Development of an Iowa planning model for the State Wetland and Riparian Area Plan

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Development of an Iowa Planning Model for the State Wetland and Riparian Area Plan

by

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Signatures have been redacted for privacy

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The Iowa planning model provides a means to implement the Iowa Wetland and Riparian Area Plan. I have a special thanks to Paul Anderson for his time, expertise, guidance, and mentoring through the formation of this plan and applied research. Paul’s critiques, sense of direction, and good humor were invaluable for me to focus and complete my work. I also thank Tim Keller for his commitment of the Landscape Architecture Department resources and staff as well as his trust in supporting this project. I thank Julia Badenhope for providing time, expertise, and companionship in the quest for ecological application to planning and design. Jim Pease introduced me to the possibilities and need for wetland planning in Iowa. I thank Jim for his direction and support in making great strides forward in the Iowa wetland planning process.

I thank Jim Gulliford for his trust in my work and his leadership in facilitating the Department of Agriculture and Land Stewardship’s forward movement with a planning process beneficial to enhancement and protection of Iowa’s resources.

My family, Susan, Carolyn, and Ben, have lived with my time constraints and given me the time spent away from them during this project. I thank them for supporting and encouraging me through the time and space requirements of writing and studying, and for their continued support of my endeavors.
The Iowa Wetland and Riparian Area planning model is the outcome of a series of events unfolding an opportunity for wetland and riparian area planning in Iowa. Planning and design through a landscape and watershed approach to wetland and riparian areas was a match with my experiences in watershed and greenbelt planning. The model begins a planning process leading to the development of the Iowa Wetland and Riparian Area Conservation Plan. Events leading to this project are accounted below.

In the January of 1994 I was invited to speak at the EPA Regional Wetland Conference in Kansas City. My program was part of a panel and was titled, “Watersheds of the Raccoon River Greenbelt.” The meeting involved individual speakers, panels, and break-out sessions by state. I attended the Iowa session. During that meeting I was introduced to the State Wetland Conservation Plan Program, which provides each state the opportunity to develop a funded wetland planning strategy. Primary funding for the plan is provided by the EPA. During that session I learned from Diane Hershberger (EPA Region 7 Chief), Jerry Shimek (EPA Region 7 Project Manager), and Jim Pease (Iowa State University Extension Wildlife Biologist) that Iowa was the only state in Region 7 that had not initiated a state wetland conservation plan. Events leading to the preparation of the grant application began with selection of a state sponsoring agency, achieving support from Iowa departments involved with wetlands, determining the source of the twenty-five percent funding match by the state, writing the grant, and forming the planning agenda.

Jim Gulliford, Division Director for the Iowa Department of Agriculture and Land Stewardship (IDALS) agreed to be the sponsor and to approve the grant application on behalf of the Department. The Iowa Department of Natural Resources (IDNR) plays an integral and far reaching role in the wetland plan. It was necessary and extremely critical for the IDNR to
endorse the concept and agree to participate in the planning process. The first Iowa departmental meeting was held in November 1994 as an informational meeting to introduce the plan concept, gain consensus, and obtain approval to move forward with the grant application and planning effort. Richard Bishop, Jeff Joens, and Jack Riessen represented the wildlife and regulatory bureaus of the IDNR, Jim Gulliford represented IDALS, and Mark Ackelson, Director of the Iowa Natural Heritage Foundation also attended the meeting. A general consensus was reached to support developing the plan and to initiate approval to move ahead with the grant application process.

The next planning meeting occurred in Kansas City in February at the 1995 Wetland Region 7 Meeting. The Iowa breakout session proved to be informative and supportive for the plan. Those attending included representatives from the Iowa Department of Transportation, Iowa Department of Natural Resources, U.S. Fish and Wildlife Service, Natural Resource Conservation Service, Federal Highway Administration, and EPA. I presented a summary of the plan and planning concept. Representatives supported the need and direction of the plan. This final acknowledgment and approval by the attending agencies was required and timely for EPA grant approval.

These events led to my thesis research. The basic planning and support activities to this point occurred from September 1994 to the time of grant submittal in December 1994 to the regional meeting in Kansas City in February 1995. There was continued communication from February to June 1995 between my office (Dallas County Conservation Board), Iowa State University Landscape Architecture Department, IDALS, and EPA primarily concerning refinement of the grant budget. The grant proposal application was successful and expected to be officially approved by EPA and the Iowa Department of Agriculture and Land Stewardship in August 1995.
This thesis was the next step in the planning process: designing the appropriate wetland conservation planning model for Iowa. The thesis was based on a review of existing state wetland plans using a case study research method, a study of Iowa environmental resource plans, a survey of state planners and program leaders, and state wetland conservation plan guidelines. It develops a planning model for the Iowa Wetland and Riparian Area Conservation Plan.
CHAPTER 1. THE PROBLEM AND ITS SETTING

Introduction

State Wetland Conservation Plans present an opportunity for states to engage in comprehensive strategic planning to protect wetland resources. EPA funding supports serious planning efforts by first forming a state wetland planning and program direction and then implementing planning strategies through subsequent grant funding. Such strategies include resource inventorying and monitoring, managing design and measurement, forming and refining regulatory and non-regulatory functions, improving education, forming partnerships, and improving communication and cooperation between agencies, organizations, and the public (Oregon Division of State Lands 1995).

Iowa has effectively drained its wetland resource base. Riparian areas are tied to a stream system damaged by a broken network of riparian connections. There are many political subdivisions in Iowa. Ninety-nine counties offer as many approaches to resource management of wetlands and riparian areas. Municipal governments connected to wetlands and riparian areas view these resources from different perspectives. Communities next to rivers have a different concept of land use than their original settlement purposes. There are always opportunities for resource management departments in state government to improve resource information, assess its position in resource enhancement and protection, and improve agency communication and cooperation. These possibilities are available to Iowa through development of a State Wetland Conservation Plan.
Statement of the Problem

Iowa does not have a planning model for a State Wetland and Riparian Area Plan. This study analyzes the planning approach, content, and structure of selected exemplary State wetland conservation plans, other selected plan sections and publications to develop an appropriate planning model for wetland and riparian area planning in Iowa.

Subproblems

The first subproblem. The first subproblem was to determine Iowa’s needs relative to wetlands and riparian areas.

The second subproblem. The second subproblem was to determine what existing plans are considered exemplary for Iowa.

The third subproblem. The third subproblem was to determine what sections of plans, articles, and other publications fit Iowa’s needs and apply to development of the Iowa planning model.

The fourth subproblem. The fourth subproblem was to determine how the appropriate elements can be combined to create an approach, content, and structure for wetland and riparian area planning in Iowa.

Hypotheses (Propositions)

The first proposition was that there are state plans and other reference sources considered, in part, exemplary for Iowa wetland and riparian area planning.

The second proposition was that some of Iowa’s needs are different than other states and are not expressed in other state plans.

The third proposition was that landscape ecology principles provide an effective approach to develop the Iowa Wetland and Riparian Area Plan.
The fourth proposition was that through review of other state plans applied as units of analysis (cases) the approach, structure, and content will direct the formation of the Iowa planning model for the wetland and riparian area plan.

**Delimitations**

The study did not form goals and objectives, make an inventory of wetland and riparian resources, propose protection mechanisms, implement the plan, or develop a monitoring and measurement program.

The study did not prioritize wetland and riparian area systems.

The study was limited to wetland and riparian area resources and programs.

The study was limited to developing an appropriate format, concept, and approach for wetland and riparian area planning in Iowa.

The study analyzed and developed the planning process leading to the development and implementation of the plan.

The study was limited to setting the stage as a beginning and ordered process to write the Iowa Wetland and Riparian Area Plan.

**Definitions of Terms**

**Wetland.** Area of predominantly hydric soils where standing water or wet soil conditions exist for a significant part of the growing season of most years: when surface water is present, depth generally does not exceed six feet: and vegetation is dominated by water tolerant plants.

The three definitions presented below are federal wetland definitions established to implement specific federal regulations and programs (Federal Interagency Committee for Wetland Delineation 1989). Each definition is based on three wetland elements: hydrology, hydric soil, and hydrophytic vegetation.
• U.S. Army Corps of Engineers and U.S. Environmental Protection Agency

Those areas that are inundated or saturated by surface or groundwater at a frequency and duration to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

• U.S. Department of Agriculture, Soil Conservation Service

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

• U.S. Department of the Interior, Fish and Wildlife Service

Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification wetlands must have one or more of the following attributes: (1) at least periodically, the land supports predominantly hydrophytes, (2) the substrate is predominantly undrained hydric soil, and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year.

Riparian areas. Riparian areas include those communities conceivably affected by periodic flooding (for example, bottomland hardwood communities). Following Cowardin's classification system (Cowardin et al. 1979), riparian areas include palustrine emergent, scrub-shrub, and forested systems, in addition to riverine systems (Monda 1992).

A riparian area is an area of streamside vegetation along any perennial or intermittent stream including the stream bank and adjoining floodplain which is typically distinguishable from upland areas in terms of vegetation, soils, or topography (Kusler and Kentula 1990).

State Wetland Conservation Plan (SWCP). The State Wetland Conservation Plan is a comprehensive plan for wetlands protection and management. The SWCP is undertaken at a variety of levels and coordinated with state and national plans to achieve the interim goal of no overall net loss and a long term goal of increasing the nation's wetlands inventory. The Iowa Wetland and Riparian Area Plan is the SWCP for Iowa.
Appropriate format, concept, and approach. An appropriate format, concept, and approach to wetland and riparian area planning is a planning model tailored to Iowa's needs, goals, and objectives.

Planning Model. The planning model is an entity designed to outline a planning process applied to Iowa wetland and riparian area planning. The model applies planning elements of approach and content based upon their use in exemplary state plans, recommendations from a survey of selected federal and state officials, and continuity with Iowa plans. The elements are placed in a structure based upon an order and use derived primarily from their structure and use in case study plans, other state plans, and wetland grant guidelines.

Assumptions

The first assumption. The first assumption was that there is a need for an Iowa Wetland and Riparian Area Plan.

The second assumption. The second assumption was that currently no planning model exists for an Iowa Wetland and Riparian Area Plan because Iowa's needs are different than those of other states.

The third assumption. The third assumption was that an appropriate planning model for Iowa can be developed.

The fourth assumption. The fourth assumption was that the planning process will bring local, state, and federal agencies to some agreement in definition, protection, enhancement, and priority.

The fifth assumption. The fifth assumption was that the formation of wetland and riparian area goals and objectives protect and enhance wetlands.

The sixth assumption. The sixth assumption was that it is important to protect wetlands and riparian areas in Iowa.
The seventh assumption. The seventh assumption was that both wetlands and riparian areas are included as the primary elements of the wetlands planning process.

The eighth assumption. The eighth assumption was that wetlands can be preserved and enhanced to the point of no net loss through state wetland comprehensive planning.

The Importance of the Study

Nationwide wetlands and riparian areas are in the forefront of local, state, and federal natural resource programs. Private and public interests are at stake as decisions are made to remove or protect and enhance wetlands and riparian areas. Organization and critical planning form the basis to determine methods to analyze, interpret, and to make wetlands and riparian area decisions. Each state has a different definition of wetlands and a different approach to wetland protection and enhancement. Iowa needs to develop its approach through a state wetland and riparian area plan. Complete consideration must be given to Iowa’s needs, natural and cultural resources, and economy by integrating the quality and impact of wetlands and riparian areas with Iowa’s environment and quality of life. Lack of a definition, inventory, monitoring, and protection of wetlands and riparian areas in Iowa is observed in our agriculture lands, wildlife enhancement and protection, flood control, water quality, and control of runoff.

A look at Iowa’s history of protection illustrates a substantial decline in environmental quality. Wetlands and riparian areas are extremely important to all aspects of human needs and are important to governments at all levels.

A 1990 EPA study found that out of 7155 miles of stream in Iowa, only 158 miles were considered swimmable and 90 miles fishable (EPA 1992b). Record flooding occurred in 1993. A 1993 Illinois Department of Natural Resources wetland study found wetlands to have a major influence on flood levels. For every 1% increase in wetland area in the watershed there was a 3.7% decrease in peak flow to average precipitation ratio (Demissie and Khan 1993). Iowa does not have a consistent definition and approach to wetland loss, management, and enforcement. The
decrease in wildlife habitat, increase in water pollution, dehydration of our lands, raising of flood pools, loss of top soil, economic impact, loss of quality recreation and decrease in quality of life is not a direction we want to continue. The continuation of these impacts to our livelihood, natural and cultural resources, and long term sustainability does not serve the public interest (Riley, Gallup Jr., and Gallup 1993).

These are the indicators of Iowa's need for a state wetland and riparian area plan. Iowa has an opportunity to improve the effectiveness and efficiency of protecting public and private sector wetlands and riparian areas to the point of no net loss and future gains. The development of an appropriate model sets the stage for developing the planning administration and network and writing the Iowa Wetland and Riparian Area Plan.

The Iowa Wetland and Riparian Area Plan will cover areas of mutual interest for federal, state, and local agency collaboration. It will provide a multi-disciplinary approach to assessment, development, and management of wetlands and riparian areas. It will provide a new sense of positive recognition for the values of wetlands and riparian areas. Water quality will be improved and opportunities will form for education and communication with schools, the public, and landowners. The plan would develop a functional strategy for directing and assessing resources, form consistent definitions, and meet federal, state, and local goals to improve and increase wetland resources.
CHAPTER 2. LITERATURE REVIEW

Historical Overview of Change in Iowa Wetland Resources

This historical overview depicts natural resource elements and their cultural context of land use impacts in Iowa. The history of change in wetland resources develops the setting for Iowa's Wetland and Riparian Area Plan.

In the past, Iowa was a land of exceptional biological diversity, continuous stream corridors, expansive prairies interrupted only by wetland complexes, forested river valleys, and southern and eastern forests. Iowa prairies, trees and other vegetation were growing in some of the most fertile soils in the world. The rich ground, relatively flat terrain, and favorable climate provided settlers with an almost ideal location for farming (Iowa Conservation Commission 1981). Iowa has been a place inhabited by hunting and gathering and agrarian cultures for thousands of years (Zimmerman and Anderson 1982).

The "Swamp Land Act of 1850" granted some 1.2 million acres of wetlands to the State of Iowa for swamp reclamation. To early Iowa settlers, the value of a marsh lay in the ease of draining and converting it to productive farmland. That pattern started in the late 1800's and continues today. By 1938, only 50,000 acres of prime marshland remained in Iowa. Today there are about 35,000 acres of natural marsh. The 1850 challenge to replace marshland with cropland successfully eliminated 96.5% of the marshland and left a new challenge to protect and restore wetlands (Iowa Department of Natural Resources 1988c).

Resulting from intensive agricultural practices and relatively even rural population distribution, Iowa has one of the most altered landscapes in the nation. Iowa has more miles of road than 39 other states even though it ranks twenty-third in area. No Iowan is more than twenty-five miles from a hospital (Iowa Department of Economic Development 1994). Nearly
95% of Iowa's land is agricultural with most of the land devoted to growing harvested crops (Iowa Department of Natural Resources 1988b).

Iowa's water quality carries a warning: too many nitrates and too many coliforms. Sediments, nutrients, and pesticides are the primary agricultural pollutants. Sediment entering the Mississippi River, primarily arising from Iowa croplands, ranges from 10 to 1,000 tons per square mile. Almost half of the state's area that drains to the Mississippi loses over 1,000 tons per square mile. Of the 9.8 million tons of sediment carried annually by the Cedar River, 9.1 million tons (93%) are attributed to cropland erosion. Recent studies indicate that 427,800 tons of total nitrogen and 10,000 tons of available phosphorous enter Iowa's waters from corn and soybean fields each year. Pesticides are the third primary nonpoint source pollutant with 26,000 tons of herbicides and 4,000 tons of insecticides applied to the land in 1982 (Iowa Department of Natural Resources 1988b).

Among the fifty states, Iowa has less land in public ownership than almost all states in the nation (less than two percent) and continues to rapidly lose natural resources to rural and urban impacts (Iowa Department of Natural Resources 1988a). The idea of preserving and enhancing natural resource cycles every few decades is expressed in this 1931 quote from Ding Darling.

"We cannot bring the old conditions back, and we must not resent or despair of a situation which is now history and cannot be rewritten. But we are unworthy of our intelligence with which we credit ourselves if we do not immediately act to preserve what there is left or our outdoor natural endowment and bring back gradually, where practical, the waste areas which never should have been cleared, purge our rivers of pollution and repopulate them with their native game and fish, not only for our enjoyment and well-being but as a heritage for those who shall follow after us. (J.N. "Ding " Darling 1931)

Ding Darling was a political cartoonist for the Des Moines Register and later first director of the U.S. Biological Survey. The Biological Survey was predecessor to the U.S. Fish and Wildlife Service.
Resource planners and the public form popular conservation priorities with new planning legislation in several states by mandating local environmental planning. There has been a growing movement to protect resources, farmlands, and historic places (Steiner 1991). Wetlands and streams continue to be the producers of quality wildlife and habitat, regulators of groundwater discharge and recharge, filters of water and indicators of water quality, sources of recreation, commercial opportunities, beautiful places to live and to visit, and a frontier to conquer (Iowa Department of Natural Resources 1988c).

In many Iowa farm fields, tiling machines continue draining wet areas and bulldozers continue removing trees along streams. Current estimates place the rate of loss of existing privately-owned wetlands at about two percent per year (Iowa Department of Natural Resources 1988c). Well planned rural and urban development which suits land use and construction to the site and recognizes critical resource area limitations is desirable and can be implemented through the use of several planning and design methods (Steiner 1991). The books *Earthscape* (Simonds 1978), *Saving Americas Countryside: A Guide to Rural Conservation* (Stokes et al. 1989), and *Ecology of Greenways: Design and Function of Linear Conservation Areas* (Smith and Hellmond 1993) reflect ideas and applications of ecology to natural, cultural, and economic impacts in site design. In particular, *Ecology of Greenways: Design and Function of Linear Conservation Areas* applies principles of landscape ecology to environmental corridors. It does an excellent job in describing ecological functions of corridors and applies the concept to case studies. It is a useful reference for landscape and site planning and applies directly to wetlands and riparian areas.

The phenomenon of wetland loss has resulted in concern of state and federal agencies to reduce such losses in most states. In fiscal year 1992, EPA awarded wetland protection funds to forty-one states (EPA 1992a).
In contrast to Iowa's relatively small percentage of remaining wetlands, the 215 million acres of original wetlands in the United States have been reduced to 95 million acres, leaving about 44% remaining (Iowa Department of Natural Resources 1988c).

In the summer of 1987, at the request of the U.S. Environmental Protection Agency, a group of industry and government leaders, farmers, and environmentalists formed the National Wetlands Policy Forum. The Forum came together to address major policy concerns about how the nation should protect and manage its valuable wetlands resources. The Forum recommended an overall goal of "no net loss and long-term gain" (National Wetlands Policy Forum 1989).

This goal reflects a sense of urgency, yet provides flexibility to accommodate the need for economic growth. It was envisioned as a strong foundation on which to build equitable and effective wetlands policies. The Forum recommended that comprehensive statewide wetlands strategies were the best way to implement no net loss (World Wildlife Fund 1992).

Each state has a different approach to wetlands protection. However each statewide strategy should contain the following elements (National Wetlands Policy Forum 1988):

- An overall goal
- Information about a state's wetlands (where they are located, what type, etc.) and the threats that put these wetlands at risk
- An assessment of current wetlands protection efforts
- An action plan
- A funding strategy
- A monitoring and evaluation plan

Iowa's Needs Relative to Wetland and Riparian Area Conditions

Over 70% of the riparian systems in the U.S. have been altered, with natural riparian communities reduced 70% overall and 95% in some areas (Brinson, et al. 1981). It is estimated that 10 to 15 million acres or approximately 1.5% of U.S. land area of riparian ecosystems remain in
the U.S. (Brinson, et al. 1981). According to Hey (Hey et al. 1982) the rivers in the upper midwest were originally shallow, slow-moving, and meandering. The more extensive floodplain areas were characterized by moist meadows. The more southern floodplains often supported bottomland hardwood communities. Many of these woodland communities have been destroyed or are currently threatened. Virtually all of these systems have been altered to some extent by activities such as channelization or draining (Kusler and Kentula 1990).

Many of Iowa’s resource needs are derived from disturbances to the landscape. Cultural and natural resources are impacted by disturbances to wetlands and riparian areas. Cultures may suffer from their own environmental impacts (Greider and Garkovich 1994). Disturbance results from lack of information, attitudes, lack of funding, poor implementation of resource practices, and unsuitable site design (Field and Burch 1988). Some of Iowa’s needs are described below based on information and planning principles from the Iowa Department of Natural Resources (1988b), from Steiner (1991), and from Smith and Hellmund (1993). Iowa needs include:

- Higher water quality
- Improved habitat for wildlife
- Increased funding for resource acquisition, management, and education
- Reduced soil loss
- Reduced flooding
- Containment of chemicals
- Protection of prime farm land
- Protection of critical areas
- Protection of scenic rivers
- Lower impact highway standards through riparian areas
- Improved ecological condition of all areas
- Increased connectivity and interior size of ecosystems
Investigation into Iowa's needs requires further review of the *Iowa Wetlands Protection Plan*, community surveys, demographics, journal articles, Iowa wetlands projects, environmental resource assessments, and related natural and cultural resource studies.

**Determination of Exemplary Plans and Other Sources Applied to Iowa**

Iowa will be the beneficiary of other wetland planning efforts across the country. The process of statewide wetland protection involves looking beyond the bounds of traditional efforts (World Wildlife Fund 1992). Innovative approaches can be found across the country (World Wildlife Fund 1992). Selection of exemplary plans for state wetland planning is based upon location, approach, organization, effectiveness, and recommendations from EPA, U.S. Fish and Wildlife Service, other federal and state agencies, and individuals (World Wildlife Fund 1992). Literature and other sources reviewed includes EPA lists of projects across the country, contact with EPA Regional Offices in Kansas City, Chicago, Philadelphia, and Seattle and communication with other programs such as the Chesapeake Bay Alliance, Kansas Water Office, Raccoon River Greenbelt, Iowa Department of Natural Resources and Iowa Natural Heritage Foundation.

**Appropriate Planning for Iowa**

Appropriate planning for Iowa is embodied in a plan that recognizes the quality potential of Iowa's resources, the method to restore Iowa, improve its water quality, preserve its remaining natural resources, and sustain its cultural integrity (Iowa Department of Natural Resources 1988a). Iowa is different than other states. The 1994 Statistical Profile of Iowa lists some of Iowa's unique features (Iowa Department of Economic Development 1994).

**Natural Resources**

- Iowa is the only state bordered by two navigable rivers.
- One hundred sixty-six species of native Iowa plants are state endangered or threatened, and seventy species of fauna are state endangered or threatened (Roosa 1982).
• Due to agriculture, Iowa has one of the most altered landscapes in the nation. Iowa has lost 95% of its wetlands, 85% of its woodlands, and 99.9% of its prairies.

