Report of the Governor's Freshwater Wetlands Forum

January 17, 1990

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January 16, 1990

The Honorable Carroll A. Campbell, Jr.
Governor of South Carolina
State House
Columbia, S. C. 29211

Dear Governor Campbell:

In response to your concern for the conservation of the state's natural resources and your subsequent request that we study the issue of wetlands in South Carolina, I am glad to submit to you the report of the Governor's Freshwater Wetlands Forum. This report examines the state's declining wetlands inventory, identifies its value to water and soil quality and conservation, acknowledges its contribution to fish and wildlife habitat and recognizes its importance in flood control.

Several different interests were represented on the Forum and from these interests a consensus was fashioned. We believe this can now provide the basis for your legislative recommendations to the General Assembly and a framework for a wetlands conservation plan for South Carolina.

The report deals with all the questions you raised in your charge to us.

1. We believe you can achieve a no net loss goal using this plan

2. The report is strongly biased toward non-regulatory solutions to wetlands conservation

3. It identifies and classifies wetlands

4. A mitigation plan is suggested to off-set wetland losses.

5. We call for regulation by a single, existing state agency. This should simplify the present regulatory web that delays unnecessarily those who would invest in our state and create employment.

6. The recommendations in this report, if adopted, should lead to a gradual shifting of responsibility for wetlands protection from the federal government to state government.

7. The general public is just becoming aware of the wetlands issue and we have recommended some educational initiatives we feel would be helpful to you and to the General Assembly as you put wetlands before them.

You chose an exceptional group of leaders to consider this matter. They worked hard and gave unselfishly of their time and energy. They finished their work in eight months, even with the lost time to Hugo. Their final vote was unanimous.

We hope this report will be useful to you, the General Assembly and to all South Carolinians who will read the report.

Sincerely yours,

Charles A. Bundy

Charles A. Bundy
Chairman

CAB:bnv

Mr. Charles Bundy and Governor Carroll A. Campbell

TABLE OF CONTENTS

INTRODUCTION

In the Spring of 1989, Governor Carroll A. Campbell, Jr. convened the Governor's Freshwater Wetlands Forum, chaired by Mr. Charles Bundy of the Springs Foundation, to address major policy concerns about how South Carolina should protect and manage its valuable wetland resources. Thirty-seven members were selected to serve on the Forum, including state legislators, representatives fromstate and Federal agencies, municipal officials, farmers, and environmental, business and industrial leaders. The Forum members were assisted in their deliberations by staff of many of the state's natural resource agencies.

The formation of the Governor's Forum on Freshwater Wetlands was the logical and necessary follow-up step to Governor Campbell's participation on the National Wetlands Policy Forum, which he co-chaired. The National Forum recommended "all states undertake the preparation of State Wetlands Conservation Plans" and "undertake wetlands planning to achieve the goal of no net loss."

Governor Campbell's charge to the Forum membership — to develop recommendations for a State Wetlands Conservation Plan with the goal of "no overall net loss" of the state's remaining wetlands base, emphasizing non-regulatory programs — was congruous with policies already adopted by the National Forum in the Fall of 1988, and successively by the major environmental and natural resources organizations at the national level. Specifically, the Forum was charged to:

1. Develop methods to achieve no overall net loss;
2. Encourage non-regulatory approaches to wetlands protec tion and minimize regulatory solutions;
3. Simplify the permit process for wetlands in South Carolina;
4. Suggest single federal agency jurisdiction with authority delegated to the State;
5. Enhance public understanding of the wetlands issue;
6. Reach consensus on a set of policy recommendations, with full Forum endorsement; and
7. Develop the foundation for a State Wetlands Conservation Plan.

The recommendations presented in this report were developed during a series of meetings held from April 1989 through January 1990, and represent the consensus of the Governor's Freshwater Wetlands Forum.

photo by Sandy Goodwin

EXECUTIVE SUMMARY and RECOMMENDATIONS

DEFINITION

In South Carolina, the Governor's Freshwater Wetlands Forum has adopted the following definition of wetlands:

1. **The term 'wetlands' means those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands must possess three essential characteristics: (1) hydrophytic vegetation, (2) hydric soils, and (3) wetland hydrology.**

INVENTORY

The Governor's Freshwater Wetlands Forum recommends:

2. **The National Wetlands Inventory is the preferred inventory methodology;**
3. **The use and completion of the National Wetlands Inventory should be the primary tool for the identification and generalized mapping of wetlands for the entire state.**
4. **The National Wetlands Inventory is a high priority and should be completed for the entire state as soon as possible.**
5. **State appropriations should be made available for cost-share completion of the National Wetlands Inventory, in cooperation with the U.S. Fish and Wildlife Service, and digitization (computerization) of the wetlands inventory for the state of South Carolina.**
6. **County soil surveys should be used in the interim until a more detailed wetlands inventory is completed.**
7. **An inventory of wetland gains and losses should be updated every 10 years and published every five years for the benefit of the General Assembly and the public.**
8. **A single state agency should be responsible for mapping and computerizing the state's wetlands.**
9. **The "Federal Manual for Identifying and Delineating Jurisdictional Wetlands", adopted at the federal level on January 10, 1989 by the U.S. Environmental Protection Agency, the U.S. Army Corps of Engineers, the Soil Conservation Service and the U.S. Fish and Wildlife Service, should be used as the technical basis for identifying and delineating wetlands in South Carolina.**

PROTECTION

The Governor's Freshwater Wetlands Forum recommends the following programs for wetland protection. The recommendations are preferable to and should be implemented in addition to any regulatory options.

Existing policies and programs should be adjusted as follows:

10. Encourage all state agencies to adopt the state's "no net loss" goal for all of their wetland activities.
11. Encourage land-holding state agencies, with the assistance of state natural resource agencies, to identify wetlands and develop management plans to protect wetlands on their properties.
12. Support adequate funding for state wetlands acquisition and management programs.
13. Focus on permanent protection of the best resources.
14. Encourage wetland sites not significant enough for Heritage Trust Sites to be donated in fee-simple or by easement for conservation purposes.
15. Provide preferential property tax relief for landowners who grant perpetual conservation restrictions or easements to governmental bodies or approved non-profit land trusts. Develop consistent guidelines for use by county and municipal assessors.
16. Encourage local governments to preserve wetlands through existing mechanisms such as zoning, subdivision controls, floodplain ordinances, and active management of their properties and utility rights-of-way. They should be encouraged to examine all development controls and modify those that unintentionally promote wetland conversion.
17. Enlist the aid of local government officials (city and county councils, planning commissions, zoning administrators, building inspectors, etc.) in identifying potential wetland alterations; they can refer contacts to the appropriate organizations as well as serve to inform South Carolina citizens of the benefits of wetlands protection.

The following initiatives should be undertaken:

18. Develop real estate tax incentives for landowners protecting wetlands (such as the deferred taxation system used for agricultural land).
19. Develop a detailed state Wetland Conservation Action Plan aimed at identifying and protecting the most significant wetlands resources and systems in the state. The Plan would assist developers in the identification of areas to be protected, target wetlands for purchase by agencies and land trusts, encourage donation or preservation by landowners, and suggest mitigation opportunities.
20. Establish a state wetlands trust fund and/or mitigation bank for the acquisition, rehabilitation, and/or restoration of wetlands.
21. Encourage the establishment of public or private local or regional wetland trusts which can acquire (through gift, purchase, or inheritance) and manage wetlands.
22. Establish a rehabilitation or restoration program for altered wetlands. Encourage state agencies to review prior activities (for example, road construction) and undertake restoration programs.
23. Make best management practices (BMPs) mandatory for cer-

tain activities exempt from regulation (e.g., agriculture, forestry, mining).

24. **Encourage the development and use of best management practices (BMPs) for wetland protection for all activities.**
25. **Provide incentive techniques in city and county land use regulations, such as transfer of development rights, cluster development, and planned unit development. Recognition of wetlands protection as a public good in enabling legislation is desirable.**
26. **Support the inclusion of agricultural wetlands in the federal Conservation Reserve Program of the U.S. Department of Agriculture.**

The Governor's Freshwater Wetlands Forum supports a freshwater wetland conservation program that establishes an overall goal, defines regulatory jurisdiction, specifies regulated activities and exemptions, describes acceptable mitigation policies and actions, assigns regulatory responsibility to one state agency, and supports improvements in the Federal wetlands regulatory process.

