regulatory* tools, involves the purchase of land in fee simple (purchase of all rights) or easements and leases (purchase of partial rights). The Fish and Wildlife Service began such efforts in 1958. Both perpetual (purchase of partial rights for life) and short term (purchase of rights for 10-20 years) easements have been used. Short term leases tend to work best for some types of land. Purchase and easement programs now protect 583,856 and 1,295,627 acres, respectively, in national

waterfowl production areas in eleven Midwestern states (U.S. Fish and Wildlife Service, 1991).

The *non-regulatory* dis-incentive measures and incentive measures in the Food Security Act (Farm Bills) of 1985 and 1990 represent a major change in federal policy. The Farm Bill Swampbuster provision, a dis-incentive, prevents the release of federal farm program payments to land users who convert wetlands after December 25, 1985. Since its passage, wetlands losses have slowed (Heimlich, 1991). However, recent program evaluations indicate that the lax program enforcement and ineffective policies seriously weakened the provision (Heimlich, 1991; Hayden, 1990). Although the 1990 Farm Bill offers policy improvements, Heimlich (1991) reports that only one third "of the 17 million wetland acres subject to agricultural conversion" (p. 82) were located in counties where government payments had a significant impact on farm income.

New federal policies also offer promise for wetland protection. The Agricultural Wetlands Reserve, an incentive program, will enroll permanent easements and restore farmed wetland areas (Heimlich, 1991). Heimlich reports this program has a high potential to protect up to 2.5 million marginally productive wetlands at a low cost.

The States

Table 2.3 lists legislation and policies by region in the contiguous U.S. The choice of regulatory and non-regulatory policy used by states sheds light on the issue of compensation, societal rights and property rights, as well as the level of urgency that

some states feel to protect wetlands. The use of protection tools in certain states are described in the next section and provides additional insights about regional philosophies toward wetland protection.

Table 2.3
Summary of Wetland Policies by Region and
for Tennessee and Minnesota

Region¹	Working Definition	Statewide Inventory	Wetland Funding	Regulatory Program
East Coast	67%	25%	17%	75%
West	54%	27%	9%	36%
North and Midwest	76%	59%	24%	47%
South Central	62%	25%	0%	12%
State²				
<i>Tennessee</i>	<i>Yes</i>	<i>No</i>	<i>Yes</i>	<i>No</i>
<i>Minnesota</i>	<i>Yes</i>	<i>Yes</i>	<i>N/A</i>	<i>Yes</i>

¹ Amounts presented for each region represent the percentage of states in each region that has implemented the wetland policies identified. Approximately 5 states of the 48 states did not provide adequate information. The following states are included in each region: East Coast - CT, DE, FL, GA, ME, NJ, NC, RI, SC, and VA; West - AZ, CA, CO, ID, MT, NV, NM, OR, UT, WA, and WY; North and Midwest - IL, IN, IA, KS, MI, MN, MO, NE, NH, NY, ND, OH, PA, SD, VT, WV, and WI; South Central - AL, AR, KY, LA, MS, OK, TN, and TX.

² For Tennessee and Minnesota, "Yes" indicates that the state has and "No" indicates that the state has not implemented the wetland policies. "N/A" indicates that the information was not available.

Source: Steiner, et al. (1991).

State Policies

Regulatory policies first developed in the east coast region of the United States where coastal wetland losses became an important issue. Regulatory efforts were catalyzed by coastal wetland losses that resulted in shoreline de-stabilization and a loss

of food sources and reproductive habitat needed for a viable seafood supply. Early efforts began in 1963 in Massachusetts where permits were required prior to coastal wetland alteration. Later in 1966 inland wetlands were protected for their flood control capabilities (Larson, 1991). Steiner (1991) indicates that regulatory policies have been used strongest in the coastal regions followed by the Midwest (See Table 2.3). Regulatory controls appear to have been used more widely on the coast due to the immediate impact recognized for on local economies and communities. The researcher should also point out that the South in comparison to other regions is last in the nation to use regulatory policies.

Steiner indicates that other states have developed regulatory policies for much broader natural resource protection than coastal wetlands and wetlands in general. For example, 14 states had inland wetland protection laws in 1990. Many also had floodplain, shoreline, riparian and "buffer" (areas adjoining wetlands) protection laws. Florida and Vermont protect wetlands through growth management policies.

Non-regulatory policy encourages the protection of wetlands through incentives or voluntary means. The Midwest ranks first in the use of non-regulatory policies despite extensive uses of regulatory measures. The South Central U.S. (defined in Table 2.3) is second in the use of non-regulatory policies. The South's preference of non-regulatory approaches over regulatory approaches could be reflected by (1) a desire to target needs unmet by regulatory methods, (2) a perceived lack of urgency to protect wetlands, or (3) strong property rights philosophies that place man's priorities over the loss of natural resources.

Other policies characterize the nature in which states are actively pursuing wetlands protection. These include wetland mapping, definitions, and funding levels. Steiner (1991) indicates that states in the North/Midwest regions rank first in each category. Thirty-eight percent of the lower 48 states have completed inventories and 71% have wetland definitions.

State Tools

The regulatory tools used by states include federal mechanisms and state developed mechanisms. Steiner, et al. (1991) list two types of tools available for use by states: the 404 Permit Program and the 401 Permit Program. Under the 404 Permit Program, states have the option of accepting control over the permit process (only Michigan had in 1991). However, the 401 permit process was used by all states in 1991 with the exception of Georgia. State developed mechanisms include local planning and zoning, habitat disturbance permits, and the use of best management practices (BMP'S). The BMP's are required or recommended in 25 states (Steiner, et al., 1991).

Non-regulatory tools are listed in the Table 2.4. The most notable tools listed for states are acquisition tools. Acquisition appears to be most popular in the South Central and Midwestern/Northern United States. This is one of the few areas that the South is strong. The use of easements is also strong in both regions. The principle difference between the two regions is that the MidWest/Northern U.S. appears to use a more balanced approach than those used in the South (See Table 2.3). Overall, fee simple acquisition and easements are very popular.

Table 2.4
Summary of Tools Used for Wetland Protection by Region and
for Tennessee and Minnesota

Region¹	Execu- tive Orders	Tax Incentives	Ease- ments	Recog- nition Programs	Sub- sidies	Acqui- sitions	Technical Assistance & Education
East Coast	0%	25%	17%	17%	33%	17%	25%
West	27%	9%	18%	36%	27%	36%	55%
North and Midwest	18%	29%	59%	18%	59%	59%	82%
South Central	12%	12%	50%	12%	50%	50%	38%
State²							
<i>Tennessee</i>	<i>Yes</i>	<i>No</i>	<i>Yes</i>	<i>No</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
<i>Minnesota</i>	<i>Yes</i>	<i>No</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>

¹ Amounts presented for each region represent the percentage of states in each region that has implemented the wetland policies identified. Approximately 5 states of the 48 states did not provide adequate information. The following states are included in each region: East Coast - CT, DE, FL, GA, ME, NJ, NC, RI, SC, and VA; West - AZ, CA, CO, ID, MT, NV, NM, OR, UT, WA, and WY; North and Midwest - IL, IN, IA, KS, MI, MN, MO, NE, NH, NY, ND, OH, PA, SD, VT, WV, and WI; South Central - AL, AR, KY, LA, MS, OK, TN, and TX.

² For Tennessee and Minnesota, "Yes" indicates that the state has and "No" indicates that the state has not implemented the wetland policies.

Source: Steiner, et al. (1991).

Other non-regulatory tools are used by many states. Easements are used in 19 states and fee simple acquisition is used in 21. Twenty-seven states use technical assistance, 26 have education programs, and ten states use tax incentives.

Tennessee - General Wetland Policy

Tennessee wetland policy has come a long way since the beginning of the century. In the early 1900's, many felt that West Tennessee's broad, alluvial flood plains (some,

one quarter to four miles wide), held untapped potential. George Ashley, a state geologist, described these floodplains as "worthless swamps on the way to wealth and prosperity" (Ashley, 1910, p. 8). Most did not recognize the value of these large natural systems.

With the advent of human settlement many changes occurred in the West Tennessee environment. Flooding caused by increased runoff from deforestation and human settlements caused many to look for ways to alter the natural hydrologic river systems (Ashley, 1910). This interest combined with a desire to convert wetlands into productive farmland resulted in stream channel alteration, channelization, dredging and levying. Although many recognized human impacts as the problem (Ashley, 1910) the methods chosen only created more problems.

Drainage activities were pursued enthusiastically to address the concerns and ambitions of local citizens. In West Tennessee local drainage authorities³, were created to promote drainage projects. Through these districts all the original channels in the Obion Forked Deer River Basin were altered between 1920 and 1930 (Dean, et al., 1987). Other projects since 1960, through the Corps of Engineers and the Obion Forked Deer Authority (a state flood control and drainage agency created in 1974) have completed almost 300 miles of channelization or channel restoration. Although many of the other rivers and streams in West Tennessee have been unaltered; urban development,

³ Tennessee followed the lead of Illinois and created drainage districts to promote wetland conversion to farmland. Ashley (1910) cited an Illinois Geological Survey that described these drainage laws as "models for other states" (p. 11). In 1780, it is estimated that 22.8% of Illinois' land area was wetlands; now only 3.5% percent is wetlands. Thus, it is not surprising that Illinois ranks 5th in wetland losses.

public works projects and soil erosion continued to impact the natural hydrologic system in West Tennessee as well as wetlands.

In Tennessee, serious protection of wetlands was not considered until the 1980's. Lawsuits over the use of channelization in West Tennessee caused federal and state drainage agencies to consider the environmental impacts of dredging and helped to focus the attention of state government on wetland issues. By 1982, the Governor's Safe Growth Team Report (prepared by the wildlife management institute) provided early recommendations for wetlands acquisition, protection and actions by state government to protect wetlands (Dean, et al., 1987). Recommendations by the Governor's Safe Growth Staff in 1984 and findings by the House Soil Erosion and Wetlands Study Committee provided new insights on innovative measures and needs in resource protection. Two permit systems and land use regulation were considered by two state agency reports in 1985 (Dean, et al., 1987). One of the reports did not foresee potential for passage of regulatory efforts at the state level. The other report recommended against Tennessee assuming the 404 Permit Program.

The 1986, Tennessee Wetlands Acquisition Protection Act, specifically provided the means to acquire and protect Tennessee wetlands (Dean, et al., 1987). Bottomland hardwoods and certain types of wetlands are approved for purchase in the act. Funding is provide by the Tennessee Real Estate Transfer Tax. One individual interviewed for this study indicated that the tax measures were passed due to its potential to raise funding (approximately \$3 million per year) and because of a weak real estate lobby. Provisions of the act require that acquisitions cannot occur through eminent domain and that local

tax roles be reimbursed by the managing agency, the Tennessee Wildlife Resources Agency. Over 24,000 acres were acquired between 1986 and 1990. Recent wetland acquisition in Tennessee has been slowed. One person interviewed for this study indicated that the land purchases have declined because of the negative publicity of buying land during a period of budget short falls. In any event, offers for wetland sales by private landowners exceeds current funding levels available to purchase wetlands.

Additional wetland policies for Tennessee were developed in 1988 and 1990. The *Tennessee Wetlands Plan* offers some indications of wetland problems and needs but offers no recommendations. The 1990 *Tennessee Implementation Plan for Wetland and Waterfowl Conservation* " complements the goals of the North American Waterfowl Management Plan" (TWRA, 1990, p. i). It addresses habitat or wetland needs and problems and outlines strategies for TWRA actions. The TWRA plan includes a broad range of conservation measures and initiatives that address private lands assistance, acquisition, management and development, data base development, and evaluation and monitoring. Out of 442,000 acres of public lands, the plan targeted over 14,000 acres for management and development and 4,400 acres for reforestation. Goals for private lands acquisition exceed 90,000 acres. Approximately 80% of the wetlands acquisition will occur in West Tennessee with a the total cost of \$67 million.

Tennessee wetland definitions have been inconsistent and poorly developed. Dean et al. (1987) reports that four different definitions have been used in Tennessee for regulatory and non-regulatory purpose: (1) The Section 404 Permit definition - U.S. Corps of Engineers; (2) The National Wetlands Inventory definition - Fish and Wildlife

Service; (3) Tennessee Executive Order No. 65 Interagency definition; and (4) The acquisitions definition of the Tennessee Protection Act (as outlined in the Tennessee Wetland Plan).

Current wetland policy is being developed by the Governor's Interagency Task Force on Wetlands, whose primary task is to create a state wetland plan. The task force is organized on two levels. A top level group makes up the primary policy and decision making body. The second group, known as the technical working group, is made up of staff level representatives from the task force agencies represented at the top level. The technical working group is responsible for three tasks: (1) a state wetland plan, (2) wetland mitigation policy, and (3) private landowner assistance policy. A wetland definition is not a task force focus due to revisions occurring on the national level. To date, the process is incomplete.

ADDITIONAL POLICY PERSPECTIVES IN THE LITERATURE

In policy research it is important to know what strategies and tools are utilized to develop or implement the policy. But, it is also important to identify what alternatives or possibilities should exist. The following section discusses much of the research and literature on wetland policy in relation to policy development and policy implementation.

Policy Development

The role of state government is probably the most important issue addressed in the literature pertaining to this study. According to the literature, states should develop

comprehensive resource planning (O' Malley, 1989; Leape, 1991; Conservation Foundation, 1988b). The National Wetlands Forum specifically recommended *state* conservation plans to identify and address unique state wetland problems by utilizing local knowledge (Leape and Sherk, 1991). In addition states should act on their plans and provide leadership (O'Malley, 1991; and Larson, 1991). This includes leadership not only in meeting the issues but also in dealing with government impacts on wetlands such as transportation improvements and public land management. Many however, recognize that states must get federal assistance for state action to occur (Davis, 1991; Leape and Sherk, 1991).

Issues such as the use of regulatory or non-regulatory approaches in wetland programs are important. Many indicate a place and sometimes a need for various levels of regulatory protection (Leape and Sherk, 1991; Larson, 1991; Goldstien, 1991; Ortman, 1989; Noon, 1989 and Conservation Foundation, 1998a). Zedler (1991) recognized the need for regulation to stop losses of wetlands at critical levels (e.g., California has lost 91% of its wetlands). Although regulatory methods may be useful, non-regulatory means are needed to address property rights and economic fairness issues (Heimlich, 1991; van der Valk, 1991; Maslyn, 1991; Leitch, 1983). The fairness issue can be summed up as follows: many landowners are unable "to capture payment for the many public uses (i.e., indirect benefits, flood control etc.) of wetlands on their property (Leitch, 1983, p. 1465).