Agriculture

• Iowa farmers produced more than $10 billion in crops and livestock in 1991.
• 25% of America's pork and 7% of the nation's grain fed beef are raised in Iowa.
• Iowa farmers produced nearly $3 billion worth of products for export in 1991.
• Iowa was the first state in the nation to provide cost-share incentives to landowners for installing permanent soil conservation practices, the first state to enact an erosion control law, and the first state to offer no-interest loans as an alternative financing option for landowners to consider in the financing of permanent soil conservation practices (Iowa Department of Natural Resources 1988b).

Economy

• In 1992, tourists in the state of Iowa spent an average of $111.93 a day and stayed an average of 3.1 days.
• Iowa is the nation's 13th most productive state in manufacturing.
• More than 88% of Iowa's businesses are classified as small (fewer than 20 employees).

Infrastructure

• Iowa has more miles of roads than 39 other states.
• All township surveys were completed in Iowa by 1858 and subdivided into sections by 1860 (Horton and Schwieder 1982).

Demographics

• Among the fifty states, Iowa ranks 30th in population and 23rd in land area.
• The violent crime rate in Iowa is 63% lower than the national average.
• The 1993 census estimate for Iowa's population was 2,814,000.

• Iowa students have ranked first or second in the nation in ACT and SAT scores for the past two decades.

A plan that distinguishes a state's qualities, improves its deficiencies, predicts its outcomes, regionally connects it to other state resources, and educates its public is specific and selective to appropriate state planning (World Wildlife Fund 1992).

Rich prairie soils, stream corridors, and water resources are major elements in Iowa's natural resource base. Following 100 years of extraction, remaining fertile soils continue to decline in an agriculture place with an urban society. The state has lost one-half of its original average 16 inches of topsoil. During the 1950's Iowa's population changed from predominantly rural to predominantly urban. Iowa's current soil loss measured by sheet and rill erosion is estimated at 143,873,000 tons annually (United States Department of Agriculture, 1995). Erosion yields sedimentation which immediately and directly lowers water resource qualities. With 95% of Iowa's agricultural land primarily in harvested crops, a decline in natural resource quality leaves a delicate balance between sustaining and enhancing the remaining natural resources or continuing to lose them (Iowa Department of Natural Resources 1988b).

Many of Iowa's natural and cultural qualities are centered around river corridors. River corridors are the most expansive open space resource in Iowa that warrant protection. Iowa's wetlands once covered approximately two million acres across the state, most notably in the Des Moines Lobe or prairie pothole region of north central and central Iowa. Today, over 95% of these lands have been drained and converted to intensive agriculture or have been developed (Iowa Department of Natural Resources 1988a). The four basic wetland types found in Iowa designated by the 1988 Iowa Open Spaces Plan are listed below.

1. Palustrine wetlands are shallow basins where water levels fluctuate reflecting rainfall patterns;
2. Lacustrine wetlands which are associated with protected shallow lake edges and water levels are less responsive to rainfall patterns;
3. Riverine wetlands are associated with rivers and include areas such as side channels, overflow areas and oxbows; and
4. Seepage wetlands (fens) which form where groundwater rises to the surface and continuously saturates the soil, but standing water may or may not be present. (Iowa Department of Natural Resources 1988b, 42)

According to U.S. Census Bureau estimates, Iowa's population increased for the second year in 1989, following six years of decline. Iowans are older than twenty years ago with an average age today of 33 (Iowa Department of Economic Development 1991). The population is becoming more urbanized with most rural areas hitting their peak population in 1900 or earlier (Iowa Department of Economic Development 1991).

Surveys in Iowa and the midwest provide some insight to understanding attitudes toward wetlands, wetland values, and their meaning. The Survey on Attitudes, Towards Wetlands Among the General Population, Farmers and Wetland Developers (University of Missouri-St. Louis 1992) is a study regarding attitudes towards wetland preservation and development in Missouri. The survey results indicated that no one gave the correct technical definition of a wetland, which would include mentioning unique soil, vegetation and the presence of water. However, survey results indicated that awareness regarding wetlands was generally higher among the better educated, among men, and people not living in the larger cities in Missouri. The greatest percentage of all three groups surveyed said that the most important reason for preserving wetlands was to provide for diverse wildlife. Most persons surveyed knew little about wetland regulations and one out of five persons had visited a wetland in the past year. An important finding from the survey, Landowner Attitudes Toward Wetland Preservation Policies in the Prairie Pothole Region, was that landowners' attitudes toward wetlands have an effect on participation in wetland preservation programs. According to Smutko et al. (1984), it appears that the success of wetland preservation efforts may be improved in several ways:
• By making a greater effort to provide additional information to the public about wetland preservation programs

• By increasing the monetary incentives to preserve wetlands

• By changing attitudes of the public toward governmental involvement by increasing emphasis upon proper management of government-improved management of government-acquired wetlands

• By concentrating preservation efforts in those geographical areas where attitudes are pro preservation

The survey, *Attitudes and Behaviors of Iowa Farmers Toward Wildlife* (Pease 1993), illustrates rural attitudes toward wetlands based upon farmers orientation toward wildlife. One question in the survey asks, "In the past 5 years, have protected or restored wetland for use by wildlife?" Twenty-four percent of those "wildlife oriented" farmers said yes and seven percent of the "not wildlife oriented" said yes. It appears that farmers oriented toward implementing wildlife practices may be more likely to protect and enhance wetlands.

Acceptance of wetlands by understanding attitudes and examining wetland benefits tied to an awareness of regulations and trust in government programs through demonstration, education, and incentives appear to be key to successful wetland protection in Iowa and the Midwest.

*Landscape Ecology Principles Applied to the Iowa Wetland and Riparian Area Plan*

For more than one hundred and fifty years, human settlement activities have affected the quality and abundance of wetlands in the United States and in Iowa. Despite fairly stringent environmental regulations, the cumulative impacts of isolated projects continue to alter the character of the overall landscape (World Wildlife Fund 1992).

Until recently wetlands have been regarded largely as nuisances and have been drained, cleared, filled, inundated, degraded with toxins and nutrients, and exploited for whatever
resources could be extracted from them. Recently we have begun to realize that in their natural state wetlands produce numerous benefits for society, benefits which are either irreplaceable if lost or can be replaced only at immense expense. Although wetlands are generally recognized as a vital element in the biosphere, they continue to disappear and be degraded (U.S. Department of the Interior 1994).

How can it be that wetlands are so valuable in their natural state, yet they are being eliminated at such a rapid rate? The answer to the paradox is that although wetlands serve society in multiple ways, the nature of wetland benefits are such that the owners of wetlands usually cannot capture the benefits for their own use or sale. The flood protection benefits accrue to others downstream. The fish and wildlife that breed and inhabit the wetlands migrate, and are captured or enjoyed by others. The ground water recharge and sediment trapping benefits cannot be commercially exploited. Hence, for the owner of a wetland to benefit from his resource, he often has to alter it, convert it, and develop it. (U.S. Department of the Interior 1994, 33)

Iowa’s landscape is composed of an interactive network of wetlands and riparian areas where urban and rural land uses impact natural resource functions (Smith and Hellmund 1993). Wetlands are part of an interdependent natural system connected to surrounding landscapes in many ways, they are affected by activities on adjacent lands as well as in more remote areas. Traditional approaches to wetlands protection and management generally fail to consider what might be called the landscape context. The most serious consequence of this failure is that the potential cumulative impacts of wetlands losses or alterations go unrecognized. A state wetlands strategy should move toward landscape approaches with respect to both regulatory and non-regulatory tools (World Wildlife Fund 1992). A prerequisite to this type of approach is an understanding of the landscape factors responsible for the formation and maintenance of wetlands (U.S. Environmental Protection Agency 1994b).

Wetlands protection requires information on the interaction of wetlands with other ecosystems within broad geographic areas, such as ecoregions and watersheds (U.S. Environmental Protection Agency 1994b). Empirical analysis and overlay analysis (i.e.,
Geographic Information System - GIS) are two approaches under evaluation by the EPA's Wetlands Research Program for landscape-scale assessments. Watersheds or other landscape units also can be prioritized for ecosystem protection and restoration activities through a GIS-based approach (U.S. Environmental Protection Agency 1994b). The emerging field of landscape ecology provides a conceptual basis for landscape analysis of agricultural nonpoint source pollutant problems (Forman and Godron 1986). A focus on off-field controls changes the unit of analysis for physical and social science questions from the field to the landscape scale (Natural Research Council 1993). Landscape analysis considers the spatial juxtaposition and dynamic interactions between agricultural and adjacent ecosystems in the context of water quality in the landscape as a single unit, for example, a watershed or groundwater recharge zone (Natural Research Council 1993).

A definition of “critical” area proposed by the American Law Institute's Model Land Development Code, was described by Steiner (1991) as the following:

- An area significantly affected by or having an effect upon, an existing or proposed major public facility or other areas of major public investment.
- An area containing or having a significant impact upon historical, natural or environmental resources of regional or statewide importance. (American Law Institute 1974 cited in Steiner 1991, 248).

The Washington State Environmental Policy Act (SEPA) describes environmentally sensitive or critical areas as those areas that (Steiner 1991): “. . . could have a significant adverse environmental impact, including but not limited to, areas with unstable soils, steep slopes, unusual or unique plants or animals, wetlands, or areas which lie within floodplains.” (State of Washington, 1984, section 908, 56 cited in Steiner 1991, 249) Critical and environmentally sensitive areas are terms and concepts often used interchangeably (Steiner 1991). Application of critical area concepts to the landscape approach may provide a method to designate and analyze the status of wetlands and riparian areas for protection and enhancement.
The New Jersey Pinelands Commission divides environmentally sensitive areas into four categories: ecologically critical areas, perceptually and culturally critical area, resource production critical areas, and natural hazard critical areas (Steiner 1991).

The Natural Resource Conservation Service (NRCS) has developed a broad policy action setting ecosystem management as one of six major initiatives of the NRCS Strategic Plan (Natural Resources Conservation Service 1994). NRCS ecosystem-based assistance:

1. focuses on ecological principles rather than only on specific resources;
2. is consistent with the need to achieve sustainable use and development of the Nation's natural resources;
3. is systems oriented, rather than single-resource focused;
4. recognizes that people are part of the ecosystem; and,
5. conforms to the way the world is arranged— as interrelated ecological, social, and economic systems. (Natural Resources Conservation Service 1994, 1)

The Environmental Protection Agency uses a similar concept to NRCS ecosystem management as it describes the watershed protection approach to aquatic ecosystems.

The watershed protection approach is a comprehensive, holistic strategy for protecting and managing water (surface and groundwater resources using the watershed as the integrating framework. The approach broadens EPA's perspective from chemical water quality to the protection and restoration of aquatic ecosystems, and from a specific water resource to encompass the entire land area which affects the quality of that resource. The WPA also provides a framework for refocusing existing programs to operate in a more comprehensive and coordinated manner (EPA 1993).

The Natural Resource Conservation Service's ecosystem management approach and the Environmental Protection Agency's watershed protection approach are applications of landscape ecology principles. Landscape ecology is the study of the structure, function and change in a heterogeneous land area composed of interacting ecosystems (Forman and Godron 1986). Ecological, climatic physical, and socio-economic processes are linked together on different
temporal and spatial scales in a complex dynamic system that has evolved into the landscape patterns that exist today (Haines-Young, Green, and Cousins 1993). Landscape ecological theory is defined by Naveh and Lieberman as the study of landscape units from the smallest landscape cell to the global ecosphere landscape in their totality as ordered ecological, geographical, and cultural wholes. Naveh and Lieberman go beyond the biological hierarchical context of the landscape and emphasize the important role of human ecology in understanding landscape dynamics (Haines-Young, Green, and Cousins 1993).

The Iowa Water Plan '78 forms conservancy districts based upon river basin planning areas (Iowa Natural Resources Council 1978). Watersheds become the means to outline Iowa's water resources and are consistent in concept with multifunctional approaches recommended in the Iowa Water Plan '78. The Iowa Water Plan '78 recognizes critical water resource protection and recommends forming protected water areas by identifying critical river and stream corridors, lake shorelines, and wetlands (Iowa Natural Resources Council 1978).

Recommendations of the Iowa Water Plan led to the Iowa Protected Water Areas General Plan (Iowa Natural Resources Council 1978). The Protected Water Area Plan recognizes Iowa's surface water resources as a system of lakes, marshes, and rivers. The plan critically assesses and prioritizes water resources through a filtering process in context to natural areas verses man-made, land uses along water areas, land cover, and landform regions (Iowa Conservation Commission 1981).

Iowa water resource plans have recognized wetlands and streams or riparian areas as critical or environmentally sensitive areas (Steiner 1991). Plans, planning directions, and government agencies have used both ascending and descending typologies when designating water resource areas (Forman and Godron 1986). For example, the Iowa Protected Water Area Plan uses a descending typology while the ecosystem based approach introduced by the Natural Resources
Conservation Service applies an ascending typology (Forman and Godron 1986). The application of landscape ecology concerns the spatial relationship between landscape elements. Vegetation is maintained in a dynamic state resulting in spatial and temporal heterogeneity of community structure and composition which are not apparent at a single place or time (Haines-Young, Green, and Cousins 1993). The quality of the vegetation along streams measured in connectivity and the size, number, and connectivity of wetlands are landscape ecology measurements for quality and impact (Haines-Young, Green, and Cousins 1993). The Iowa Wetland and Riparian Area Conservation Plan reviews former planning strategies and application of landscape ecology principles. Landscape ecology is one method to identify, protect, and enhance water resources in Iowa (Haines-Young, Green, and Cousins 1993).

**Basic Protocol for the State Wetland Conservation Plan**

As a beginning, Iowa's plan must follow the basic recommended planning protocol provided by the EPA (Wetlands Program FY 95 Grant Guidance for States 1994a). The basic elements of the state plan include the following:

1. **Statement of Need, Goals and Objectives**
   Define the purpose of the plan. Identify the goals and objectives of the SWCP; (include specific time horizons for achieving the goals)

2. **Inventory and Assessment of Wetland Resources**
   Identify Iowa's wetland and riparian resources based on available information; summarize the information on status and trends

3. **Evaluation of Protection Mechanism**
   Identify existing programs (public and private) and mechanisms available to protect and restore wetland resources; identify gaps in programs as well as opportunities to increase efficiency and effectiveness of existing and new programs.

4. **Strategy Development and Implementation**
   Identify specific actions, target dates, implementation mechanisms to be used; develop geographic-specific plans which can include location of areas generally suitable for development, restoration, or acquisition; coordinate with applicable Federal, State, and local government programs and private sector efforts.
5. Monitoring
   Establish how the programs carrying out the recommendations will be
   monitored and reported.

6. Plan Approval
   Identify a mechanism and entity for getting approval and/or acceptance of the
   recommendations included in the plan.

Several of the recommended planning references supplementing the EPA guidelines
include the following: Statewide Wetlands Strategies A Guide to Protect and Managing the
and Riparian Areas in Kansas, Missouri Wetlands: A Vanishing Resource, Clean Water and
Thriving Farms, Mutual Goals in Sustainable Agriculture, and 1992 National Resources Inventory:
Highlights. The list of literature cited includes sources on policy, economics, planning, and
ecology.

Summary

Iowa has a resource base and management needs different from other states. Yet many
planning issues are very similar. This study applies Iowa’s resources to a planning model
reflective of other states but different in content and approach to organizing wetlands and
riparian areas in a comprehensive state conservation plan.

From the time prior to "The Swamp Land Act of 1850" to the present, human settlement
activities have affected the quality and abundance of wetlands in Iowa. Despite fairly stringent
environmental regulations, the cumulative impacts of isolated projects continue to alter the

Henry A. Wallace Secretary of Agriculture in 1938, wrote the following in the USDA
Yearbook of Agriculture (Iowa Department of Natural Resources 1988b, 2-1):

Nature treats the earth kindly, man treats her harshly. He overplows the
cropland, overgrazes the pastureland, and overcuts the timberland. He destroys
millions of acres completely. He pours fertility year after year into the cities
which in turn pour what they do not use down the sewers into the rivers and
This terribly destructive process is excusable in a young civilization. It is not excusable in the United States.

Henry Wallace and many other leaders since his day have made inroads to correct problems identified in 1938, but a land use ethic has been slow to evolve and much of what went on in 1938 still goes on today. Remaining natural wetlands in Iowa are no longer universally viewed as a frontier to conquer. The easily and economically drainable wetlands were drained long ago, and there is growing public support to protect the ones which remain (Iowa Department of Natural Resources 1988b).

Recent research efforts have concentrated on developing methods for addressing cumulative impacts by focusing on entire landscape units rather than individual wetlands sites. In addition, techniques are being developed to measure the effects of cumulative impacts on the biotic community. To evaluate the effects of incremental impact, wetlands protection and management must be approached from a landscape perspective. Individual wetlands are often affected by events beyond their boundaries, either in adjacent uplands or in more distant areas within the same watershed. Understanding how a wetland fits into its surrounding landscape is the first step in assessing potential over time (World Wildlife Fund 1992).

Applications of landscape ecology concepts help interpret wetland and riparian area resource needs and provide a method to inventory, measure, and monitor resource functions and values (Haines-Young, Green, and Cousins 1993). The purpose and philosophy behind creating the Iowa Wetland and Riparian Area Conservation Plan is to recognize, protect, and enhance wetlands and riparian areas as connected functional elements of cultural, ecological, and hydrological systems (World Wildlife Fund, 1992). Primary strategies in forming an Iowa planning model are to educate our society about wetland and riparian area values, identify the natural and cultural resources, and add experiences of the past and predictions for the future.
CHAPTER 3. RESEARCH METHOD

... empirical research advances only when it is accompanied by logical thinking, and not when treated as a mechanistic endeavor. This lesson turns out to be a basic theme of the case study method. (Yin 1994, xv)

Research Method

The research method involved a review of selected exemplary state plans, existing Iowa plans, other selected plan sections and publications to develop an appropriate format, concept, and approach for wetland and riparian area planning in Iowa.

The case study was selected as the research method. It becomes the preferred strategy over other methods when "how" and "why" questions are posed, when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context (Yin 1994). The decision to follow a case study method is based upon the hypotheses or propositions, analysis of the research question, review of the literature, and discovery of new insights in formation of the planning model. This is a research method accommodating formation of the Iowa planning model by beginning with the questions, how to form a planning model and why we need to plan to protect and enhance wetland and riparian areas in Iowa.

This method began by constructing an outline based on a protocol posed by the National Wetlands Policy Forum and EPA grant guidelines. A study was made of selected exemplary state plans, existing Iowa plans, other selected plan sections, and publications. Conclusions formed around the approach, structure, and content were expected to lead to formation of an Iowa wetland and riparian area planning model.

Case Study as a Research Strategy

The nature of the data in this study was both oral and written. Multiple sources of evidence were used. The method for this planning process was qualitative. The research question
did not require control over behavioral events and it focused primarily on contemporary events.

One basic assumption was that Iowa continues to lose wetlands and Iowa wants to reduce wetland loss. The form of the research question was how and why. The question asked, how is a state wetland and riparian area plan developed with an appropriate approach, content, and structure for wetland and riparian area planning in Iowa. Why does Iowa continue to lose wetlands and how does Iowa develop a plan to reduce wetland loss?

More questions arose from how to develop the plan and to why was it necessary to develop a plan. Some of these questions included the following:

- Why does Iowa need a wetland and riparian area plan?
- How is an appropriate planning model developed for Iowa?
- How are the appropriate planning elements combined to form an Iowa plan?
- What are Iowa’s wetland and riparian area needs and how are they determined?
- What state wetland plans are considered exemplary and why are they exemplary?
- Why do we apply landscape ecology principles to a state wetlands plan?
- How will the state implement its strategies to achieve its wetland and riparian area goals?
- How is support and direction developed for the plan?
- How do you develop the policy framework for "no net loss" and eventual increase in the quality and quantity of Iowa’s wetland and riparian area resource?

Robert Yin’s guidelines indicated that the case study method was applicable to this problem. Yin defined the case study as a research strategy (Yin 1994). The technical definition began with the scope of a case study.

1. A case study is an empirical inquiry that
   - investigates a contemporary phenomenon within its real-life context, especially when
   - the boundaries between phenomenon and context are not clearly evident. (Yin 1994, 13)
The Iowa wetland and riparian area plan model investigated a contemporary phenomenon within its real-life context. The phenomenon was the wetland and riparian area loss in Iowa in the context of land use and the effects of land use by natural, cultural, and economic forces in the environment. The boundaries between phenomenon and context were relatively clear to biologists and landscape architects but were not clear to the public nor to individuals. This is likely because the phenomenon of wetland and riparian area loss continues to occur contrary to the public interest.

The second part of the technical definition discussed data collection and data analysis (Yin 1994).

2. The case study inquiry
   • copes with the technically distinctive situation in which there will be many more variables of interest than data points, and as one result
   • relies on multiple sources of evidence, with data needing to converge in a triangulating fashion, and as another result
   • benefits from the prior development of theoretical propositions to guide data collection and analysis. (Yin 1994, 13)

The model for the wetland and riparian area plan had many variables. Variables were based upon resources and their condition, cultural influences on land use practices and acceptance of control measures, level and approach by state agencies to planning, and other factors.

Multiple sources of evidence in the form of planning approach, structure, and content were studied to develop an appropriate Iowa model for the wetland and riparian area plan. The convergence of data in a triangulating fashion of each planning element was a part of the Iowa plan. The benefit of earlier planning efforts and basic plan contents guided data collection and analysis.

Above, I have attempted to apply Yin's definition of case study as a research strategy to the Iowa Wetland and Riparian Area Plan Model. I believe that the case study method was a
means to define the research strategy for this problem. The case study demonstrated how an appropriate wetland and riparian area plan was developed for Iowa and how key planning elements are appropriate for Iowa.

**Case Study Components of Research Design**

"Research design is the logic that links the data to be collected (and the conclusions to be drawn) to the initial questions of a study." (Yin 1994, 18) The components of research design were examined beginning with questions listed above in the section Case Study as a Research Strategy. Guidelines and applications for propositions were demonstrated below (Yin 1994).

Five Components of Research Design

1. Study's questions
2. Propositions
3. Units of analysis
4. Logic linking data to propositions
5. Criteria for interpreting findings

1. Study's Questions (see section Case Study as a Research Strategy)

2. Propositions
   a. There are state plans and other reference sources considered, in part, applicable to Iowa wetland and riparian area planning.
   b. Some of Iowa's needs are different than other states and are not expressed in other state plans.
   c. Landscape ecology principles provide an effective approach as the basis for Iowa wetland and riparian area protection and management decisions.
   d. Through review and study of other state plans applied as units of analysis (cases) the approach, structure, and content will direct the formation of the Iowa model for the Wetland and Riparian Area Plan.
3. Units of Analysis

Information gathered about each state plan or case formed a multiple-case study. Propositions identified the relevant information about each plan. The state plans formed the cases. The propositions derived from the question examined the approach, content, and structure of each plan.