Consistent with goals expressed in the report of the National Wetland's Policy Forum, the Governor's Freshwater Wetlands Forum finds that:

27. **The primary goal of the wetlands program in South Carolina is to achieve no overall net loss of regulated wetlands, based on function and value, to be accomplished through a program of wetland classification and mitigation.**

The Governor's Freshwater Wetlands Forum recommends:

28. **The adoption of a regulatory program that includes all contiguous and isolated freshwater wetlands of the state. The area of jurisdiction would encompass all of the approximately 4.5 million acres of wetlands of the state.**
29. **The establishment of a specific classification system for the state's freshwater wetlands, based on hydrologic type. The recommended system classifies South Carolina's freshwater wetlands into four broad groups:**
    - Class 1: Wetlands Adjacent to Navigable Streams - are wetlands that are located adjacent to and are hydrologically contiguous with navigable waterways as defined by R.19-450.2C., S.C. Code of Laws, 1976.

      [Note: Navigable waters means those waters which are now navigable, or have been navigable at any time, or are capable of being rendered navigable by the removal of accidental obstructions, by rafts of lumber or timber or by small pleasure or sport fishing boats.]
    - Class 2: Wetlands Adjacent to Non-Navigable Streams - are wetlands that are located adjacent to and are hydrologically contiguous with streams which flow into navigable waters.
    - Class 3: Isolated Wetlands - are wetlands not hydrologically contiguous with the surface water tributary system dis -

charging into a lake, pond, river, stream, or other surface water feature.

- Class 4. Man-made Wetlands constructed in areas that were not wetlands in their natural state and Natural Isolated Wetlands less than five acres in size - This class does not include wetlands constructed for mitigation purposes.

The Forum recommends that any activity which could adversely impact the important functions of wetlands in Classes 1, 2, and 3 should require a permit. Consideration should be given to allow the regulatory agency to issue general permits. Furthermore, any activity specifically exempted could be conducted in any class of wetlands without a permit. No permit would be required for any activity conducted in Class 4 wetlands, unless endangered species or critical ecological habitat is impacted.

30. That specific types of alterations which could impact wetlands be regulated if not presently regulated. Some of these alterations include:

a. Filling or Deposition of Materials - including such alterations necessary for the construction of dams or dikes. This activity is currently regulated in virtually all wetlands of the state.

b. Dredging Without Fill or Deposition, Excavation, or Removal of Materials - Commercial mining is currently regulated in all wetlands. Other dredging and excavation activities are regulated in saltwater and tidal freshwater wetlands only.

c. Placement of Structures or Obstructions - These activities are now regulated in saltwater and tidal freshwater wetlands.

d. Hydrologic Alteration including Draining and Flooding - Again, these activities are currently regulated in saltwater and tidal freshwater wetlands.

e. Discharge of Wastewater - This activity is currently regulated in all wetlands.

31. Exemption from regulation of the following activities in order to avoid duplication of existing regulatory programs and simplify the regulatory program.

a. Normal farming or ranching, with approved "Best Managment Plans" (BMPs).

b. Normal silviculture, with BMPs.

c. Maintenance of currently serviceable structures.

d. Maintenance of farm or stock ponds.

e. Maintenance of irrigation canals and construction of ponds of five acres or less.

f. Maintenance of drainage ditches and canals.

g. Construction of temporary sedimentation basins - at construction sites.

h. Construction/maintenance of temporary roads for moving mining equipment, with BMPs.

i. Repair, rehabilitation or replacement of any previously authorized, currently serviceable structure or fill.

j. Fish and wildlife harvesting devices and structures - such as deer stands, duck blinds, traps, etc.
k. Discharges of dredged or fill material into isolated wetlands of less than five acres in size - with due consideration of endangered species and critical habitat.
l. Dredging isolated wetlands of less than five acres in size - with due consideration of endangered species and critical habitat.
m. Draining isolated wetlands of less than five acres in size - with due consideration of endangered species and critical habitat.
n. Normal maintenance and repair of functional rice field and wildlife management impoundments -including dikes and water control structures, with BMPs.
o. Activities associated with routine maintenance of existing public and private highways, roads, streets, and bridges, or replacement of, or minor improvements to structurally deficient or functionally obsolete structures located in regulated freshwater wetlands - where the improvements are necessary to meet current design and safety standards. These activities must be implemented in accordance with approved best management practices (BMPs) to assure the protection of freshwater wetland functions and values. Maintenance, replacement, or minor improvement includes adding extra lanes or increasing the rights-of-way for public roads within a regulated wetland only where five acres or less of wetlands will be impacted per project.
p. Any emergency activity commenced under an emergency order - to protect the public's health and safety when ordered by the following elected officials or their appointees: the governor of the state of South Carolina, the chairman of the county council of the county in which the activity will take place, or the mayor of the municipality in which the activity will occur, and with notification to the primary permitting agency.
q. Routine and emergency repair, maintenance and replacement of, or minor improvements to systems serving the public - such as electricity, natural gas, communications, water or sewer, and railroad systems.
r. Fishing, trapping, hunting, swimming, boating, hiking.
s. Maintenance, repair or operation of gas or oil pipelines, with BMPs.
t. Maintenance of drinking water supply impoundments.
u. Federal, state or local government mosquito control activities.
v. Any activity for which an individual Section 404 or NPDES permit is required.

32. Consideration of the use of mitigation to offset degradation and loss in regulated wetlands, with consideration given to the level of public benefit resulting from the activity.

33. Application of the following policies as the state considers the implemention of a wetlands mitigation program:

a. Mitigation must include avoiding impacts, rectifying impacts , minimizing impacts, reducing or eliminating impacts, and/or compensation for impacts.
b. Compensation mitigation may not be used without first applying other types of mitigation.
c. Compensation mitigation must be considered for all unavoidable permitted losses of wetlands to achieve the no net loss goal.
d. Acceptable compensation mitigation should be:
   - restoration of degraded wetlands
   - creation of new wetlands, if technically feasible
   - enhancement of existing wetlands
   - preservation of existing non-regulated wetlands
   - reasonable cash payments into a freshwater wetlands mitigation program
e. In most cases a minimum of 1:1 acreage replacement of wetlands will be required to achieve no net loss of values. However, this ratio may be greater where the functional values of the area being impacted are demonstrably high. Conversely, the ratio may be less than 1:1 for areas where the functional values associated with the area being impacted are demonstrably low and the likelihood of success associated with the mitigation proposal is high.
f. Compensatory actions (e.g., restoration of existing degraded wetlands or creation of man-made wetlands) should be undertaken, when practicable, in areas adjacent or contiguous to the discharge site (on-site compensatory mitigation). If on-site compensatory mitigation is not practicable, off-site compensatory mitigation should be undertaken in the same geographic area (i.e., in close physical proximity and, to the extent possible, the same watershed). In determining compensatory mitigation, the functional values lost by the resource to be impacted must be considered.
g. A mitigation banking system should be established to assist in attaining no net loss goals.

34. The identification of an existing state agency, having representatives of all relevant state agencies as well as appointed members, which could consolidate all existing freshwater wetlands programs into a new program to fill existing gaps in regulation. The agency would use a single application process, public notice, review period, public hearing if needed, appeals process if needed, enforcement procedures, and issue a single state permit.

35. That the federal law covering the Section 404 program establish clear policies and simplified procedures through federal legislation, allow program assumption for all wetlands of the state, and provide for financial support to states seeking to assume management of the program.

The Forum urges the South Carolina General Assembly, as part of the legislative process, to explore and recognize the economic impacts of

any regulatory mechanisms and programs established to the citizens of South Carolina.

The Governor's Freshwater Wetlands Forum recommends the following wetlands education programs:

36. A comprehensive bibliography should be compiled of all relevant wetlands publications from federal, state, and private sources.

37. An adequately staffed wetlands information office should be established within the state agency primarily responsible for freshwater wetlands regulation. The wetlands information office should:

a. Have complete knowledge of the wetlands permitting process;
b. serve as the state wetlands information manager;
c. have an adequate supply of wetlands information materials to send to all interested persons inquiring about wetlands;
d. network closely with regional councils of government and other planning agencies to enhance information exchange with municipal government officials;
e. be responsible for updating the bibliography recommended above;
f. prepare wetlands-related information releases to the news media (newspaper, radio and television); and
g. coordinate the output of the recommended wetlands mapping process with the data available from local tax assessors to provide a periodic direct mail advisory to landowners who may have wetlands on their property. The advisory should inform the owners of the likely existence of a wetland on their property and the means to obtain wetlands information.