Other policy considerations for wetlands are listed as follows:

- (1) The reluctance of wetland owners to accept compensation for the present value of converted wetlands without consideration for non-monetary values (e.g., some landowners wish to have the wetness of their fields removed just to prevent harvesting delays, etc.)
- (2) The need to address individual values, goals and assumptions (Cutler 1984; Duncan, 1984) or perceptions by the use of less controversial terminology in policy statements.
- (3) The economic impact on the community where preservation occurs (Leitch and Scott, 1984)
- (4) The "problem is not the values that are being applied to . . . [individual or collective choices for wetland protection] but the process by which choices are reached (Tietenberg, 1988, p. 21). Therefore, the process of policy making for all issues must include all natural resource considerations.
- (5) Valuation of wetlands to determine priorities of wetlands against other needs (i.e., optimal allocation of resources) (Farber and Costanza, 1987; Lynne, et al., 1981; Brown and Hammack, 1973)
- (6) Sustainable Resource Management through holistic, multi-resource, "resource system" (watershed or river system) planning (Neiring, 1991; and Maslyn, 1991).
- (7) The sustainability criterion (Tietenberg, 1988, p. 33): "future generations should be left no worse off than current generations."

These considerations collectively suggest that the solution to wetland protection problems should consist of approaches that address both immediate *and* long term needs.

Policy Implementation

Obviously the literature on policy considerations is much more extensive than the literature on more practical matters such as policy tools. However, some suggestions can

be reached from the literature sources that are available. As discussed previously, a wide range of protection tools exist. Duncan (1984) provides the best description of the *effectiveness* of protection tools. Although these tools were used to protect agricultural land, the applications are much the same. Duncan looked at preferred taxation, special districts, zoning, purchase of development rights (PDR) and transfer of development rights (TDR). Duncan's conclusions indicated that incentives or land use regulation alone were ineffective at protecting agricultural land, especially at the urban fringe where lands were subject to greater pressures. Duncan discovered that a system that allowed development rights to be sold or transferred to planned growth areas would succeed.

Historical uses of *easements* as a tool have been studied in the Midwest. Study results have concluded that easements were very successful with less than 1% damage to wetlands under contract occurring each year. Enforcement was cited as the primary factor for the success of easements programs. Some feel however that other problems result from easements (national survey respondents). Second and third generation owners of wetlands may not appreciate that a portion of the bundle of property rights (especially drainage rights) has been purchased. Experts also cite high legal and administrative costs as a negative aspect of easement programs.

Lastly, some feel that *restoration* as a tool in wetlands management will replace much of the emphasis on wetland preservation or protection (Shabman, 1991). Heimlich (1991) reports the 1990 revised swampbuster provision was improved by restoration requirements that required restoration in exchange for the reinstatement of farm program eligibility. Heimlich also indicates that the new USDA Wetland Reserve will provide for

restoration in a cost effective way and could possibly reduce "crop acreage and commodity program costs" (p. 82). Reduction in subsidy programs through restoration of agricultural wetlands is also supported by Ortman (1989). In addition, the role of restoration in general has been recognized in other ways as an important aspect of wetland policy. Restoration to "replace unavoidable wetland losses" and expansion of existing restoration activities (Larson, 1991, p. 66; O'Malley, 1989; Conservation Foundation, 1989b); and economic incentives that restore wetlands (van der Valk, 1989) are needed components of wetland restoration policy that offer new hope for wetlands.

CHAPTER THREE

STUDY RESULTS

DATA SUMMARY

The data presented in this section provides insights for developing wetlands policy recommendations for Tennessee. As discussed previously, three methods were used to gather data for this study: (1) a telephone survey of national experts; (2) a telephone survey of state professionals and stakeholders; and (3) a case study of Minnesota wetlands policies. A panel review process was used to review preliminary findings.

THE NATIONAL TELEPHONE SURVEY: ACADEMICS AND PROFESSIONALS

The purpose of the national survey was to gain a national perspective on wetlands policy. The people chosen for the survey were professionals and academics whose careers are specifically policy oriented and for the most part favor wetlands protection. These individuals represented government, private associations and academia. The experts were chosen because of their orientation to *policy* issues and their experience in regional or national affairs. All of the respondents were assured confidentiality. This promoted candid and frank conversations on many critical issues. Some experts wished to see more social or policy oriented studies developed in the future.

The following information is the collective result of the telephone interviews with a total of 7 experts. The small survey sample allowed the researcher to spend more time

probing the experts concerning their views on wetland policy. The interviews lasted from 45 to 75 minutes.

Data Summary

The data obtained from the survey questions (See Appendix B) are grouped in five categories: (1) government and private sector roles, (2) policy considerations, (3) the application of wetland protection tools, (4) wetlands research areas and (5) state with progressive wetland protection programs. The last category will be discussed in the case study section. The conclusions of each of these categories provide some interesting information for wetland policy in Tennessee.

Government and Private Sector Roles

To determine Tennessee state government policies, it was necessary to identify roles for federal and state government and the private sector. Each of the national policy experts were asked what they believed should be the role of state and federal government, and the private sector in wetland policy. Most of the experts (6 of 7) felt that the federal government had the primary responsibility for policy making and technical or financial support. In general if the financial and human resources are available in a given state then the state government should interpret and adapt federal policy for its own natural resource needs. States should identify its needs and developed strategies based upon broad federal policies, standards and goals.

The literature supports the federal role identified in the national survey. Some suggest that the federal government's wetland policy should send "a clear signal that the continuing loss and degradation of the nation's wetlands is not acceptable." They add that "greater state involvement in wetlands protection" is sorely needed (O'Malley, 1989, p. 9 & p. 11).

One expert with considerable experience in the development of national legislation felt that government roles are non-exclusive. He stressed that each unit of government is a part of a cooperative system. He added that "national goals must be shared by all units of government - state government responds to national goals by implementation in cooperation with local government."

The private sector also has a responsibility to protect wetlands. Most of the experts felt the private sector should act as stewards, participants, supporters, and be aware of resource needs. Three out of seven experts mentioned a role for private sector groups. Two of the seven experts felt these groups reflected public opinion. The role of stewardship, in particular, represents one opinion that individuals have "an obligation to look beyond their own parochial interests" and must now be "responsible to the public interest" (Survey Respondent, National Expert Survey).

Policy Considerations

Wetland policy considerations include (1) barriers, (2) opportunities, (3) reasons to protect wetlands, and (4) measures of success. Each are used to evaluate and provide needed information concerning the potential for policies to succeed. The following policy considerations are defined and summarized by topic.

Barriers

Barriers are obstacles to achieving policy goals, such as wetland protection. Barriers can be equated to holes in a tire; their presence can impede progress. Like holes in a tire, barriers must be dealt with. The collective opinion of the experts surveyed was that the largest barrier to wetland protection is a lack of information and understanding of the problem. People do not understand or have knowledge of the benefits of wetlands or the impacts of their losses. Education is central to the issue of resource protection and all stages beyond it. Interrelated to education are parochial or property rights interests. Three of the seven experts saw these attitudes as barriers for wetland policy. Parochial attitudes and property rights are based on self interest, not societal interest. In addition, few experts believed that wetland definitions are a major barrier.

Opportunities

Policy goals can be fulfilled if potential areas of progress are identified. Several of the experts interviewed saw opportunities for wetland protection in holistic and

sustainable resource planning and management. Many recognized the potential in this concept. Natural resource systems function according to the quality of its components. Wetlands and uplands perform valuable functions as well as other land areas. Each land area is interrelated and has to be managed with consideration for the other. Sustainability promotes integrated resource management without depleting resources. Restoration was recognized by two of seven experts interviewed as a means to address wetland losses. Existing federal and state programs already use this growing concept. Only one expert saw renewed state government interest as an opportunity. However, many felt that states were waiting for agreement on a final federal definition before developing their own strategies.

Reasons to Protect Wetlands

Four of six experts felt that wetlands should be protected based on their flood control benefit. Biodiversity and water quality was cited by half of the respondents.

Measures of Success

Most of the experts (six of seven) felt that quantity and quality measures should be considered in wetland protection policy. Some states require that these characteristics be equally restored if lost. One expert was skeptical of how quality measures could be determined.

The Application of Wetland Protection Tools

The preference of one wetland protection tool over another helps to determine the best tool for a given situation; specifically when contemplating regulatory tools versus non-regulatory tools. Two scenarios were developed for this evaluation: (1) a scenario where wetland losses were due to agricultural or silvicultural drainage (the rural scenario) and (2) a scenario where losses were due to urbanization (the urban scenario). Both considered wetlands in private ownership. To avoid bias, the experts were not asked to rank regulatory and non-regulatory tools together. For each scenario, the experts ranked separately the lists of regulatory and non-regulatory tools. First, the researcher read the rural scenario (See Appendix B). The experts then ranked regulatory tools that they believed would best protect wetlands for the rural scenario. Then, respondents ranked non-regulatory tools that they believed would best protect wetlands for the rural scenario. Results for the urban scenario were collected in a similar fashion.

Summary Results: The Rural Scenario

In the rural scenario, five out of six experts ranked special permits as their first or second choice to protect wetlands from the list of regulatory tools. When considering only non-regulatory tools, five out of six experts ranked easements as their first or second choice for wetland protection, and all the experts ranked easements as their first, second or third choice. Three of seven and two of seven experts ranked tax incentives and leases, and technical assistance and fee simple purchases, respectively, as one of their top three choices.

Summary Results: The Urban Scenario

In the urban scenario, five out of seven wetland policy experts preferred zoning as their first or second choice for wetland protection from the list of regulatory tools. Four of the seven experts chose mitigation as their first or second choice. Most of the respondents, in general, had a harder time ranking the choices for non-regulatory tools. Of those who chose to rank the non-regulatory tools, four out of six experts ranked fee simple acquisition as one of their top two choices. Three out of the six experts ranked tax incentives and purchase of development rights (PDR) as their first, second or third choice.

Conclusions of Both Scenarios

A few facts offer insights on the preference of non-regulatory and regulatory tools in rural and urban situations. The experts preferred zoning in the urban scenario and case by case permits in the rural scenario as regulatory options. Zoning could be considered a more restrictive land use tool than permitting. In addition, it appears that non-regulatory tools were easier to rank in the rural scenario than the urban scenario. Finally three of the seven wetland policy experts stated (without being asked) that they preferred regulatory tools over non-regulatory tools in the urban context. This fact combined with data from this survey implies that non-regulatory tools are preferred in rural situations.

Wetlands Research Areas

The experts also identified critical research areas needed for wetland protection and issue resolution. Five of the seven policy experts saw a need for information on functions and values of wetlands. Although general wetland functions and values are known, some of the respondents specifically mentioned a need to identify site specific wetland values and functions. Four of the seven experts saw a need to convert scientific terminology into policy terminology to promote better and more understandable policy. Two experts saw a need for a wetland definition and determination of social costs, benefits or tradeoffs. Restoration, decision making models, mitigation, inventory/geographic information system, and case study research were also identified by the respondents.

STATE TELEPHONE SURVEY: EXPERTS, PROFESSIONALS AND PRIVATE INTERESTS

Background

The state telephone survey was designed to identify two basic sets of information: (1) the areas of agreement between polarized interests in Tennessee, and (2) the frequencies of agreement on critical wetland policy issues for policy makers, policy stakeholders, and resource professionals in Tennessee. Many of the people surveyed were recommended by academicians or identified through news articles and newsletters. All of those surveyed are Tennessee residents.

The survey questions and statements were developed from responses to survey questions in the national policy experts survey (See Appendix B). After the State Survey instrument was developed, three pre-test surveys were conducted and modifications were made and the primary survey conducted.

Table 3.1 indicates the types and numbers of Tennessee professionals, experts and stakeholders interviewed for the state survey. As shown, people surveyed are grouped in three categories: (1) Agriculture and Forestry, (2) Environmental, Conservation and Wildlife, and (3) Legislative. Groups one and two represent the majority of those interviewed.

Table 3.1
State Survey Respondents

GROUP	CATEGORY	SUB-CATEGORY	NUMBER
Agriculture & Forestry	Private Landowners	Farmer	1
		Tree Farmer	1
	Government	TN State Agency	2
	Private Associations	Agricultural Interest	4
		Forest Interest	2
	Academia	Research	1
Environmental, Conservation & Wildlife	Government	TN State Agency	5
	Private Associations	Wildlife Interest	3
	Academia	Research	2
Legislative	State	State Senator	1
	Federal	Field Representative	1
Total Surveyed			23

Data Summary

The data obtained from the survey questions (See Appendix B) are grouped in seven categories. These include (1) general responses concerning the wetland issue, (2) perceptions, (3) issues, (4) government roles, (5) policy, (6) regulatory and non-regulatory measures, and (7) research interests. Two response methods were used: (1) closed ended statements designed to gauge the respondents' level of agreement on certain policy issues (e.g., whether they strongly agree, agree, are neutral, disagree, strongly disagree); and (2) open ended questions that provided further insights to issues addressed in the closed ended statements. The conclusions of the questions and statements are discussed in the following section by category.

General Responses

When the pre-test surveys were conducted, it was noticed that people wanted to state their overall or general opinions on wetlands very quickly. Therefore, two questions were asked before the structured survey began: (1) What do you think about the wetland issue? (See responses in Figure 3.1) and (2) What should the state do about it? (See responses in Figure 3.2). This allowed respondents, in some cases, to "vent" their emotions and proceed with the survey. The following list summarizes these opinions. These responses provide some very interesting conclusions about the nature of future Tennessee wetland policy and the role of state government.

Figure 3.1

- (1) Wetland losses are a serious problem and are threatened by many sources;
- (2) We need to balance social interests and private interests;
- (3) Special interests in Tennessee are polarized; both are right in many respects;
- (4) Tennessee is considered a leader in rural, inland type wetland protection in the southeast;
- (5) Restore natural systems; floodplains are the issue; no channelization;
- (6) Need sustainable management; no back door regulation; and
- (7) New policy must be flexible.

General Thoughts on the Wetland Issue In Tennessee - Question 1

Figure 3.2

- (1) Develop a sound protection program with regulatory and non-regulatory tools;
- (2) Develop common sense and team approaches; seek the "middle ground";
- (3) Give the farmer flexibility and educate the public;
- (4) Get comfortable with classification and definitions; Develop [or identify] structure to implement;
- (5) Take the lead; mediate; involve universities; and fund wetland protection.