The content was defined as what the plan includes, its participants, and its scope. The structure of the plan was defined as the sequence, emphasis, and priorities. The planning approach involved the landscape approach, process, application, levels of participation, and the diversity of interests and groups. The analysis began by using the EPA planning guidelines as the base and explored the contents peripheral to that base.

The units of analysis (cases) were selected State Wetland Conservation Plans. The cases included Oregon, Tennessee, and Kansas. Each plan was selected for several reasons. The selection was narrowed because there were few completed plans available at this time. Many other state plans were in various stages of completion, for example the states of Washington, Maine, Delaware, Nebraska, and Missouri were nearing completion.

Kansas was selected because it was in the same EPA Region as Iowa. The plan included riparian areas and wetlands in its planning approach. There was a good background and follow-up to the plan and it had a quality technical base supporting its planning strategies.

Oregon was selected because of its statewide regulation and planning approach. Oregon had a reputation for progressive environmental protection measures and was recommended by EPA and other state agencies.

Tennessee was selected because its strong local jurisdictional (home rule) characteristics were similar to Iowa’s. The Tennessee plan was proven successful through its acceptance by two different administrations. The plan had a good technical background, quality content, and was highly recommended by EPA and other state wetland planners.
4. Logic linking data to propositions

The existing Iowa environmental plans included various criteria applicable to the Iowa model such as goals and mission statements, assessment of existing conditions, definitions, regulations and authority, and history of the resources. The criteria from Iowa plans were reviewed through an inventory by studying the content and approach to Iowa resources.

The selected cases were reviewed for criteria specific to Iowa’s needs, unique features, and characteristics. This criteria was noted in the review of the existing Iowa plans. Upon review, the criteria was applied to the cases and noted where they were not addressed in the case.

A landscape approach was recommended by EPA and discussed in the publication Statewide Wetland Strategies. “A strategy should promote landscape approaches as the basis for wetlands protection and management decisions.” (World Wildlife Fund 1992, 19) The type of approach was identified in each case and used to investigate the proposition that landscape ecology principles provided an effective approach to develop the Iowa Wetland and Riparian Area Plan.

The approach, content, and structure of each case was studied, compared to Iowa’s plan requirements and applied to the formation of an Iowa Wetland and Riparian Area planning model.

5. Criteria for interpreting the findings

The criteria for interpreting the findings were the following:

- Assess the results of a comparison between the match of the approach, content, and structure, of the cases with the needs and appropriate planning for Iowa in the resulting content, structure, and approach of the Iowa Planning Model.
• Meet the State Wetland Conservation Plan guidelines and recommended wetland strategies (National Wetlands Policy Forum 1988)

• Use successful planning strategies in patterns or individually within the plan (one measure of success is determined through interviews of selected federal and state wetland planners)

Case Study Database

The database consisted of four components. They included case study notes, case study documents, tabular materials, and narratives. Case study notes were the result of interviews, document analysis, and conference notes. Case study documents included state plans, articles, books, and other publications. Tabular materials later in this chapter were derived from tables of elements arranged according to planning approach and to content for the cases and for the Iowa resource plans. Narratives were written to answer specific planning approach, structure, and content questions.

Analysis of Case Study Evidence

The state plans proved to be successful through patterns of criteria. Patterns were found prevailing from case to case, data was collected concerning the success of the plan through interviewing federal and state agency planners.

“Pattern matching” matched sections of each case to form an effective approach to the Iowa planning model through the apparent success of the plan itself. For example, the Oregon plan was related to the long term environmental protection structure of the state and was developed internally with less input by outside organizations and the public. It was more of an administrative plan, successful because of its land use history and the progressive Oregon environmental track record.
The Tennessee plan was successful due to its pattern of technical work and watershed approach to formation of policy. Measurement of success may be related to the ability to effect policy, stop wetland loss, using a non-regulatory approach, involvement of agricultural agencies, restoration goals and implementation methods, and successfully sustaining planning recommendations and policies through changing administrations.

**Case Study Protocol**

1. Overview of the multiple-case study project (purpose, objectives, process, cases)
2. Procedures and Case Study Questions (questions arise from the approach, content, and structure, application to Iowa)
3. Introduce the plan (case), write a brief history of the case including region, department, and points of interest
4. Approach – landscape approach, process, application, and participants in Table 1 are under the headings planning principles, inventory, assessment, and classification, regulatory and non-regulatory (protection mechanism), monitoring resources and measuring impact, development, collaboration, implementation methods, and miscellaneous methods
5. Content – what the case includes under the headings of EPA grant guidelines, inventory and assessment, evaluation of protection mechanism, strategy development and implementation, monitoring, and plan approval mechanism
6. Structure – sequence, emphasis, priorities
7. Case Features -- significant, unique, process, implementation, perpetuation, etc.
8. Comparisons and application to Iowa (How will the case apply to the Iowa model?)
9. Critique and unique features
10. Evaluate data from each case (apply data to the planning model)

11. Plan analysis and case study reports

**Type of Structure**

A descriptive case study approach was applied to build an Iowa planning model. An unsequenced structure defined by Yin appears most appropriate for this study. Building an Iowa planning model could follow a theory-building approach to case study structure as referenced by Yin (1994). In theory-building, a logical sequence of plan development grows from an alignment of selected state plans. The plan approach, content, and structure of each selected state plan, section, and publication is reviewed and applied to Iowa’s needs, more specific natural and cultural resources, and trends. However, this study is more of a descriptive case study than an exploratory study. A theory building approach could be applied to a case study recording the process and implementation of plans.

**Summary**

This case study method identified a research process to develop the Iowa planning model through a multiple-case study approach (Figure 1). The Iowa planning model (Figure 2) begins the planning and implementation process for the Iowa Wetlands and Riparian Area Plan. Case study methods provided a way to describe the most exemplary state plans in the country and in Iowa’s EPA Region 7. A multiple-case study with no separate chapters for individual cases was applied. This method became a cross-case analysis where a planning process was synthesized through the case study. An Iowa model was developed through discovery of new planning elements, applications of existing planning elements and concepts, and ideas derived from this process.
Cases Review and Reports Case Analysis

Oregon Abstracts and Process Multiple-Case Analysis of Planning Approach, Content, and Structure

Tennessee

Kansas

Cross Case Analysis

Planning Approach and Content Plan Structure
Multiple-Case Study Report Multiple-Case Study Report

Survey of Planners

Multiple-Case Study Apply to Iowa Wetland and Riparian Area Planning Model

Figure 1. Multiple-Case Study Method of selected plans (cases) - Oregon, Tennessee, and Kansas

Development of an Iowa Planning Model for the State Wetland and Riparian Area Plan

Multiple-Case Study

EPA Grant Guidance Iowa Grant Proposal Iowa Resource Plans Survey of Planners and Leaders

Case Study Iowa Planning Model Planning Strategy Analysis

Figure 2. Multiple-Case Study Method Applied to the Development of the Iowa Planning Model
CHAPTER 4. RESULTS

Chapter Four describes each plan (case) in the form of an abstract, conducted the case study by first identifying the elements of the planning approach and content for each case, and identified and compared the structure of each case. The case study then included an analysis and comparison of the way each element and pattern of elements were considered to meet Iowa's planning requirements, and apply to the Iowa Wetland Planning Model (Figure 1). Iowa plans and the EPA Grant were reviewed as separate studies for approach and content as an application to the model. The EPA Grant included an analysis of structure. The results of the case study were described through a case study report. The Iowa Wetland and Riparian Area planning model (Figure 2) was produced as a result of the multiple-case study of State plans, EPA Grant study, and the Iowa plan study. A survey of federal and state wetland planners examined the success of the model and evaluated the elements applied to the approach, content, and structure of the Iowa Wetland and Riparian Area planning model.

Case Study

Abstracts of State Wetland Conservation Plans

An abstract was written as an orientation and summary of the planning strategy for each case. The form or structure of the abstract followed the form of the plan and described the plan's concept, emphasis, and approach from its introduction to its implementation and conclusion.

Oregon's Wetland Conservation Strategy

In Oregon the 1970's brought an increased awareness of public values for wetlands and led to legislative actions. Actions supporting public values included the Removal-Fill Law in 1971, the landmark land-use legislation in 1973, statewide planning goals specifically identified wetland resources, and the 1989 Legislature focused on integrating wetland planning and permitting. Oregon's wetland management program formed from this strong background of
recognition of wetland benefits and legislative support, public interest principles of wetlands, and a need for wetland protection.

The Oregon Plan suggested direction and established priorities for an integrated state wetland program. Recommendations were directed toward improving the effectiveness and efficiency of Oregon’s efforts to conserve, restore, and protect wetlands. The report recognized that many wetlands occur on private property.

The goal of the Strategy is the following:

Ensure the long-term protection and management of the state’s wetland resources through both regulatory and non-regulatory measures by (a) providing protection of wetlands and restoration sites, (b) conserving and managing functions, values, and acreage of wetlands, and (c) encouraging restoration of wetlands for watershed, water quality, and/or wildlife objectives, while accommodating necessary economic activities. Also, to manage Oregon’s wetlands through partnerships that improve education, communication, cooperation, and consistency among agencies, organizations, and the public. (Oregon Division of State Lands 1995, 5)

The ultimate goal of the Strategy was “no net loss” of wetlands in terms of acreage, functions, and values. Implementation of Oregon’s Wetland Conservation Strategy will assist the Oregon Progress Board’s Benchmark of maintaining at least 100 percent of the 1990 wetland acreage (Oregon Division of State Lands 1995).

The Oregon Plan began with the history of wetland management initiatives affecting Oregon. It defined wetlands and wetland benefits. Oregon formed a strategy through its goals followed by supporting principles of strategic planning. The strategy process was lead by the Division of State Lands serving as facilitator, mediator, and integrator. Recommendations and implementation guidelines established a cooperative wetland conservation strategy. Strategies were expressed through issues such as regulatory integration or wetland planning. The approach through the planning process was outlined in a format interpreting an issue by describing the issue and needs and following with prioritized recommendations.

The Oregon Plan concluded with strategic implementation and priority strategies to
achieve its goals. Successful implementation of the Wetland Strategy is characterized by the following:

- implementation of strategy elements,
- coordination and consistency among public agencies,
- measurable long-term wetland protection, restoration, and management efforts on public and private lands,
- program flexibility that allows the state to take advantage of future resource opportunities, and
- enhanced cooperation between public and private parties.  
  (Oregon Division of State Lands 1995, 53)

The Strategy suggested numerous significant tasks necessary to achieve long-term conservation of wetlands in Oregon. The Strategy’s highest priority actions should achieve the following goals:

- effective wetland resource conservation,
- coordination and consistency among public agencies, and
- landowner and public support and implementation.  (Oregon Division of State Lands 1995, 54)

Tennessee Wetlands Conservation Strategy

Barbara D'Angelo, Chief U.S. EPA Region III and Eric Hughes EPA Region IV, during a telephone interview on April 24, 1995, considered the Tennessee plan as one of the most successful plans in the country in terms of support and implementation of planning goals. This was primarily due to the planning process and the quality of the planning strategy.

In this excerpt from a letter to the citizens of Tennessee, Governor Ned McWherter shows his support for the Wetland Conservation Strategy.

Through the Tennessee Wetlands Conservation Strategy, we seek to focus the financial and human resources currently available in our state to pursue a common goal. Together, we seek to conserve, enhance and restore the acreage, diversity and quality of wetlands in Tennessee. To accomplish this, we will quantify our wetland assets, prioritize our interests, address fundamental reasons for wetland losses and measure our progress.

Tennessee’s wetlands and other natural resources are our inheritance and our gift to future generations. (Governor’s Interagency Wetlands Committee 1994)

Support from Governor McWherter, followed by continued support from a new Governor, exemplified wetland planning in Tennessee. The realization of the importance and benefits of
wetlands at legislative and administrative levels led to the success of wetland planning strategies in Tennessee.

Governor Ned McWherter appointed an Interagency Wetlands Committee (IWC). In December 1989 the IWC recommended that the state develop a comprehensive state-wide Wetlands Conservation Plan for Tennessee. Tennessee was one of the first two states in the nation to begin work on a State Wetlands Conservation Plan. However, due to the transition of wetlands qualification, classification, characterization, functional value assessment and unavailable resource information, it was decided not to produce a comprehensive State Wetlands Conservation Plan, but to develop a comprehensive “conservation strategy” to guide statewide wetlands policy and technology development towards a detailed plan in the future (Governor’s Interagency Wetlands Committee 1994).

The Tennessee Wetlands Strategy defined wetlands as transition zones controlled by landscape and hydrology, and that typically contained attributes of both aquatic and uplands environments. Wetlands of most concern in Tennessee and wetlands targeted in the strategy are those shallow, freshwater wetlands which contain submerged, emergent herbaceous and/or woody vegetation, and are collectively referred to as palustrine wetlands (Governor’s Interagency Wetlands Committee 1994). The Wetlands Strategy proposed hydrogeomorphic classification, a method to classify various types of wetlands by similar function. Ten wetland types based on hydrogeomorphic concepts were identified in Tennessee. These occurred within landscape and landform settings that often had wetland hydrology, hydric soils, and under normal circumstances supported hydrophytic vegetation (Governor’s Interagency Wetlands Committee 1994).

It shall be the goal of the State of Tennessee to provide the maximum practicable wetlands benefits to Tennessee and her citizens by conserving, enhancing, and restoring the acreage, quality, and biological diversity of Tennessee wetlands. (Governor’s Interagency Wetlands Committee 1994, 19)
The Tennessee Wetlands Strategy acknowledged several wetland resource protection measures responding to the base planning recommendations determined in part by the National Wetlands Policy Forum. These measures included the following:

- Providing information and education to private landowners
- Collecting and sharing information about the resource
- Offering technical assistance to private wetlands landowners, upon request
- Taking responsibility for data collection and analysis with the state
- Inventorying and characterizing the state's wetland resources, creation of a GIS-based wetlands data base, research, analysis and long term monitoring of status and trends
- Regularly disseminating technical information to planners and wetlands managers
- Identifying unique wetlands and potential restoration sites, and to rank them
- Endorsing the existing state policy to acquire certain unique or exceptionally high quality wetlands, and to manage these wetlands to protect or enhance their functions and benefits to the public
- Enhancing and restoring wetlands, public and private, to offset previous losses, and increasing the resource base by approximately 10% by the year 2000
- Determining the need for an effective regulatory program, making recommendations for water quality standards, record keeping and follow-up of mitigation projects
- Sharing the work load, sharing information, pooling resources, and consistent communication and coordination among agencies and interest groups
- Endorsing existing funding mechanisms and calling on respective agencies to allocate adequate funds to carry out the responsibilities assigned to them.
The Tennessee Wetland Strategy developed a wetlands conservation strategy and implementation schedule. The schedule described each action, set priorities, and set a timeframe. The schedule was followed by monitoring and evaluating recommended actions and condition of the state's wetlands.

It was proposed that the evaluation and monitoring of the status and trends of Tennessee's wetlands become a part of a more comprehensive program of monitoring and evaluating changes in Tennessee's total habitat. This process was identified as part of the Tennessee Biodiversity Program.

**Kansas Wetland and Riparian Areas Project**

Kansas is in EPA Region VII which also includes Iowa, Missouri, and Nebraska. Kansas was the first state in Region VII to complete its state wetland conservation plan. As the title indicates, the plan integrated wetland and riparian areas throughout its planning strategy. The Kansas Wetland and Riparian Areas Project (WRAP) was a multiagency coordination effort addressing common issues and needs regarding conservation of wetland and riparian areas. This project was approved by the Kansas Water Authority and coordinated by the Kansas Water Office.

The mission statement for the Kansas Wetland and Riparian Areas Plan is the following: “To maintain and enhance wetlands and riparian areas and their contributions to our society and the environment in harmony with socio-economic considerations.” (Kansas Wetland and Riparian Area Project 1993a, 1)

A series of seven documents and manuals were developed to form the Kansas Plan. The information presented in this format met EPA expectations for state wetlands planning. Each document may stand alone or combine as a set to represent the complete Kansas Plan. The documents are listed and described below.
• *Kansas Wetland and Riparian Resources: Conservation Goals and Strategies*  (Kansas Wetland and Riparian Area Project 1993a)

As one of six parts of the Kansas Plan, this document identified goals and strategies for the protection of wetland and riparian resources. It included the project mission statement, goals, and strategies.

• *Classification of Wetland and Riparian Areas in Kansas*  (Monda 1992a)

The Wetland and Riparian Areas classification document includes definitions, terminology and classification of wetland and riparian area terminology and types. Resource assessment and inventory, historical information, and types of targeted wetland and riparian areas are determined.

• *Wetland and Riparian Areas in Kansas: Resource in Need of Conservation*  (Monda 1992b)

• *Local Planning Guide for Wetland and Riparian Areas in Kansas*  (Brooks and Deines 1993)

The Local Planning Guide is distributed by the Kansas Water Office, Kansas Department of Wildlife and Parks, and Conservation District Offices. It was developed to serve community decision-makers who are considering planning and management of wetland and riparian areas at local and regional levels in Kansas.

• *Management Practices for Wetlands and Riparian Areas*  (Miller 1993)

The Management Practices manual catalogs the best management practices (BMPs) that can be applied to restore or enhance wetland and riparian areas. Practices are included from SCS, USFWS, EPA, and miscellaneous sources.

• *Wetland and Riparian Areas Program Directory Manual*  (Monda 1992c)

The Program Directory Manual provides a listing and description of programs that directly or indirectly influence conservation of wetland and riparian areas. Agencies and organizations were contacted through mail survey. Programs are divided among six descriptive
categories: regulatory programs, acquisition/leasing, financial assistance, technical assistance, inventory/monitoring, information/education, planning, and research.

- **Wetland and Riparian Targeting Final Report** (Kansas Wetland and Riparian Area Project 1993b)

  This document describes the wetland and riparian targeting process as a mechanism to focus planning activities on priority geographic areas within a river basin.

**Report on State Wetland Planning Process**

The planning process for each state varies. Process was influenced by factors such as the natural resource base, condition of the resources, demographics, history of resource protection, the agency managing the project, political climate, economic base, funding, collaboration and cooperation with other agencies, and time and staff constraints. The process for each state plan is described below beginning with Oregon.

**Oregon Planning Process**

The Oregon Division of State Lands served as facilitator, mediator, and integrator of Oregon’s **Wetland Conservation Strategy** process. To identify issues and develop recommendations for the Strategy, the following sources were used: literature review, interviews with representatives from key government agencies and interest groups, and topical wetland strategy workgroups. Representatives from the development community, environmental groups, consultants, agricultural organizations, universities, and federal, state, and local governments served on nine advisory committees that met from June 1992 to February 1993. These groups addressed specific issues, developed consensus recommendations, and guided Strategy development. Workgroups discussed and developed recommendations for the Strategy components. The components included the following:

- Inventory, trends, and research
• Regulatory integration
• Planning
• Public land management
• Public information and technical assistance
• Protection
• Best management practices
• Restoration

Each workgroup drafted a background paper with consensus recommendations for improving wetland conservation. Collectively, the recommendations and implementation guidelines established a cooperative wetland conservation strategy for the state. Recommendations were prioritized in each chapter of the Strategy (Oregon Division of State Lands 1995).

"Oregon has pioneered a planning program to create a context for wetland regulation. Planning approaches that address large-scale issues have been recognized in the governor's budget and in deliberations of the 1989 and 1993 Legislatures." (Oregon Division of State Lands 1995, 50).

**Tennessee Planning Process**

The Tennessee planning process originated from the Governor's office in the fall of 1989. An Interagency Wetlands Committee (IWC) was appointed to advise the Governor. Members of the Committee were leaders of state and federal agencies, and leaders of private user groups and conservation organizations. The Committee's purpose was to exchange information and coordinate the programs of federal, state, and local agencies, conservation organizations, and private landowners to manage, conserve or restore wetlands for beneficial uses. The Committee meets semi-annually to review programs and budgets and prepare recommendations for the Governor.
The Committee appointed a Technical Working Group (TWG) made up of professional staff members from each agency or organization to carry out necessary research and technical analysis.

The IWC recommended that the state develop a comprehensive state-wide Wetlands Conservation Plan for Tennessee. The TWG was directed to prepare a plan outline and to estimate the human and financial resources needed to develop a plan. In the spring of 1990, the State Planning Office, acting on behalf of the IWC submitted a successful proposal to the U.S. Environmental Protection Agency (EPA) and was awarded the grant in July of 1990. As outlined in the abstract describing the Tennessee plan, the TWG found it necessary to take an alternative approach to developing a comprehensive plan. The strategy was developed as a framework to build a comprehensive wetlands conservation plan in the future.

The final draft of the Tennessee Wetlands Conservation Strategy was approved by the IWC for submission to the Governor on November 16, 1993. In February 1994 the Governor endorsed the Strategy as an official instrument of state wetland policy.

Kansas Planning Process

Manuals developed in the Kansas Wetland and Riparian Areas Project began with a foreword stating the following: "The Wetland and Riparian Areas Project (WRAP) represents a cooperative effort involving federal and state agencies and organizations for the purpose of addressing conservation issues related to wetland and riparian areas in Kansas. A primary goal of the project was to provide pertinent information to government agencies, private organizations, and the general public regarding wetland and riparian resources." (WRAP 1992, ii)

In Kansas, planning groups were formed to organize and produce the plan. Planning groups include the work group, technical group, and advisory group. The work group was comprised of people with program responsibilities from different departments and agencies. It attempted to address all concerns raised by the advisory group. The result of the plan represents
the work group's efforts to achieve a balance between conflicting concerns, coordinating areas of planning and direction and facilitating the technical and advisory group's information and discussion. The technical group worked on technical issues and problems to support planning issues arising from work and advisory group's needs in the planning process. For example, technical wetland issues include classification, definition, function, management practices, monitoring, measuring, and water quality. The advisory group consisted of special interest groups, professional organizations other private organizations and interested individuals. Unanimous endorsement by the advisory group was not attempted.

The planning process was completed on a departmental level as a state plan. Following development of the plan, it was presented to the Governor's office by the lead agency. Team work and departmental relationships were developed to facilitate decision making and roles.

Planning process varies from state to state. The Oregon, Tennessee, and Kansas plans each implement a different process, but it is one customized to the political conditions and resources of each state. In contrast to the process, the case analysis of approach and content illustrates a high degree of similarity between states in the use of planning elements applied to planning approach and content.

Case Analysis of the Planning Approach and Content

Analysis of the approach and content is represented in the form of a table. Approach is defined in terms of planning process, application of planning components or elements, levels and diversity of participation and program application or method of agencies and organizations. Content is defined in terms of the elements and programs that the plan includes. Scope of the plan is defined in terms of the breadth related to the plan's contents.

Evaluation criteria are listed as elements of the plan. Elements are the primary subjects of each plan. For example, one element in the approach is that the wetland plan addresses both rural and urban wetland resources; another example is hydrogeomorphic classification applied to
classify wetland functions. Examples of elements of content ask the question, does the plan include a technical assistance program and a mitigation banking policy? The primary elements of each plan are categorized into planning approach (Table 1) and content (Table 2) and are applied to each case, Oregon (O), Tennessee (T), and Kansas (K). The Iowa Wetland and Riparian Area Grant (G) is reviewed in a similar process.