The address and phone number of the wetlands information office shall be made available through the media and other sources, including state agencies.

38. A speaker's bureau should be established, represented by qualified persons from across the state, to speak on various wetlands issues. The list of available speakers should be made available to the news media and other groups seeking presentations on wetlands-related topics.

39. A publication describing South Carolina wetlands and their functions and protection needs should be developed. The publication should be widely distributed throughout the state, and also be made available at all county extension offices and the State Library.

40. A joint meeting be held annually or semiannually of the commissioners, board chairmen and executive directors of the state's natural resource agencies and the directors of the state's councils of government. The purpose of these meetings shall be to exchange information and ensure coordination of all state programs and activities relevant to wetlands and other natural resource issues.

photo courtesy S.C. Wildlife & Marine Resources Department

FRESHWATER WETLANDS

DESCRIPTION

Freshwater wetlands are lands inundated or saturated by freshwater from precipitation, surface runoff, overbank flooding, or groundwater discharge. In contrast, coastal and estuarine wetlands are inundated or saturated by tidal flooding of salt or brackish water. In the contiguous 48 United States, freshwater wetlands comprise more than 90 percent of the approximately 95 million acres of the country's wetlands. While freshwater wetlands are found throughout the United States, they are concentrated in the Southeast, where 10 states, which comprise 16 percent of the nation's land surface, contain 47 percent of its freshwater wetlands.

Freshwater wetlands are characterized on the basis of dominant plant communities. Emergent wetlands, such as marshes, are dominated by non-woody, herbaceous plants including grasses, cattails, sedges and rushes. Scrub-shrub wetlands are dominated by woody plants less than 20 feet tall and include bogs, bays, and pocosin wetlands. Forested wetlands, the most abundant type, contain a predominance of woody plants greater than 20 feet in height and include the bottomland hardwood forests and cypress-tupelo swamps. Any of these freshwater wetland types may be "contiguous," having direct hydrologic connection to rivers, streams, or lakes, or "isolated," with no direct connection to other surface water bodies.

SOUTH CAROLINA FRESHWATER WETLANDS

Freshwater wetlands occur throughout South Carolina; they are most abundant in the central and lower areas of the state. Freshwater marshes are most prevalent along the lower portions of the Waccamaw, Pee Dee, Black, Santee, Cooper, Edisto, and Savannah Rivers. Forested wetlands, primarily cypress-tupelo swamps and bottomland hardwood forests occur in abundance along the Waccamaw, Pee Dee, Little Pee Dee, Lynches, Black, Santee, Wateree, Congaree, Edisto, Salkehatchie, and Savannah Rivers. Isolated wetlands are found throughout the state, but are most numerous in the central and lower areas of the state; they include Carolina bays, pocosins, potholes, mountain bogs and sinkholes. Together, South Carolina's freshwater wetlands are a major part of the landscape, comprising about 21 percent of the state's land surface.

In South Carolina, freshwater wetlands make up about 90 percent of the 4.5 million acres of wetlands; the remaining 10 percent consist of saltwater and brackish-water marsh. Estimates suggest the state's contiguous freshwater wetlands include about 90 thousand acres of tidal and non-tidal freshwater marsh, and about three million acres of wooded wetlands. In addition, as many as one million acres of isolated wetlands exist in the state.

FRESHWATER WETLANDS - FUNCTIONS AND VALUES

Freshwater wetlands perform a number of important functions of value to private landowners and to the public. These functions can include:

Flood Flow Alteration - Freshwater wetlands located in river and stream floodplains temporarily store and slowly release flood waters, thereby reducing peak flows downstream. Studies have shown that flooding may be reduced by as much as 80 percent in river basins rimmed by wetlands. Since flood events represent 80 percent of all natural disasters and result in about 150 deaths and five billion dollars in property damage annually in the United States, the value of wetlands in ameliorating these damages is significant.

Water Quality Improvement - Freshwater wetlands serve as filters and retention basins for sediments, nutrients, pesticides, and other pollutants from water. Wetlands slow the rate of water flow which allows sediments to settle out; physical, chemical, and biological processes bind pollutants to wetland soils and plants. Since most wetlands are located at the land-water interface, they function to intercept pollutants being transported from watershed lands before reaching watercourses.

Because wetlands help improve water quality, scientists are interested in utilizing both natural and manmade wetlands as part of domestic and industrial wastewater treatment systems. In South Carolina, for example, the Grand Strand Water and Sewer Authority in Horry County is using freshwater wetlands adjacent to the Waccamaw River and four Carolina bays to treat wastewater. The Forum endorses continued controlled experimentation for this purpose since such use assists in accomplishing many positive objectives of the Forum's recommended policy.

Erosion Control - Freshwater wetland vegetation functions to control soil erosion by reducing water velocity through friction, dampening wave action and binding soil together through root systems. Since wetland vegetation usually inhabits the land-water interface, it can significantly reduce erosional impacts of currents and wave action along the shorelines of large rivers and lakes. The banks of some rivers have resisted erosion for 100 to 200 years due to the presence of wetland trees and other plants. In some areas, wetland plants are used to stabilize shorelines.

Fish and Wildlife Habitat - Freshwater wetlands provide essential breeding, nesting, feeding and shelter habitats for many commercially and recreationally-important fish and wildlife species. Since food, cover, and water are all in the same area, wetlands are attractive to an abundance and diversity of animal species. Species that either depend on wetlands for survival or are frequently found

in wetlands include ducks, geese, swans, herons, egrets, hawks, owls, eagles, woodpeckers, warblers, black bears, deer, beaver, mink, otter, raccoon, muskrat, alligator, and many reptiles and amphibians. Fish species that utilize freshwater wetlands for spawning and nursery habitat include largemouth bass, bluegill, warmouth, shad, white bass, pickerel, and catfishes. Many additional fish species are dependent upon wetland-produced food for their survival. It is estimated that almost 35 percent of all rare and endangered animals either live in wetlands or are dependent upon them. Human benefits from wetlands such as fish and wildlife habitat are economic as well as recreational and aesthetic. The U.S. Fish and Wildlife Service and the U.S. Bureau of the Census estimate that South Carolinians spent over $712 million on fishing and hunting in 1985. During the same period, more than $113 million were spent on non-consumptive uses of fish and wildlife resources.

Food and Timber Production - Freshwater wetlands are highly productive for plant life. The rate of primary production in freshwater wetlands has been shown to be greater than that for cultivated agricultural lands. This high productivity contributes greatly to the production of bottomland hardwoods for the timber industry. It is estimated that there are 82 million acres of commercial forested wetlands in the continental United States; the standing value of southern wetlands forests is eight billion dollars. In South Carolina, the value at the mill of hardwood timber from wetlands was 37 million dollars in 1986.

Water Supply - Freshwater wetlands are important as recharge areas for groundwater aquifers. They also improve surface water quality, thus reducing the level of water treatment required prior to use.

Recreation and Aesthetics - Freshwater wetlands are also important for recreational activities, like fishing, hunting, boating, camping, hiking, swimming, nature observation, and photography. Notable wetland-related recreational areas in South Carolina are the state parks with over 15,000 acres of wetlands, Wildlife Management Areas with 42,000 acres, National Wildlife Refuges, Congaree Swamp National Monument with 15,000 acres of near-virgin bottomland hardwood wetlands, the National Audubon Society's Beidler Forest/Four Hole Swamp with 3,400 acres, and numerous Nature Conservancy properties. The economic value of recreational use of wetlands is demonstrated by the expenditures for consumptive and non-consumptive use of fish and wildlife resources cited above.

Education and Research - Because of their diversity of plant and animal communities and their unique ecology, freshwater wetlands offer many opportunities for scientific

research and education. Many of South Carolina's colleges and universities are or have been involved in wetlands research. Several, including the University of South Carolina's Belle W. Baruch Institute, Beaufort campus, and Coastal Carolina College own and manage wetland areas for research purposes. Many of the freshwater wetland areas held as conservation or preservation areas are also utilized for research and educational purposes.