The Role of State Government to Resolve the Issue - Question 2

Most of the comments concerning the wetland issue in Tennessee represented a moderate view. Most of the respondents felt that wetlands are endangered and should be protected in a fair and equitable manner. Some expressed the view that the major special interests (farm groups and environmental groups) had individual issues that were correct and felt that something should be done to address each perspective. Most felt Tennessee should develop a sound program and stick to it. Some also felt the state

should take the lead to mediate differences so that wetland policy in Tennessee could move forward.

Perceptions

The wetlands issue in Tennessee is very polarized due to confusion and misinformation about the status of wetland losses and the need to protect them. Therefore, it was necessary to determine if the respondents surveyed thought that wetlands are being lost or degraded. Questions 12 and 13 of the survey (See Appendix B) were designed to obtain the respondents' perceptions of the status of Tennessee's wetlands. The survey respondents were asked whether they felt Tennessee's wetlands were decreasing in quantity (acreage) and quality (impacts from excessive flooding, erosion or pollution). They were asked to answer these based on their perceptions. Approximately 78% agreed that wetland acreage was decreasing. The same amount agreed that wetland quality was decreasing. People who were neutral stated they did not feel competent to answer and some simply may not have wanted to voice their opinion.

Issues

Recently the literature has addressed and identified many wetlands issues; therefore, respondents were asked to identify issues that they felt had not been adequately addressed in Tennessee. The following summary (Figure 3.3) lists the issues that were mentioned most often.

Figure 3.3

- (1) Extremism; selfishness; misinformation; fraud; unprofessional development of research (researchers) and use of research (private associations);
- (2) Irresponsible participation in policy resolution; faked interest or lack of participation; lack of coordination and cooperation (agencies);
- (3) Lack of inventories and information;
- (4) Fear by private land users due to inconsistent policies;
- (5) Misuse of existing laws by agencies;
- (6) Narrow emphasis on protection issues; lack of sustainable management approaches;
- (7) Channelization;
- (8) Need to focus on the Floodplain and broader floodplain impacts;
- (9) Restoration and Compensation; and
- (10) Lack of locally organized environmental interests to balance lobbying at the state levels.

Issues - Question 21

Of all the issues mentioned, extremism was mentioned in many different ways quite frequently. This issue was attributed to environmental groups and private interest groups (farm groups) alike. Some stated that there are cases where state agencies responsible for wetlands policy are causing some of the biggest barriers by not participating actively in state discussions. Others saw a need for more balanced and organized representation, not at state lobbying levels, but at local community levels.

Government Roles

The role of government was analyzed to determine state government's interaction with federal government. Due to the polarization of Tennessee's policy environment and a historical role of federal involvement, many desire changes in government

responsibilities. Some feel that the state should assume responsibility for the federal 404 Permit Program. Others want the state to develop its own policy without federal interference or oversight. The following summaries provide insight into these issues.

State Assumption of the 404 Permit Program - Question 14

Over 60% of the survey respondents indicated that the state should not assume primacy for 404. Many felt that Tennessee is notoriously weak in wetlands regulatory issues. One person added that a "gorilla in the closet" such as the federal government was needed to remove political pressures. Others felt that Tennessee did not have the manpower or funding to assume primacy. Those who agreed (26%) indicated that the state needs more control of its own issues and that the federal government has misinterpreted the scope of the permit jurisdiction and should no longer manage the 404 permit program.

States Should Develop Regional Natural Resource or Wetland Policy - Question 15

Over 60% of those surveyed felt that individual states or a group of states should develop their own natural resource policies as opposed to the federal government. Many felt natural resource policies needed to be regionalized. Some wanted the federal government to develop quality standards and general guidelines for states to follow. Twenty-six percent felt that states should not play any major policy role. For example, one farmer felt that policy should be consistent nation wide.

The Federal Government Should Provide Oversight for State Programs - Question 16

Over 60% of those surveyed agreed that the federal government should oversee state resource activities. This statement combined with other survey data indicates that most of those surveyed saw a role for the federal government. However, many indicated that states like Tennessee should provide leadership for wetland protection and support for federal policies. As in the national telephone survey, some felt that federal and state government must work cooperatively.

Policy Issues

This section is a general category that covers a wide range of wetland policy issues. Most of these issues concern unresolved points of view, address specific items of interest or represent perspectives that may need to be considered in future policy discussions. The following items are addressed by policy topic.

Natural Hydrologic Processes and the Floodplain - Questions 8 & 11

Pre-test survey respondents felt that natural hydrologic processes and floodplains had been forgotten as basic factors in the debate concerning wetlands. Therefore, the survey addressed floodplains as an issue because they are where most wetlands in Tennessee exist. In addition some felt that water processes (hydrology) should also be addressed. In response to adding these issues to the survey it was found that 79% of those surveyed felt that floodplain protection and management should take priority over

wetland protection and management. Over 80% felt that natural water processes should be preserved.

Wetland Classification - Question 10

Some feel a wetland classification system is needed to guide decision making concerning wetlands. Over 80% of those surveyed felt that a classification system was needed to guide state policy. Some felt that wetland classification should be generalized and used in policy development.

What Wetland Types Should Be Preserved or Not Be Preserved? - Question 20

In response to the previous question 26% of those surveyed felt natural swamps, cypress-tupelo swamps, and other live ecosystems should be protected. Over 20% felt that most wetlands, all floodplains, and other wetlands defined by the federal manual, and beneficial or threatened wetlands should be preserved. Over 25% and 13% felt prior converted farmland and "swamped out land" respectively should not be preserved. Some people did not want to preserve wetlands that were impaired or not functioning as a wetland. Responses appear to be low in this category because the question was unclear to those responding.

Regulatory and Non-Regulatory Measures

Many groups agree on the types of wetlands, but disagree when its time to choose the most effective protection method or tool. Many do not like regulatory methods

because they involuntarily force people to maintain wetlands. People who own wetlands feel that they should receive an economic return, especially when taxes are due. Others, do not favor non-regulatory methods because they work too slowly when wetlands are being lost rapidly. The following summary addresses compensation and regulatory versus non-regulatory methods and tools.

Compensation - Questions 6 & 7

Most of the respondents (83%) felt that wetlands should be taxed at a lower rate as a preservation incentive. Many felt that lower tax rates were not enough. Some stated that wetland taxation is a fairness issue rather than an incentive issue. Others stated it could be easily handled through existing green belt laws. In addition, over 80% felt that protection of private lands should involve some level of compensation.

Non-Regulatory v/s Regulatory Protection - Questions 4, 17 & 18

Approximately 70% felt non-regulatory programs cannot be used without regulatory methods. Seventy-four percent preferred both regulatory and non-regulatory methods. Of those who preferred both, 82% leaned toward non-regulatory methods. Seventy-eight percent felt regulatory tools could be used independently for non-controversial wetlands (e.g., cypress-tupelo swamps). Minnesota apparently believes in this approach; it regulates only wetland types 3, 4 and 5 (See Appendix A) and bottomland hardwood wetlands.

Other Protection Methods - Questions 3, 5 & 19

Public/private joint ventures, acquisition programs, education and technical assistance are widely used in the United States. Over 50% strongly agreed and over 40% agreed that joint ventures for wetland preservation should be pursued in Tennessee. Approximately 70% strongly agreed and over 20% agreed that state programs should include education and technical assistance. Tennessee currently uses fee simple acquisition to protect wetlands. Over 50% of the respondents preferred acquisition while only 30% preferred easements. Almost 50% preferred both. Many felt easements, in this region, were hard to enforce over time.

Research Interests

Future research was an important aspect of the survey responses. Question nine addressed this issue. Over 80% agreed (35% strongly agreed) that more research was needed concerning the function and values of wetlands. However, many felt that plenty of information was available. Some agreed with the contention that data assimilation was needed and more site specific studies were desired. Other topics were listed by the respondents that specifically address Tennessee. Figure 3.3 approximately lists the ranking of responses.

Figure 3.4

- (1) We need resource assessment, "the numbers are too fuzzy or used too loosely" (e.g., identify un-useable farmland acres impaired by drainage);
- (2) More case studies of other conservation efforts;
- (3) What is the real dollar or social value of wetlands?;
- (4) How attitudes are attitudes changed?;
- (5) A need to tie classification to hydrology;
- (6) Creation of interdisciplinary/non-biased approaches to research;
- (7) Identification of data gathered by other researchers;
- (8) Basic site specific function and value of wetlands in Tennessee;
- (9) Private sector information transfer;
- (10) Stabilization of human impaired water systems (i.e., fix channelization);
- (11) Function and value of non-floodplain wetlands; and
- (12) Coordinated, interagency regulatory permit/case review activities.

Research Topic Area Recommendations - Question 22

Table 3.2 indicates the breakdown of responses for survey questions 3-16. As shown, non-controversial questions usually had a higher frequency in the strongly agree or strongly disagree category. Overall combined agreement or disagreement is strong and is represented by some 80/20 or 20/80 percent margins (cummulative SA/A and SD/D).

Table 3.2
Frequency of Subject Responses - State Telephone Survey

QUESTIONS ¹	Frequency of Responses ²				
	SA	A	N	D	SD
3. Education and technical assistance should be included in state wetland preservation programs.	70%	22%	8%	0%	0%
4. Voluntary programs are effective, but regulatory programs must be available as a backdrop.	14%	56%	0%	26%	4%
5. Joint ventures for wetland preservation between the public and private sectors should be pursued.	52%	44%	4%	0%	0%
6. Wetland areas should be taxed as marginal lands (i.e. at a lower rate) as an incentive to private landowners to preserve wetlands.	48%	35%	13%	4%	0%
7. Wetland protection programs for privately owned lands should provide for some level of compensation.	35%	48%	9%	4%	4%
8. Natural hydrologic processes occurring in seasonally flooded bottomlands or other "seasonally wet" areas should be preserved in some manner.	44%	39%	13%	0%	4%
9. More research is needed concerning the function and values of wetlands.	35%	47%	9%	9%	0%
10. A wetland classification system is needed to guide state wetland preservation policy.	35%	48%	4%	9%	4%
11. Floodplain protection and management should precede wetland protection and management.	18%	61%	4%	13%	4%
12. The acreage of naturally occurring wetlands in TN is decreasing.	30%	48%	13%	9%	0%
13. The quality of naturally occurring wetlands in TN is decreasing.	30%	48%	22%	0%	0%
14. TN state government should assume responsibility for existing federal regulatory efforts (404 Permit Program).	4%	22%	13%	39%	22%
15. A state or group of states, not federal government, should develop regional natural resource policy.	17%	44%	13%	17%	9%
16. The federal government should provide oversight for state natural resource programs.	17%	44%	13%	17%	9%

¹ Questions 1-2 and 17-22 were open-ended questions and, therefore, are not included in this table.

² The following abbreviations are used in the table: SA - Strongly Agree; A - Agree; N - Neutral; D - Disagree; SD - Strongly Disagree.

CASE STUDY: THE MINNESOTA MODEL

One purpose of the national experts telephone survey was to identify a leading state in wetland protection for a case study. Although many states were listed, Minnesota was mentioned by more than five out of seven national experts surveyed⁴. One policy expert in the literature described Minnesota as having "a reputation for being a progressive, responsible state government" (Runge, 1988, p. 144). Therefore, an examination of Minnesota's programs could provide interesting insights for Tennessee. Two Minnesota legislative actions were used for the case study. The 1986 Reinvest in Minnesota (RIM) Program and the Wetland Conservation Act of 1991. These programs promote innovative and progressive efforts to protect wetlands.

The Reinvest in Minnesota Program

The RIM Program represents an effort to reinvest state income in its natural resource base. Since 1986, the program has addressed soil conservation, wetlands, forest resources, fish and wildlife, and wildlife habitat in a very comprehensive, cost effective manner. RIM's biggest success appears to be its overall statewide appeal. Many of Minnesota's farm, conservation and environmental interests played an active role in the passage, funding, adaptation and implementation of RIM.

RIM is unique because of its goal to "fill the gaps" of existing federal program efforts. Furthermore, RIM did not originally address wetlands. The following

⁴ The National Telephone Survey was also designed to identify a leading wetland protection program. Unfortunately, most only identified narrow or specific programs with little consistency. Therefore, Minnesota and its programs were chosen for the case study.

discussion includes details about RIM in addition to wetland protection. The discussion is intended to indicate the significance and potential of broad based, comprehensive natural resource programs.

Policy History

The RIM program was borne out of a 1984 Governor's Citizen Commission to Promote Hunting and Fishing in Minnesota (Edgerton, 1988). Twenty people, representing business, natural resources, and public policy, were charged with the task of developing a plan that would provide more opportunities for hunting, fishing and tourism in the state. A committee report revealed that "a combination of increasing human population, decreasing wildlife habitat, and inadequate natural resource funding was severely limiting recreation and tourism opportunities and diminishing the overall quality of life" in Minnesota (Edgerton, 1988, p. 107). In addition, it was concluded that Minnesota sportsmen were known as "the single most important source of out of state license and tourist money to almost every [neighboring] state and Canadian province" (p. 107).

Other factors created a climate of urgency for state action. The loss of 5,000 farms in 1984 caused alarm in the farm sector. Trends indicated that 93,000 farms would go out of business over a ten years period. These two factors combined added strain on the state's economy and the natural resources on which it depended (Korczak and Gran, 1986). In addition, over half of the state suffered from soil erosion losses above soil tolerance levels and 13.5% of the state was eroding more than twice tolerance

levels. The resulting impacts on water quality and wildlife habitat represented a real threat to an already declining tourism industry.

The Governor's Citizen Commission compared the state to a factory that needed reinvestment (Edgerton, 1988). The commission recommended that 1% of the billion dollar return from tourism be reinvested in the state's natural resources. This report caused quite a lot of interest in Minnesota among farm groups, environmentalists, and wildlife enthusiasts. Informal communication about the possibilities of such a proposal resulted in a coalition of special interests. The coalition (later known as the RIM coalition), represented "the largest most diverse coalition of environmental and agricultural groups ever assembled in Minnesota history" (Edgerton, 1988, p. 108).