Each plan has prioritized its elements in different ways. For example, Tennessee prioritized according to action or implementation of a strategy. It used a high, medium, or low agency priority classification. Oregon’s Plan prioritized recommendations by marking and listing each high priority issue and recommendation. Kansas did not indicate priority of plan elements, but applied a priority targeting method to watersheds within a basin that require priority planning efforts. In Table 1 and 2, one (1) was assigned where the element was marked as a priority and/or it was listed as a goal or a principle based upon the case planning strategy. Two (2) was assigned where the element was recommended, but was not marked high priority in the plan. Three (3) was assigned to the element if it was listed as important but of lower priority.

“In Place” referred to an operational program, regulation, or strategy identified in the plan that will be implemented or has been implemented. The program “In Place” may be an established program, but needs a review and possible modification.

Planning elements are listed according to a priority number. One (1) is listed first, two (2) is listed second, and three (3) is listed third. The numbers refer only to Oregon (O) and Tennessee (T). Kansas did not prioritize elements. In the plan analysis, Oregon and Tennessee prioritize their wetland programs and elements similarly.
Table 1. Planning approach including planning elements, plan recommendations and initiated or implemented (In Place) strategies and programs

<table>
<thead>
<tr>
<th>Planning Principles</th>
<th>Recommended</th>
<th>In Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Landscape approach (landscape, watershed, ecosystem)</td>
<td>(1)O,T,K,G</td>
<td>O</td>
</tr>
<tr>
<td>Riparian &amp; wetland planning</td>
<td>(1)O,T,K,G</td>
<td>K</td>
</tr>
<tr>
<td>River basin planning (hydrologic units)</td>
<td>(1)O,T,K,G</td>
<td>K</td>
</tr>
<tr>
<td>Cumulative impacts</td>
<td>(2)O</td>
<td></td>
</tr>
<tr>
<td>Rural and urban involvement</td>
<td>(1)O, (3)T</td>
<td></td>
</tr>
<tr>
<td>Local planning &amp; land use</td>
<td>(2)O,T,K,G</td>
<td>O</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inventory, Assessment, and Classification</th>
<th>Recommended</th>
<th>In Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wetland assessment methods (ranks wetlands for protection)</td>
<td>(1)O,T,K,G</td>
<td>K</td>
</tr>
<tr>
<td>Wetland categorization - assessment or classification (ecological functions)</td>
<td>(1)O,T,K,G</td>
<td>O,T,K</td>
</tr>
<tr>
<td>Wetland delineation</td>
<td>(1)O,T,K</td>
<td></td>
</tr>
<tr>
<td>Hydrogeomorphic application</td>
<td>(1)T,K,G</td>
<td></td>
</tr>
<tr>
<td>Predictive (identifies by definition applies site limitations to land use)</td>
<td>O,T,K</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Regulatory and Non-Regulatory (Protection Mechanism)</th>
<th>Recommended</th>
<th>In Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Federal regulation coordinated with state and local planning</td>
<td>(1)O,T,K,G</td>
<td>O,K</td>
</tr>
<tr>
<td>Implement proactive non-regulatory program</td>
<td>(1)O,T,K</td>
<td></td>
</tr>
<tr>
<td>Regulatory process (overlaps of removal-fill program)</td>
<td>(1)O,T,K,G</td>
<td>O,T</td>
</tr>
<tr>
<td>Consistent regulation &amp; mgmt. on public &amp; private lands</td>
<td>(1)O,T,K,G</td>
<td>O,T,K</td>
</tr>
<tr>
<td>Regulatory &amp; non-regulatory approach</td>
<td>(1)O,T,K,G</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Monitoring Resources and Measuring Impact</th>
<th>Recommended</th>
<th>In Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitoring activities for &quot;no net loss&quot;</td>
<td>(1)O,T,K,G</td>
<td></td>
</tr>
<tr>
<td>Water quality standards</td>
<td>(1)O, (2)T,K,G</td>
<td>O,K</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Development, Collaboration, and Implementation Methods</th>
<th>Recommended</th>
<th>In Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public agency collaboration</td>
<td>(1)O,T,K,G</td>
<td>O,T,K</td>
</tr>
<tr>
<td>Identify priority wetlands</td>
<td>(1)O,T,K,G</td>
<td></td>
</tr>
<tr>
<td>Education and communication</td>
<td>(1)O,T,K,G</td>
<td>O,K</td>
</tr>
<tr>
<td>Cultural resource integration and involvement</td>
<td>O,T,K</td>
<td></td>
</tr>
</tbody>
</table>
Table 1. (continued)

<table>
<thead>
<tr>
<th>Miscellaneous Methods</th>
<th>Recommended</th>
<th>In Place</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Elements</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agricultural wetlands Restoration (policy &amp; priority)</td>
<td>(2) O, T, K</td>
<td>O</td>
</tr>
<tr>
<td>Private landowner participation (voluntary)</td>
<td>(1) O, T, K, G</td>
<td></td>
</tr>
<tr>
<td>University participation</td>
<td>(1) O, T, K, G</td>
<td>O, T</td>
</tr>
<tr>
<td>Develop stable long term funding sources</td>
<td>(1) O, T, K</td>
<td></td>
</tr>
</tbody>
</table>

O - Oregon, T - Tennessee, K - Kansas, and G - Grant
(1) Highest Priority (2) Priority (3) Important

Table 2. Content of state plans, recommendations by each plan, and initiated or implemented (In Place) strategies and programs

<table>
<thead>
<tr>
<th>EPA Grant Guidelines</th>
<th>Recommended</th>
<th>In Place</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Elements</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mission &amp; goals</td>
<td>O, T, K, G</td>
<td>O, T, K</td>
</tr>
<tr>
<td>Inventory &amp; assessment</td>
<td>O, T, K, G</td>
<td>O, T</td>
</tr>
<tr>
<td>Evaluation of protection mechanism</td>
<td>O, T, K, G</td>
<td>T, K</td>
</tr>
<tr>
<td>Strategy development &amp; implementation</td>
<td>O, T, K, G</td>
<td>O, T, K</td>
</tr>
<tr>
<td>Monitoring</td>
<td>O, T, K, G</td>
<td>O</td>
</tr>
<tr>
<td>Plan approval mechanism</td>
<td>O, T, K, G</td>
<td>O, T, K</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inventory &amp; Assessment</th>
<th>Recommended</th>
<th>In Place</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Elements</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assessment of existing conditions</td>
<td>O, T, K, G</td>
<td>T</td>
</tr>
<tr>
<td>Measuring &amp; analysis of resources</td>
<td>O, T, K, G</td>
<td></td>
</tr>
<tr>
<td>GIS data base for inventory, planning &amp; permit evaluation</td>
<td>(1) O, T, K, G</td>
<td></td>
</tr>
<tr>
<td>Resource inventory (method &amp; program)</td>
<td>(1) O, T, K, G</td>
<td>O, K</td>
</tr>
<tr>
<td>Landscape analysis</td>
<td>(1) O, T, K, G</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Evaluation of Protection Mechanism</th>
<th>Recommended</th>
<th>In Place</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Elements</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regulations &amp; authority</td>
<td>O, T, K, G</td>
<td></td>
</tr>
<tr>
<td>Define &amp; identify critical resource areas</td>
<td>O, T, K</td>
<td></td>
</tr>
<tr>
<td>Methods of wetland protection</td>
<td>O, T, K, G</td>
<td>O, T, K</td>
</tr>
</tbody>
</table>
Table 2. (continued)

<table>
<thead>
<tr>
<th>Strategy Development &amp; Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Elements</strong></td>
</tr>
<tr>
<td>Establish priorities</td>
</tr>
<tr>
<td>Common definition/identification</td>
</tr>
<tr>
<td>Technical assistance program</td>
</tr>
<tr>
<td>Education &amp; outreach</td>
</tr>
<tr>
<td>Mitigation and mitigation banking policy</td>
</tr>
<tr>
<td>Wetland restoration policy</td>
</tr>
<tr>
<td>Best resource mgmt. practices (BMP’s)</td>
</tr>
<tr>
<td>Ecological design practices</td>
</tr>
<tr>
<td>Public lands management</td>
</tr>
<tr>
<td>Economic development integration</td>
</tr>
<tr>
<td>Demographics &amp; land use (development &amp; intense land use)</td>
</tr>
<tr>
<td>Research &amp; demonstrations</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Elements</strong></td>
</tr>
<tr>
<td>Monitoring resources</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Plan Approval Mechanism</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Elements</strong></td>
</tr>
<tr>
<td>Implementation schedule</td>
</tr>
<tr>
<td>Funding for planning objectives</td>
</tr>
</tbody>
</table>

Case Analysis of the Plan Structure

The structure of the plan was based on sequence or arrangement of content and emphasis of elements or subjects. Planning priorities were identified from the position of the elements within the plan. The structure was examined through an outline of the contents of each plan. This allowed a comparison of the sequence of the planning elements as they were applied to the formation of an Iowa model. The approach and content identified important elements of a State Wetland Conservation Plan as they applied to a planning strategy through recommendations, prioritization, and implementation. By structuring these recommended elements based on uniform
planning criteria from other states and alignment with Iowa’s planning requirements, the formation of a recommended Iowa plan became more apparent. The following Figures 3, 4, and 5 include the arrangement of the contents in each plan to allow a clearer and more insightful comparison of the planning structure.

**Oregon Plan Structure**

The Oregon Plan’s wetland program team leader, title of the plan, and date of completion are listed below.

Oregon’s Wetland Conservation Strategy
Ken Bierly, Wetlands Program Team Leader Policy and Planning Section,
775 Summer St. NE
Salem, Oregon 97310-1337
(503) 378-3805 Ext. 246

Oregon’s Wetland Conservation Strategy
Issue Analysis, Public Discussions & Recommendations
Oregon Division of State Lands
Wetland Conservation Strategy Workgroups
March 1995
Compiled by Nancy Leibowitz

The contents of the Oregon Plan provide the organized layout of the planning strategy.

The outline or structure below follows the Table of Contents, but with more detail (Figure 3).

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Figure 3. Structure of *Oregon’s Wetland Conservation Strategy* (Oregon Division of State Lands 1995)
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Restoration, Public Information, Data Needs

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   Categorization
   Cumulative Impacts
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   Wetland Categorization
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Issue and Needs
Recommendations

Wetland Restoration
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Recommendations

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Figure 3. (continued)
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  Protection
Wetland Resource Information
  Inventory and Trends
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Strategic Implementation
  Priorities

Figure 3. (continued)

Tennessee Plan Structure

The Tennessee Plan's wetland program leader, title of the plan, and date of completion are listed below.

George Dodd Galbreath, Tennessee Environmental Policy Office
14th Floor L & C Tower
401 Church Street
Nashville, Tennessee 37243-1553
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Tennessee Wetlands Conservation Strategy
by the Governor's Interagency Wetlands Committee and its Technical Working Group
February, 1994
Published by the Tennessee State Planning Office

The Tennessee Plan varies from the Oregon Plan in several distinguishable ways. For example, it varies in process and its approach to planning goals. The structure of the Tennessee Wetlands Conservation Strategy as outlined is similar to the Table of Contents but with more plan detail (Figure 4).
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Figure 4. Structure of Tennessee Wetlands Conservation Strategy
(Tennessee State Planning Office 1994)
Kansas Plan Structure

The Kansas Wetland and Riparian Areas Project (WRAP) leader, participating departments and EPA Region 7 project officer are listed below.

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Project Manager
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Subcontracting Agency Project Manager
Kansas Department of Wildlife and Parks

The Wetland and Riparian Areas Project is a wetland planning and implementation project developed by Kansas with EPA funding assistance. There are seven separate sections to the Kansas Plan. Each section is developed to stand alone or be incorporated into the rest of the plan. Kansas takes a different structural approach and arrangement in its planning than Oregon or Tennessee, however the planning content is similar (Figure 5).

Wetland and Riparian Areas Program Directory Manual (Monda 1992c)

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Figure 5. Kansas Wetland and Riparian Area Project (WRAP 1993)
Wetland and Riparian Resources: Conservation Goals and Strategies (Kansas Wetland and Riparian Area Project 1993a)

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SCS Field Office Technical Guide - Kansas
USFWS - Partners for Wildlife, North Dakota Wildlife Extension Program
Procedures Manual
EPA - Summary of State Manuals of Forestry Best Management Practices
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Classification of Wetland and Riparian Areas in Kansas (Monda 1992a)

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    USFWS - Partners for Wildlife, North Dakota Wildlife Extension Program
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    EPA - Summary of State Manuals of Forestry Best Management Practices

Local Planning Guide for Wetland and Riparian Areas in Kansas (Brooks and Deines 1993)

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Figure 5. (continued)
In the case analysis, planning approach, content, and structure were reviewed in table and outline form. The planning approach and content of each case was studied. Data was gathered through this analysis. Each state plan represented a case analyzed in Tables 1 and 2. Questions concerning subjects (elements) within each plan were answered by noting their presence (recommendation), priority (1, 2, or 3), and implementation (In Place). Kansas did not prioritize its planning elements. The ratings (1, 2, and 3) referred only to Oregon and Tennessee.

The following section includes cross-case conclusions drawn from the multiple case analysis. The planning approach, content and structure were analyzed through data from the tables (approach and content), outlines (structure), and survey (federal and state planners and project leaders).
Cross-case Analysis

One goal in this multiple case study is to build a general explanation that fits each of the individual cases. The objective is analogous to multiple experiments (Yin 1994). This study uses multiple sources of evidence, creates a case study database, and maintains a chain of evidence.

Planning Approach and Content Multiple-Case Study Report

The planning approach and content report reviews elements by category in Tables 1 and 2 and summarizes with a general explanation applied to individual cases.

Table 1 (planning approach including planning elements, plan recommendations and initiated or implemented (In Place) strategies and programs)

Planning principles — Landscape approach, riparian and wetland planning, and river basin planning are rated highest priority by all cases. Cumulative impacts are a priority in Oregon and rural and urban involvement and local planning and land use are discussed and identified as a (2) priority and (3) important respectively in Oregon and Tennessee.

Inventory, Assessment, and Classification — Wetland assessment methods, wetland categorization, and wetland delineation are part of all cases and rated highest priority in all cases. Hydrogeomorphic application is not part of the Oregon plan but is mentioned as a research area applied to future planning. Predictive applications referred to understanding and applying site limitations to ecological function and applying site limitations to land use. They were identified in all cases but not prioritized.

Regulatory and Non-Regulatory (Protection Mechanism) — All elements were included in all cases and were rated highest priority. The elements included the following: federal regulation coordinated with state and local planning, implement proactive non-regulatory
program, regulatory process, consistent regulation and management on public and private lands, and regulatory and non-regulatory approach.

Monitoring Resources and Measuring Impact – Elements in this category included monitoring activities for “no net loss” and water quality standards. Once again, all cases included both elements and rated each element as (1) high priority, except Tennessee rated water quality as a (2) priority. Water quality has several meanings and applications in wetland and riparian area planning. Different applications of monitoring, measuring, evaluating, and assessing both terrestrial and aquatic resources (rapid bio-assessments) are described.

Development, Collaboration, and Implementation Methods – Public agency collaboration, identify priority wetlands, education and communication, cultural resource integration and involvement are all rated (1) highest priority in all cases. Cultural resource integration and involvement was not rated. The process of department interaction and involvement with the project and cooperative agency relationships at local, state, and federal government levels were expressed as extremely important in all cases.

Miscellaneous Methods – This category included agricultural wetlands, restoration (policy and priority), private landowner participation (voluntary), university participation, and develop stable long term funding sources. One exception was in university participation where Oregon rated it (1) highest priority and Tennessee rated participation as a (2) priority. The rest of the categories were rated (1) highest priority except for agricultural wetlands rated (2) priority for all cases.

Summary of Table 1 (Approach)

The importance of this report was in discovery of close relationships of individual states use of planning elements even though a substantial difference in geographic location, political climate, and process of plan development occurred. Patterns of high priority elements were apparent in this study. There was significant consistency in cases under each category of planning
element. These consistencies primarily included both Groups of (1) "highest priority" elements in each category and included all cases. Exceptions were noted in the discussion above. Except for the hydrogeomorphic approach and ecological design, Oregon included all elements in its plan. Tennessee and Kansas were also consistent in most areas. Both included the hydrogeomorphic approach to function and classification in their planning. Oregon discussed it as a research application for future planning. Kansas did not prioritize planning elements as in other cases, but made clear statements of their use in its plan. The Grant application in Appendix B is noted (G) in Tables 1 and 2. It is included as one of the study components applied to the formation of the planning model, but is not part of the case study analysis.

This report applies to the model by linking data individually and in patterns to the formation of consistent and dependable relationships of planning elements applied to the Iowa model.

Table 2. (Content of state plans, recommendations by each plan, and initiated or implemented (In Place) strategies and programs)

EPA Grant Guidelines -- As expected, the base guidelines of state wetland conservation plans are met in all cases. The elements of content include mission and goals, inventory and assessment, evaluation of protection mechanism, strategy development and implementation, monitoring, and plan approval mechanism. This is the basic core of the state wetland plan program.

Inventory and Assessment -- This category includes assessment of existing conditions, measuring and analysis of resources, GIS data base for inventory, planning and permit evaluation, resource inventory (method and program), and landscape analysis. All elements are included in all cases. The GIS data base, resource inventory and landscape analysis are rated (1) high priority.
Evaluation and Protection Mechanism -- The elements include regulations and authority, define and identify critical resource areas, and methods of wetland protection. There is no prioritization; however, all elements are included in all cases. All cases have some methods of wetland protection in place.

Strategy Development and Implementation -- This is a more general category and includes a range of planning elements from prioritizing to research. The elements include the following: establish priorities, common definition/identification, technical assistance program, education and outreach, mitigation and mitigation banking policy, wetland restoration policy, best resource management practices, ecological design practices, public lands management, economic development integration, demographics and land use, and research and demonstrations.

Elements are rated (1) highest priority in all cases except for demographics and land use and research and demonstrations. Both are rated (2) priority for all cases. Tennessee does not include “Best resource management practices” (BMP). Ecological design practices are not part of any case. These practices are designed to improve resource protection beyond existing BMP’s. All plans either have developed their own wetland definition or use the federal government’s definition.

The Iowa Department of Transportation expressed an interest in mitigation banking at the February 1995 EPA Region 7 meeting. They see mitigation banking as one method to solve highway construction issues involving wetlands.

Monitoring -- The element, monitoring resources, is not prioritized but recommended by all cases. State wetland plan guidelines identify monitoring as a method to oversee wetland protection efforts and evaluate the success of planning efforts.

Plan approval mechanism -- This is a process varying from case to case. The plan approval mechanism depends upon political climate, state planning department involvement,
and other commitments, relationships, and constraints between departments, agencies, and organizations.

Tennessee had the only implementation schedule. It was well defined and committed state departments to a relatively strict time frame. Funding to implement objectives was high priority in all cases. In some cases no new programs were to be implemented but funding levels were required to remain at the same level.

Summary of Table 2 (Content)

Many categories are not prioritized in the plan content. Categories of inventory and analysis, strategy development and implementation, and plan approval mechanisms are prioritized. They have primarily a (1) highest priority rating.

Consistency in plan content is an important validation of use of specific elements in the planning process. The alignment of elements in each category within each case is considered a pattern to follow and apply to the model. The cross-case analysis and survey data apply these principles to the model.

Plan Structure Multiple-Case Study Report

The Oregon Plan lays the groundwork in a clearly defined structural planning process. It is an administrative process beginning with preface, background, and history. The plan defines its language and follows with plan participants. The structure is defined by an Oregon planning process which identified issues and developed recommendations from a wide variety of sources. The issues and recommendations formed the strategy and outline of the plan.

Workgroups identified each issue and made recommendations. The plan structure then follows each issue with an issue and needs statement and develops and prioritizes recommendations. The plan is summarized by discussing program resolution, non-regulatory program development and wetland planning implementation. It concludes with developing
sources of wetland resource information through inventory, studying trends, and research leading to priorities and strategic implementation.

The Tennessee Plan was early in the process of developing a State Wetland Conservation Plan. Tennessee was one of sixteen states on the advisory panel to formulate State Wetlands Conservation Plan Guidelines. The Tennessee technical working group followed the outline published by the World Wildlife Fund which is the core planning guideline referenced earlier in this study (statement of need, goals, and objectives, inventory and assessment of wetland resources, evaluation of protection mechanism, strategy development and implementation, monitoring, and plan approval).

Tennessee begins with a resource background including definitions, inventories, wetland types, functions and uses, conditions, and economic consequences of wetland loss. This places wetland planning into context in Tennessee, develops necessary planning criteria, and describes the status of wetland resources. This information sets the stage to form planning goals and proceed through the plan to monitoring and evaluation.

The Tennessee Plan varies from the Oregon Plan by more strictly following the State Wetlands Conservation Plan Guidelines. These guidelines are arranged to follow the planning process in Tennessee. Tennessee is more confident making decisions and recommendations by justifying them through a reliable technical background. Its technical methods are demonstrated and applied early in the plan.

Kansas develops its plan through a format involving a series of independent manuals that may stand alone or presented as a unit. There is no order given to which manual comes first. The series of documents follow the State Wetlands Conservation Plan Guidelines. Kansas formed Wetland and Riparian Areas Project (WRAP) work groups, advisory groups, and technical groups to carry out the process. Documents were developed by some of these groups. For example, the
Kansas Wetland and Riparian Resources: Conservation Goals and Strategies manual was produced by an interagency WRAP Work Group.

The series may be followed through a logical order including lists and roles of government agencies and private organizations, goals and strategies, classification and inventory, management practices, local planning guide, and wetland and riparian area targeting.

The Kansas Plan takes the plan to the project level through the targeting mechanism. It also defines and integrates riparian areas and wetlands throughout the plan.

The plan structures are diagrammed in Figure 15 under the Iowa Wetland and Riparian Area planning model. The comparison of approach, content, and structure with an understanding of the process in each state clarifies the arrangement of elements and planning protocol in each state.

Iowa Environmental Resource Plans, EPA Grant Proposal, and EPA Grant Guidance

Study of Iowa Environmental Resource Plans

This study reviewed selected Iowa natural and recreation resource plans as they defined a direction for resource evaluation and management in Iowa. Some of Iowa’s plans follow federal eligibility guidelines to access federally funded programs. Iowa plans discussed needs and methods to inventory, evaluate, and manage natural and recreational resources. This review centered primarily around plans produced by the Iowa Department of Natural Resources that related directly and indirectly to wetland and riparian area resources and were applicable to the Iowa planning model. The value of Iowa planning applied to the Iowa Wetland and Riparian Area Plan was held in their identification of resources, the goals they developed, the conditions they examined, and the purposes they served.