THE LOSS OF FRESHWATER WETLANDS

A significant amount of the nation's freshwater wetland resource has been degraded or destroyed. More than half of all wetlands in the 48 contiguous states have been lost since the early 1700s. Between the mid-1950s and mid-1970s, nine million acres (net) of wetlands were lost in the 48 states, and much of this loss impacted on freshwater wetlands. The average annual rate of loss during this 20-year period was 458,000 acres, an area half the size of Rhode Island.

In 1984 the U.S. Office of Technology Assessment estimated that the annual loss rate was 300,000 acres. A number of states — California, Iowa, Michigan, Minnesota, Louisiana, North Dakota, Connecticut, Ohio, Indiana and Illinois — have lost most of their original wetlands. Eighty-four percent of the wetlands lost during the previous two decades occurred in the Southeast, much of it occuring in Louisiana, Mississippi, Arkansas, North Carolina and Florida. Freshwater wetland losses in South Carolina are not well-documented, but appear to be less extensive than in other states. However, recent studies have documented severe impacts on the state's Carolina bays; only 30 of the 2,700 bays of two acres or larger remain in their natural condition. However, according to the USDA Forest Service, bottomland hardwood forests, the most abundant wetland type in South Carolina, show an overall average acreage gain between the periods 1970-1978 and 1978-1986, although 20 percent of these forested wetlands were lost during the previous two decades.

A combination of natural and human forces continue to affect the quantity and quality of freshwater wetlands. Natural forces which may act to increase and/or decrease wetland acreage include: sea level rise, droughts and floods, hurricanes and other storms, erosion and accretion of soils, settling of the earth's surface, and biological factors such as beaver dam construction and natural succession from one habitat type to another.

Human activities which have important impacts on wetlands include:

- Drainage for crop production, timber production, and mosquito control. This activity results in the conversion of wetlands to non-wetlands and has been the greatest single cause of wetland loss in the United States.
- Dredging and stream channelization for navigation channels, flood protection, housing development, and reser-

voir maintenance. Dredging and excavation in wetlands results in a conversion of vegetated wetland to open water and can impact the hydrology of adjacent wetlands.

- Filling for dredged spoil and other solid waste disposal, road and highway construction, and commercial, residential and industrial development. Filling destroys wetland hydrology, soils, and vegetation and results in a direct conversion of wetlands to non-wetlands.
- Construction of dams, dikes, levees, seawalls, and other structures for flood control, water supply, irrigation, storm protection and other purposes. Under some circumstances, construction of dams and similar structures can develop wetlands in areas that were previously upland. However, more often, these structures flood wetlands and convert them to open water.
- Discharge of pollutants including sediment, nutrients, pesticides, herbicides and other toxic materials to waters and wetlands. Such activities may act to degrade the quality of wetlands.
- Mining of wetland soils for sand, gravel, peat, phosphate and other materials. Mining activities in wetlands can convert wetlands to open water, result in wetland filling, and impact wetland vegetation and hydrology. Appropriate reclamation practices can mitigate for some impacts and result in conversion of uplands to wetlands in some circumstances.
- Withdrawal of surface and groundwater in and near wet lands. These activities can adversely impact wetland hydrology and result in settling of wetland soils.

Each of these activities, to one degree or another, continue to affect freshwater wetlands across the United States and in South Carolina. In general, human activities are strictly controlled in coastal areas; therefore, impacts on these wetland resources are minimized. However, in most states, including South Carolina, there is significantly less control and protection of wetlands in areas where the vast majority of freshwater wetlands occur.

FRESHWATER WETLAND ISSUES

The Governor's Freshwater Wetlands Forum was divided into three task forces by the chairman: Definition, Inventory and Protection. Each task force was charged with the responsibility of thoroughly discussing and evaluating freshwater wetland issues within its purview and developing recommendations on the protection and enhancement of freshwater wetlands in South Carolina for consideration by the full Forum.

photo courtesy S.C. Wildlife & Marine Resources Department

DEFINITION

Wetlands are generally considered to be lands that range from and often develop between terrestrial and aquatic systems, with the presence of water being the underlying factor in wetland formation. Wetlands are usually covered by shallow water or have saturated soil or subsoil for some time during the year. These wet conditions usually lead to the growth of specially adapted plants, called hydrophytes, and the formation of wet, or hydric soils.

Hydrophytic vegetation can be described as macrophytic plant life that can grow in water or in a substrate that is periodically deficient in oxygen as a result of excessive water content. A U.S. Fish and Wildlife Service publication entitled "Wetland Plants of the State of South Carolina" provides a listing of these plants.

Hydric soils are soil types that, in their undrained condition, are saturated, flooded, or ponded for seven or more days during the growing season (soil temperatures above biologic zero - 41°F) and develop anaerobic characteristics that can be determined from a Munsell color chart. Hydric soils favor the growth and regeneration of hydrophytic vegetation; they are classified in a U.S. Department of Agriculture, Soil Conservation Service publication entitled "Hydric Soils of the State of South Carolina."

Wetland hydrology is the driving force behind the formation of wetlands. Wetland hydrology gives rise to those areas that exhibit permanent or periodic inundation or soil saturation near the surface sufficient to create anaerobic conditions in the soil. These conditions affect the type of vegetation and characteristic soil that develop through time.

It is generally agreed that wetlands possess three essential characteristics: hydrophytic vegetation; hydric soils; and wetland hydrology.

The presence of all three characteristics is essential for the identification and delineation of wetlands, except for those areas that have been altered naturally or by man as identified in the "Federal Manual for Identifying and Delineating Jurisdictional Wetlands."

Although it is recognized that all three wetland parameters are important to define "a wetland," many definitions have been adopted by federal, state, and local agencies to fit the various needs of the agencies. In South Carolina, the Governor's Forum on Freshwater Wetlands has adopted the following definition of wetlands:

1. **The term 'wetlands' means those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands must possess three essential characteristics: (1) hydrophytic vegetation, (2) hydric soils, and (3) wetland hydrology.**

photo by Phillip Jones

INVENTORY

INTRODUCTION

The U.S. Fish and Wildlife Service estimates that, since the early 1700s, the number of wetland acres in the lower 48 states has been reduced from 215 million acres to 99 million acres. Furthermore, wetland losses from the mid-50s to the mid-70s averaged 458,000 acres annually. During this period, the majority of these wetlands were altered to support agricultural interests.

In South Carolina, the status and trends of wetland acreages, gains, losses, and conversions are not known. A significant amount of information has been collected on a few wetlands, with this information extrapolated to estimate the total resource base. Gross estimates of wetland acreage have been generated by public and private agencies and organizations. The U.S. Fish and Wildlife Service estimates that 4.2 million acres of freshwater and 500,000 acres of saltwater wetlands exist in South Carolina.

The issues related to a freshwater wetlands inventory in South Carolina were considered by the Governor's Freshwater Wetlands Forum in two parts: mapping and delineation.

CURRENT WETLANDS INVENTORY ACTIVITIES

The National Wetlands Inventory was developed by the U.S. Fish and Wildlife Service to provide scientific information on the nature and extent of wetlands in the United States. This inventory and classification system was not devised for a specific agency's regulatory program, but to provide detailed maps of wetland types (based on the vegetation and classification scheme developed by Cowardin *et al.* 1979), and current acreage statistics and trends.

Under the 1976 Code of Laws of South Carolina, Section 48-9-290, the S.C. Land Resources Conservation Commission (SCLRCC) has been given the authority "to coordinate the development of a statewide floodplain lands area inventory and to formulate guidelines for the conservation, protection and use of floodplain lands, excluding tidelands and marshlands." Taking this into consideration, the SCLRCC and the South Carolina Coastal Council (SCCC) have cooperatively developed a computerized wetlands data base for the eight coastal counties. As of January 1, 1990, the National Wetlands Inventory has been computerized for 124 of the 150 available NWI maps. The remaining 25 maps will be completed by April, 1990.

The U.S. Army Corps of Engineers and the U.S. Fish and Wildlife Service are cooperatively funding the mapping of the remaining land areas within the coastal plain and a portion of the sandhills physiographic regions. The S.C. Water Resources Commission will be coop-

eratively funding the mapping and computerization of 72 NWI maps along the Edisto Basin. All of the above mentioned efforts are being coordinated with the U.S. Fish and Wildlife Service so that products are not duplicated. Once these activities are completed (Fall 1990), 55 percent of the state of South Carolina will be mapped, and 36 percent of the state's NWI maps will be computerized and used to generate wetland statistical information.