Coalition membership included 40 individuals from "the Sierra Club to the Minnesota Corn Growers Association" (p. 108), many of whom were often opposed to the others views (Edgerton, 1988). Due to efforts by the coalition, in 1985, the first RIM legislation was passed, but unfortunately without funding. One state official observed that the lack of funding for RIM "made coalition members angry" and caused them to organize lobbying efforts (Wayne Edgerton, Personal Communication, May 18, 1992). These efforts resulted in passage of the 1987 RIM Act and \$16 million in program funding. Although this was short of the \$60 million recommended by the Governor's Citizen Committee, private sector groups and the government recognized the program's potential (Korczak and Gran, 1986).

Introduction of Wetland Initiatives

After 1986, the RIM coalition recognized it's ability to get important consensus building legislation passed. The coalition continued to "fine tune" (Edgerton, 1988, p. 108) the legislation through improvements and amendments that addressed current issues and resource needs including wetlands. By 1980, Minnesota ranked third nationally in existing wetlands but had lost over 6 million acres (compared to over 1 million lost in Tennessee) (Dahl, 1990). In 1986, wetlands had become a major natural resource issue, for many other states (Wayne Edgerton, Personal Communication, May 18, 1992). Wetland restoration on private lands, where many of the losses had occurred, was recognized as an important opportunity. Therefore, a wetlands restoration component was added to the 1987 RIM bill.

RIM Management and Program Elements

The RIM program is managed by two state agencies. The Board of Soil and Water Resources (BSWR) manages RIM programs for private lands assistance. BSWR functions through locally organized Soil and Water Conservation Districts (91 counties) which have a long history and well established network of private lands assistance efforts. Although the BSWR has a long history in soil conservation, wetlands restoration has been the number one priority of the BSWR for several years (Wayne Edgerton, Personal Communication, May 18, 1992). The second agency, the Minnesota Department of Natural Resources (DNR), manages RIM programs primarily for public lands. The DNR has historically managed public lands and provided regulatory

enforcement of wildlife and resource laws. Therefore, several RIM initiatives were developed for the DNR to improve habitat on state owned preserves and recreation areas.

The RIM programs have been very comprehensive and flexible for resource needs. The principal programs were designed to address priority needs such as soil erosion and wildlife habitat. After soil erosion was addressed, the program focus "shifted away from marginal agricultural lands toward drained wetlands and, very recently, also toward riparian land and sensitive groundwater areas" (Taff and Lee, 1990, p. 6). Other programs were developed to "augment" the focus programs. In this manner, habitat surrounding land enrolled in the focus programs could be enhanced and potential impacts controlled.

Each program element and its accomplishments are described as follows (Minnesota Department of Resources, 1991; Minnesota Department of Resources, 1992).

BSWR Programs

The RIM Reserve-Marginal Farmland Retirement Program is designed to establish permanent vegetation on highly eroding cropland. Originally landowners could enroll lands and receive payments for 10 years. Currently, the program offers 20 year and perpetual easements. Over 16,000 acres were entered in 1986; an additional 10,000 acres through 1991 (approximately 8,000 acres are in perpetual easements).

The Wetlands Reserve - Wetlands Restoration Program provides perpetual leases for wetland areas and cost-shared restoration to remove drainage practices. Over 5,000 acres have been enrolled to date.

The Riparian Lands Program, Sensitive Ground Water Program and Pastured Hillside Program augment the above programs and address other resource needs. Each protects sensitive lands through 20 year and perpetual easements. Over 2,000 acres have been enrolled since 1987.

DNR Programs

The Critical Habitat Match Program allows donations of land or money to the state. The state matches cash donations and provides 50% of the assessed value of donated land to the non-profit organizations to complete restoration work on the wetland site. Cash matches by the state provide improvement and protection of habitat. Approximately \$7.7 million in cash and land donations have been given since 1986. The state has matched another \$8.2 million since 1986. Another \$1.9 million in private funds has been pledged and an additional \$2 million is expected for FY93-94.

The Wildlife Enhancement Program, Fisheries Enhancement, and Forest Wildlife Management provide funds for acquisitions, easements, technical assistance, wildlife habitat improvement practices, habitat restoration, research, and small public recreation facilities. DNR also conducts a Prairie Bank program to gain easements on native prairie lands. Since 1987 over 300,000 acres of lands have benefited from all DNR programs.

Other Program Accomplishments

Three accomplishments by the RIM program and the process by which it developed are important to identify. *First*, the involvement of broad interests made RIM an acceptable program to policy makers, policy implementers and private citizens. The RIM coalition in particular, provided unprecedented cooperation. An additional alliance of 91 Soil and Water Conservation Districts; the Minnesota Extension Service; the Department of Natural Resources; the Minnesota Pollution Control Agency; the U.S. Fish and Wildlife Service; the Agricultural Stabilization and Conservation Service; and the Soil Conservation Service cooperated in implementation processes.

RIM also involved local citizens. Through local screening committees "local decision making and priority setting" was accomplished through "a group of agency personnel, sportsmen, and local . . . conservation districts" (Larson, 1987, p. 126). The screening committees accepted applications, established priorities and identified assistance for implementation of the RIM practices. As Larson (1987, p. 126) describes, this approach eliminated the alternative "top down approach [which] stifles local creativity and promotes reactive local organizations."

University involvement also contributed to RIM. During RIM's development, Minnesota, like many states, had scarce financial resources (Runge, 1988). Therefore, any effort that helped target resources efficiently were considered very timely. In 1986, the University of Minnesota developed a targeting scheme to identify lands that were "low in productivity and highly vulnerable to erosion damage" (Runge, 1988, p. 138). The scheme was very effective due to its ability to focus scarce resources on poorly

productive, highly vulnerable resources. The scheme also helped to reduce the "temptation to allocate RIM funds for purely political purposes" (Edgerton, 1988, p. 108). Additionally, since RIM's implementation the University has also played a significant role in identifying program strengths and weaknesses (Lee and Taff, 1990; Taff and Lee, 1990).

Non-profit groups such as Ducks Unlimited, and Pheasants Forever through locally organized chapters have had a significant impact on RIM's success. The current RIM coordinator, Dave Bahm (Personal Communication, April 15, 1992) acknowledged that "RIM efforts have been consistently augmented . . . through [non-profit] financial support to round out cost sharing, technical assistance." Non-profit members also provided free labor, and free seed; all of which have accelerated the program. Bahm noted that in the 1990 sign-up, Pheasants Forever provided \$35,000 in cost share dollars to assist landowners with cover practices. Ducks Unlimited provided \$75,000 for restoration work and tree seedlings for wetlands. One non-profit official noted that non-profits provide free administrative support for RIM projects (Pheasants Forever, Financial Officer, Personal Communication, May 19, 1992). He also noted that non-profits receive grants from federal agencies who may be avoiding the 30% administrative cut taken by state agencies.

Second, RIM was particularly designed to avoid competition with other federal programs and to "fill gaps" left by them (Wayne Edgerton, Personal Communication, May 18, 1992). For example, the Conservation Reserve Program was established in 1985 to establish permanent cover on highly erodible land through ten year, annual lease

payment contracts. Although RIM had a similar program (The RIM Reserve), RIM easement payments were less than the CRP program payments to avoid competition. However, RIM provided a needed alternative by offering a one time lump sum payment and a perpetual easement option. RIM also enrolled lands already protected (unlike some CRP requirements) to promote wildlife values (Korczak and Gran, 1986). Heywood and Cooper (1989) report that large numbers of RIM sign-ups reflected the interest of wildlife incentives.

Competition was also avoided with other federal programs. In Minnesota, by 1990, over 200,000 acres of existing wetlands had been acquired or leased by the Fish and Wildlife Service (USF&WS, 1991). The RIM wetland programs focused on restoration of wetlands previously lost. The program concept appears to have been very successful. In fact, state agency officials interviewed for this study claimed that some of the legislative wording for the new Federal Wetlands Reserve Program is identical to RIM Wetland legislation.

Third, the wetland accomplishments of RIM are not specific to programs that address wetlands, but programs that address all of the resource and economic needs of Minnesota. For example, controlling soil erosion prevented damage to riparian habitats and wetlands. By improving low quality upland wildlife habitat, the wildlife in adjoining wetlands and other ecosystems benefited. The RIM program not only addressed wetlands but also their relationship to the environment. Larson (1987) adds that the flexibility of RIM offers an opportunity to link a wide variety of natural resource policies.

RIM's Future

Funding has been the primary problem for RIM programs. In 1991, reserve program requests of \$4.9 million exceeded the appropriated funding of \$1.9 million by more than half (MDNR, 1992; See Table 3.3). Most of the funding for RIM has come from state bonding. Originally, program funding was to near \$60 million over 10 years (\$6 million per year). Since 1987, funding has averaged \$3.75 million per year (See Table 3.4). Funding in 1990 only covered administrative costs. With lower funding levels it has been difficult to meet all of the demands. Many of the programs that augment the RIM Reserve were put on hold for 1991 (MDNR, 1992). For several years a trust fund idea has been touted as a solution to budget woes. Stable funding is however, in sight. State officials reported that a trust fund is being established from gambling proceeds, with RIM being "the only draw."

Criticism of the program was sought out but hard to find. State officials reported that early criticism came from metropolitan interests. Other criticism came from farm groups but appeared to have no major effects on the program due to balanced lobbying efforts (crucial to the discussion of controversial issues) and obvious RIM benefits for farmers. When asked what should have been done differently, Wayne Edgerton, Ex-RIM coordinator, suggested that they should have developed stable funding "while the iron was still hot". One possible criticism should be noted concerning funding for wetlands. In 1991, requests for wetland easements were approximately half of the appropriations. Despite this, enthusiasm by private organization representatives and state program officials interviewed seemed high. On the whole, RIM appears to be very successful.

Table 3.3
Landowner Demand for RIM Reserve in 1991
(all dollar amounts in thousands)

Program Type	Funding Requests	Approved Funding
Wetland Restorations	\$ 2.9	\$ 5.6
Other Easements	\$ 4.9	\$ 1.9

Source: Adapted from Minnesota Department of Natural Resources (1992a).

Table 3.4
Demand for RIM Reserve
(all dollar amounts in thousands)

Year	Funding Requests	Approved Funding
1987	\$ 5.5	\$ 4.5
1988	\$ 5.0	\$ 4.5
1989	\$ 6.3	\$ 1.5
1990	\$ 4.2	\$ 0.75
1991	\$ 7.8	\$ 7.5

Source: Adapted from Minnesota Department of Natural Resources (1992a).

The Minnesota Wetland Conservation Act of 1991

The Minnesota Wetland Conservation Act represents a different approach to conservation than RIM. The Act focuses on wetlands. It is largely a regulatory act designed to curtail the loss of wetlands and to provide specific legislative directives for future wetland policy. The Act is interesting in that it requires no-net loss of wetland acreage as well as no-net loss of wetland functions and values (Greg Larson, Minnesota Department of Natural Resources, Personal Communication, May 19, 1992).

Policy History

"In order to understand how the Wetland Conservation Act developed, [one] must first understand the historical context of wetlands in Minnesota" (Greg Larson, Minnesota DNR, Personal Communication, May 19, 1992). In pre-settlement days, "the young Minnesota landscape" was literally "loaded with wetlands." For any development to occur many acres of predominantly Prairie Pothole wetlands had to be altered. Therefore, the loss of these original wetlands has been tremendous. Some parts of the state have lost all of their original wetlands, others only some.

The need to protect wetlands in Minnesota originated with the federal government. Regulatory efforts of the Corp of Engineers and the restrictions of the 1985 Farm Bill⁵ resulted in bad experiences between land users and government. Prior to any

⁵ Minnesota needed more Soil Conservation Service wetland determinations to comply with the Farm Bill's swampbuster provisions than all of the other states combined (Greg Larson, Personal Communication, May 19, 1992).

wetland legislation, people were "bringing a lot of baggage to the bargaining table." Therefore, efforts to protect wetlands were not popular.

Because of these factors it took three years to pass the Minnesota Wetland Conservation Act. Two previous attempts to pass wetlands protection failed. Even when the bill was passed in 1991, it was voted on during the closing hours of the session. Its passage was primarily due to the addition of several exemptions (John Jashke, Wetland Management Specialist at the Minnesota BSWR, Personal Communication, May 19, 1992). Although conservation groups had rallied around the bill, the coalition style support of the early RIM Act was not present. According to John Jashke at the Minnesota Board of Soil and Water Resources, the bill was primarily the "brainchild" of Markus Marsh, a Minnesota legislator.

Policy Elements

The Wetlands Conservation Act established several innovative and well developed policies. These included new regulatory procedures, policy goals for inventory and monitoring, research, some non-regulatory approaches, and specific standards for protection of certain unique habitat. The following section summarizes key elements in the Wetland Conservation Act of 1991 (emphasis added).

Article 1 - Policy

Article 1 states that it is in the public interest of Minnesota to (1) "achieve *no net loss* in the quantity, quality, and biological diversity of Minnesota's existing wetlands,"

(2) "increase the quantity, quality, and biological diversity of Minnesota's existing wetlands by restoring or enhancing diminished or drained wetlands," (3) avoid direct and indirect impacts from activities [that reverse above purposes] of wetlands," and (4) replace wetland values where avoidance of an activity is not feasible and prudent" (p. 2).

Article 2 - Wetland Prioritization and Planning

Article 2 states that local government will develop "water plans" to identify "regions of high priority for wetlands" (p. 4). The Minnesota Board of Soil and Water Resources will develop criteria for the public value of wetlands.

Article 3 - Permanent Wetland Preserves

This article authorizes the Minnesota Board of Soil and Water Resources to purchase perpetual easements for wetland types 1, 2 or 3 (See Appendix A). These types are mostly unprotected by regulatory means in the Act. Up to 4 acres of adjacent upland can be leased for each acre of protected wetland to prevent off-site impacts and provide additional habitat.

Article 4 - Wetland Preservation Areas

This article offers landowners the opportunity to enroll their wetlands, located in high priority wetland zones (designated by Board of Soil and Water Resources), into a wetland preservation area. Article 4 also states that the preservation areas are exempted

from property tax, limits eminent domain actions, and limits sewer and water extensions to the area. Removal of the designation can occur in 8 years, after notification.

Article 5 - Wetland Establishment and Restoration

This article allows landowners to apply to local government to create or restore wetlands with cost share assistance. The areas must be placed under a permanent easement for future protection.