Iowa plans have a consistent reoccurring theme. There is a continued loss of resources, the river systems lead the way as a significant resource treasure and are an integral part of Iowa’s natural resource system, there needs to be a protection process in place, resource management and
protection needs reliable funding, and educating the public will improve commitment and participation in resource protection and enhancement. The Resource Enhancement and Protection (REAP) Program is an example of recent quality legislation that assists improvement of natural resource conditions. The plans addressed many elements of the wetland and riparian area plan. The plans studied in this report include the following:

- Iowa Water Plan '78 Framework Study Main Report
- Iowa Protected Water Areas General Plan
- 1988 Iowa Open Spaces Plan
- 1988 Iowa Statewide Comprehensive Outdoor Recreation Plan (SCORP)
- Iowa Wetlands Protection Plan: A Supplement to the 1988 SCORP

Other critical planning areas considered as important references to the direction of wetland and riparian area planning in Iowa, include North American Waterfowl Management Plan, Iowa Prairie Pothole Joint Venture Plans (Acquisition and Restoration of a Wetland Complex in Northwest Iowa and Acquisition and Restoration of Wetlands in 31 Iowa Counties), and Upper Mississippi Great Lakes Joint Venture. In four other federally funded projects, planning is in the form of grant applications. These projects include the Iowa Great Lakes, Cedar River, Lost Island, and Eagle Lake projects. The Iowa Forest Ecosystem Guidelines offer an approach to riparian woodlands applicable to the Iowa planning model.

River Front Commissions such as Iowa City, Des Moines, Ottumwa, and Council Bluffs apply urban riparian and wetland planning perspectives to the Iowa planning model.

Greenbelts planned and implemented by cities, counties, and the federal government are of recognized importance in the watershed planning and management of wetland and riparian areas. The Iowa River Greenbelt, Raccoon River Greenbelt, Des Moines River Greenbelt, and Central Iowa Greenway Project are examples of planning processes that consider the integration of cultural and natural resources and allocate time, funding, and energy to wetlands and riparian areas.
The following plans have been reviewed by outlining the goals, approach, content, needs of Iowa, characteristics of Iowa, and their application to wetland and riparian area planning in Iowa.

Iowa Water Plan '78 Framework Study Main Report

The goal of a statewide comprehensive water program, as dictated by Chapter 455A, Code of Iowa, is to put the surface and groundwater resources of the state to their fullest beneficial use, to the end that the prosperity, general welfare, and best interests of the state be served. (Iowa Natural Resource Council 1978, 1)

The goal is more specifically stated in the following five points:

1. To provide for the efficient use of the state’s water resources, both now and in the future

2. To conserve the water and related land resources of the state and prevent the waste thereof

3. To provide an adequate and safe water supply for existing and future use, to meet a variety of demands

4. To protect and enhance the quality of water in the state

5. To consider the interrelationships among social economic, and environmental values, and reduce adverse impacts caused by conflicts. (Iowa Natural Resource Council 1978, 1)

As a method to reach the goals of Iowa’s water and land related resources, the Iowa Water Resources Framework Study has investigated and documented the following (Iowa Natural Resource Council 1978, 8):

- The current quantity and quality of the state’s resources
- Provision for adequate municipal, rural, agricultural, and industrial water supply
- Provision for the protection and enhancement of water-related recreational opportunities
- Conservation and development of fish and wildlife resources
- Provision for commercial and recreational navigation
- Water needs for energy development
- The quality of Iowa’s surface and groundwater, and needs for improvement
- Causes and damages of floods, and various approaches to floodplain management
- Planning alternatives that satisfy the multiple objectives of development, management, and protection of these resources
- Techniques for increasing the water resource base to meet projected future demands
- Legislative need, suggested priorities, and suggestions for the implementation of the plan

The plan is important to the model by identifying federal and state agencies involved in water resource planning, by stating applicable general planning guidelines including Iowa benefits, by considering needed changes in the law, and by establishing general priorities. The Water Plan addresses cultural perspectives of water systems and promotes public interest during evaluation of management decisions. The plan is critical to the model through its approach to development of data by designating six conservancy districts (river basin planning areas) comprised of individual river basins or groups of river basins (Figure 6).

Figure 6. River Basin Planning Areas (Iowa Natural Resources Council 1978, 28)
Protected Water Areas General Plan

"The primary goal of the Protected Water Areas (PWA) Program is to select the best examples of the remaining natural areas along lakes, rivers, and marshes to assure their continued existence." (Iowa Conservation Commission, 1981, 2) Management of the resources will be established through the joint efforts of the Iowa Department of Natural Resources and cooperating landowners. Specific management practices will be developed to be compatible with the landowner's existing use of the land and with the intent of the PWA (Iowa Conservation Commission, 1981).

The PWA Program was designed to preserve and maintain the existing scenic and natural character of selected lakeshores, river corridors, and marshes in Iowa. The evaluation procedure applied a five-step filtering process with separate evaluation criteria. The process started with all water areas in Iowa. Five filters started with all water areas in Iowa and lead to recommendations for master planning. The filter system includes the following:

- Filter one -- Man-made verses natural areas
- Filter two -- Land uses along water areas
- Filter three -- Aerial survey
- Filter four -- Landform regions
- Filter five -- Recommendations for master planning

Generally, support for the PWA concept was expressed during all public participation phases. About 75 percent of those surveyed in the statewide attitudinal survey indicated that the state's water and associated land areas need additional protection. Almost all of the rural landowners (92.6 percent) surveyed by the Wallaces Farmer magazine thought Iowa should begin implementing ways to more actively preserve the natural and scenic character of at least some lakes, rivers, and marshes. About half of those farmers felt that protecting these water areas is
important enough to justify regulating the expansion of agricultural, industrial, residential, and recreational land uses onto these areas (Iowa Conservation Commission, 1981).

A primary application of PWA to the Iowa Wetland and Riparian Area Plan is a recommended revision to the Scenic Rivers Act that will make it more operational. “Allow for the protection of lakeshores and marshes as well as rivers under the same authority, thus requiring that the Act’s title be made more general such as Protected Water Areas Act.” (Iowa Conservation Commission, 1981, 9) The Iowa PWA concept is a significant application of resource protection and enhancement principles to be carried forward in the Iowa planning model.

1988 Iowa Open Spaces Plan

“Open spaces for the purposes of the plan are defined as: natural and cultural resource areas that contain natural vegetation, fish, wildlife, and/or have historic, scenic, recreation, and education value. Examples of open spaces in cities or towns may include: parks, riverfronts, and town squares. In rural areas open spaces include such areas as woodlands, marshlands, river corridors, lakeshores, parks and wildlife areas.” (Iowa Department of Natural Resources 1988a, 1)

The 72nd General Assembly in 1987 directed the Iowa Department of Natural Resources in House File 620 to “prepare a statewide, long-range plan for the acquisition and protection of significant open space lands...” (Iowa Department of Natural Resources 1988a, 2) Other organizations were specified to be directly involved in preparing the plan. An overall goal was that a minimum of ten percent of Iowa’s land area be included under some form of public open space protection by the year 2000 (Iowa Department of Natural Resources 1988a).

The overall goal of the Open Spaces Program is to protect more of the best remaining land and water areas in Iowa having natural vegetation, fish, wildlife, historic, scenic, recreation and outdoor education value for public use, enjoyment, and benefit. (Iowa Department of Natural
More specific goals include the following:

1. Accelerate existing programs that contribute to open space protection by providing money to complement existing sources of funds.

2. Increase public opportunities to use, enjoy, and benefit from Iowa’s protected open spaces.

3. Increase the amount of public land for the management of fish, wildlife, and forest resources.

4. Protect representative examples of Iowa’s land and water areas containing natural and cultural resources, including those in a range from common to rare and unique.

5. Maintain and improve Iowa’s scenic resources.

6. Provide buffer areas around existing public lands.

7. Increase public awareness of the economic and social benefits of protecting Iowa’s open spaces to help direct and motivate the existing broad base of support.

8. Provide the most appropriate protection of open spaces by using a variety of available methods, such as land acquisition, easements, leases, preserve dedications, local zoning, and property tax incentives.

9. Coordinate open space protection among federal, state, county, and municipal government and private organizations. (Iowa Department of Natural Resources 1988a, 3)

Application of open space concepts of protection and enhancement to the Iowa planning model is significant. This is because management planning and implementation can be applied immediately as policy, it has long term assurance, it acts as a demonstration to private projects, it protects thousands of acres of land and water, and it projects more protection into the future. The open space plan is organized into geographic and resource units. It recognizes the need for additional planning and resource inventories in some open space categories such as urban projects. The Open Spaces Plan identifies areas of needed protection, all of which may be related to private property protection and enhancement needs. Those areas specifically identified include Mississippi River bluff protection, water areas protection, scenic highways, trail development,
reforestation, prairie restoration, and wildlife habitat enhancement. Implementation of open space protection in Iowa involves coordination, cooperation, and action from all levels of government and several private organizations. These concepts apply directly to the Iowa planning model.

1988 Iowa SCORP

The Statewide Comprehensive Outdoor Recreation Plan’s (SCORP) primary functions are to assess the supply and demand for outdoor recreation resources and to define priorities for actions on the part of all sectors to meet identified needs. SCORP’s goals include the following:

1. Summarize in tabular and narrative forms the supply and condition of public and private outdoor recreation lands, facilities and programs in the State of Iowa.

2. Present an updated assessment of past, present and future public demand for those lands, facilities and programs.

3. Summarize recently completed and ongoing research and planning activities aimed at high-priority recreation and resource issues.

4. Provide a comprehensive list of perceived issues in need of attentions and resolution.

5. Examine the roles of city, county, state, federal and private sectors in meeting recreational demands.

6. Recommend actions that will help guide the funding, staffing, development and management of future outdoor recreation efforts in Iowa. (Iowa Department of Natural Resources 1988b, 1-1)

Application of SCORP to the Iowa planning model is evident through SCORP’s evaluations. It evaluates recreation and natural resource conditions of lands and public/private supply and status of the land. It evaluates assessments of need and demand from the resource by associations of collective agencies and organizations. SCORP observes and records the status of conservation practices, game and non-game, forest cover, prairie preserves, water and water quality, and Iowa’s river resources.
SCORP gives formal support to the Protected Water Area Program and officially recommends it. The PWA approach to water resources by including rivers, marshes, and natural lake shorelines supports the wetland and riparian area approach in the Iowa planning model.

Iowa Wetlands Protection Plan: A Supplement to the 1988 SCORP

The Iowa Wetlands Protection Plan is a supplement to the 1988 SCORP plan. Section 303 of P.L. 99-645 calls for each state to prepare an addendum. State plans are expected to be consistent with the National Wetlands Priority Conservation Plan prepared by the U.S. Fish and Wildlife Service. The purposes of the Iowa Wetlands Protection plan are the following:

• To document wetland losses.
• To inform and educate decision-makers on the value of wetlands.
• To delineate priorities for protection, restoration and management of wetlands in Iowa.
• To provide a vehicle for improved communications between entities involved or concerned with wetland protection.
• To identify protective mechanisms available, and develop funding sources to protect and restore wetlands. (Iowa Department of Natural Resources 1988c, 3)

"The basic goal for wetland protection in Iowa is to assure that all remaining high-quality wetlands are protected in perpetuity." (Iowa Department of Natural Resources 1988c, 3)

The Iowa Wetlands Protection Plan provides information on Iowa Code authorities dealing directly and indirectly with acquisition and protection of wetland resources. It defines its relationship to SCORP. It identifies a wetland protection advisory committee, assessment criteria and it identifies Iowa's wetland protection and restoration priorities.

The Iowa Wetlands Protection Plan is a critical beginning to the future wetland planning process for Iowa. This report interprets the planning approach of the existing plan to place applicable principles into the planning model. The beginning of the planning process through the
model takes these subject areas and expands them to meet the standard for State Wetland Conservation Plan.

There are significant differences between the State Wetland Conservation Plan and the Iowa planning model for the wetland and riparian area plan. The planning model is developed for a planning process more comprehensive in nature, specifically developing goals, objectives and methods of implementation. It is a broad-based plan involving significant collaboration among federal, state, and local agencies. It forms direction in regulation, resource management practices, priorities, technical assistance, education and outreach, water quality, economic development, measurement and monitoring, and involves many state departments.

Support for the model in the State Wetland Conservation Plan for river system involvement is noted in the following quote: “All rivers in Iowa possess wetland values.” (Iowa Department of Natural Resources 1988c, 9) The two interior rivers having the greatest amounts of existing or potential wetland resources are the Cedar and Wapsipinicon. These rivers provide the most notable wetlands associated with side channels, overflow areas, old oxbows, and others. (Iowa Department of Natural Resources 1998c).

Table 3 illustrates the content of each selected Iowa plan. The analysis is interpreted by comparing content elements with Iowa resource plans. When a plan includes an element, the table notes the match with an (x). Table 3 is a generalization of the contents of each plan. It does not evaluate the quality and scope of the contents. In most cases the plans noted are not comprehensive and would be considered limited in each element. The Water Plan '78 and the Protected Water Area Plan contain the most thorough examination of the resource. Each plan is limited to its more specific purpose. The Wetlands Protections Plan discusses several critical elements in wetland planning but does not commit nor elaborate on critical planning issues. It does not develop definitions and form goals and strategies carried to the level of process and implementation.
Table 3. Iowa Plan Analysis

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Iowa Wetland and Riparian Area EPA Grant Proposal

Jim Gulliford, Director, Soil Conservation Division, Iowa Department of Agriculture and Land Stewardship
Henry A. Wallace Building
East Ninth and Grand
Des Moines, Iowa 50319
(515) 281-5851

Jeff Logsdon, Director, Dallas County Conservation Department and Iowa State University Landscape Architecture Department
1477 K Ave.
Perry, Iowa 50220
(515) 465-3577
Section I. Develop an Iowa Wetland and Riparian Area Conservation Plan Model

Section II. Form the Iowa Wetland and Riparian Area Mission, Goals, and Strategies

Section III. Develop a strategy for assessing and describing the functions and values of Iowa's wetlands and riparian area resources.

Section IV. Describe and evaluate existing roles, functions, programs, regulatory authorities, regulations and laws and evaluate their effectiveness.

Section V. Develop strategies and guidance for wetland and riparian area outreach, technology transfer, and information/education efforts.

Section VI. Develop procedures and criteria for determining wetland and riparian area protection actions, identification, and priorities.

Section VII. Identify and summarize state-of-the-art design and construction techniques and resource management practices for protecting, restoring, or creating wetlands riparian areas.

Section VIII. Establish short and long term strategies for protecting, restoring, acquiring, and creating wetlands and riparian areas.

Section IX. Identify options and make recommendations for a statewide integrated Geographic Information System.

Section X. Identify monitoring and research needs for water quality and wildlife quality characteristics of Iowa wetlands and riparian areas.

Section XI. Develop a process to monitor and measure the plan's impact on wetlands and riparian areas.

(Figure 7) Iowa Wetland and Riparian Area Conservation Plan Grant Structure

EPA Wetlands Program FY 95 Grant Guidance for States

Robert Barber, EPA Project Officer (913) 551-7042
Region 7 U.S. Environmental Protection Agency
Wetlands Protection Section
726 Minnesota Ave.
Kansas City, KS 66101

The basic planning protocol recommended by the EPA Wetlands Program FY 95 Grant Guidance for States includes the following (Figure 8):
1. Statement of Need, Goals and Objectives
   Define the purpose of the plan. Identify the goals and objectives of the SWCP;
   (include specific time horizons for achieving the goals)

2. Inventory and Assessment of Wetland Resources
   Identify state's wetland and riparian resources based on available information;
   summarize the information on status and trends

3. Evaluation of Protection Mechanism
   Identify existing programs (public and private) and mechanisms available to
   protect and restore wetland resources; identify gaps in programs as well as
   opportunities to increase efficiency and effectiveness of existing and new
   programs.

4. Strategy Development and Implementation
   Identify specific actions, target dates, implementation mechanisms to be used;
   develop geographic-specific plans which can include location of areas
   generally suitable for development, restoration, or acquisition; coordinate with
   applicable Federal, State, and local government programs and private sector
   efforts.

5. Monitoring
   Establish how the programs carrying out the recommendations will be
   monitored and reported.

6. Plan Approval
   Identify a mechanism and entity for getting approval and/or acceptance of the
   recommendations included in the plan.

Figure 8. EPA Wetlands Program FY 95 Grant Guidance for States

Survey of Federal and State Wetland Planners

The case study method as described in Chapter 4 lists the criteria for interpreting the
findings as one of five components of research design for case studies (Yin 1994). One measure of
success of the planning model is determined through interviews with selected federal and state
wetland planners and program administrators. Critical assessment of the model was developed
through a survey and implemented using telephone interviews. The interviews provided some
insight to the development of the planning model and an assessment of the applied information from the case study.

A series of questions provide an evaluation of the planner's and project manager's State Wetland Conservation Plans, recommended applications to the Iowa planning model, and a professional opinion of the quality, direction, and potential success of the Iowa plan.

The interview questions are arranged in the following order: planning process, agency and organizational involvement, unique features, and planning approach. Conclude with an evaluation of the Iowa planning approach.

Planning Process and Agency and Organizational Involvement

1. What was the process of collaboration with other agencies and when were outside political organizations such as Farm Bureau (those generally opposing wetland regulation) introduced to the plan?

2. What recommendation can you make about successfully beginning the planning process?

3. At what stage and how was the governor involved?

4. Was a University involved in the process or production of the plan? What department(s)?

Unique Features and Planning Approach

5. What are the most unique features about your plan?

6. How does a landscape approach apply to your plan?

7. Why does this planning approach best fit Tennessee/Oregon/Kansas?

8. How is Tennessee/Oregon/Kansas different from other states and how does this planning best fit Tennessee/Oregon/Kansas?

9. If you were to rewrite the plan and change the process, what would you change?
Evaluation of the Iowa Planning Approach

The form of the survey distributed to participants evaluating and commenting on Iowa planning concepts begins with an introduction and follows with statements concerning planning approach and content. The survey begins below.

Based on a case study of Oregon, Tennessee, and Kansas, an analysis of Iowa resource plans, the '95 EPA Wetland Grant Guidelines, a review of Kansas, Missouri, and Nebraska plan outlines, and a review of other wetland resource publications, an Iowa Wetland and Riparian Area Planning Model was developed.

The Basic Iowa planning approach is as follows:

(Please comment on each element of the plan. For the first time through these questions please hold your comments to strongly agree, somewhat agree, uncertain, somewhat disagree and strongly disagree. Following this series of questions, we can discuss further comments in any planning area you would be willing to provide additional advice and information.)

1. Iowa will take a landscape approach using landscape ecology principles as they apply to ecosystems, landscapes, watersheds, and river basins.

2. Iowa will combine wetlands and riparian areas in the planning and implementation process.

3. Iowa is using hydrogeomorphology as an ecological function approach to wetland classification.

4. The Iowa State University Landscape Architecture Department has a contractual role in plan development and production.

5. The Landscape Architecture Department is looking forward to participating in a long term relationship with the Iowa Department of Agriculture and Land Stewardship and Iowa Department of Natural Resources concerning natural resource issues.
6. Water quality evaluation is applied to measurement and monitoring the progress of wetland and riparian area enhancement and restoration practices. Rapid bioassessment techniques will be applied.

7. Ecologically based design considering ecological function will be applied to management practices.

8. Recommendation such as statewide riparian and flood plain zoning district policy may be planned and developed.

9. Local government involvement through county conservation departments may be given permit authority or review capabilities in river basins or regions throughout Iowa.

10. A study to develop a statewide integrated Geographic Information System (GIS) will be implemented to inventory, measure, monitor, and locate wetlands.

11. Communication and education through schools, organized groups, and the public will be an element in implementation of the Iowa plan.

12. Do you have any last comments or suggestions for the Iowa plan?

The survey was conducted through telephone interviews. A cover letter, map of Iowa river basins, list of demographic and resource information about Iowa, and the questions were forwarded prior to an appointed interview time and place (Appendix).

Those states and agencies interviewed included the following: Oregon, Tennessee, Kansas, EPA Region 7 and EPA in Washington D.C. The results of the telephone survey were tabulated and produced in an interview case study report.
The following professional state and federal planners and administrators were interviewed:

**Oregon** *(Oregon’s Wetland Conservation Strategy)*
Ken Bierly, Wetlands Program Team Leader  Policy and Planning Section,
775 Summer St. NE
Salem, Oregon 97310-1337
(503) 378-3805 Ext. 246

**Tennessee** *(Tennessee Wetlands Conservation Strategy)*
George Dodd Galbreath, Tennessee Environmental Policy Office
14th Floor L & C Tower
401 Church Street
Nashville, Tennessee 37243-1553
(615-532-8545)

**Kansas** *(Kansas Wetland and Riparian Areas Project)*
Jerry Shimek EPA Kansas Project Officer U.S. Environmental Protection Agency Region 7
Wetlands Protection Section
726 Minnesota Avenue
Kansas City, KS 66101
(913) 551-7042

**Washington D.C.**
Reggie Parrish EPA Wetlands Environmental Specialist
401 M Street SW MC 4502-F
Washington D.C. 20460
(202) 260-6095
Pilot Survey of Federal and State Wetland Planners

Forming criteria for interpreting the findings was one of the final steps described in the research design method in Chapter Three. The data collected to form elements of the planning model were evaluated through a survey of federal and state wetland planners (Appendix A). Questions were derived from the planning approach and content of the cases. The survey measures success of primary elements of the model by asking professional planners and project managers how and why they used particular approaches and elements in their wetland planning and evaluation. The survey then asked the planners' opinion of these concepts and elements as they applied to the Iowa planning approach.

The survey is one method to interpret the success of the planning strategy of applied elements in the Iowa plan. Chapter Five applies another method of assessing planning elements in the Iowa model. It compares Iowa's approach and content side by side with Tennessee and Kansas plans to Oregon planning strategies.

A pilot survey was conducted to test the procedure, content of the survey, and refine the questions (Figure 9). Two pilot surveys were conducted. The individuals surveyed included Allen Farris (Iowa Department of Natural Resources, Fish and Wildlife Division Administrator) and Bob Barber (EPA Iowa Wetland Program Coordinator). As a result of the pilot survey, a few changes were made to the form of the questions, procedure for asking the questions, refinement of the content, and an improved efficiency in recording responses. Bob Barber was surveyed through both survey sections. Allen Farris was surveyed for only the basic Iowa planning approach.

Bob Barber (EPA Iowa Wetland Program Coordinator) was surveyed on June 19, 1995 at 5:30 p.m. and Allen Farris, IDNR Fish and Wildlife Division Administrator was surveyed on June 20, 1995 at 11:00 a.m. (Figure 9).
Planning Process and Agency and Organizational Involvement

Bob Barber EPA Iowa Wetland Program Coordinator

1. What process of collaboration with other agencies do you recommend?
   Designate a central figure to pull others together and form interagency agreements for cooperation to assist in forming agency agreement for planning outcome and commitment.
   One problem in Iowa is the separation of, for example, water quality people and fish and wildlife people. Groups do not tend to work together. Missouri has designated one person as wetland coordinator and contact.