MAPPING OPTIONS CONSIDERED BY THE FORUM

To develop a better understanding of the aerial extent, location and types of wetland habitats that exist in the state, the mapping and identification of the wetland resource base was deemed essential by the Governor's Freshwater Wetlands Forum. Three mapping options and one non-mapping option were considered by the Forum. The mapping options included:

National Wetlands Inventory Mapping - consists of conventional air photo/field-verified (2 percent sampling of total) wetland interpretation methodology that identifies and maps vegetation type and hydrologic regime of wetlands. The U.S. Fish and Wildlife Service's National Wetlands Inventory (NWI) maps provide information on wetland location and type with the latter based upon a classification scheme that contains, nationally, more than 272 wetland types. Wetland acreage figures and aggregation of wetland types into broadly defined wetland categories can be generated once the data are computerized. The minimum mapping unit for wetland delineation is approximately two-tenths of an acre. The NWI provides only a generalized depiction of wetlands based solely on vegetation characteristics, and is not intended for use in delineating wetlands for regulatory purposes.

Soil Survey Mapping - Soil surveys are produced under a national cooperative program that is administered by the USDA Soil Conservation Service. Soil survey manuscripts contain interpretive and mapped information characterizing the soil resources within a county. The Soil Conservation Service has published and continues to update a list of hydric soils found within the United States and, subsequently, within each county soil survey. Acreage figures of hydric soils by county can be easily obtained and interpretive maps for site specific areas can be examined in its published form or reproduced to highlight the location of hydric soils. The minimum mapping unit is normally five acres, but depends upon the scale of mapping.

Satellite Image Interpretation - Satellite imagery is available from two sources: (1) the U.S. Landsat Thematic Mapper (TM) data and (2) the French SPOT data. Satellite imagery is good for identifying broadly defined vegetation types and land uses, such as forested and nonforested freshwater wetlands, estuarine intertidal marshes, beaches,

uplands, water, and other features. Since the data are in a digital format, statewide wetlands mapping can be completed in less than one year. Satellite image interpretation, however, offers a lesser degree of land cover classification detail. The minimum mapping unit for TM data is one-quarter of an acre and, for SPOT data, one-tenth of an acre.

Upon consideration of these options, on the recommendation of the Identification Task Force, the Forum recommends:

2. **The National Wetlands Inventory is the preferred wetlands inventory methodology.**
3. **The use and completion of the National Wetlands Inventory should be the primary tool for the identification and generalized mapping of wetlands for the entire state.**
4. **The National Wetlands Inventory is a high priority which should be completed for the entire state as soon as possible.**
5. **State appropriations should be made available for cost-share completion of the National Wetlands Inventory, in cooperation with the U.S. Fish and Wildlife Service, and digitization (computerization) of the inventory for the state of South Carolina .**
6. **County soil surveys should be used in the interim until a more detailed wetlands inventory is completed.**
7. **An inventory of wetlands gains and losses should be updated every 10 years and published every five years for the benefit of the General Assembly and the public.**
8. **A single state agency should be responsible for mapping and computerizing the state's wetlands.**

PROJECTED COSTS OF WETLANDS MAPPING

To complete the wetland mapping process for the remainder of the state of South Carolina, and to computerize the wetland mapping data for the development of a statewide wetland data base, $300,000 will be needed from the state. The U.S. Fish and Wildlife Service will cost share on a 50/50 basis with the state to complete the wetlands mapping for the remaining 45 percent of the state; the state's cost for wetlands mapping is approximately $135,000. To computerize the wetland maps, generate wetland statistical information by county and for the state, and develop wetland informational booklets for each of the 46 counties, an additional $165,000 will be necessary. The total time required to complete all phases of identification, mapping, and computerization is estimated to be three years.

IDENTIFICATION AND DELINEATION OF JURISDICTIONAL WETLANDS

On January 10, 1989, The Federal Manual for Identifying and Delineating Jurisdictional Wetlands was adopted by four federal agencies: the U.S. Environmental Protection Agency, the U.S. Army Corps of

Engineers, the U.S. Fish and Wildlife Service, and the USDA Soil Conservation Service. With the adoption of this manual, a major step has been taken to remove inconsistencies among the agencies and streamline the permitting process.

The agreement requires a three-parameter approach — the presence of hydrophytic vegetation, hydric soils, and wetland hydrology — to be used for the identification and delineation of wetlands. The manual describes technical criteria, field indicators and other sources of information and methods for identifying and delineating jurisdictional wetlands in the United States.

In the manual, hydrophytic vegetation is defined as macrophytic plant life growing in water, soil or in a substrate that is at least periodically deficient in oxygen as a result of excessive water content. Hydric soils are defined as soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part. Wetland hydrology is defined as permanent or periodic inundation, or soil saturation to the surface, at least seasonally.

The wetland delineation methods presented in the manual can be grouped into two general types — offsite and onsite determinations. Offsite procedures are designed for use in the office, while onsite procedures are for use in the field. Depending upon the amount of field information needed or the complexity of the area in question, one of three basic onsite methods may be employed: routine, intermediate level or comprehensive.

The routine method is designed for areas equal to or less than five acres in size or larger areas with homogeneous vegetation. For areas greater than five acres in size or areas of any size that are highly diverse in vegetation, the intermediate-level or the comprehensive method is recommended. The comprehensive method is applied to situations requiring detailed documentation of vegetation, soils and hydrology.

In South Carolina, the Governor's Freshwater Wetlands Forum recommends that:

9. **The "Federal Manual for Identifying and Delineating Jurisdictional Wetlands," adopted at the federal level on January 10, 1989 by the U.S. Environmental Protection Agency, the U.S. Corps of Engineers, the Soil Conservation Service and the U.S. Fish and Wildlife Service, should be used as the technical basis for identifying and delineating wetlands in South Carolina.**

photo courtesy S.C. Wildlife & Marine Resources Department

PROTECTION PROGRAMS

NON-REGULATORY PROGRAMS

Non-regulatory wetlands protection programs are generally preferable to regulatory programs because they involve voluntary action. They can also be implemented with or without regulatory programs. Many non-regulatory programs are already underway in South Carolina and others could be initiated.

Existing Non-Regulatory Programs

Acquisition/Ownership
Public or private acquisition of wetlands is one way to permanently protect wetlands from incompatible land uses or undesirable impacts. Acquisition can be in fee simple or partial interest (e.g., conservation easements). Wetlands may be acquired through purchase, gift, or inheritance. There are several agencies and organizations currently involved in the acquisition or ownership of wetlands to protect endangered species, permit scientific and educational use, provide recreation, preserve open space, or preserve the natural character of a site. Though not always specifically intended, this often leads to wetland protection. Some of these programs (and their sponsoring agencies and organizations) are:

National Wildlife Refuges (U.S. Fish & Wildlife Service) - South Carolina's National Wildlife Refuges have significant wetland resources as follows:

Refuge	Wetland Type	Acreage
Cape Romain	fresh marsh & impounded	3,085
	salt marsh & creeks	27,660
	open water	30,000
Carolina Sandhills	freshwater	2,626
Santee	fresh marsh & impounded	1,425
	open water	9,000
Pinckney Island	palustrine	67
	estuarine	2,728
Savannah (SC side)	palustrine	9,323
	lacustrine	4,900

National Forests (U.S. Forest Service) - National Forests in South Carolina provide significant wetland reserves. The Francis Marion National Forest has 55,795 acres of riparian areas including about 40,000 acres of wetlands. The Sumter National Forest has 13,407 acres of riparian areas including 1,500 acres of wetlands. These wetlands are managed to protect wetland ecosystem values while providing related beneficial uses. Wilderness areas in the Francis Marion National Forest with significant wetlands include Hellhole Bay (2,200 acres), Wambaw Swamp (4,850 acres), Little Wambaw Swamp (5,223 acres), and

Wambaw Creek (1,900 acres). Also, several special interest areas are managed to protect wetlands containing rare plants or scenery. The Southeast Forest Experiment Station manages the Santee Experimental Forest which includes approximately 3,000 acres of forested wetlands.