Article 6 - Regulation of Wetland Activities

Article 6 states that all public waters "may not be drained or filled wholly or partially" (p. 26) unless replaced with wetland areas of *equal* value. This means that a high quality wetland (e.g., type 6) cannot be replaced by a lower quality wetland (e.g., type 3) (Greg Larson, Personal Communication, May 19, 1992). Public waters are defined as lakes, streams etc. and include wetland types 3, 4 and 5 that are 10 or more acres in size in unincorporated areas and 2 1/2 acres in incorporated areas. Wetlands are defined according to the 1985 Farm Bill definition.

This article also lists 24 exemptions (See Appendix C). Some exemptions are very practical, e.g., removal of small "nuisance" wet areas in the type 2 class and removal of beaver dams or culvert blockages. This article also dictates the following: mitigation is a last resort; replaced wetlands must be protected by 10 year deed restrictions; and replacement must occur in the same watershed or county. In addition, this article established mitigation banks, provided for interdisciplinary review processes,

required joint planning with federal agencies to simplify permit processes, etc., required development of wetland inventories, and provided for involvement by agriculture and environment committees in agency reviews.

Article 7 - Interim Wetland Activities

Article 7 provides for a wetland act test period until agency rules are established in 1993. Until then, permits are not to be granted to drain, fill or burn a wetland as defined and delineated by the 1989 unamended Federal Manual for identifying and delineating wetlands.

Articles 8-11 - Other Wetland Policy Categories

Article 8 provides for protection of peatlands and designates scientific and natural areas. Article 9 provides clearance for DNR assumption of primacy in the Corps of Engineer 404 Permit Program. Article 10 requires that state activities in land management or transfer be consistent with the public purpose for wetlands. Article 11 authorizes \$12 million from bond proceeds fund and \$1.9 million from the general fund.

Specific Policy Elements Examined

Minnesota officials were asked questions about the 1991 Wetland Act relating to application in Tennessee. One question concerned Department of Transportation roles in wetland protection. One official stated that the Department of Transportation (DOT) had developed and had broad approval of a wetland mitigation plan and a wetland

banking program. The act is very specific that mitigation is a last resort. Its impact on the Minnesota DOT however, is unclear.

The exemption issue was discussed in terms of certain types of exemptions for agriculture and federal programs. Some of the weakest exemptions cited were exemptions 1, 5 and 6 (See Appendix C). Exemptions 5 and 6 particularly give the federal agencies priority review over jurisdictional activities, which some feel could be handle with less controversey by the state. One DNR official stated he felt that some of the exemptions provided very responsible flexibility in the law. In fact, he stated that the number of exemptions (24) probably represented 12 or fewer specific exemptions.

Implementation and Accomplishments

Staff interviewed at the Minnesota Department of Natural Resources and the Board of Soil and Water Resources could not provide data on the success of the new Wetlands Act. One individual personally knew of wetlands that had been restored by requirements of the Act after drainage had commenced. Others felt that public knowledge of the Act had helped to protect many more acres. In the future as inventories are established, the success of the Wetland Conservation Act of 1991 will be determined.

How does the Act specifically differ from RIM concerning wetlands and how will the Act impact RIM? One Minnesota official characterized RIM as a program focusing on wetland restoration. The Wetland Conservation Act of 1991 protects wetlands in their current undisturbed or moderately disturbed state. The Act provides regulatory

protection of what some consider higher value wetland types (types 3, 4, 5, and peatlands) and non-regulatory protection for lower value types (1, 2 and certain 3's). Other officials feel that RIM will not be affected. It will only continue to adapt, change and seek out other "holes to fill" in existing federal and state programs.

Case Results Summary

Table 3.5 lists the characteristics of two programs: (1) The RIM Program and (2) The Wetland Conservation Act of 1991. The RIM program has been tested by several years of program application and the following list of RIM successes indicates why RIM worked. The evidences of success in Table 3.5 are shown by specific acceptance of RIM by national organizations and government. The last two categories in Table 3.5 summarizes why RIM was adopted by the Minnesota legislature and one way to improve such programs.

Table 3.5 also lists potential factors of success for the Minnesota 1991 Wetland Conservation Act. Although it has not been tested over the years like the RIM program many factors are evident of its potential effectiveness. From these factors the Act appears to have a strong foundation.

Table 3.5
A Summary of the Minnesota Model For Wetland and Natural Resource Policy

The RIM Program

Success Factors

Broad coalition Involvement
Academic Support and Monitoring
A Comprehensive Program Focus
(System Resource Management)
Linking with Fed Programs
Promote Public Involvement
Promote State Patriotism
Non-profit Group Involvement
Money Matches-Private Investment
ID Link to the State Economy
A History of Federal Participation
Use of Existing Networks
"Bottom up Organizational Roles
Flexible Eligibility Requirements

Evidence of Success

Council of Govs. Model
RIM as Model for Fed Program
Numerous Acres Benefited
Local Public Awareness

Why RIM Was Passed

Meet a Crisis or Need
Broad Coalition Support
A Balanced Lobby Environment

Improvements Suggested

Get Stable Funding When Passed

The Wetland Conservation Act of 1991

Potential Success Factors

Desperate Need to Protect Wetlands
Successful History of RIM
Tried Major Non-Regulatory Effort First
Quick Follow-up with Regulatory Effort
Clear & Decisive Legislative Goals
Offers Detailed guidelines
Regulatory with Non-Reg. Components
Offers Non-regulatory Incentives

Flexible Exemptions, Stay Tough Policy
Standardized Interdisciplinary Roles
Protects Priority Wetlands Specifically
Uses Existing Gov. Planning Structure
Requires Coord. State & Fed. Processes
Addresses Valuation
Requires Inventory & Monitoring
Promotes Local Involvement

PANEL REVIEW

A panel review process was developed to review the study data and preliminary findings with a panel of policy experts. The researcher presented the data and findings and responded to questions concerning details of policies, critical issues, and potential conclusions that may be drawn from the study. The response to preliminary conclusions was favorable. The panelists stressed that specific recommendations should be developed and that opportunities to present the study to the Governor's Interagency Task Force on Wetlands should be pursued.

CHAPTER FOUR

CONCLUSIONS AND RECOMMENDATIONS FOR TENNESSEE

The recommendations in this chapter originate from four sources: (1) literature concerning wetland policy and policy tools; (2) National Experts Telephone Survey; (3) State Telephone Survey; and (4) the Minnesota Case Study. Specific findings based on these data sources were discussed in Chapter 3 and will be used as the basis for the recommendations outlined in this chapter. Prior to presenting these recommendations, specific conclusions concerning the policy process will be discussed.

STUDY CONCLUSIONS - THE POLICY PROCESS

Many agree that wetland policy in Tennessee is greatly needed. But what enables policies to be developed and adopted?⁶ The researcher has concluded that there are several reasons for the development and adoption of new natural resource policy on the state level. The Minnesota Case and the literature indicates that new natural resource policy initiatives will result from shared opportunities, crises or links to other state policy needs. For example, in Minnesota natural resource policy was linked to a billion dollar tourism industry. The enhancement and protection of natural resources was viewed as

⁶ Policy development occurs when an individual or a group of individuals identifies a public need or purpose and places it into a public forum (e.g., in the media or in formal discussions) for identification of alternative actions. After a public purpose has been recognized and discussed in public forums, it is usually addressed and articulated by legislation. Legislation contains guidelines, methods and tools used to implement the policy that addresses the public purpose. Policy adoption occurs when the bill becomes law and is funded.

the primary means of improving tourism and people realized that without reinvestment, the states resources would continue to decline.

Minnesota had also had a crisis. Due to the nature of reactive American politics, many important policy issues are addressed on the heels of a crisis. In Minnesota, the crisis was declining natural resources, a loss of tourism dollars and a loss of family farms. Therefore, environmentalists, state economists and farm groups were able to recognize an opportunity to work together to address mutually related problems. The crisis caused action and the action resulted in progress.

However, the adoption of natural resource policy by the legislature in Minnesota did not occur easily. Most of the credit is due to the RIM Coalition. When financial resources were withheld in the first RIM legislation, coalition members from farm, environmental and tourism organizations lobbied harder for program funding the next year and won. Without strong coalition support the RIM legislation may not have been properly funded.

Other factors contributed to the Minnesota RIM policy process to protect natural resources. The non-regulatory nature of the RIM act addressed preliminary issues derived from the needs and expectations of Minnesota landowners and society in general. In addition the RIM Reserve provided needed financial help for farmers and funds to protect fragile soil and water resources. State universities developed new tools to target scarce state funds and programs. Finally, the legislation was designed to avoid competition with existing federal efforts allowing RIM to successfully fill gaps missed by the federal programs.

These factors also enabled wetland protection to become a major focus of future Minnesota legislation. The effectiveness and broad appeal of RIM apparently allowed more controversial, pro-active wetland policy to be passed in later years. Furthermore, the RIM program proved that state agencies could implement successful land conservation programs. Although these factors were not directly correlated in this study the influence of RIM is also evident in the detail of the Wetland Conservation Act of 1991. Again broad based, well coordinated policy was developed to address wetland protection needs and private interests. After RIM, the state may have been able to develop regulatory efforts focusing on wetlands that not have been politically feasible in the past.

Wetland Policy Development and Adoption in Tennessee

What do the lessons in Minnesota and this study mean for Tennessee? First, policy makers in Tennessee should not wait for a crisis or for numerous groups to suddenly recognize that they share policy opportunities. Policy development in Tennessee has to be initiated by action. Many states are waiting on federal rulings of jurisdictional wetland definitions. Minnesota has shown that states do not have to wait. Existing definitions, such as the *1989 Manual for Delineation and Identification of Wetlands* and classification systems such as the Cowardin et al. system, can be effectively used. Classification must be used responsibly to determine which classes or types of wetlands should be protected. Classification can also help to determine whether regulatory means should be used or a combination of non-regulatory and regulatory means should be used.

Lastly, the Minnesota case study specifically, indicates that protection of wetlands should originate from a broad approach that enhances and protects all natural resources. Natural resources are interrelated systems and should be managed as such. Tennessee has no shortage of abundant and diverse resources and they deserve mutual attention.

In order to protect wetlands, the state telephone survey and the Minnesota Case study show that impacts on wetlands from other resource problems (e.g., cropland erosion, floodplain impacts, or stream channel alteration) must be stopped. This effort will require broad support from all groups in Tennessee. Special interests (i.e., farm, wildlife or development interests) on either end of continuum of interests should participate responsibly in the policy debate. The wider range of policy interests between these extremes should meet together with the special interests to gain agreement on critical policy issues. Minnesota has proved that better policy results when input by all affected interest groups is included.

TENNESSEE WETLAND POLICY RECOMMENDATIONS

The policy recommendations for Tennessee will be presented in three sections. Section one, **Policy Conclusions**, are statements that provide a benchmark for future wetlands policy in Tennessee and represent the major source input from this study. These statements based only on approaches and opinions that can be substantiated by this study. Section two, **The Policy Process** outlines a process that is recommended for future natural resource and wetland policy in Tennessee. Section three, **Policy**

Elements, addresses specific organizations that need to develop actions for natural resource and wetland protection in Tennessee.

Policy Conclusions

Each category presented in the following section represents a specific policy area. The statements listed under each category address facts established in this study. Future policy development could rely on these statements as guides for specific policy approaches. Over 40 policy statements have been developed from this study and provide some standards for wetland policy in Tennessee.

The following list describes general wetland policy standards that should be adopted for Tennessee and statements that describe predominantly held views of professionals interviewed for this study. Sustainable, holistic policy approaches were mentioned by some as one of the best methods of protecting wetlands.

Category 1: General Policy - General Guidelines for State Government

Figure 4.1

- (1) Holistic policy planning is more effective than narrowly focused methods.
- (2) Resource policy adoption can occur when realistic policy links are identified.
- (3) A general resource classification is very useful for protection standards.
- (4) Sound wetland or other natural resource protection is desirable.
- (5) People generally accept a federal policy role and over site of state activity.
- (6) Controversial, management intensive programs are best left to federal control in Tennessee.
- (7) Interstate policy development and cooperation is favored.
- (8) Views of polarized interests are disliked and generally seen as anti-progressive.
- (9) State leadership is promoted by wetland protection in public works projects.
- (10) State leadership is promoted by pro-active efforts to protect resources.
- (11) Some states recognize the merit of wetland valuation for prioritizing needs.
- (12) Expanding the jurisdiction of current laws without new laws to protect wetlands creates suspicion and anger in the public sector.
- (13) State policies are more efficient when linked with existing federal policies.
- (14) Legislation should have clear goals, detailed guidelines and proactive policies.
- (15) Stable funding should be secured when major resource programs are adopted.

Policy Guidelines

Tennessee should first address all natural resource needs and devote considerable effort to coordinate existing programs and new, more pro-active programs for control other resource impacts. Several years ago the Governor's Safe Growth Committee identified such approaches as well as the need to protect soil and wetland resources.

Sound approaches similar to those used in Minnesota are needed. Legislation and policy goals should be clear and be linked to existing federal structures and programs. Stable, long term funding should be established. Government leadership will be essential in all public works projects that may impact resources. In addition, a wetland definition and classification system should be chosen or adapted from other versions and put to use in the state.

Category 2: Resource Considerations - Policy Conclusions That Impact Wetlands

Figure 4.2

- (1) Human induced hydrologic changes (i.e., channelization and levying) in natural river systems are not desired.
- (2) Low gradient, alluvial floodplains function best naturally.
- (3) Resource inventory is a priority to monitor the status of natural resources.

Policy Considerations

Resource considerations concern issues that relate to other natural resources. These issues should be considered prior to developing wetland policy. For example, Wetland policy should promote an end to channelization in West Tennessee. People surveyed for the study felt that the river systems in West Tennessee particularly should

be allowed to return to their natural state. Impacted lands along hydrologically damaged river systems should be given top priority for acquisition and protection. Resource inventory should be focused on on impacted areas and sources of impacts.

Category 3: General Wetland Policy - Policies Specific to Wetlands

Figure 4.3

- (1) Decreased wetland acreage and quality in Tennessee is generally not disputed.
- (2) Wetland value and quality is best protected and restored by "no net loss."
- (3) Wetlands are best managed as system components (i.e., floodplain or upland).
- (4) Site specific information on wetland functions is sparse.

Wetland Policies

Most of the people interviewed for this study felt that natural wetlands are truly decreasing. The Minnesota Case study showed that no net loss in value and quality is the best approach to prevent the net loss of wetland functions and values. Tennessee should develop a similar no net loss policy. However, wetlands should not be protected as single units, but as a component of a fragile floodplain system or upland habitat. Specific wetland types in Tennessee should be studied to identify their specific function and value.