2. When should outside political organizations such as farm bureau (those generally opposing wetland regulation) be introduced to the plan?
   When all relevant data are available and compiled to show a concrete picture of what the process is to get there. Participation of organizations may show too many viewpoints to get something accomplished if involvement is too soon. Missouri is an example.

3. What recommendation can you make about beginning the planning process?
   Get everyone together in a forum and help them understand what the goals are. Key for Iowa is to show how this process is better than the existing state wetlands plan.

4. At what stage and how should the governor be involved?
   The Governor has to brought into it, but equally important is that the legislature is brought into it -- at least the process.

5. Are Universities involved in the process or production of state plans? Which department(s)?
   University involvement is good on a technical basis and not policy related. The University should not be hired to make policy.

Unique Features and Planning Approach

6. What are some of the most unique features in state plans you are familiar with?
   A key feature is that the state should develop its own definition.

7. Does a landscape approach apply to most plans? Should it apply?
   Interaction of the components of the landscape is the way of the future. You could expect to give up some wetlands and gain others. The key is rural landowners, where wetlands are a component of the landscape.

8. Why does this planning approach best fit (Tennessee/Oregon/Kansas)?
   It ties local agencies and governments together.

9. How is e.g. Tennessee/Oregon/Kansas different from other states and why does this planning best fit Tennessee, Oregon, or Kansas?
   Need to become more familiar with the other plans. Each state has its own approach and conditions.

Figure 9. Pilot Survey of Federal and State Wetland Planners
10. If you were to change the state planning process, what would you change?
The question is more applicable to state planners.

The basic Iowa planning approach is as follows:

Bob Barber EPA Iowa Wetland Program Coordinator
Allan Farris IDNR Fish and Wildlife Division Administrator

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<tr>
<th>A. Strongly Agree</th>
<th>B. Somewhat Agree</th>
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<th>D. Somewhat Disagree</th>
<th>E. Strongly Disagree</th>
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<td>Bob Barber/Allan Farris</td>
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A/C 1. Iowa should take a landscape approach using landscape ecology principles as they apply to ecosystems, landscapes, watersheds, and river basins.

B/E 2. Iowa should combine wetlands and riparian areas in the planning and implementation process.

C/D 3. Iowa should use hydrogeomorphology as an ecological function approach to wetland classification.

B/D 4. The Iowa State University Landscape Architecture Department has an advisory and technical role on a contractual basis in plan production.

B/D 5. On an as needed basis, Iowa State University hopes to form a long term planning, technical, and advisory relationship with the Iowa Department of Agriculture and Land Stewardship and Iowa Department of Natural Resources concerning natural resource issues.

A/D 6. Water quality evaluation should be applied to measuring and monitoring the progress of wetland and riparian area enhancement and restoration practices. Rapid bioassessment techniques should be applied.

A/A 7. Management practice design for wetland protection and enhancement should be based on ecological functions.

A/C 8. Statewide riparian and floodplain zoning district policy should be planned and developed.

B/C 9. Local government entities such as county conservation departments should be delegated permit authority or review capabilities in river basins or regions throughout Iowa.

Figure 9. (continued)
A/B 10. A study should be implemented to develop a cross-agency statewide integrated
Geographic Information System (GIS) to assist inventorying, measuring, monitoring, and locating wetlands.

A/A 11. Communication and education through schools, organized groups, and the public will be an element in implementation of the Iowa plan.

12. Do you have any last comments or suggestions for the Iowa plan?
   "Do what is best for Iowa, be thorough, comprehensive, use good science, prioritize a comprehensive agenda as a foundation for policy. Be politically aware, know the key players and integrate the process." (Bob Barber EPA Iowa Wetland Coordinator)

Figure 9. (continued)

Surveys of Federal and State Wetland Planners

Results of the surveys of selected state and federal program coordinators are listed below in Figures 10, 11, 12, 13, and 14. The survey of the Iowa planning approach (Figure 11) includes responses from each of those surveyed. A report on the surveys follows this section. The first survey was conducted June 20th and the last on June 28, 1995. Those surveyed include the following:

- George Dodd Galbreath, Tennessee Environmental Policy Office (Figure 10)
- Ken Bierly, Oregon Wetlands Program Team Leader (Figure 11)
- Jerry Shimek, EPA Kansas Wetland Program Coordinator (Figure 12)
- Reggie Parrish, EPA Wetlands Environmental Specialist, Washington D.C. (Figure 13)

Each survey interview was approximately 45 minutes long. Each of those surveyed was cordial, responsive, and cooperative. The surveys were conducted by telephone. A letter and information about Iowa was faxed to Jerry Shimek and Reggie Parrish. Dodd Galbreath and Ken Bierly wished to be interviewed right away when I contacted them to make an appointment. During the survey, responses were entered directly into a word processing document.
June 20, 1995 - Tuesday, 3:30 p.m.
Tennessee survey with George Dodd Galbreath

Planning Process and Agency and Organizational Involvement

1. What was the process of collaboration with other agencies?
   The process involved a multi-agency multi-organization task force of executive leaders (top dogs). It was facilitated by the state planning office as a neutral office. A technical committee deliberated on the policy and brought it back to the steering committee. Dr. Ruth Nefs, executive assistant to the governor organized the plan. The process involved the Governor's endorsement of the plan.

2. When were outside political organizations such as Farm Bureau (those generally opposing wetland regulation) introduced to the plan?
   The leading conservation group (Tennessee Conservation League) and Farm Bureau asked the governor to start the wetland planning process by convening an executive level process.

3. What recommendation can you make about beginning the planning process?
   Have all affected parties at the table with priority on key political players and key state agency leaders. Allow every one to have a fair and open hearing and good professional facilitation and mediation if necessary. They will create a lot of drag, like drafting someone in the army in a war they did not want to fight.

4. At what stage and how was the governor involved?
   From the beginning. The governor made it an executive level project. He empowered the process and gave it credibility.

5. Was a University involved in the process or production of the plan? Which department(s)?
   Yes, the University was involve in the technical committee. The Biology Department was involved. There were five state agencies and seven federal agencies. Environmental and conservation departments were primary in the production of the plan.
   The leader must be fair and must not bring many biases to the processes.

Unique Features and Planning Approach

6. What are the most unique features about your plan?
   The best feature about the document is its structure. Every strategic plan must have a broad goal and then identify several objectives that are measurable individual goals that are subsets of the overall goal. Each objective has actions that follow. The next best is that the objectives are prioritized high, medium, and low.
   Agencies should be asked what objectives they want to take on and when they want to implement them. The broader application is know what you want to do, who is going to do it (who is responsible) and when it is to be done. The "what" can be done in many different ways.

Figure 10. George Dodd Galbreath, Tennessee Environmental Policy Office
7. Does a landscape approach apply to your plan?

Yes, the watershed approach is landscape oriented and a hydrogeomorphic method is used to classify wetlands. Status of the plan is measured through hydrologic units or watersheds and functional methodology on the landscape. We want to know how they fit, how they relate, and what the effect on the larger system is. Implementation can be through ecosystems.

8. Why does this planning approach best fit Tennessee?

The hydrologic approach is good because there is a lot of water in the state and it takes into account water as the fundamental component of wetlands. This approach is good for Tennessee because the wetland technology and current science gives it a good foundation. The diverse make-up of the group was encouraged.

Tennessee is significant because we have state level agencies that have credibility in the legislature and with the public. Most issues are rural issues in Tennessee. Most of the future losses are in rural areas. We were not protecting rural area wetlands. The approach to get at fundamental opportunities is in private hands and with a rural perspective.

The approach was to involve key political people and identify key political issues. There is a small network of organizational leaders not as involved. It was critical that key commissioners and state agency officials and key political people were involved. Farm Bureau and forest interests were key in the planning process.

Neutral facilitation should be brought to the table. The people who are affected by the process are affected the most. Every one has a veto. Need 100% agreement to move forward. It developed a win-win situation where people understand each others perspective and get what they want over time.

9. How is Tennessee different from other states and why does this planning best fit Tennessee?

Question eight and nine are similar and nine was answered.

10. If you were to rewrite the plan and change the process, what would you change?

We would use professional facilitation from the beginning. It took too long. It is a timeless entity. We would move the process along quicker and not lose the participants. The urban greenway was an important part of the comprehensive planning process.
June 26, 1995 - Monday, 6:30 p.m.
Oregon survey with Ken Bierly

Planning Process and Agency and Organizational Involvement

1. What was the process of collaboration with other agencies?
   First we identified other agencies with interest and a role in wetlands. Identify
   individuals with expertise and information. People were invited through written invitation.

   Working groups were formed to develop the plan. Working groups were given specific charges and
   were more valuable than folks with specific agendas.

2. When were outside political organizations such as Farm Bureau (those generally opposing
   wetland regulation) introduced to the plan?
   From the beginning. It was important to bring outside organizations in at the beginning. It
   was necessary to determine what their objectives were. Their involvement was critical to success.
   The organizations were part of the working groups.

3. What recommendation can you make about beginning the planning process?
   Make sure that you have the strength or level of support from the governor and other
   political support. That support is necessary to keep the planning process going. It will be
   extremely important to maintain continuity. One problem with the Oregon planning process was
   that there was a disjunction between completed staff work and finalizing the document for
   publication.

4. At what stage and how was the governor involved?
   In Oregon, the governor chairs the land board which is the policy body. That Board was
   a part of policy decisions from the beginning. Regulatory policy has been in place for twenty
   years. The land use planning program has protected farm land and was supported.

5. Was a University involved in the process or production of the plan? Which department(s)?
   Research from Oregon State University was done as a part of work groups. The Botany
   Department was involved. Restoration policy was studied by the School of Oceanography.

Unique Features and Planning Approach

6. What are the most unique features about your plan?
   One of the uniqueness about it was that the plan tried to tailor the approach to the
   existing programs. It was important to plan to find the deficiencies and take a strategic approach
   to correcting them. We did not expect to find there would be additional funds to implement an
   additional program or make additional changes.

Figure 11. Ken Bierly, Oregon Wetlands Program Team Leader
7. Does a landscape approach apply to your plan?
   One of the specific recommendations of the plan is to shift toward community landscape and watershed planning efforts.

8. Why does this planning approach best fit Oregon?
   The plan is based upon existing regulatory structure and authorities in the state. Some of the recommendations that came out of working groups tailored the plan to the diversity of landscapes in Oregon. Distinctions were made between rural and urban areas for standards.

9. How is Oregon different from other states and why does this planning best fit Oregon?
   The planning authority and permitting authority in Oregon is relatively unique and basing planning on that authority is unique. There was a rather robust discussion on how to integrate federal and state programs. Definitions were not developed beyond those in state statutes.

10. If you were to rewrite the plan and change the process, what would you change?
    The outcome of the plan was good. We could have taken a longer period of time writing the plan and made a greater level of specificity for future efforts. It became clear that a programmed effort over a longer period of time was best.

Figure 11. (continued)

June 28, 1995 - Tuesday, 1:00 p.m.
Jerry Shimek, EPA Kansas Wetland Program Coordinator

Planning Process and Agency and Organizational Involvement

1. What process of collaboration with other agencies do you recommend?
   As many other agencies as may have a role in administering the plan and whomever else is interested should be invited and encouraged. They need to be involved in the beginning. We are breaking new ground with state wetland plans. New people will become involved that were not involved before in wetland planning. Economic issues were addressed in Kansas. Some of the other programs in other states were involved with the commerce commission. Once you identify the players. Communication is really crucial. Try to correspond until they don’t want to hear from you anymore.

2. When should outside political organizations such as Farm Bureau (those generally opposing wetland regulation) be introduced to the plan?
   Think about this as a role rather than a timing question. Anybody and everybody who support or oppose wetland regulation should be brought in early on. The developer of the plan should make a conscientious decision on the role. In Missouri, the projects were derailed because,
for example, Sierra Club and Farm Bureau had similar roles. In Kansas several groups were set up. People who had program responsibilities like me, (in wildlife, health and environmental departments, etc.) were put together as the work group. Then the technical staff (group) who worked with the work groups on technical issues and problems was developed. The advisory group was the third group where we put special interest groups and professional organizations such as the wildlife society and society of civil engineers. They provide the workgroup with advice. The work group was responsibility to put the ideas of others together. It never put people together at opposite ends of the poles making final decisions. It gave the advisory group a sense of importance. On any issues resolved in the work group, the advisory group had an opportunity to respond and that response could become part of the document. This provided a way for the group to resolve the issues. At times the opposite ends agreed. Try the first time and revisit the question if need be. The goal was to move the planning process forward. Define your vision of their role. Most understood their role. Opportunities were given to disagree with us. There were between 14 and 20 organizations involved. Citizens representing themselves or an organization were welcomed.

3. What recommendation can you make about beginning the planning process?
   Start with the people who are responsible, the working group, move participation upward. If it filters up no one will be surprised about it. Figure out who the workgroup will be right away and have a reason for their participation and their roles. Give people their responsibility. I'm not sure what to do if a politician becomes involved. Have someone on the work group who has an understanding of the planning process. One person in charge with good public facilitation skills works well.

4. At what stage and how should the governor be involved?
   The consensus nationally is that the governor doesn't have to be involved to have a successful project. In some cases state agencies became involved when they had to. Sometimes planning was presented as a staff level project and not anything to get alarmed about. It was a public participation process as part of a normal planning project. Evaluate where you are at politically and what approach to take by considering the role of agriculture and the aversion to regulation. In Kansas the governor was not a part of the process until the process was done. Then the lead agency sent it up to the governor. You should build team work and team relationships before you get into too many decisions. Do some work and information gathering by discovering policy and roles.

5. Are Universities involved in the process or production of state plans? Which department(s)?
   In Kansas in the beginning, Kansas State University entered the planning process as contractors and developed a local planning guide. The University became part of the work group. The Landscape Architecture Department and a planner from the Community and Regional Planning Department at Kansas State University were involved.

   **Unique Features and Planning Approach**

6. What are some of the most unique features in state plans you are familiar with?
   One of the fairly unique features about Kansas is that there were tools to implement the plan developed simultaneously with the plan. How would you target limited resources? We
formed a crude targeting model, developed a planning guide and did workshops as part of the planning process. Another thing was public surveys of what a plan might contain. The work group wanted to reach people not part of the public interest groups. Kansas has a water planning process. Other components of other plans like comprehensive outdoor recreation and resource plans that have special interest to wetlands were applied.

7. Does a landscape approach apply to most plans? Should it apply?
   It applies to the Kansas plan. Some of the work was relevant to landscape type analysis. It should apply. For now we will adapt. The resources are transitional. We know what happens in the uplands affects the water bodies. This is the way wetland planning will end up.

8. Why does this planning approach best fit Kansas?
   Part of it was the landscape based water planning process. They take a holistic approach to water. They break the state down into river basins. River basins break down to sub-basins with everything from water supply to water law. Recreation, endangered species, and water law are all considered at once.

9. How is Kansas different from other states and why does this planning best fit Kansas?
   As I referenced in the last question, the river basin planning process applies.

Figure 12. (continued)

June 28, 1995 - Tuesday, 2:00 p.m.
Reggie Parrish, EPA Wetlands Environmental Specialist Washington D.C.

Planning Process and Agency and Organizational Involvement

1. What process of collaboration with other agencies do you recommend?
   A lot of sharing of resources between agencies is needed. A preliminary inventory of resources should be done. Be involved in the goals formulation process. Discuss the committing processes to identify some of the gaps and some of the strong points. In-kind services on the part of each agency should be discussed and organized. California is implementing their plan. The government agencies need to separate from the grassroots program. The federal government is trying to streamline the process between agencies. We first need to get our act together in the planning procedure and process before going to the public. Then go to work.

2. When should outside political organizations such as Farm Bureau (those generally opposing wetland regulation) be introduced to the plan?
   In the very beginning be careful not to isolate any particular group. We are trying to avoid controversy for those not being part of the planning process. Have selected people represent each group and inventory the resources.

Figure 13. Reggie Parrish, EPA Wetlands Environmental Specialist, Washington D.C.
3. What recommendation can you make about beginning the planning process?
   Make a preliminary inventory of the resources and describe their condition. So we know what resources we have. Educate to the magnitude of problem.

4. At what stage and how should the governor be involved?
   It was important to both California and Tennessee for the governor's policy office to be involved. It is an initial buy-in from the governor and reduces risk by keeping them in the loop so to speak.

5. Are Universities involved in the process or production of state plans? What department(s)?
   Universities are involved, for example, departments of planning, marine biology for water quality or standards, and ecological assessments and measurement. Dispute resolution and public administration may be good areas for university involvement.

Unique Features and Planning Approach

6. What are some of the most unique features in state plans you are familiar with?
   Ohio used a unique facilitation approach. California has a regional planning approach because areas of California have such different environmental and land use conditions. A lot of states make recommendations for the whole state, but different areas need different approaches.

7. Does a landscape approach apply to most plans? Should it apply?
   Yes, this is the only way to do wetlands planning. We have to look at the ecosystems together. In California the waterfowl move from ecosystem to ecosystem. Look at watershed and ecosystem. The watershed is hydrological.

8. Why does this planning approach best fit Tennessee/Oregon/Kansas?
   A holistic approach is the best approach. For example, endangered species do not confine themselves to one area, they are influenced by other areas. Natural systems do not know political boundaries. We want to protect natural resources associated with them. Looking at the resource holistically helps look at the bigger picture for restoration. We need to look at the physical as well as the management perspective.

9. How is Tennessee/Oregon/Kansas different from other states and why does this planning best fit Tennessee/Oregon/Kansas?
   Tennessee's main plan was to get a real picture of the resource by inventorying the resource. Oregon was more focused on local and regional planning in management.

10. If you were to change the state planning process, what would you change?
    I would recommend that the state resource agencies overlapping goals are coordinated by one in the planning process. Some type of consistency requirement should be added. The grant process could improve. There are a lot of hoops to get through to the funding. Monitoring and follow-up and consistency could be better.

Figure 13. (continued)
Figure 14 lists questions focusing on elements of the basic Iowa planning approach. Elements were derived from each of the plans in the case study, Iowa plans, and interviews with planners and project managers nationwide. The survey asked for a response ranging from strongly agree to strongly disagree. Each of those surveyed was given the opportunity to comment on any question and to make a statement at the end. Responses from all four interviewed and their comments are listed in Figure 14.

The basic Iowa planning approach is as follows:

<table>
<thead>
<tr>
<th>A. Strongly Agree</th>
<th>B. Somewhat Agree</th>
<th>C. Uncertain</th>
<th>D. Somewhat Disagree</th>
<th>E. Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Galbreath/Bierly/Shimek/Parrish</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B/B/A/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Iowa should take a landscape approach using landscape ecology principles as they apply to ecosystems, landscapes, watersheds, and river basins.
   - An ecosystem approach could dilute the focus on wetlands (Galbreath).
   - There are other approaches that are equally valid (Bierly).
   - The characteristics and features of Iowa. The system is so broken you have to take a broader view to fix it (Shimek).
   - The only way to go. Must take a broader approach rather than protect individual wetlands (Parrish).

2. Iowa should combine wetlands and riparian areas in the planning and implementation process.
   - Presume that wetlands and riparian areas can be connected (Bierly).
   - Even though the riparian areas are not jurisdictional, they are affected by wetlands. The water issues must look at riparian areas (Shimek).
   - Often the two are confused. They need to be distinguished and not be confused by definition (Parrish).

3. Iowa should use hydrogeomorphology as an ecological function approach to wetland classification.
   - This is the direction I see making sense for us (Bierly).
• It can be extremely time consuming. We see several examples that the people discussed and found solutions to. It doesn’t matter how sophisticated the science is, people must agree. The ultimate in scientific modeling may be perceived as a black box and in a way ultrasophistication is not necessary. Getting on the site and asking, does this site represent a high quality or low quality resource. Understandings and agreement among biologists and agencies can occur on site (Shimek).
• Not sure if it provides flexibility and consideration for agriculture areas (Parrish).

4. The Iowa State University Landscape Architecture Department has an advisory and technical role on a contractual basis in plan production.
• There needs to be strong relationships between state government and universities (Bierly).
• University should provide technical, planning, and advisory assistance and not make policy (Parrish).

5. On an as needed basis, the Landscape Architecture Department hopes to form a long term planning, technical, and advisory relationship with the Iowa Department of Agriculture and Land Stewardship and Iowa Department of Natural Resources concerning natural resource issues.
• Tennessee involved academics for technical assistance. Use the University on an as needed basis move quickly from abstract to something on the ground (Galbreath).

6. Water quality evaluation should be applied to measuring and monitoring the progress of wetland and riparian area enhancement and restoration practices. Rapid bioassessment techniques should be applied.
• Other methods such as hydrogeomorphology classification and function should be applied (Galbreath).
• Trying to establish water quality standards for wetlands is difficult. It should be a series of factors and not a sole factor. Rapid Bio-assessment should be applied (Parrish).

7. Management practice design for wetland protection and enhancement should be based on ecological functions.
• Ecological functions must include all functions (Galbreath).
• They should also be based on potential impacts from stressors (Bierly).
• Identify this approach as something to do later on – you need some kind of monitoring component (Shimek).
• Hydrologic properties, flood control, and sediment deposition should be factors (Parrish).

Figure 14. (continued)
8. Statewide riparian and floodplain zoning district policy should be planned and developed.
   • If Iowa wants it they should have it (Galbreath).
   • Not necessarily statewide But wetland protection should be integrated with land use regulations (Bierly).
   • Take a landscape and multiple disciplinary approach to land use (Shimek).
   • Yes, based upon our experience of flooding over the last few years (Parrish).

9. Local government entities such as county conservation departments should be delegated permit authority or review capabilities in river basins or regions throughout Iowa.
   • Uncertain because of the local units of government may not withstand political pressures. Local governments should have a role, but need the horsepower to take a strong stand (Shimek).
   • I strongly agree, but there should be state oversight for consistency between counties (Parrish).

10. A study should be implemented to develop a cross-agency statewide integrated Geographic Information System (GIS) to assist inventorying, measuring, monitoring, and locate wetlands.
    • It is a political decision to integrate GIS or to make one entity responsible for it. All departments should have access to it (Bierly).
    • Make sure GIS efforts receive the appropriate priority. Can eat up a lot of time and resources before you get off the ground. The poor man’s” GIS with mylar overlays may be enough. I have seen very few systems where the data base has been sufficient and the folks have the skills to use it. An outcome of the plan would be to determine how to gear up and implement this type of capability (Shimek).

11. Communication and education through schools, organized groups, and the public should be an element in implementation of the Iowa plan.
    • Develop an even emphasis across the public awareness of audiences. Must break out of the school group because you are two generations away from the decision makers. I see lop-sided efforts with emphasis on school groups (Shimek).