National Parks (National Park Service) - The Congaree Swamp National Monument contains over 15,000 acres of near-virgin bottomland hardwood wetlands. It is preserved primarily for recreation, though not to the detriment of the resource. There are several other National Park landholdings which may have some wetlands.

Savannah River National Environmental Research Park (U.S. Department of Energy) - At the Savannah River Site, there are approximately 34,500 acres of bottomland hardwoods, 1,000 acres of Carolina bays (191 individual bays), and 4,000 acres of impoundments, many with well-developed lacustrine wetland vegetation.

Heritage Trust Program (S.C. Wildlife and Marine Resources Department) - This program actively pursues sites to be preserved. It focuses on habitats of rare and endangered plants and animals and unusual landforms. The goal is preservation of the state's natural diversity and only "the best" examples are considered. Properties are usually purchased (outright or through bargain sale) or donated. Property can be acquired in fee simple or by conservation easement. The program currently lists 25 Heritage Preserves in South Carolina totalling over 35,000 acres. Most of these sites contain wetlands, such as Carolina bays, barrier island complexes, sloughs, interdune pools, impoundments, small streams or rivers, "limesinks", montane bogs, waterslides, and solution pools.

Wildlife Management Areas (S.C. Wildlife and Marine Resources Department) - Although most of this program's 1.3 million acres is leased from private landowners, approximately 64,000 acres are owned or under long-term agreement by the state. Of this, about 42,000 acres are wetlands. These wetlands are somewhat protected as they are managed primarily for wildlife.

State Parks (S.C. Department of Parks, Recreation and Touism) - Of approximately 80,000 acres in the state parks system, there are over 15,000 acres of wetlands and 1,400 acres of lakes (excluding larger water bodies adjacent to parks). Acquisition priorities are for beach access, river/lake access, and infill and buffer areas for existing parks.

State Forests (S.C. State Forestry Commission) - There are approximately 5,500 acres of wetlands of the 77,480 total acres in four state forests.

State Scenic Rivers (S.C. Water Resources Commission) - This program allows for acquisition in fee simple but most of the properties so far have been obtained through perpetual easement. Currently, two river segments have been designated in South Carolina.

State Universities - Institutes and foundations of the University of South Carolina and Clemson University own over 17,500 acres of wetlands (mostly salt marsh) for research and educational purposes.

Santee Cooper (S.C. Public Service Authority) - Santee Cooper manages about 22,000 acres of wetlands as part of its land holdings. Of this about 16,000 acres are in the Upper Santee Swamp.

Correctional Centers (S.C. Department of Corrections) - The S.C. Department of Corrections has extensive landholdings throughout the state. Although no inventory has been taken, many of these properties have significant wetlands, such as the Wateree River Correctional Institution and the MacDougall Youth Correctional Center.

Local Governments - It is estimated that local governments (including special districts) in South Carolina control over 200 acres of wetlands. The preservation status of this property is different for each jurisdiction and each department (recreation, utility, etc.) within each jurisdiction.

The Nature Conservancy - This private, non-profit organization purchases property for preservation purposes through fee simple acquisition, donation or perpetual conservation easements. Over 61,000 acres have been protected in the state; approximately 12,940 acres of which are freshwater wetlands and approximately 36,600 of which are saltwater ecosystems.

The Audubon Society - This is a private organization which preserves wetlands through acquisition. The most significant of their holdings includes about 6,000 acres of wetlands.

Ducks Unlimited - This private organization has been purchasing wetlands nationally for many years and has recently assisted in a large acquisition for the S.C. Wildlife and Marine Resources Department. Their focus is on habitat for migratory waterfowl.

Private Land Trusts - There are several private land trusts in South Carolina providing wetlands preservation. One of the largest is the Nature Conservancy, but there are also small local land trusts. In many cases, these trusts were established for preservation of specific sites or scenic vistas.

The advantages of acquisition include fewer court battles over "unconstitutional taking," permanent protection, the potential for active public use, the availability of some grant programs, and its success in urban areas. The disadvantages include high cost, frequent political opposition to large-scale acquisition, the need for public land management, and protection of only the specific area acquired and not the larger ecosystems.

Conservation Restrictions

Conservation restrictions are an acquisition of "rights" rather than actual land. These include easements, deed restrictions or covenants, and transfer of development rights. Conservation restrictions usually prohibit certain uses (such as development) while permitting continued private ownership. They can be temporary or permanent. Current programs include the following:

Conservation Restrictions and Easements (Sections 27-9-10 through 30, South Carolina Code of Laws) - These provisions of South Carolina law provide for the use of a restriction, easement, covenant, or condition for the retention of land or water areas in their natural, scenic, open or wooded condition, or as fish and wildlife habitat. They provide limits on construction, dumping of soil or other substances, removal of vegetation, excavation, other surface uses, and other activities or uses detrimental to retention of land or water in its natural state. It may be used by the Heritage Trust Program, any governmental body, or the Nature Conservancy and perhaps other groups. Preferential property tax assessment for conservation restrictions or easements are decided on a county-by-county basis.

State Scenic Rivers Act (Sections 49-29-10 through 210, South Carolina Code of Laws) - This act allows for the use of perpetual easements to preserve river corridors designated as scenic, recreational or natural. They are obtained by purchase or donation. Landowners donating perpetual easements may claim a reduction in state income tax and have the easement portion of the property exempt from all property taxes.

Deed Restrictions/Covenants - Restrictions and covenants in deeds can limit specific uses or activities of properties. They may be permanent ("running with the land") or temporary, but are usually enforceable only by parties in the deed or neighboring landowners.

Transfer of Development Rights - Local governments can encourage preservation of farmland or open space by transferring development rights (measured in dwelling units per acre) from a parcel in one zoning district to another (off-site). The landowner whose property is downzoned is compensated by the developer who receives the increased density. It is similar to mitigation and all parties receive benefits. The process is used by many states but adoption in South Carolina would probably require enabling legislation.

Registration - The Heritage Trust Program registers sites as Heritage Sites. This process is a voluntary "gentleman's agreement" to preserve the natural character of a site, which can be terminated by either party with 30 days notice. Enforcement is unlikely due to the ease of termination.

Conservation restrictions provide tax relief for landowners and are low cost to government because the land remains in private ownership. Their voluntary nature makes them more politically acceptable. Disadvantages include the preclusion of public use of the land, only limited real estate tax reductions, and being restrictions that are only temporary.

Tax Incentives

Tax deductions, exemptions and reductions (preferential assessment) are several of the benefits currently possible for preservation. Under the State Scenic Rivers Act a land donor (in fee simple or by easement) may deduct the fair market value of the donation from state income tax. If a perpetual easement for Scenic Rivers is granted, the land will also be exempt from property tax. Reduction of property assessment under other conservation easements is decided by individual county assessors.

Property tax incentives encourage private landowners to keep land in a certain state (e.g., open space or farmland) and may not be as burdensome to the landowner as other methods. Under preferential assessment, property is assessed at its present use value. Under deferred taxation, property is assessed at its present use value but owners who convert to some other use must pay some or all of the taxes that would have accrued during the years of preferential assessment. Under written agreements restricting land use for a determined number of years, preferential assessment and payment of deferred taxes for conversion to non-eligible uses may be involved with all three types of agreements. State government receives lower tax revenues but benefits by wetlands or urban green space preservation.

Tax incentives encourage voluntary protection and reduce tax burdens on landowners. Disadvantages include a reduction in local tax revenues and the possibility that incentives may not curb land speculation. Incentives are not currently tailored to wetlands conservation.

Management Techniques

Certain management techniques protect wetlands for specific purposes. Water level maintenance, impoundment and pumping may stabilize wetland water levels, increase wetland area, improve waterfowl habitat, or re-establish natural species. Often the public bears the cost of the activity though it may be carried out by private individuals or organizations.

Implementation of management techniques can enhance wildlife habitat and compensate for the effects of prior damage. But management can be high in cost, perpetual and done at the expense of a natural ecosystem.

Best Management Practices (BMPs)

Best management practices are voluntary conservation tools that generally allow use of the resource under recommended guidelines. Landowners bear most of the costs but also benefit from conservation

of valuable natural resources. For example, the S.C. Forestry Commission, has adopted BMPs for forested wetlands which include specific recommendations for forest road construction, regeneration, harvesting, stream management and protection of sensitive natural resources. There are also established BMPs for agriculture and mining.