Category 4: Wetland Policy Elements - Specific Components Used to Protect Wetlands

Figure 4.4

- (1) Wetland property tax relief is not an incentive; it is a fairness issue.
- (2) Mitigation may provide flexibility, but is best used as the last alternative.
- (3) Flexible but strict rules are required components of regulatory policy.
- (4) Regulatory protection, for some types of wetlands, is generally acceptable.
- (5) Non-regulatory measures should be seriously considered as a policy standard for some wetland types.
- (6) Education and technical assistance are integral tools in natural resource policy.
- (7) Wetland standards and policies should become consistent and stable.
- (8) Wetland and natural resource protection laws need explicit, clear goals.
- (9) Diverse protection tools address diverse problems and expectations.

Policy Tools

Tax relief should be used as a key wetland tool in Tennessee to promote fairness in wetland protection policy. People who are asked to limit their use of wetlands for other purposes should be given tax relief. However, it is desirable that landowners provide some means of commitment for protection in return for tax relief. Therefore, the use of wetlands and other natural resources or unique land preservation districts should be pursued in Tennessee.

This study has also recognized that there is support for and a need for a carrot and stick approach for wetland protection. Critical wetland areas should be identified to determine what approach is needed best through resource inventory. This inventory could help establish which wetland types within the classification system are most threatened. Wetlands that are most threatened could be protected primarily by regulatory

means (the stick) and non-regulatory means. Other less threatened wetland types could be protected by non-regulatory protection. A priority or critical status given to forested wetlands (i.e., the predominant type of wetland in Tennessee) should be established by resource inventory and very close interaction with the forest industry.

Flexible, fair exemptions should be provided for all regulatory rules. In addition, much of the interpretation for these and other guidelines will greatly depend on technical and educational assistance. Resource education programs and activities should be developed from an academically based, multi-disciplinary approaches. Education should become a standardized process in all resource policy programs especially where the public is required to understand legal and technical issues.

Category 5: Policy Coordination - Cooperative Efforts in State Policy Activities

Figure 4.5

- (1) Academia can provide useful policy components and monitor outcomes.
- (2) Use of existing planning networks provides balance in social and private needs.
- (3) Local organizations (i.e., non-profits) can catalyze policy implementation.
- (4) Inter-discipline management fosters credible and acceptable resource regulation.
- (5) Polarization is reduced by valuing viewpoints and overcoming selfish interests.
- (6) Coordinated state/federal regulation promotes harmony and policy goals.
- (7) Using existing government structures promotes effective implementation.
- (8) State patriotism and public involvement produce more effective policy results.
- (9) "Bottom-up" organization promotes creativity and effective implementation.

Coordinated Efforts

Coordination and cooperation is the key to new wetland and natural resource programs. "Bottom up" organizational methods in Tennessee will not be the best approach until better state support and organization assistance is developed. Tennessee's Soil Conservation Districts could be an excellent organizational structure to develop for this purpose. In Tennessee, coordination with federal agencies like TVA, SCS, EPA and the Corp of Engineers is crucial to policy success and financial efficiency. In addition, interdisciplinary approaches should be the standard for all policy and resource program efforts. Academic support is also greatly desired to provide fair and equitable review and support of state actions.

The Policy Process

One of the most important aspects of the Minnesota Case was its policy process. The policy process in Minnesota consisted of policy need identification (resources were declining in quality and value), coalition involvement (cooperative, mutually shared needs), policy development (the RIM program and Wetland Act concepts), policy adoption (legislative adoption) and policy implementation (broad based cooperation, monitoring and adaptation of the policy for new needs). Tennessee could greatly benefit by following such an approach.

How will a policy process develop in Tennessee? The following recommendations provide one alternative approach. Each step discussed in the following section represents incremental progress to wetland and natural resource protection. Each step activity relates key policy conclusions provided in the previous section.

Step One

There appears to be a need in Tennessee for coordinated, locally supported natural resource lobbying efforts. Tennessee non-profit organizations should establish a coordinated, local private citizens network. The goal is to promote pro-active natural resource policy efforts in Tennessee. The private citizens network should be developed under an experienced, well funded organization with national affiliations, if possible (The Tennessee Association of Soil and Water Conservation Districts is a good candidate). The private citizen network should avoid polarized and narrowly focused activities.

Step Two

Environmental and other special interest group leaders in Tennessee should designate a lead organization for the development of general comprehensive natural resource policy approaches for Tennessee. The designated lead organization should not represent polarized interests. The organization should have sufficient resources and staff to coordinate long term policy activities and should not be connected to political or administrative structures in Tennessee government.

The lead organization should develop informal policy discussions that identify alternatives for pro-active state government activities. Roles for non-profit organizations should be identified. Natural resource protection policy should first address natural resource issues in a broad context (forests, water, floodplains, etc.). The issues discussed should be based on individual natural resource components (wetlands, endangered wildlife, etc.). This process should identify two types of resource

components: (1) general resource components (cropland, forests, water, etc.) and (2) threatened or high priority components (wetlands, scenic areas, endangered species, etc.). Academic institutions should be involved in and possibly coordinate this process to promote fairness.

Step Three

A broad natural resource program should be developed that plans for the protection and enhancement of all natural resource components such as cropland, forests, wetlands, water, and wildlife. Long term funding sources should be identified in the proposed policy program and subsequent legislation. After the broad natural resource program is developed, more specific program approaches should be identified for high priority resource components (e.g., wetlands).

Step Four

Implementation of the broad natural resource program should occur with government and private organization support and coordinated assistance. Academic research could be useful to monitor and evaluate the program's effectiveness.

Step Five

Policy development, adoption and implementation should be repeated after step two for high priority or threatened resource policy programs.

Policy Groups

This section presents recommendations for four state groups: (1) The Tennessee Governor's Interagency Wetland Task Force, (2) Tennessee Universities and Academic Centers, (3) Tennessee Non-Profit Organizations, and (4) Tennessee Resource Agencies. Again, previous policy considerations or statements provided at the beginning of this chapter should be used as guide for future actions.

The Tennessee Governor's Interagency Wetland Task Force

First, substantial effort should be devoted to gain stronger support from certain special interests on the task force. Farm groups must be a major supporter of any state wetland plan. Private meetings should be arranged between task force leaders and their superiors to insure support. Every conceivable effort must be made to consider alternative views and various needs.

Second, the task force should focus on sound, scientific based, policy focused products. A specific, understandable, general wetland classification should be chosen or developed to determine a fair and effective means of classifying wetland protection levels (non-regulatory & regulatory versus totally non-regulatory).

Third, it is too late to develop a state wetland plan from a broad, state natural resource policy program. However, the state wetland plan should recognize the need for mutual resource protection and enhancement. The task force should develop a general approach to broad natural resource protection under which wetlands are a critical

component. In addition, the state task force is requested to review this study for potential use in the current plan process.

Universities and Academic Centers

Increased academic support and involvement is very needed in state natural resource and wetland policy. Some have called for greater academic leadership in resource policy efforts. Others interviewed for this study, especially those who were skeptical of agency research and policy efforts, and want more interdisciplinary academic participation in state resource activities. It is recommended that research institutions review opportunities for such assistance. Below are important research topics that should be adopted and addressed.

Figure 4.6

- (1) What are our wetland resources?
- (2) What are other states doing to protect wetlands?
- (3) What is the real dollar or social value of wetlands?
- (4) How do we change attitudes toward wetland protection?
- (5) What interdisciplinary approaches to research can be developed?
- (6) What data has been gathered by other researchers?
- (7) What site specific function and values exist in Tennessee wetlands?
- (8) How do we promote information transfer to the private sector.
- (9) How do we repair channelization and other human induced impacts?
- (10) What is the function and value of non-floodplain wetlands?
- (11) What coordinated, interagency activities can be developed?

Research Questions That Should be Addressed

Tennessee Non-Profit Organizations

Local organizational development by non-profit entities could promote future public involvement in pro-active state activities. These organizations should develop more private citizen networks and involve them in state resource debates. In addition, these organizations should identify and marshal political support in the legislature and especially local government.

State Agencies

Tennessee agencies should coordinate efforts and better focus their activities. To accomplish this lead agencies should be established and integrated resource management should become the standard. Furthermore, federal resources are more available in Tennessee than many other states. More joint opportunities with TVA, USGS and SCS should be pursued.

Finally, it appears that the state planning structure in Tennessee needs to be reorganized and addressed. Although this study did not identify deficiencies of the state planning office some of those interviewed felt the state could do much better. The policy section of the Governor's office should be reviewed for to strengthen policy coordination activities. Additionally, local and regional planning functions do not appear to be as developed in Tennessee as Minnesota. A planned future for Tennessee could reduce economic instability through resource protection and enhancement. Tennessee has the economic and natural resource wealth to balance economic and environmental prosperity.

In closing, it will take the participation of everyone to address wetland resource

needs and problems. The call for integrated, economically sustainable, wetland and other natural resource protection should be heard and heeded by all natural resource professionals, citizens and political leaders. Let us begin the task so that we may succeed. After all, the natural resources available to our children tomorrow depends primarily on what *we do* today.

REFERENCES

REFERENCES

- Ashley, G.H. (1910). Drainage problems in Tennessee. Drainage and Reclamation in Tennessee, Bulletin No. 3. U.S. Geological Survey: Nashville.
- Baltezare, J. F., Beekie, S. F., Grosz, K. L., Leitch, J. A., Schutt, P. F. (1990). Status of wetlands in North Dakota in 1990 (Agricultural Economics Report No. 269). North Dakota State University, Department of Agricultural Economics, Agricultural Experiment Station.
- Board of Soil and Water Resources. (1992). The wetland Conservation act of 1991. St. Paul, Minnesota.
- Brown, G.M. & Hammack, J.H. (1974). Waterfowl and wetlands: toward bioeconomic analysis. Washington, DC: Resources for the Future.
- Conservation Foundation. (1988a). Conservation Foundation Letter. Conservation Foundation, Communications Department (5): Washington D.C.
- Conservation Foundation. (1988b). Protecting America's wetlands: An action agenda. The final report of the National Wetland's Policy Forum. Waldorf, Maryland: Harper Graphics.
- Cutler, R.M. (1984). Toward a theory of broad-based planning for the preservation of agricultural land. Natural Resources Journal, 24, 85-114.
- Dahl, T.E. (1990). Wetlands Losses in the United States 1780's to 1980's: Report to Congress. U.S. Department of the Interior, U.S. Fish and Wildlife Service: Washington, D.C.
- Davis, D.G. (1991). States must play a key role in preserving wetlands. Forum for Applied Research and Public Policy, Spring, p. 108.
- Dean, R.D., Jacobs, M.L., Smith, R.H., White, N.L. (1987). Policy options for the protection and management of wetlands in Tennessee (Research Report No. 115). University of Tennessee, Water resources Research Center: Knoxville.
- Dillman, D.A. (1978). Mail and Telephone Surveys: The Total Design Method: Wiley - Interscience Publication: New York.
- Edgerton, W.A. (1988). Innovation in natural resource management-the reinvest in Minnesota (RIM) program. Rangelands, 10 (3), pp. 107-109.
- Environmental Protection Agency. (1988). America's wetlands: Our vital link between land and water. (Report No. OPA-87-016). Washington, DC: Office of Wetlands Protection.
- Environmental Protection Agency. (1989). Highlights of Section 404, federal regulatory program to the waters of the United States. Office of Wetlands Protection: Washington D.C.
- Farber, S. & Costanza, R. (1987). The economic value of wetland systems. Journal of Environmental Management. 24, 41-51.

- Frey, M.R. (1988). To everything there is a season: Reinvest in Minnesota (RIM) and soil conservation. Journal of Agricultural Ethics, 1, pp. 291-304.
- Goldstien, J.H. (1991). The road to no-net-loss wetlands. Forum for Applied Research and Public Policy, Spring, pp. 73-77.
- Goolsby, W.C., Young, M.J. (1983). Economic incentives to preserve bottomland hardwood forests (Research Report No. 98). University of Tennessee, Water Resources Research Center: Knoxville.
- Hayden, G.F. (1984). A geobased national agricultural policy for rural community enhancement, environmental vitality, and income stabilization. Journal of Economic Research, 18, (1), 181-218.
- _____. (1990). Wetlands provisions in the 1985 and 1990 Farm Bills. Journal of Economic Issues, 24, (2), 575-587.
- Heywood, P., Cooper, T. (1989). Enrollment in Minnesota's RIM reserve program. Journal of Soil and Water Conservation, January-February, pp. 60-64.
- Hiemlich, R.E. (1991). Wetlands and Agriculture: new relationships. Forum for Applied Research and Public Policy, Spring, pp. 78-83.
- Korczak, K., Gran, M. (1986). RIM-Reinvest in Minnesota. Journal of Soil and Water Conservation, September-October, pp. 314-316.
- Krutilla, J.V. (1985). The economics of natural environments (3rd ed.). Washington, DC: Resources for the Future.
- Larson, G. (1987). Linking state and federal policy: The RIM initiative. In D.W. Halbach, C.F. Runge and W.E. Larson (Eds.), Making soil and water conservation policy work: Scientific and policy perspectives (pp. 121-135). Ankeny, Iowa: Soil Conservation Society of America.
- Larson, J.S. (1991). The future of U.S. wetlands. Forum for Applied Research and Public Policy, Spring, pp. 66-72.
- Leape, J.P., Sherk, H. (1991). States have a key role in preserving wetlands. Forum for Applied Research and Public Policy, Spring, pp. 84-88.
- Leitch, J.A. (1983). Economics of prairie wetland drainage. Transactions of the American Society of Agricultural Engineers. No. 82-2543, 1465-1470.
- _____. & Scott, D.F. (1984). Improving wetland policy through amelioration of adverse effects on local economies. Water Resources Bulletin, 20 (5), 687-692.
- Lee, T., Taff, S.J. (1990). Property tax accessor's treatment of parcels entered into Minnesota's RIM reserve program (Staff Paper P90-69). Department of Agricultural and Applied Economics, University of Minnesota: St. Paul.
- Lynne, G.D., Conroy, P., & Prochaska, F. (1981). Economic valuation of marsh areas for marine production processes. Journal of Environmental Economics and Management, 8, 175-186.