12. Do you have any last comments or suggestions for the Iowa plan?
    • “Do what is best for Iowa, be thorough, prioritize a comprehensive agenda, and apply good science and technology as a foundation for policy and plan development. Be politically aware. Know the key players and involve them throughout the plan.” (George Dodd Galbreath, Tennessee).
• “Keep a clear awareness of what works and what doesn’t in your state. Make clear recommendations that work or they won’t ever be listened to. Make sure what you recommend has a high likelihood of being implemented.” (Ken Bierly, Oregon)

• “It’s easy to get excited about good ideas and making a plan that is all things to all people. Think of the plan as an open ended process and make a parking lot for ideas that may be applied to the second go around of plan development. The plan and tasks must be manageable. Be concerned about information overload that may interfere with accomplishing the plan.” (Jerry Shimek, EPA Kansas Wetland Coordinator)

• “The classification issue is important for Iowa because of Iowa’s agriculture land. The citizen involvement and participation and outreach will be extremely important to the plan. It is important to get people on board as soon as possible and have an open process.” (Reggie Parrish, EPA Wetland Environmental Protection Specialist, Washington D.C.)

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**Figure 14. (continued) Survey of Basic Iowa Planning Approach**

**Survey Report**

In addition to evaluating the success of the model, the survey benefited the planning model in several ways. Useful information on planning procedure, approval, and organization was discovered during the survey. New information that was considered for the model is listed below.

- The leading conservation group and Farm Bureau asked the governor to begin the wetland planning process (Galbreath/Tennessee).

- In Kansas several groups were set up. They included a work group, technical group, and advisory group (Shimek/Kansas).

- During the planning process, no representatives or individuals who made final decisions and were at opposite ends of the poles were put together. (Shimek/Kansas).

- Take a holistic approach to water, it was a landscape-based water planning process (Shimek/Kansas). There is a lot of water in Tennessee. The plan takes into account water as the fundamental component of wetlands (Galbreath/Tennessee).
Important general consensus issues described by all states includes the following:

- Determine what objectives the agency wants to take on and when they want to implement them. Know what you want to do, who is going to do it and when it is to be done.
- It is important that key commissioners and state agency officials and key political people are involved.
- Quality, unbiased facilitation should be brought to the table. Its best to have one person in charge with good facilitation skills.
- Bring outside organizations in at the beginning. All interested agencies, organizations, and individuals should be involved.
- It is important to maintain continuity during the planning process.
- Tailor planning approach to existing programs
- Extensive collaboration is required between agencies.
- A programmed effort over a longer period of time is best for writing the plan.
- Communication is crucial during the full extent of the planning period.
- Apply the landscape approach to wetland planning.

The comments listed above are valuable applications to the model. Some of the comments serve as a basis for planning model concepts.

**Iowa Wetland and Riparian Area Planning Model**

The Iowa Wetland and Riparian Area Model was formed through a systematic process using a case study method, plan analysis and comparison, and a planning strategy analysis. There were requirements, standards, and surveys used to acquire data and evaluate elements of the planning model. Figures 1 and 2 in Chapter Four outline the process. The model is an entity designed to outline a planning process applied to Iowa wetland and riparian area planning. It is an analysis of planning approach, content, and structure. It is a structured process, an outline of a
set of elements representing physical and functional landscape processes of wetland and riparian areas. It is a framework to protect, restore, and create wetlands. The core of the model represents the following components:

- Statement of need, goals, and objectives,
- Inventory and assessment of wetlands resources,
- Evaluation of existing and needed protection mechanisms,
- Plan approval, and
- Monitoring progress.

"In general, all types of models may be classified into three groups: iconic, analogue, and symbolic." (Holcomb Research Institute 1975, 6 cited in Anderson 1980, 81). The Iowa planning model is symbolic in that it represents a structured method to analyze and plan for the physical landscape and the processes surrounding wetlands and riparian areas. The Iowa planning model integrates natural and cultural resources and the management of those resources in the context of wetlands and riparian areas.

The model applied planning elements of approach and content based upon their use in exemplary state plans, recommendations from a survey of selected federal and state officials, and continuity with Iowa plans. The elements were placed in a structure based upon an order and use derived primarily from their structure and use in case study plans, other state plans, and wetland grant guidelines.

Iowa Planning Model Concept

The Iowa planning model concept was developed from an application of the following references and data sources: case study analysis of planning approach, content, and structure, literature review (references), survey of federal and state planners, State Conservation Plan Guidelines, Iowa EPA Grant Proposal, Iowa resource plans, and planning strategy analysis (Figure 2).
Below, a concept statement is made followed by evidence listed in parenthesis justifying use of the concept. The propositions are linked to the findings

**Applied Planning Model Concepts**

- Apply a landscape approach -- (Based on survey, case study, literature review, EPA grant)
- Combine wetland and riparian areas -- (survey, Iowa Wetlands Protection Plan, research on cumulative effects, other state planning principles)
- Use hydrogeomorphology as an ecological function approach to wetland classification -- (recent use in federal and state agencies, case study, literature review, and survey)
- University has advisory and technical roles in the planning process - (case study, survey)
- Water quality in some form should have a role in the plan. Water quality could be applied to monitoring, measuring, and assessing impacts, priorities, and qualities of wetland and riparian area resources. Water quality may be applied as a method to express issues and concerns -- (case study, literature review, survey)
- Management practice design is based upon ecological function -- (survey, case study)
- Address floodplain regulation -- (survey)
- Local government participation in inventory, assessment, and regulation -- (survey, case study, Iowa plans)
- Conduct a study to develop a cross-agency statewide integrated GIS -- (survey, case study, EPA grant)
- Communication and education as an integral part of the planning process -- (survey, case study, EPA grant)

**Planning Approach and Content of the Model**

Elements of the model planning approach and content listed in Tables 1 and 2 are applicable to the Iowa planning model. The case study has demonstrated the importance of the elements through prioritization and inclusion in the selected cases. The elements were not
included in all cases, however the intent of the model is to include them in some form as indicated in the structure of the planning model.

Planning Structure of the Model

Basic structure of the planning model is represented by sequence and application of elements to the Iowa plan. State wetland plan outlines illustrated in Figure 15 were used to develop planning structure for the Iowa model. The process in Iowa influences the sequence, content, and relationships of department responsibilities to application of particular elements to the plan. The outline will objectively reflect a model representative of a state wetland planning process in Iowa. Changes to the model are expected based upon the emphasis Iowa wants to place on the plan.

Oregon’s Wetland Conservation Strategy

**Background and Purpose**

- **Introduction**
  - Definition, Guiding Principles, and Components
  - Issues
- **Program Resolution**
  - Non-Regulatory (Public Info. and Technical Assistance)
  - Wetland Plan Implementation
- **Resource Information**
  - (Inventory and Trends Research)
  - Strategic Implementation (Priorities)

**Issues and Recommendations**

*Figure 15. State Wetland Plan Outlines*
Tennessee Wetlands Conservation Strategy

Definition
Inventories
Functions and Uses
Condition of Wetlands
Economics of Wetland Loss

Goals and Objectives

Organization Responsibilities
Evaluation of Wetland Program
Strategy Implementation

Action Plan
(Strategic Objectives and
Action Priorities)

Coordination and Funding

Implementation Schedule

Monitoring and Evaluation

Kansas Wetland and Riparian Area Project

1. *Wetland and Riparian Areas Program Directory Manual*
2. *Wetland and Riparian Resources: Conservation Goals and Strategies*
3. *Classification of Wetland and Riparian Areas in Kansas*
4. *Management Practices for Wetland and Riparian Areas*
5. *Local Planning Guide for Wetland and Riparian Areas in Kansas*
6. *Wetland and Riparian targeting Final Report*

1. Agencies, Organizations, and Programs
2. Goals and Strategies
3. Classification and Inventory
4. Mgmt. Practices

5. Local Planning Guide
6. Wetland and Riparian Area Targeting

Figure 15. (continued)

The structure of the Iowa model is illustrated in Figure 16. Its formation is a result of case study planning structures, State Wetland Conservation Grant, EPA guidelines, multiple cross-case analysis and planning survey. The issues and recommendations are frequently represented in other states. This section of the model may be expected to change according to priorities presented by Iowa committees and work groups during the planning process. Figure 16 is a flow chart beginning
with the introduction and Iowa planning concept and ending with coordination and funding.

Figure 17 is the Iowa planning model structure and is comparable to a table of contents for the Iowa plan. The Iowa wetland and riparian area planning model is represented by a list of planning model concepts, flow chart, and planning structure.

The components of the planning model representations illustrated in Figures 16 and 17 are discussed in the next chapter. Chapter Five describes the logic linking data to propositions, criteria for interpreting the findings, and a planning strategy analysis.

**Iowa Wetland and Riparian Area Planning Chart**

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Iowa Wetland and Riparian Area Planning Chart

Introduction → Iowa planning approach → Program evaluation

Form issues and recommendations → Form goals and strategies → Inventory (status of the resource)

Strategic Implementation → Program resolution

Public information, education, and communication
Identification, prioritization, and protection actions
Resource management practices
Protection, restoration, acquisition, and creation of wetlands
Cross-agency statewide GIS
Wildlife and water quality characteristics
Inventory, trends, and research needs

Monitoring and evaluation

Coordination and funding
```

Figure 16. Iowa Planning Model Flow Chart
Preface
Background
Purpose and goals

Introduction

History and concept
Natural resources
Historical and cultural resources
Wetland and riparian area concept

Definitions
Iowa wetlands and riparian areas (in context to other resources, condition, design, and impact, define the plan and its scope)

Iowa planning concept (guiding principles)
Iowa planning approach (watershed planning, local wetland and riparian area planning, restoration and protection, non-regulatory program development, regulatory integration, public lands management, wetland and riparian area priorities (targeting)
Inventories (inventory and assessment system development, using, for example, GIS)
Classification system
Function and use (hydrogeomorphic and others)
Condition of Iowa wetlands and riparian areas
Economics of wetland loss
Benefits of wetlands and riparian areas
Process (planning process to develop wetland and riparian area project and program)
Issues (identified by agencies, organizations, and others)

Agency, organization, and program responsibilities (Applying the Iowa planning approach)
Agencies and organizations (involved in wetland and riparian area resources)
Programs (associated with wetland and riparian resources)

Evaluation of existing wetland programs
Programs
Organizational responsibilities
Regulation
Public information and education

Classification and inventory (existing conditions)
Resource information
Classification
Inventory

Goals and strategies (existing goals and formation of new goals and strategies)

Figure 17. Iowa Planning Model Structure
Issues and recommendations
  Wetland planning
  Wetland protection
  Wetland restoration
  Public information
  Management practices
  Public lands management

Program resolution (Integrate existing programs with issues and recommendations)

Wetland and riparian area plan implementation (Strategic implementation)
  Implementation process (placing issues and recommendations into the process)
  Implementation schedule

Public information, education, and communication (Develop procedures and criteria for
determining wetland and riparian area outreach, technology transfer, and
information/education efforts)

Wetland and riparian area identification, prioritization, and protection actions (Develop
procedures and criteria for determining wetland and riparian area protection actions,
identification, and priorities)

Resource management practices (Identify and summarize state-of-the-art design and
construction techniques and resource management practices (ecological design) for
protecting, restoring, acquiring, and creating wetlands and riparian areas)

Wetland and riparian area protection, restoration, acquisition, and creation (Establish short
and long term strategies for protecting, restoring, acquiring, and creating wetlands and
riparian areas)

Cross-Agency statewide geographic information system (Identify options and make
recommendations for a statewide integrated Geographic Information System)

Wetland and riparian area wildlife and water quality characteristics (Identify monitoring
and research needs for water quality and wildlife quality characteristics of Iowa
wetlands and riparian areas)

Wetland and riparian area inventory, trends and research needs (Recommend and direction)

Monitoring and evaluation (Develop a process to monitor and measure the plan's impact on
wetlands and riparian areas)
  Monitoring the implementation process (action plan),
  Monitoring, evaluation, and trends

Coordination and funding

Conclusion

Figure 17. (continued)
CHAPTER 5. DISCUSSION

The most important attribute of good answers is that they indeed connect specific evidence—through adequate citation—to the pertinent case study issues. (Yin 1994, 98)

The previous chapter applied the case study method. It analyzed and reported on the approach, content, and structure of each state plan as a case. Chapter Four also studied Iowa environmental plans as a method to understand the concepts behind planning in Iowa, their emphasis, commitments, management recommendations, and practices. It also reviewed the Iowa EPA State Wetland Conservation Plan Grant. The grant formed a planning strategy as a result of reviewing several other state plans, watershed programs, and wetland resource publications. The case study and the other components of the study combined to form an Iowa Wetland and Riparian Area Planning Model. An evaluation of the concept and elements of the model was conducted through a survey of several state and federal planners and program managers. The result was an indication of what components or elements of the model were consistent with successful planning in other states, what elements aligned with expectations from Iowa Plans, and what approach and content could be expected to be successful. A variable not thoroughly investigated in this study was process. A brief review of the Oregon, Tennessee, and Kansas process was made to provide some insight to the Iowa Planning Model. Iowa’s circumstances are different, some of the techniques from the cases and references to the book Statewide Wetland Strategies produced by World Wildlife Fund will be helpful to the planner’s use of the model.

Chapter Five discusses the case study research design by linking data to propositions and describes criteria for interpreting the findings. It applies a planning strategy analysis of principles, goals, and objectives of state plans to the approach of the Iowa planning model.
Logic Linking Data to Propositions

Chapter Four describes five components to case study research design. They include the study's questions, propositions, units of analysis, logic linking data to propositions, and criteria for interpreting findings.

Propositions are linked to the data sources and are applied to planning model concepts. The propositions include:

- The first proposition was that there are state plans and other reference sources considered, in part, exemplary for Iowa wetland and riparian area planning.

State plans and other references address wetland issues comparable to Iowa. Surveys in Iowa and the Midwest apply to perceptions of landowners about resource conditions and their willingness to improve them. Wetland and riparian area disturbances may be measured similarly given the parameters of geomorphic setting (position in the landscape), landform, water source, and hydrologic profile (water duration, depth, and flow). Both rural and urban impacts to wetlands and riparian areas exist in all regions. It appears that basic planning approaches can be similar in most states, but with an emphasis placed on each state's unique conditions. Iowa's conditions were illustrated earlier in the literature review and Iowa resource plans. Basic planning approach and content elements express an approach and method to improve wetland and riparian area conditions related to Iowa as well as Oregon, Tennessee, and Kansas. For example, the Iowa Water Plan's river basin planning areas is a landscape approach and evaluating needed changes in the law is a legislative action. The Iowa Protected Water Area General Plan recommends implementation by private and public entities on a voluntary (non-regulatory) basis and recommends river corridor and marsh preservation. As an example, some of the elements represented in planning approach and content represented in Iowa resource plans include landscape approach, riparian and wetland planning, river basin planning (hydrologic units), local planning and land use, water quality standards, private landowner participation and so on.
The planning approach and content elements are represented in Iowa resource plans. As observed in the tables and literature review, the elements are included in other state plans, articles, and publications.

• The second proposition was that some of Iowa's needs are different than other states and are not expressed in other state plans.

This study did not identify differences in Iowa's needs from other states, but found many similarities. Iowa's needs differed, based upon magnitude of impact rather than discovery of a different need. An order of magnitude could be measured by wetland loss. For example, ninety-five percent of Iowa's wetlands in the Des Moines Lobe (prairie pothole region) have been drained and converted to intensive agriculture or developed. Demographics, landuse, level of impacts, and remaining resource base are differences in terms of measurement but are the same phenomena.

• The third proposition was that landscape ecology principles provide an effective approach to develop the Iowa Wetland and Riparian Area Plan.

Landscape approach applied at scales from watersheds to ecosystems and the function and interaction of hydrologic phenomena, vegetation, and soils were integral parts of the case study. Landscape ecology is also expressed as the most applicable approach by federal government agencies and by the survey of planners and program leaders. Support for landscape ecology principles is described in the literature review beginning on page seventeen.

• The fourth proposition was that through review of other state plans applied as units of analysis (cases) the approach, structure, and content will direct the formation of the Iowa planning model for the wetland and riparian area plan.

The Iowa planning model depends on the case study for representative, consistent, proven, planning elements that may be applied to Iowa. The cross-case analysis found consistent evidence favoring the application of approach and content elements to the Iowa model. Other components
of the model include EPA grant guidance, Iowa grant proposal, Iowa resource plans, and survey of wetland planners and leaders.

Criteria for Interpreting the Findings

The criteria for interpreting the findings are listed below with a narrative supporting each statement.

- Assess the results of a comparison between the match of the approach, structure, and content, of the cases with the needs and appropriate planning for Iowa in the resulting content, structure, and approach of the Iowa Planning Model.

Iowa's needs listed in the literature review and in the study of Iowa's plans illustrate resource conditions and trends with consistency. From a planning perspective these conditions are similar to resource needs of states in the case study. Consistency, prioritization, and strong correlation of elements included throughout the cases withstands geographic, political, and economic diversity. These parameters indicate that Iowa is expected to need the same elements to meet its wetland goal of reducing wetland loss. State Wetland Conservation Plan guidelines and elements evaluated in the multiple case analysis address Iowa's needs. The elements and needs are comparable. The federal and state planner and program leader survey evaluates several concepts and elements of the Iowa planning approach and content. Examples of Iowa's needs include: higher water quality, improved habitat for wildlife, increased funding for resource acquisition, management, and education, reduced soil loss, reduced flooding, containment of chemicals, protection of prime farmland, protection of critical areas, protection of scenic rivers, lower impact highway standards through riparian areas, increased connectivity and interior size of ecosystems.
• Meet the State Wetland Conservation Plan guidelines and recommended wetland strategies (National Wetlands Policy Forum 1988)

It was important to evaluate whether each case included State Wetland Conservation Plan guidelines in its content. It was found that each case covered all elements of the recommended planning guidelines. The application to the Iowa model is similar to other states. The guidelines are basic requirements addressing wetland protection and enhancement. The guideline protocol attends to protection from wetland loss by establishing goals, inventorying, regulating, measuring, and monitoring wetlands. Just as in other states, Iowa is losing wetlands and will apply these guidelines to its planning model.

• Use successful planning strategies in patterns or individually

within the plan (one measure of success is determined through interviews of selected federal and state wetland planners)

Cases in this study were determined successful on a state and national basis by other states, by EPA wetland program managers and environmental specialists, and by the successful political process of acceptance. Consistent patterns of approach, content, and priority among cases illustrates application of selected elements to successful wetland planning. The survey also evaluated the application of selected approach and content elements to Iowa planning. The result was positive endorsement of most wetland planning concepts described in the survey results in Figure 14.

Planning Strategy Analysis

The overall goal or mission statement from each state in the case study is quoted below. Even though there are significant regional differences, the consistency and application to Iowa becomes evident in the similarity of the goal or mission statement in each state.
Oregon’s Wetland Conservation Strategy goals are to:

- ensure the long-term protection and management of the state’s wetland resources through both regulatory and non-regulatory measures by (a) providing protection of wetlands and restoration sites; (b) conserving, managing functions, values, and acreage of wetlands; and (c) encouraging restoration of wetlands for watershed, water quality, and/or wildlife objectives, while accommodating necessary economic activities;

- manage Oregon’s wetlands through partnerships that improve education, communication, cooperation, and consistency among agencies, organizations, and the public. (Oregon Division of State Lands 1995, 12-13)

The goal of the Tennessee Wetlands Conservation Strategy states, “It shall be the goal of the State of Tennessee to provide the maximum practicable wetlands benefits to Tennessee and her citizens by conserving, enhancing, and restoring the acreage, quality, and biological diversity of Tennessee wetlands.” (Governor’s Interagency Wetland Committee 1994, 19)

The mission statement for the Wetland and Riparian Area Project in Kansas is “To maintain and enhance wetlands and riparian areas and their contributions to our society and the environment in harmony with socio-economic considerations.” (Kansas Wetland and Riparian Area Project 1993a, 1)

To further assess and account for planning elements in the Iowa model, goals, objectives, and principles from the cases are analyzed. The strategies of the Oregon Plan are a baseline to compare goals and objectives of the Kansas and Tennessee plans. Elements of the Iowa planning model are compared to the principles, goals, and objectives of the other plans. Elements of the plan are derived from planning goals. If the planning goals are similar, considered successful, and apply to the principles of wetlands and wetland management the model is expected to be more reliable.

The Oregon strategies were selected as a base of analysis because of Oregon’s more complete explanation and more definitive direction in the principles it lists.

1. “Wetland planning should be integrated with watershed management, economic development, transportation and infrastructure programs, floodplain and stormwater management, point and
non-point water quality control programs, and habitat management planning efforts as a means to prevent adverse wetland impacts and resolve land-use conflicts." (Oregon Division of State Lands 1995, 13)

- Tennessee does not develop planning principle of infrastructure and habitat management. It does however classify wetlands according function. Management practices may then be assessed by functional impact.
- In the Kansas planning and coordination strategy watershed management is mentioned, but no specific programs or practices are described.
- The Iowa model includes ecological design which addresses infrastructure design at watershed and site scales. Water quality programs and cumulative impacts in floodplains are also included in the model.

2. "Public agencies should form partnerships to facilitate exchange of services, data, personnel, and funds in order to eliminate duplication of effort, resolve policy and management differences that currently exist for wetland and riparian areas, and promote maximum effectiveness in use of public funds and personnel." (Oregon Division of State Lands 1995, 13).

- Tennessee forms cooperative relationships with other departments and agencies, but does not mention it as a goal or objective.
- Kansas regards cooperation as a goal by stating, "Improve coordination and cooperation among federal, state, local, and private entities responsible for wetland and riparian stewardship." (Kansas Wetland and Riparian Area Project 1993a, 3)
- The Iowa Planning Model includes public agency collaboration as a primary element.

3. "Where possible, conservation activities should be conducted within a watershed or landscape context to assure long-term sustainability of the resource. Piecemeal regulation, management, and
conservation of wetland and riparian habitat is ineffective in conserving and sustaining the resource and addressing societal needs for clean water, wildlife habitat, and floodplain protection.” (Oregon Division of State Lands 1995, 13)

- Tennessee references wetlands in hydrologic units. Tennessee’s first objective is to characterize the wetlands resource more completely and identify the critical functions of the many types of wetlands in each physiographic province (Governor’s Interagency Wetlands Committee 1994).

- Kansas applies landscape scales by targeting river basins and smaller watersheds. The combination of riparian areas and wetlands effectively lends planning to cumulative effects and larger scale perspective. A Kansas planning goal is to “Maintain diversity of wetland and riparian ecotypes and size classes across the state.” (Kansas Wetland and Riparian Area Project 1993a, 2).

- The Iowa planning model applies landscape scale and landscape ecology principles to measurement, inventory, monitoring, and resource management practices.

4. “Recognizing that a significant percentage of Oregon’s wetlands are privately owned, a key to effective wetland management is cooperation with private landowners. Providing information, technical assistance, and incentives to encourage voluntary participation in wetland conservation programs and opportunities should be promoted.” (Oregon Division of State Lands 1995, 13)

- Tennessee recognizes working with private landowners as a public benefit and is accomplished through education, technical assistance, and incentive programs. The Tennessee objective is “To increase the level of benefits from wetlands on private land.” (Governor’s Interagency Wetlands Committee 1994, 22)

- A goal in the Kansas Plan is to “Balance public benefits supplied by wetland and riparian resources with the rights of private property owners.”(Kansas Wetland and Riparian Area Project 1993a, 3) This is followed by the statement that private property owners
have a right to conduct activities and use wetlands and riparian areas in a manner that is compatible with public needs.

- The Iowa planning model recognizes private property by recommending local planning and land use, private landowner participation, consistent regulation and management on public and private lands, education and communication, and establishing a regulatory and non-regulatory approach. The model could go further by addressing incentives.

5. "Consistent regulation and management of wetlands on public and private lands is necessary to protect the resource in Oregon. Local, state and federal public land agencies should provide additional protection and stewardship of wetlands on public lands." (Oregon Division of State Lands 1995, 13)

- Tennessee does not directly address consistent regulation on public lands. However, it does stress the importance of establishing meaningful wetlands use classifications and water quality standards to protect those uses (Governor’s Interagency Wetlands Committee 1994).

- To form consistent regulation and management of wetlands, one Kansas goal is to improve coordination and cooperation among federal, state, local, and private entities. Responsibilities for conserving wetland and riparian areas in Kansas are shared by many state and federal agencies, city and county agencies, and private organizations and individuals. More emphasis should be placed on citizen involvement.

- The Iowa planning model provides the opportunity to develop an organized approach to regulation and management of wetlands. It is the intent of the model to improve the organization and consistency of standards, regulation, and conservation of wetlands and riparian areas.
6. "The state should develop standards, policy, and funding sources to implement a proactive non-regulatory program aimed at restoration and protection of wetlands. State efforts should complement federal efforts to achieve these ends." (Oregon Division of State Lands 1995, 13)

- Tennessee does not discuss non-regulatory programs in its goals and objectives. However

  Tennessee is in favor of an effective non-regulatory approach.

- The Kansas Plan goals do not mention a non-regulatory program. Although Kansas, like Tennessee is in favor of a non-regulatory approach where it is reliable.

- The Iowa planning model addresses regulatory and non-regulatory programs. To promote the wetland plan and to lessen government involvement, Iowa supports feasible non-regulatory programs.

7. "The current regulatory program must be made more effective, efficient, and responsive to the public and to landowners." (Oregon Division of State Lands 1995, 13)

- In the plan Tennessee does not directly recognize the need for a more effective and efficient regulatory program. Tennessee does not expect change its regulations. The plan addresses improving the regulatory system through wetlands information delivery to local government, the public, and the schools and to establish meaningful wetlands use classifications (Governor's Interagency Wetlands Committee 1994)

- A Kansas Plan goal is to "improve coordination and cooperation among federal, state, local and private entities responsible for wetland and riparian stewardship." (Kansas Wetland and Riparian Area Project 1993, 3) The plan does not directly change the regulatory program.

- One of the base requirements of the Iowa planning model is to evaluate the protection mechanism. This element in combination with an inventory, better site interpretation and reporting should improve efficiency of the regulatory process.
8. The state must strive to implement an integrated wetland strategy that is comprehensive, flexible, and regionally focused, and that helps achieve Oregon Benchmarks to:

- preserve the 1990 wetland resource base,
- improve watershed health,
- increase the water quality of Oregon's rivers and streams,
- increase Oregon's groundwater quantity and quality,
- decrease the incidence of species that are threatened, endangered, or rare in Oregon,
- increase the recreational opportunities in the state,
- increase the number of visually attractive rural highway miles, and
- increase the percent of industrial lands actually suitable for development.

- Tennessee sets a goal of preserving a specific number of acres in west Tennessee and strives to achieve no net loss in hydrologic units. The plan expects to improve water quality and high-quality wetlands and protect scarce wetland community types. Tennessee recommends creating more urban riparian/wetland greenbelt areas as an alternative to development (Governor's Interagency Wetlands Committee 1994).

- The Kansas Plan addresses wetland protection similar to the Oregon Plan with three goals. They include the following: "Attain no-net-loss of remaining wetland and riparian resources, considering acreage, function, and values. Maintain diversity of wetland and riparian ecotypes and size classes across the state. Increase quantity and quality of high priority wetland and riparian ecotypes." (Kansas Wetland and Riparian Area Project 1993a, 2)

- The Iowa planning model adds the benefits of wetlands to the wetland planning approach as a primary element, much as Oregon applies recreational areas, rare and endangered species, increased wildlife, scenic by-ways, increased water quality and groundwater quality.
9. Adequate resources must be pursued to ensure program implementation.

- Tennessee does not include funding of the wetlands program in its objectives. As part of the state planning office and as the program becomes integrated into the system it may be secure with the general budget.

- Kansas does not mention funding sources for the program, but does discuss financial assistance and incentives for private and public land owners.

- The Iowa planning model places funding and planning objectives together and weighs the importance of sustained funding sources as a priority.

As a result of the contribution of each state planning experience and documentation, the Iowa planning model was directed through the above strategies. The goals, objectives, and mission statements implement formation of the model by applying and testing it at the same time. If it is suitable to begin to form the planning purpose and goals then this may be applied as a measure of success and importance as the model's preliminary application toward a successful plan.
CHAPTER 7. CONCLUSIONS AND RECOMMENDATIONS

The Iowa wetland and riparian area planning model reflects the needs of wetland and riparian area resources in Iowa, applies existing Iowa concepts and plans, and is formed from exemplary state plans from across the nation.

The process of writing and implementing the Iowa plan is different than in other states. The conditions in each state are different. This is an opportunity for Iowa to develop a funded customized planning strategy for wetlands and riparian areas. The model is a successful strategy if applied in a timely and conscientious manner. The model forms a more practical approach where coordination and collaboration of local, state, and federal governments will have the opportunity to protect and enhance wetland and riparian resources in Iowa. The time, funding, and planning environment is available to Iowa. The Iowa Department of Agriculture and Land Stewardship and the Iowa Department of Natural Resources with the assistance from the Iowa State Landscape Architecture Department are the primary Departments engaged with the responsibility to develop and produce this plan.

Iowa has the opportunity to develop a high quality innovative plan. This is somewhat due to a history of work previously done in Iowa and by other states and the federal government. Never-the-less, the process and success of implementation will be measured by the understanding, cooperation, and realization of environmental conditions and needs by the legislative and executive branches of state government.

The time and expertise in planning, the dedication and commitment in funding, the quality and effectiveness in education and communication, and the cooperation and sufficiency in government warrants the success of wetland and riparian area goals and insures that the benefits are part of our quality of life.
Recommendations

As this project evolved it became evident that other applied methods may conclude with an Iowa planning model. In this thesis, I believe the case study research method worked well to identify and substantiate an approach Iowa should take in its natural and cultural resource planning. Iowa needed a planning approach and content analysis of credible wetland planning. I believe Iowa needed a level of confidence and reliability (proof) that other states have successfully applied particular landscape, riparian and wetland planning methods. These methods are different from Iowa’s current planning approach to natural resource management. However, many of Iowa’s existing plans make reference to these approaches but do not apply them.

This study illustrates to some degree that process drives approach, structure, and content of planning. Process is demonstrated through differences in planning structure and involvement of different branches of government, primarily the executive branch. As the Iowa model formed it became a product of the planning process in Iowa. It would be beneficial to study process and how it applies to other plans and then relate to a process applicable for Iowa. However, process is another extensive project and one requiring another body of research. The approach, content, and structure are the backbone of the model and will be formed and implemented through a particular process.

This project leads the way to many research opportunities. Opportunities that benefit local, state, and federal agencies as well as applications to the private sector for insightful long-term, ecologically responsible future planning and design. Recommendations for additional research are the following:
Interpretation, Education, and Communication

- Interpretive methods applied to site design — interpreting the resource through
  landscape design applied for example to wetland design, riparian woodlands,
  aquatic education, nature trails, nature centers, park entrances, and park features
- Environmental education and design field schools — studying landscape ecology at
  watershed and ecosystem scales — develop educational methods and
  opportunities with public agencies, private organizations, and land owners
- Develop aquatic education programs around landscape assessment, conditions, and
  impacts

Ecology and Natural Resource Management

- Watershed planning — applied to design, inventory, assessment, management areas,
  practices and implementation
- Biological parameters applied to site assessment from landscape scale to site scale (for
  example, amphibian, vertebrate, insect, vegetation survey and interpretation
  applied to landscape and built system assessment and design
- Hydrogeomorphological classification and its application to site design, ecology, site
  evaluation, and designation
- Water quality in wetland and riparian areas involving measurement, monitoring, and
  its relationship to ecological function, hydrology, restoration, and landscape
  design
- Study the role and size of buffers for wetland and riparian area protection — determine
  effective widths of corridors and sizes of wetland complexes and their
  cumulative effects
Cultural Resources

• Iowa Bioregion -- what is it and how are the ecological and human communities a part of it

• Wetland cultural affiliations -- for example investigate culture perspectives in design, use, and perception at the following intervals: 5,000 years, 500 years, 100 years, 50 years and present.

• Economic association and influence of wetlands historically and under specified circumstances such as agriculture, construction and community perception and use

• Subsistence cultural design and use in wetland and riparian areas

• Cultural community assessment based upon settlement and proximity to stream corridors

• Cultural affiliation of river towns at settlement compared with today

• Design and use of wetlands and riparian areas in communities

• Impacts of flooding on historic landscapes

Environmental Planning and Land Use

• Process of wetland and riparian area planning in Iowa/Midwest/nation

• Process of natural resource planning in the Midwest (watersheds/regions/ecoregions)

• Critical area designation and mapping, and application to planning and zoning

• Predictive modeling for development applied to site suitability, location of wetland and riparian areas, on site scale in relationship to the landscape scale

• Mitigation and mitigation banking process and program development for particular impacts such as highways and housing developments,

• Landscape ecology principles applied to wetland and riparian area practice design and implementation
• Riparian area logging and reforestation practices
• Cumulative impacts of wetland complexes and low order streams on communities
• Public interest benefits of enhancement and protection of wetland and riparian areas
• Study the relationship of soil and hydrology to successful wetland vegetation re-establishment

Regional Planning and Inventory
• Method and process to inventory and assess a watershed from river basin scale to smaller 30,000 to 60,000 acre watersheds.
• Wetland designation and mapping with GIS
• Predictive applications of GIS and site suitability
• Iowa restoration project – where do we begin and how do we restore Iowa – assess current programs that enhance and protect Iowa resources, then design an overall project bringing current programs together in a unified approach and apply a new method (for example, scenic by-way, roadside vegetation management, protected water areas, greenbelt/greenway projects, REAP, and so on)
• Greenbelt and Greenway programs in Iowa – inventory, program analysis, future planning, connectivity, lead organization, impacts to wildlife, communities, water qualities, significant sites, case study, and application to new projects
• Develop criteria for locating priority landscape positions to protect or restore wetlands to improve water quality and wildlife habitat (Oregon Division of State Lands 1995)

Landscape Ecology and Design
• Define sustainable practices and apply them to ecological design
• Develop a system to define sustainable practices through a series of tests (ecological functions)
• Wetland and riparian area design on public lands
• Re-design best management practices (BMP) to zero soil loss.
• Demonstration sites for sustainable practices
• Apply universal soil loss equation to ecological design practices
• Characterize geomorphic, hydrologic, and biotic interrelationships in the landscape

Communities and Local Government
• Urban and rural interface of community value and assessment of wetland and riparian area resources
• Describe the local government role in identification, protection, and enhancement of wetland and riparian area resources
• Develop local government program in coordination with state and federal system to inspect, regulate, and permit wetland and riparian area projects and impacts
• Planning methods for small communities in wetlands administration
• Adult education -- training local officials in resource planning, impact analysis, quality design, development impacts, and infrastructure standards
• Communication and publication needs for local governments through university extension services, public agencies, private non-profit organizations and networks of community projects

The recommendations for future research are listed as projects that could easily become extensions of the wetland and riparian area plan or stand as independent projects. These subjects of interest indicate a need for research in this area. These subjects are primarily public interest issues and are questions many public agencies ask.

Conclusion

Approximately 95 percent of Iowa’s historic wetlands have been converted to agriculture, commercial, and other uses (Iowa Department of Natural Resources 1988a). The conversion of
wetlands has been accompanied by a decline in water quality, loss of wildlife habitat, and increased risk of flood damage and erosion. Much of the conversion of wetlands was a result of public policies that provided funding and technical assistance to drain and dike wetlands, as well as incentives to purchase cheap or free public “swampland” for conversion to “productive” use (Oregon Division of State Lands 1995).

Changes in public policy during the last two decades have attempted to reverse the trend of wetland conversion and to redirect regulatory, landowner incentive, and management efforts (Oregon Division of State Lands 1995). These changes in public policy are reflected in federal and state regulations and in planning mechanisms aimed at protecting natural resources.

Despite the changes, many observers believe the federal and state regulatory programs aimed at protecting wetlands are not comprehensive, consistent, or sufficiently effective (General Accounting Office 1988, National Wetlands Policy Forum 1988, U.S. Advisory Commission on Intergovernmental Relations 1992, cited in Oregon Division of State Lands 1995). Factors that contribute to this problem include over reliance on regulatory programs, an inadequate wetland inventory, the limited scope of regulatory programs, duplication and inconsistency in permit process, limited budgets, and a lack of non-regulatory programs to promote protection and restoration on public and private lands (World Wildlife Fund, 1992).

There are commonalities among states. The issues are similar. States find that the expressions of wetland loss, direction of public policy change, and effectiveness or success of regulatory programs and policies are relatively consistent across the country. A unified, cooperative, technically sufficient, and effective planning strategy is required to protect and enhance wetlands.
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APPENDIX

SURVEY OF FEDERAL AND STATE WETLANDS PLANNERS AND ADMINISTRATORS

This survey is conducted to provide another perspective and insight to the development of the Iowa planning approach and as an assessment of information from a case study conducted to form an Iowa planning model. The participants include state and federal project managers and administrators of State Wetland Conservation Plans.

The interview questions are arranged in the following order: planning process, agency and organizational involvement, unique features, and planning approach. Questions conclude with an evaluation of the Iowa planning approach.

Planning Process and Agency and Organizational Involvement

1. What was the process of collaboration with other agencies and when were outside political organizations such as farm bureau (those generally opposing wetland regulation) introduced to the plan?
2. What recommendation can you make to begin the planning process?
3. At what stage and how was the governor involved?
4. Was a University involved in the process or production of the plan? What department(s)?

Unique Features and Planning Approach

5. What are the most unique features about your plan?
6. How does a landscape approach apply to your plan?
7. Why does this planning approach best fit (Tennessee, Oregon, and Kansas)?
8. How is e.g. Tennessee, Oregon, or Kansas different from other states and how does this planning best fit Tennessee, Oregon, or Kansas?
9. If you were to rewrite the plan and change the process, what would you change?

Evaluation of the Iowa Planning Approach

Below is the form of the survey distributed to participants evaluating and commenting on the Iowa planning approach.

Based on a case study of Oregon, Tennessee, and Kansas, an analysis of Iowa resource plans, the '95 EPA Wetland Grant Guidelines, a review of Kansas, Missouri, and Nebraska plan outlines, and a review of other wetland resource publications, an Iowa Wetland and Riparian Area Planning Model was developed.

Please comment on each element of the plan. For the first time through the questions, based on your opinion, please select strongly agree, somewhat agree, uncertain, somewhat disagree and strongly disagree. Following this series of questions, we can discuss further comments in any planning area you would be interested and willing to provide additional advice and information.
The basic Iowa planning approach is as follows:

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Somewhat Agree</th>
<th>Uncertain</th>
<th>Somewhat Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
</table>

1. Iowa will take a landscape approach using landscape ecology principles as they apply to ecosystems, landscapes, watersheds, and river basins.

2. Iowa will combine wetlands and riparian areas in the planning and implementation process.

3. Iowa is using hydrogeomorphology as an ecological function approach to wetland classification.

4. The Iowa State University Landscape Architecture Department has an advisory and contractual role in plan development and production.

5. The Landscape Architecture Department is looking forward to participating in a long term relationship with the Iowa Department of Agriculture and Land Stewardship and Iowa Department of Natural Resources concerning natural resource issues.

6. Water quality evaluation is applied to measurement and monitoring the progress of wetland and riparian area enhancement and restoration practices. Rapid bioassessment techniques will be applied.

7. Ecologically based design considering ecological function will be applied to management practices.

8. Recommendation such as statewide riparian and flood plain zoning district policy may be planned and developed.

9. Local government involvement through county conservation departments may be given permit authority or review capabilities in river basins or regions throughout Iowa.

10. A study to develop a statewide integrated Geographic Information System (GIS) will be implemented to inventory, measure, monitor, and locate wetlands.

11. Communication and education through schools, organized groups, and the public will be an element in implementation of the Iowa plan.

12. Do you have any last comments or suggestions for the Iowa plan?

Thank you for your time and for sharing your experience and expertise.
Characteristics and Features of Iowa

The 1994 Statistical Profile of Iowa lists some of Iowa’s unique features (Iowa Department of Economic Development 1994).

- Among the fifty states, Iowa ranks 30th in population and 23rd in land area.
- Iowa farmers produced more than $10 billion in crops and livestock in 1991.
- Iowa has more miles of roads than 39 other states.
- The violent crime rate in Iowa is 63% lower than the national average.
- The 1993 census estimate for Iowa’s population was 2,814,000.
- 25% of America’s pork and 7% of the nation’s grain fed beef are raised in Iowa.
- Iowa farmers produced nearly $3 billion worth of products for export in 1991.
- Iowa students have ranked first or second in the nation in ACT and SAT scores for the past two decades.
- In 1992, tourists in the state of Iowa spent an average of $111.93 a day and stayed an average of 3.1 days.
- Iowa is the only state bordered by two navigable rivers.
- One hundred sixty-six species of native Iowa plants are endangered or threatened, and seventy species of fauna are endangered or threatened (Cooper and Hunt 1982).
- All township surveys were completed in Iowa by 1858 and subdivided into sections by 1860 (Horton and Schwieder 1982).
- Iowa was the first state in the nation to provide cost-share incentives to landowners for installing permanent soil conservation practices, the first state to enact an erosion control law, and the first state to offer no-interest loans as an alternative financing option for landowners to consider in the financing of
permanent soil conservation practices (Iowa Department of Natural Resources 1988b).

- Due to agriculture, Iowa has one of the most altered landscapes in the nation. Iowa has lost: 95% of its wetlands, 85% of its woodlands, and 99.9% of its prairies.
- Iowa has some of the richest soils in the world.
June 14, 1995

Ken Bierly, Wetlands Program Team Leader
Oregon Division of State Lands
775 Sumner St. NE
Salem, Oregon 97310-1337

Dear Ken,

Thank you for sending me Oregon's Wetland Conservation Strategy. The Oregon, Tennessee, and Kansas plans were selected for a case study to develop Iowa's wetland planning model. Part of the case study requires some additional information including several questions asking your opinion of Iowa's approach to wetland planning. You are one of five people selected for interviews. In addition to you, they include George Galbreath from the Tennessee Environmental Policy Office, Jerry Shimek EPA Kansas Wetland Program Coordinator, Bob Barber EPA Iowa Wetland Program Coordinator, and Reggie Parrish EPA-Wetland Programs in Washington D.C.

I will contact you to arrange a telephone interview concerning Iowa's wetland planning approach. I have forwarded the questions and some information about Iowa for you to review before your interview.

In return for your help, I'll send you the results of my survey. If you have any questions please contact me at 515-465-3577. I appreciate your time and advice and I look forward to talking with you.

Sincerely,

Jeff Logsdon,
Dallas County Conservation Board
Iowa State University Landscape Architecture Department
June 14, 1995

George Dodd Galbreath  
Tennessee Environmental/Policy Office TDEC  
401 Church Street  
14th Floor L and C Tour  
Nashville, Tennessee 37243-1553

Dear Dodd,

Thank you for sending me Tennessee’s Wetland Conservation Strategy. The Tennessee, Oregon, and Kansas plans were selected for a case study to develop Iowa’s wetland planning model. Part of the case study requires some additional information including several questions asking your opinion of Iowa’s approach to wetland planning. You are one of five people selected for interviews. In addition to you, they include Ken Bierly, Oregon Wetlands Program Team Leader, Jerry Shimek EPA Kansas Wetland Program Coordinator, Bob Barber EPA Iowa Wetland Program Coordinator, and Reggie Parrish EPA-Wetland Programs in Washington D.C.

I will contact you to arrange a telephone interview concerning Iowa’s wetland planning approach. I have forwarded the questions and some information about Iowa for you to review before your interview.

In return for your help, I’ll send you the results of my survey. If you have any questions please contact me at 515-465-3577. I appreciate your time and advice. I look forward to talking with you.

Sincerely,

Jeff Logsdon,  
Dallas County Conservation Board  
Iowa State University Landscape Architecture Department
June 14, 1995

Jerry Shimek, U.S. EPA Region 7
WWPD/WETS
726 Minnesota Ave.
Kansas City, Kansas 66101

Dear Jerry,

Thank you for your advice concerning the Iowa Wetland and Riparian Area Conservation Plan. The Oregon, Tennessee, and Kansas plans were selected for a case study to develop Iowa's wetland planning model. Part of the case study requires some additional information including several questions asking your opinion of Iowa's approach to wetland planning. You are one of five people selected for interviews. In addition to you, they include George Galbreath from the Tennessee Environmental Policy Office, Ken Bierly, Oregon Wetlands Program Team Leader, Bob Barber EPA Iowa Wetland Program Coordinator, and Reggie Parrish EPA-Wetland Programs in Washington D.C.

I look forward to talking with you on Wednesday the 28th at 1:00 p.m. I have forwarded the questions and some information about Iowa for you to review before your interview.

In return for your help, I'll send you the results of my survey. If you have any questions please contact me at 515-465-3577. I appreciate your time and advice and I look forward to our conversation.

Sincerely,

Jeff Logsdon,
Dallas County Conservation Board
Iowa State University Landscape Architecture Department
June 20, 1995

Reggie Parrish  
U.S. EPA  
401 M Street SW MC 4502-F  
Washington D.C. 20460

Dear Reggie,

Thank you for consenting to an interview as part of the development of the Iowa Wetland and Riparian Area Conservation Plan. The Oregon, Tennessee, and Kansas plans were selected for a case study to develop Iowa’s wetland planning model. Part of the case study requires some additional information including several questions asking your opinion of Iowa’s approach to wetland planning. You are one of five people selected for interviews. In addition to you, they include George Galbreath from the Tennessee Environmental Policy Office, Ken Bierly, Oregon Wetlands Program Team Leader, Bob Barber EPA Iowa Wetland Program Coordinator, and Jerry Shimek EPA Kansas Wetland Program Coordinator.

I look forward to talking with you on Monday the 26th at 10:00 a.m. I have forwarded the questions and some information about Iowa for you to review before your interview.

In return for your help, I’ll send you the results of my survey. If you have any questions please contact me at 515-465-3577. I appreciate your time and advice and I look forward to our conversation.

Sincerely,

Jeff Logsdon,  
Dallas County Conservation Board  
Iowa State University Landscape Architecture Department