- Maslyn, M.A. (1991). No net loss: good politics, bad policy. Forum for Applied Research and Public Policy, Spring, p. 106.
- Minnesota Department of Natural Resources. (1991). Reinvest in Minnesota annual report. St. Paul.
- _____ (1992a). Reinvest in Minnesota annual report. St. Paul.
- _____ (1992b). Wetland types and definitions. St. Paul.
- Minnesota Statutes. (1991). The Wetlands Conservation Act of 1991. (Chapter No. 354; H.F. No. 1). Minnesota State Legislature: St. Paul Minnesota
- Morganweck, R. (1989). Status and trends of wetlands in the coterminous U.S.; Selected presentations from RNRF's congressional forum on wetlands loss. Renewable Resources Journal, Summer, pp. 6-7.
- Niering, W. A. (1991). Wetlands Protection: the first step toward a sustainable society. Forum for Applied Research and Public Policy, Spring, p. 107.
- Noon, K.F. (1989). Major implementation issues in protection of nation's wetlands. Renewable Resources Journal, Summer, pp. 14-15.
- O'Malley, R.O (1989). Wetlands protection: perspectives of the states and long-term policy direction. Renewable Resources Journal, Summer, pp. 8-11.
- Ortman, D.E. (1989). Let's call them watermeadows. The Environmental Forum, January/February, pp. 21-26.
- Runge, C.F. (1988). State level agricultural policy in Minnesota: Adjusting to change in the 1980's. In E. Ospina and C.S. Sims (Eds.), The role of state government in agriculture (pp. 133-145). Morrilton, Arkansas: Winrock International.
- Shabman, L. (1991). Wetlands: from preservation to restoration. Forum for Applied Research and Public Policy, Spring, pp. 105-106.
- Staff (1990). Wetlands preservation policy gains new stature. Farmline, February, pp. 4-7.
- Steiner, F., Cook, E., Pieart, S. (1991). The interrelationship between federal and state wetlands and riparian protection programs. Arizona State University, Department of Planning: Tempe.
- Taff, S.J., Lee, S.T. (1990). Minnesota's RIM Reserve: Easement Summary and Payment Procedures (Economic Report ER90-6). Department of Agricultural and Applied Economics, University of Minnesota: St. Paul.
- Tennessee Department of Conservation. (1988). Tennessee wetlands plan: An addendum to the State Recreation Planning Report (Authorization Number 327209). Division of Ecological Services: Nashville.
- Tennessee Department of Health and Environment. (1990). The status of water quality in Tennessee (1990 305b Report). Division of Water Pollution Control: Nashville.

- Tennessee House of Representatives. (1985). Report of the soil erosion and wetlands protection study committee. Tennessee General Assembly: Nashville.
- Tennessee Wildlife Resources Agency. (1990). Tennessee implementation plan for wetland and waterfowl conservation: A cooperative project of the North American Waterfowl Management Plan. Nashville.
- Tietenberg, T. (1988). Environmental and natural resource economics (2nd ed.). USA: Harper Collins Publishers.
- Tiner, Ralph W. Jr. (1984). Wetlands of the United States: current status and percent trends. Washington D.C.: U.S. Government Printing Office.
- U.S. Fish and Wildlife Service, (1991). Annual report of the migratory bird conservation commission: National waterfowl production areas. U.S. Department of the Interior: Minot, North Dakota.
- United States General Accounting Office, (1991). Wetland preservation: Easements are protecting prairie potholes but some improvements are possible (Report No. GAO/RCED-92-27). Washington, D.C.
- van der Valk, A. (1989). Effective wetland policy: sticks or carrots? The Environmental Forum, January/February, pp. 21 & 26.
- Vaughn, G.F. (1991). Toward a workable policy for freshwater wetlands. Journal of Soil and Water Conservation, 47 (1), pp. 76-77.
- Walker, W.R., Richardson, S.C. (1991). The federal wetlands manual: Swamped by controversy (Special Report No. 54). Virginia Polytechnical Institute and State University, Virginia Water Resources Research Center: Blacksburg.
- Webster, M. (1984). Webster's ninth new collegiate dictionary. Merriam-Webster Inc.: Springfield, Massachusetts.
- Wentz, A.W. (1988). Functional status of the nation's wetlands. In D.D. Hooks and Others (Eds.), The Ecology & Management of Wetlands Vol. 2: Management, Use and Value of Wetlands, (pp. 50-59). Portland, Oregon: Timber Press.
- Wetland Conservation Act of 1991, Chapter Number 354, H.F. Number 1: Minnesota Statutes, pp. 1-61.
- Zedler, J. (1991). California's wetlands can't wait. Forum for Applied Research and Public Policy, Spring, p. 107-108.

APPENDICES

APPENDIX A

WETLAND TYPES AND DEFINITIONS

Type 1 wetlands are seasonally flooded basins or flats. Soil is covered with water or is waterlogged during variable seasonal periods but usually is well-drained during much of the growing season. Vegetation varies greatly according to season and duration of flooding.

Type 2 wetlands are inland fresh meadows. Soil is usually without standing water during most of the growing season but is waterlogged within at least a few inches of surface. Vegetation includes grasses, sedges, rushes and various broad-leaved plants. Meadows may fill shallow basins, sloughs, or farmland sags, or these meadows may border shallow marshes on the landward side.

Type 3 wetlands are inland shallow fresh marshes. Soil is usually waterlogged early during growing season; often covered with as much as 6 inches or more of water. Vegetation includes grasses, bulrushes, spikerushes and various other marsh plants such as cattails, arrowheads, pickerelweed and smartweeds. These marshes may nearly fill shallow lake basins or sloughs, or may border deep marshes on landward side.

Type 4 wetlands are inland deep fresh marshes. Soil is usually covered with 6" to 3' or more of water during growing season. Vegetation includes cattails, reeds, bulrushes, spikerushes and wildrice. In open areas, pondweeds, naiads, coontail, watermillfoils, waterweeds, duckweed, waterlilies or spatterdocks may occur. These deep marshes may completely fill shallow lake basins, potholes, limestone sinks and sloughs, or they may border open water in such depressions.

Type 5 wetlands are inland open fresh water. Shallow ponds and reservoirs are included in this type. Water is usually less than 10' deep and fringed by a border of emergent vegetation similar to open areas of Type 4.

Type 6 wetlands are shrub swamps. Soil is usually waterlogged during growing season and is often covered with as much as 6" of water. Vegetation includes alders, willows, buttonbush, dogwoods, and swamp-privet. They occur mostly along sluggish streams and occasionally on flood plains.

Type 7 wetland are wooded swamps. Soil is waterlogged at least to within a few inches of surface during growing season and is often covered with as much as 1' of water. They occur mostly along sluggish streams, on flood plains, on flat uplands and in shallow basins. Trees include tamarack, arborvitae, black spruce, balsam, red maple, and black ash. Deciduous swamps frequently support beds of duckweeds and smartweeds.

Source: Minnesota Department of Natural Resources (1992b).

APPENDIX B

INTRODUCTORY COMMENTS

The researcher read the following paragraph before beginning each survey.

This study concerns wetland protection policy for Tennessee.

I am going to ask you questions relating to the protection of wetlands, particularly actions that can be taken by state governments.

Your name will not be used; you will only be identified as - - (a generalized title was written on the survey that the respondent recommended).

Some of these questions will be philosophical in nature, others will be more direct. My goal is that you feel comfortable to express your opinions in a frank and candid manner. If at any time you have questions or comments please bring them to my attention.

There are ____ questions and/or ____ statements. You may want to use a pencil and paper for note taking.

Are you ready to begin?

NATIONAL EXPERTS TELEPHONE SURVEY¹

NAME _____

DATE/TIME CALLED _____

PHONE _____

ADDRESS _____

Your name will not be used, you will only be identified as a

_____, who has expertise in

_____.

SURVEY QUESTIONS

The Government Role

(1) In your opinion, what should be the role of state government in wetland protection?

(2) In your opinion, what should be the role of federal government in wetland protection?

(3) In your opinion, what should be the role of the private sector in wetland protection?

Emphasis on State Wetland Protection Options

(4) The following are examples of *non-regulatory* options used by state government to protect wetlands:

easements
technical assistance
long term leases
fee simple acquisition
tax and or income incentives

purchase of development rights
transfer of development rights
land trusts
education/information

What other *non-regulatory* options would you add? _____

¹ The spaces to record subject responses have been shortened for presentation purposes.

(5) The following are examples of *regulatory* options that are used by state government to protect wetlands.

land use regulation (i.e. zoning)
development or drainage permitting
mitigation

What other **regulatory** options would you add to this list? _____

(6) Please name states that you feel have the most innovative and/or effective wetland protection programs? (include coastal programs if applicable)

Can you rank them? Y N

(7) Please name specific programs (i.e., RIM, CRP etc.) that protect wetlands and whether they are regulatory, non-regulatory or both?

Program

Type

(NR - Non-reg, R - Reg, C - Combo)

(8) In your opinion, which of these programs have been the most effective?

Why? _____

Effectiveness of Wetland Protection Tools

(9) Scenario: State X has numerous acres of wetlands. These wetlands are primarily located in rural areas on lands that are largely privately owned. Wetland conversion occurs in some urban areas however, the primary losses of wetlands (broad definition) are occurring due to agricultural and silvicultural land uses.

Which of the following **regulatory** tools would you recommend to slow wetland losses?

X Rank

- ☐ a land use regulation (i.e. zoning)
- ☐ b development or drainage permitting
- ☐ c mitigation
- ☐ d other _____
- ☐ e none _____

Why _____

Can you rank their effectiveness? Y N

(10) Given the previous scenario, which of the following **non-regulatory** tools would be most effective for state government to prevent the conversion of wetlands (limit choice to three).

X Rank

- ☐ a easements
- ☐ b long term leases
- ☐ c fee simple acquisition
- ☐ d tax and or income incentives
- ☐ e purchase of development rights
- ☐ f transfer of development rights
- ☐ g land trusts
- ☐ h technical assistance
- ☐ i education/information
- ☐ j other _____
- ☐ i None _____

Why? _____

Can you rank their effectiveness? Y N

(11) Scenario: State X has numerous acres of wetlands. These wetlands are primarily located in rural areas on lands that are largely privately owned. The large majority of wetland losses are now occurring due to urban sprawl and recreational development under the broad definition.

Which of the following **regulatory** tools would you recommend to slow wetland losses?

X Rank

- ☐ a land use regulation (i.e. zoning)
- ☐ b development or drainage permitting
- ☐ c mitigation
- ☐ d other _____
- ☐ e none

Why _____

Can you rank their effectiveness? Y N

(12) Given the previous scenario, which of the following **non-regulatory** tools would be most effective for state government to prevent the conversion of wetlands (limit choice to three).

X Rank

- ☐ a easements
- ☐ b long term leases
- ☐ c fee simple acquisition
- ☐ d tax and or income incentives
- ☐ e purchase of development rights
- ☐ f transfer of development rights
- ☐ g land trusts
- ☐ h technical assistance
- ☐ i education/information
- ☐ j other _____
- ☐ i None

Why? _____

Can you rank their effectiveness? Y N

Success Defined

(13) How would you define "success" of wetland protection efforts?

(14) What specific criteria would you use to measure success or the level of effectiveness of wetland protection programs? (quantitative or qualitative)

General Policy Questions

(15) What are the most important reasons for protecting wetlands?

Technical and Functional

Examples - flood water retention, water quality, wildlife habitat, multiple benefits, forest products, biodiversity, etc.

Socio-economic

open space, public recreation, aesthetics, etc.

Can you rank these? Y N

(16) What are the most important reasons for not protecting wetlands?

Examples - socialistic precedence, economic growth, agricultural production, etc.

Can you rank these? Y N

(17) Please name potential negative impacts that could result from wetland protection? (include economic, political, & environmental)

(18) Please name potential positive impacts that could result from wetland protection? (include economic, political, & environmental)

(19) Please name three major obstacles/barriers to wetland protection?

Can you rank them? Y N

(20) Please name three major opportunities for wetland protection?

Can you rank them? Y N

(21) Please identify at least three research questions that are critical to the resolution of the wetland protection issue? (include technical scientific and socio-economic/political)

Can you rank them? Y N

(22) Are you aware of any specific reports or sources of program data that may assist this study?

(23) Do you have any additional comments to add to this survey?

STATE EXPERTS TELEPHONE SURVEY¹

NAME _____ DATE/TIME CALLED _____
PHONE _____
ADDRESS _____

Your name will not be used, you will only be identified as a

SURVEY QUESTIONS

1. What are your views concerning the wetland issue in Tennessee?

2. How can state government resolve the wetland issue?

Wetland Preservation Methods

I am going to read statements concerning other methods used to encourage or deter private landowners from converting wetlands. As each statement is read please indicate if you . .

Strongly Agree, Agree, Neutral, Disagree or Strongly Disagree

3. Education and technical assistance should be included in state wetland preservation programs.

4. Voluntary programs are effective but, regulatory programs must be available as a backdrop.

5. Joint ventures for wetland preservation between the public and private sectors should be pursued.

6. Wetland areas should be taxed as marginal lands (i.e. at a lower rate) as an incentive to private landowners to preserve wetlands. _____
7. Wetland protection programs for privately owned lands should provide for some level of compensation. _____

¹ The spaces to record subject responses have been shortened for presentation purposes.

General Policy

Focus Areas

8. Natural hydrologic processes occurring in seasonally flooded bottomlands or other "seasonally wet" areas should be preserved in some manner. _____
9. More research is needed concerning the function and values of wetlands. _____
10. A wetland classification system is needed to guide state wetland preservation policy. _____
11. Floodplain protection and management should precede wetland protection and management. _____
12. The acreage of naturally occurring wetlands in TN is decreasing. _____

What type? _____

13. The quality of naturally occurring wetlands in TN is decreasing. _____

Government and Other Roles

14. TN state government should assume responsibility for existing federal regulatory efforts (404 permit program). _____

Why? _____

15. A state or group of states, not federal government, should develop regional natural resource policy. _____

16. The federal government should provide oversight for state natural resource programs. _____

Conversational Questions

17. Overall, which approach would be most effective and acceptable for wetland preservation in Tennessee? (consider political feasibility or traditional or non-traditional acceptance)

a__ non-regulatory b__ regulatory c__ combination

Why? _____

18. Is there any situation where only regulatory methods could be used (such as in the case of easily definable wetlands)? Y N

Please describe _____

19. Which program do you prefer as a primary wetland protection tool, easements, fee simple purchase programs? Why?

20. What types of land should be protected as wetlands?

21. What issues have not been adequately addressed concerning wetlands?

22. What types of wetland studies or surveys relative to Tennessee should be developed?

Y N Functions and Values

23. Do you have any additional comments to add to this survey?

APPENDIX C

WETLAND CONSERVATION ACT OF 1991
(Laws of Minnesota 1991, Chapter 354)

SUMMARY OF THE ACT

ARTICLE 1 - POLICY (page 1)⁷

This Article includes the act's citation and language regarding the public's interest in wetland values.

ARTICLE 2 - WETLAND PRIORITIZATION AND PLANNING (page 3)

This Article specifies that state water and related land resource plans, local watershed management plans and county comprehensive water plans are to identify regions of high priority for wetland preservation, enhancement, restoration and establishment. These areas are to be identified within the plans.

The Board of Water and Soil Resources, in consultation with the Department of Natural Resources, shall adopt rules (by March 1, 1993) to establish criteria to determine the public value of wetlands, including values specifically identified in the act.

ARTICLE 3 - PERMANENT WETLAND PRESERVES (page 8)

This Article specifies that the Board of Water and Soil Resource may acquire "permanent wetland easements" on Type 1, 2, or 3 wetlands. Up to 4 acres of adjacent upland may also be included for each acre of wetland.

The payment is set at 50% of estimated market value of agricultural property for all wetlands outside the Metro area. The payment rate for other wetlands within the Metro area is 20% of estimated market value of agricultural property. Payment for adjacent upland is set at 90% for cropped land and 60% for non-cropped land, based on the estimated market value of agricultural property.

ARTICLE 4 - WETLAND PRESERVATION AREAS (page 9)

This Article specifies that a landowner with a wetland located in a high priority wetland area designated by the Board of Water and Soil Resources, may apply to the county for designation as a "Wetland Preservation Area."

Procedures are identified for creation of a "Wetland Preservation Area" that exempts the area from property tax, limits eminent domain actions, limits installation of public water, sewer and drainage systems, and allows a designation to be dropped 8 years after proper notification is given.

⁷ The numbers listed in parenthesis are the pages where the articles described are found in the legislative act.

ARTICLE 5 - WETLAND ESTABLISHMENT AND RESTORATION PROGRAM (page 21)

This Article establishes procedures allowing a landowner to apply to the local unit of government to create or restore a wetland. Cost share procedures are identified involving the local unit of government and Board of Water and Soil Resources. A permanent conservation easement must be acquired as part of these restoration procedures.

ARTICLE 6 - REGULATION OF WETLAND ACTIVITIES (page 24)

This Article requires that wetlands cannot be drained or filled unless replaced with wetland areas of at least equal public value. The main provisions of this Article are as follows:

- "Public waters wetlands" are defined to distinguish those areas included in the Department of Natural Resource's Protected Waters Inventory from the "wetlands" subject to this act.
- "Wetlands" are defined as lands having a predominance of hydric soils; are inundated or saturated with water sufficient to support a prevalence of hydrophytic vegetation typically adapted for life in saturated soils; and support a prevalence of such vegetation, under normal circumstances. This definition corresponds with the definition of wetlands in the "Swampbuster" provision of the 1985 Federal Food Security Act.
- "Wetlands cannot be drained or filled, wholly or partially, unless replaced by restoring or creating wetland area of at least equal public value under an approved replacement plan or mining reclamation plan.
- Wetland replacement is guided by the following priorities:
 - 1) avoidance of the impact;
 - 2) minimizing the impact;
 - 3) rectifying, reducing or eliminating the impact; and
 - 4) compensating for the impact by replacement or substitution.
- Wetlands located in cultivated fields can only be replaced by restoration and a 10 year deed restriction prohibiting non-agricultural use must be placed on the converted area.
- Replacement of wetlands must be in the same watershed or county with a 2:1 ratio in non-agricultural areas and a 1:1 ration in agricultural areas.
- Calcareous fens identified by the Department of Natural Resources are protected, except for activities allowed in an approved management plan.
- There are 24 categories of activities that are exempt from the replacement requirement of the Act (see separate listing of exempt activities).
- The board of Water and Soil Resources, in consultation with the Department of Natural Resources, must adopt rules governing the approval of "wetland replacement plans" by July 1, 1993. These rules must address the criteria, procedure, timing and location of

acceptable wetland replacements, allow for wetland banking for public and private project, and establish provisions for monetary payment.

- Issues concerning wetland value, location, size or type will be referred to a 3 person "technical evaluation panel" consisting of a professional employee from the Soil and Water Conservation District and the engineer for the local unit of government.
- Application, notice, public comment and appeal procedures are provided for.
- A 9 person Wetland Advisory Committee, representing a wide range of interests, is appointed by the Governor to advise the Board of Water and Soil Resources regarding rule development and to meet twice a year to review program implementation.
- The Board of Water and Soil Resources and the Department of Natural Resources must jointly plan with federal agencies to simplify and coordinate state and federal wetland permit procedures.
- The Department of Natural Resources will make National Wetlands Inventory maps available to the Soil and Water Conservation District's and will publish notice in official newspapers of wetland map availability and local information contacts.
- Agency rules for wetland replacement must be reviewed by the agriculture and environment committees of the legislature before final adoption.

ARTICLE 7 - INTERIM WETLAND ACTIVITIES (page 41)

Beginning January 1, 1992 and until wetland replacement rules are adopted on July 1, 1993, this Article prohibits landowners from draining, burning or filling wetlands as identified in the "Federal Manual for Identifying and Delineating Jurisdictional Wetlands" (January 1989).

There are 3 additional categories of activities that are exempt from this requirement, as well as the 24 categories of exempt activities allowed under Article 6 (see separate listing of exempt activities).

The Soil and Water Conservation District or local permitting authority may charge up to a \$75 fee for certification for replacement of wetland area losses.

ARTICLE 8 - PEATLAND PROTECTION (page 42)

This Article adds 18 areas to the Minnesota Scientific and Natural Area Program to preserve over 170,000 acres of unique and threatened ecologically significant peatlands. The Department of Natural Resources is authorized to acquire baseline ecological data and develop management plans for these areas and to acquire the remaining lands within these areas.

ARTICLE 9 - SECTION 404 PROGRAM (page 48)

This Article requires the Department of natural Resources to adopt rules regulating the discharge of dredged and fill material into waters of the state so that approval may be obtained from the U.S. Environmental Protection Agency to administer the Federal Section 404 Permit Program currently administered by the U.S. Army Corps of Engineers.

ARTICLE 10 - MISCELLANEOUS (page 50)

This Article establishes the following: requires the Department of natural Resources to accept gifts of wetlands or public waters wetlands; provides that public drainage system repairs may include wetland restoration or enhancement, wetland replacement and realignment to prevent wetland drainage; adjusts the definition of once-through systems using groundwater and increases the water use permit processing fee; requires the Department of Natural Resources and Board of Water and Soil Resources to compile an annual wetlands report; revalues restored wetlands for assessment purposes; prohibits sale of marginal land or wetlands by the state without a conservation easement and directs the Department of Revenue to study farmland and wetland values.

ARTICLE 11 - APPROPRIATION (page 60)

This Article authorizes funding and staff to implement the provisions of this act during the FY 92093 Biennium. Funds previously appropriated to the State Water Bank Program are also to be transferred to Board of Water and Soil Resources for use on wetland easement acquisition.

WETLAND CONSERVATION ACT OF 1991
(Laws of Minnesota 1991, Chapter 354)

SUMMARY OF EXEMPTIONS

The following activities are not regulated under the provisions of the Wetland Conservation Act of 1991:

Article 6 Exemptions: Regulation of Wetland Activities

- 1) Activities in a wetland that was planted with annually seeded crops, was in a crop rotation seeding of pasture grasses or legumes, or was required to be set aside to receive price support or other payments under United States Code, title 7, sections 1421 to 1469, in six of the last ten years prior to January 1, 1991;
- 2) Activities in a wetland that is or has been enrolled in the federal Conservation Reserve Program (CRP) under United States Code, title 16, section 3831, that:
 - a) Was planted with annually seeded crops, was in a crop rotation seeding, or was required to be set aside to receive price support or payment under United States Code, title 7, sections 1421 to 1469, in six of the last ten years prior to being enrolled in the program; and
 - b) Has not been restored with assistance from a public or private wetland restoration program.
- 3) Activities necessary to repair and maintain existing public or private drainage system as long as wetlands that have been in existence for more than 20 years are not drained;
- 4) Activities in a wetland that has received a commenced drainage determination provided for by the federal Food Security Act of 1985, that was made to the county agricultural stabilization and conservation service office prior to September 19, 1988, and a ruling and any subsequent appeals or reviews have determined that drainage of the wetland had been commenced prior to December 23, 1985;
- 5) Activities exempted from federal regulation under United States Code, title 33, section 1344(f);
- 6) Activities authorized under, and conducted in accordance with, an applicable general permit issued by the United States Army Corps of Engineers under section 404 of the federal Clean Water Act, United States Code, title 33, section 1344, except the nationwide permit in Code of Federal Regulations, title 33, section 330.5, paragraph (a), clause (14), limited to when a new road crosses a wetland, and all of clause (26);
- 7) Activities in a type 1 wetland on agricultural land, as defined in United States Fish and Wildlife Circular No. 39 (1971 edition) except for bottomland hardwood type 1 wetlands;
- 8) Activities in a type 2 wetland that is two acres in size of less located on agricultural land;

- 9) Activities in a wetland restored for conservation purposes under a contract or easement providing the landowner with the right to drain the restored wetland;
- 10) Activities in a wetland created solely as a result of;
 - a) Beaver dam construction;
 - b) Blockage of culverts through roadways maintained by a public or private entity;
 - c) Actions by public entities that were taken for a purpose other than creating the wetland; or
 - d) Any combination of the above (a to c);
- 11) Placement, maintenance, repair, enhancement, or replacement of utility or utility-type service, including the transmission, distribution, or furnishing, at wholesale or retail, of natural or manufactured gas, electricity, telephone, or radio service or communications if:
 - a) The impacts of the proposed project on the hydrologic and biological characteristics of the wetland have been avoided and minimized to the extent possible; and
 - b) The proposed project significantly modifies or alters less than one-half acre of wetlands;
- 12) Activities associated with the routine maintenance of utility and pipeline rights-of-way, provided the activities do not result in additional intrusion into the wetland;
- 13) Alteration of a wetland associated with the operation, maintenance, or repair of an interstate pipeline;
- 14) Temporarily crossing or entering a wetland to perform silvicultural activities, including timber harvest as part of a forest management activity, so long as the activity limits the impact on the hydrologic and biologic characteristics of the wetland; the activities do not result in the construction of dikes, drainage ditches, tile lines, or buildings; and the timber harvesting and other silvicultural practices do not result in the drainage of the wetland or public waters;
- 15) Permanent access for forest roads across wetlands so long as the activity limits the impact on the hydrologic and biologic characteristics of the wetland; the construction activities do not result in the access becoming a dike, drainage ditch or tile line; with filling avoided wherever possible; and there is no drainage of the wetland or public waters;
- 16) Activities associated with routine maintenance of existing public highways, roads, streets, and bridges, provided the activities do not result in additional intrusion into the wetland and do not result in the draining or filling, wholly or partially, of a wetland;
- 17) Emergency repair and normal maintenance and repair of existing public works, provided the activity does not result in additional intrusion of the public works into the wetland and do not result in the draining or filling, wholly or partially, of a wetland;

- 18) Normal maintenance and minor repair of structures causing no additional intrusion of an existing structure into the wetland, and maintenance and repair of private crossings that do not result in the draining or filling, wholly or partially, of a wetland;
- 19) Duck blinds;
- 20) Aquaculture activities, except building or altering of docks and activities involving the draining or filling, wholly or partially, of a wetland;
- 21) Wild rice production activities, including necessary diking and other activities authorized under a permit issued by the United States Army Corps of Engineers under a section 404 of the federal Clean Water Act, United States Code, title 33, section 1344;
- 22) Normal agricultural practices to control pests or weeds, defined by rule as either noxious or secondary weeds, in accordance with applicable requirements under state and federal law, including established best management practices;
- 23) Activities in a wetland that is on agricultural land annually enrolled in the federal Food, Agricultural, Conservation, and Trade Act of 1990, United States Code, title 16, section 3821, subsection (a), clauses (1) to (3), as amended, and is subject to sections 1421 to 1424 of the federal act in effect on January 1, 1991, except that land enrolled in a federal farm program is eligible for easement participation for those acres not already compensated under a federal program;
- 24) Development projects and ditch improvement projects in the state that have received preliminary or final plat approval, or infrastructure that has been installed, or having local site plan approval, conditional use permits, or similar official approval by a governing body or government agency, within five years before the effective date of this article. In the seven-county metropolitan area and in cities of the first and second class, plat approval must be preliminary as approved by the appropriate governing body.

Article 7 Exemptions: Interim Wetland Activities

- 1) All of the exemptions listed above, plus;
- 2) Development projects and drainage system improvement projects that have received preliminary or final plat approval or for which infrastructure has been installed, or that have received site plan approval or a conditional use permit, within five years before the effective date of this selection;
- 3) Activities for which the local soil and water conservation district or other local permitting authority certifies that any loss of wetland area resulting from the activity will be replaced; and
- 4) A person who is enrolled or participating in a program listed in United States Code, title 16, section 3821, subsection (a), clauses (1) to (3).

VITA

George Dodd Galbreath was born July 6, 1962 in Atlanta, Georgia. Immediately after high school graduation, he attended Tennessee Technological University (TTU). In 1984 he graduated from TTU with a B.S. in Agriculture Science. For the next five years Dodd worked with the USDA Soil Conservation Service (SCS). With SCS he promoted and offered technical assistance for soil conservation, natural resource management, and rural development to local citizens and land users.

While in federal service, Dodd participated in extensive training programs focusing on resource conservation, planning and public assistance. Through managerial training he became acquainted with SCS policy making activities at the state and national levels. He was also exposed to conservation efforts in six states ranging from salinity control to wetland protection.

During his education Dodd developed research experience with two water resources research centers. His most recent experience focused on policy research at the University of Tennessee and regional development with the Tennessee Valley Authority. His research and work interests include natural resource policy, rural policy, and regional planning for rural community development.

On March 21, 1992 Dodd married Susan Darlene Coomer.