BMPs encourage voluntary wetlands protection, are relatively low cost, and protect landowners' long-term property investment.

Rehabilitation or Restoration

The rehabilitation or restoration of previously altered wetlands is a technique of wetlands conservation. Wetlands that have been damaged by land use activities, drainage or vegetative alterations may be substantially improved by reversing the alteration; this is particularly true for drainage alterations. These techniques are significant as potential mitigation opportunities.

Rehabilitation or restoration results in a net gain of wetlands and a return of restored wetlands to the natural system. Disadvantages may include high costs, the need for a long-term commitment to monitoring and maintenance and the possible increase in mosquito production. Currently there are few available incentives for private landowners to undertake these activities and there is no mechanism to ensure permanent protection of restored wetlands.

Government Subsidies

Providing or removing government subsidies for an activity in wetlands is another example of non-regulatory protection techniques. For example, the Swampbuster Provision (Section 1221) of the Federal Food Security Act of 1985 prohibits payment of federal benefits (including Farmers' Home Administration benefits and crop subsidies) to landowners who convert wetlands to dry land agricultural production. The U.S. Soil Conservation Service policy encourages restoration of previously altered wetlands. The federal Flood Insurance Program requires restrictions on additional development in flood-prone areas to get flood insurance.

There are programs available to state and local governments for acquisition and development of recreational lands, including wetlands. These include the federal Land and Water Conservation Fund (LWCF), the state Recreation Land Trust Fund (RELT) and the state Parks and Recreation Development Fund (PARD). However, funds are limited. The selection process for LWCF and RELT encourages natural resources preservation (which includes wetlands), passive recreation, and acquisition of critical wetland areas.

Government subsidies can encourage conservation at all levels, and can focus directly on wetlands. A disadvantage may be the high costs to government of program management. Wetlands may not always receive top priority.

Local Land Use Regulations

Although local land use regulations are a form of regulation, local governments develop them to meet local needs, and some provide incentives. Examples of several which can be used for wetlands protection include incentive zoning, transfer of development rights, special zoning districts or overlay zones, and development impact fees.

Incentive zoning provides additional development capacity (more dwelling units or building floor area) in exchange for a public benefit such as wetland protection. The local ordinance must be clear about the incentive ratio of density per public benefit. Transfer of development rights is a form of incentive zoning. The wetland can be controlled by the developer, a homeowners group, the local government, or a conservation organization.

Other zoning options include the establishment of special wetland districts, sensitive area or natural resource protection districts, or combination floodplain/wetland districts. These can provide for a variety of setbacks, densities, building practices, and other features to protect wetlands.

In some states, local governments require specific amounts of open space to be set aside (or deeded to the local government) as part of the development process. In certain situations, cash in lieu of land can be provided for purchasing property off-site. Municipalities in South Carolina can use set-asides in comprehensive park and recreation plans (Section 5-23-43, South Carolina Code of Laws) and through cluster or planned unit developments.

Local land use regulations provide local control of local needs (i.e., more site-specific), promote the most suitable use of lands, allow immediate implementation of the range of options and the use of incentive-based options. Disadvantages include administrative costs to local governments, the possiblity of constitutional violations, the need for adequate enforcement, the limited ability to protect all wetlands, the placement of additional "regulations" on the public, and the inconsistencies among jurisdictions.

Non-Regulatory Recommendations

The Forum recommends the following program options for wetland protection. The recommendations are preferable to and should be implemented in addition to any regulatory options.

Adjust Existing Programs as follows:

10. **Encourage all state agencies to adopt the state's "no net loss" goal for all of their wetland activities.**
11. **Encourage land-holding state agencies, with assistance provided by the natural resource agencies, to identify wetlands and develop management plans to protect wetlands on their properties.**

12. Support adequate funding for state wetlands acquisition and management programs.
13. Focus on permanent protection of the best resources.
14. Encourage wetland sites not significant enough for Heritage Trust Sites to be donated fee simple or by easement for conservation purposes.
15. Provide preferential property tax relief for landowners who grant perpetual conservation restrictions or easements to governmental bodies or approved non-profit land trusts. Develop consistent guidelines for use by county and municipal assessors.
16. Encourage local governments to preserve wetlands through existing mechanisms such as zoning, subdivision controls, floodplain ordinances, and active management of their properties and utility right-of-ways. They should be encouraged to examine all development controls and modify those that unintentionally promote wetland conversion.
17. Enlist the aid of local government officials (city and county councils, planning commissions, zoning administrators, building inspectors, etc.) in identifying potential wetland alterations, in order that they may refer constituents to appropriate resource agencies and organizations and provide information on the benefits of wetlands protection.

The following new non-regulatory programs are recommended:

18. Develop real estate tax incentives for landowners protecting wetlands. An example is the deferred taxation system used for agricultural land.
19. Develop a detailed State Wetland Conservation Action Plan aimed at identifying and protecting the most significant wetlands resources and systems in the state. The Plan would assist developers in the identification of areas to be protected, target wetlands for purchase by agencies and land trusts, encourage donation or preservation by landowners, and suggest mitigation opportunities.
20. Establish a state wetlands trust fund and/or mitigation bank for the acquisition, rehabilitation, and/or restoration of wetlands.
21. Encourage the creation of public or private local or regional wetland trusts which can acquire (through gift, purchase, or inheritance) and manage wetlands.
22. Establish a rehabilitation or restoration program for altered wetlands. Encourage state agencies to review prior activities (for example, road construction) and undertake restoration programs.
23. Make best management practices (BMPs) mandatory for certain activities exempt from regulation (e.g., agriculture, forestry, mining).
24. Encourage the development and use of best management practices (BMPs) for wetland protection for all activities.
25. Provide incentives for city and county land use regulations, such as transfer of development rights, cluster development and planned unit development. Recognition of wetlands pro-

tection as a public good in enabling legislation is desirable.

26. Support the inclusion of agricultural wetlands in the federal Conservation Reserve Program of the U.S. Department of Agriculture.

REGULATORY PROGRAMS

Existing Regulatory Programs

Introduction

Several agencies are currently involved in wetlands regulatory activities through permitting or certification programs. Figure 1 provides a basic outline of the present regulatory program network, which involves the following state and federal agencies:

Federal:
- U.S. Army Corps of Engineers (USACOE)

State:
- S.C. Coastal Council (SCCC)
- S.C. Department of Health and Environmental Control (SCDHEC)
- S.C. Budget and Control Board (administered by S.C. Water Resources Commission, SCWRC)
- S.C. Land Resources Conservation Commission (SCLRCC)

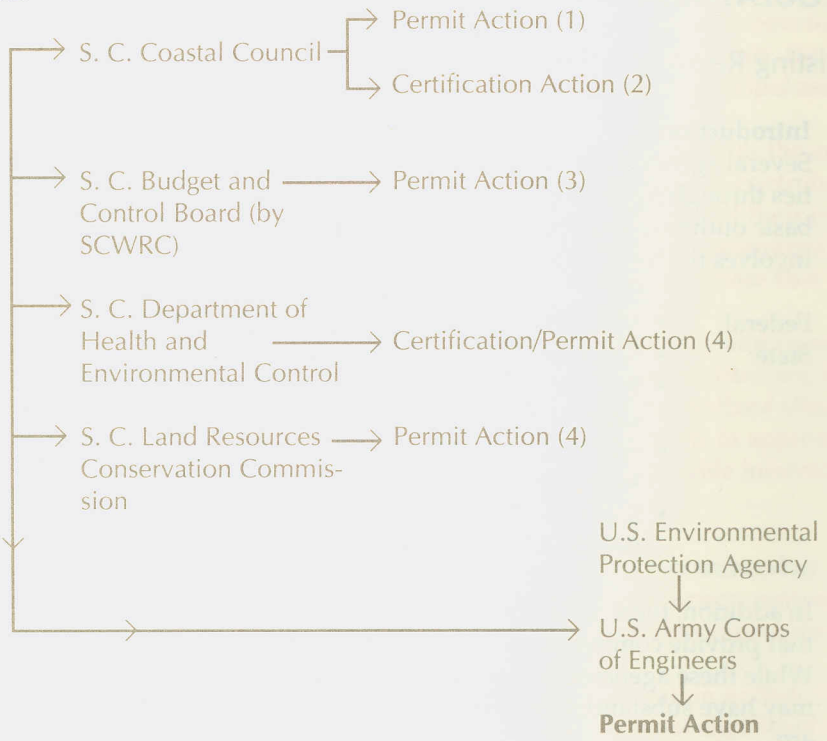
In addition, there are a number of other state and federal agencies that provide comments on state and federal permit applications. While these agencies do not have direct regulatory authority, they may have substantial influence over the permit decision. The agencies are:

Federal:
- U.S. Fish and Wildlife Service (USF&WS)
- National Marine Fisheries Service (NMFS)
- U.S. Environmental Protection Agency (This agency has veto authority over Section 404 Program permits, and is actively involved in providing guidance to the U.S. Army Corps of Engineers and in enforcing Section 404 Program provisions) (USEPA)
- U.S. Department of Agriculture, Soil Conservation Service (USDA-SCS, through the National Environmental Policy Act)

State:
- S.C. Wildlife and Marine Resources Department (SCWMRD)
- S.C. Department of Archives and History
- S.C. Office of the Attorney General
- S.C. Institute of Archaeology and Anthropology
- S.C. Department of Parks, Recreation and Tourism
- S.C. State Ports Authority
- S.C. Forestry Commission
- S.C. Department of Highways and Public Transportation
- S.C. Public Service Authority

Each agency operates according to its own application process, jurisdictional limits, level of public participation, and appeals procedures. Whenever jurisdictions coincide, joint applications and public notices are used.

Figure 1: Existing state and federal wetlands permitting network in South Carolina



1. In critical areas of the Coastal Zone
2. In non-critical areas of the Coastal Zone
3. In state navigable waters outside critical area of the Coastal Zone
4. In all waters of the state under jurisdiction of U.S. Army Corps of Engineers, S.C. Coastal Council, and S.C. Budget and Control Board

Present Permitting and Certification Programs

The following is a brief description of present regulatory programs affecting wetlands in South Carolina.

- **U.S. Army Corps of Engineers Permit Program**

The USACOE administers permit programs in South Carolina pursuant to Section 404 of the Federal Clean Water Act and Section 10 of the Federal Rivers and Harbors Act. The Charleston District Office oversees the process for waters and wetlands of South Carolina.

Several state and federal agencies are involved in the USACOE permit program. The SCDHEC and SCCC have certification authority over USACOE permits. The SCWMRD, S.C. Department of Highways and Public Transportation, SCWRC, S.C. Department of Archives and History, State Ports Authority, S.C. Department of Parks, Recreation

and Tourism, SCLRCC, USF&WS, and NMFS also review and comment on permit applications.

Section 10 permits are required for construction and alteration activities in federal navigable waters. This includes all tidal waters, all major rivers, most large lakes, and some tributaries to these bodies in South Carolina. Permit considerations include impacts to navigation, flood control, fish and wildlife resources, conservation, pollution, and the general public interest.

Section 404 permits are required for fill activities in all waters and wetlands of the state. If both Section 10 and Section 404 permits are required, they are usually processed concurrently.

The evaluation policies and environmental guidelines used to make Section 404 permit decisions have been developed by the USEPA. The guidelines, known as "404(b)(1) Guidelines," are aimed at meeting the goals of the Clean Water Act, specifically "to restore and maintain the chemical, physical, and biological integrity of waters of the United States."

The USACOE has issued 26 nationwide general permits for activities which, individually, have only minimal adverse impacts. Each has been reviewed for certification by SCDHEC and the SCCC. If certification of a nationwide permit was denied by either agency, the USACOE must process permit applications individually.

Nationwide Permit #26 affects wetlands between one and 10 acres which are isolated or above headwaters. Under permit procedures, anyone undertaking an activity impacting between one and 10 acres requests authorization from the USACOE under nationwide Permit #26. The USACOE sends the request to the USF&WS for review. Fifteen days review time is allowed unless the USF&WS requests review under the individual permit process (Pre-Discharge Notification Process). However, because the SCCC did not certify Nationwide Permit #26, activities in the coastal zone affecting these wetlands must be certified individually with review by the SCCC, USF&WS, SCWMRD, and other agencies. Any activities in isolated or above headwater wetlands affecting one acre or less are not regulated.

• **S.C. Department of Health and Environmental Control Water Quality Certification Program**

The SCDHEC administers water quality programs statewide pursuant to the South Carolina Pollution Control Act and the Federal Clean Water Act. This includes review of all Section 404 permit applications for water quality certification under Section 401(a) of the Federal Clean Water Act. Certification and any conditions imposed relate to discharge limitations, achievement of water quality standards, and protection of designated water uses. The USEPA is strongly encouraging states to use their Section 401 Certification and Water Quality Standards programs for more effective wetlands protection.

USEPA regulations set forth requirements for state certification, hearings by federal agencies on certification issues, and certifications by USEPA in cases where state certification is not applicable. These regulations also require state certification to provide reasonable assurance that applicable water quality standards are not violated. However, the regulations provide little guidance to the state about how to determine reasonable assurance. Section 401 requires the state to adopt procedures for public notice of the application for certification and procedures for public hearings if necessary. When certifying projects, SCDHEC must take action within one year and may establish effluent limitations, monitoring requirements, and other appropriate conditions. The SCDHEC Board adopted a public participation policy in 1988 and promulgated regulations in 1989. The regulations are awaiting approval by the South Carolina General Assembly.

Applicants usually apply jointly for a Section 404 permit and Section 401 certification through the USACOE, which publishes the public notice for both. Occasionally a separate Section 401 certification is required for an application covered by a Section 404 nationwide general permit. The USACOE notifies the applicant when this occurs. The Section 401 certification actions are subject to an appeals process which begins with a hearing officer's report and option for appeal to the SCDHEC Board and subsequently to the courts.

SCDHEC does not enforce or routinely monitor compliance with conditions of the Section 401 certification. This responsibility rests with the USACOE because the Section 401 certification conditions become part of the Section 404 permit; however, SCDHEC reports unauthorized activities to the USACOE and USEPA for enforcement.

Before making a final decision on a certification, the SCDHEC issues a public notice of a Section 401 public hearing which provides opportunity for public input to the decision. After the hearing, the hearing officer prepares a proposed Record of Decision on the application, the Staff Assessment, the Record of the Hearing, and analysis of comments offered at the public hearing. The Record of Decision includes a recommendation that the certification be issued or denied. Persons or organizations participating in the Section 401 public hearing have the opportunity to appeal the Record of Decision. If the recommendation is appealed, the SCDHEC Board renders the final agency decision. Otherwise the hearing officer's recommendation becomes the agency's final action. A federal Section 404 permit cannot be issued without SCDHEC certification unless such certification is waived. Also, SCCC pursuant to state law, may require SCDHEC certification before issuing permits, and usually does.

• **S.C. Coastal Council Permitting and Certification Program**
The SCCC reviews all state or federal agency permit applications for Coastal Zone Management Program consistency within the eight-county coastal zone, including USACOE Section 10 and Section 404 permits and SCDHEC Water Supply and Wastewater permits. In order for any of these permits to be issued, the SCCC must first find

the project to be consistent with Coastal Zone Management Program policies. Many of these policies are designed to protect wetlands, especially freshwater wetlands outside the SCCC's direct permitting authority.

The SCCC also has its own permitting program for projects within "critical areas" of the coast. These critical areas include saline coastal waters, tidelands, and the beach/dune system (as described in Section 48-39-280 of the new beachfront legislation which became effective on July 1, 1988, and supersedes several sections of the 1977 Coastal Zone Management Act). The SCCC's permit regulations cover policies, application procedures, public notice and hearing procedures, the decision process, exceptions, enforcement procedures, appeals, guidelines, and standards. The enforcement procedures include surveillance, the issuance of civil fines to persons making unauthorized or unpermitted alterations in critical areas, and permit modification or revocation for noncompliance.

• **S.C. Budget and Control Board Permit Program**

The S.C. Budget and Control Board maintains control of state lands. This includes constitutionally-claimed waters of the state such as "the bottom of all non-tidal navigable waters and adjacent wetlands below the ordinary high water mark and the bottom of all tidally influenced waters below the mean highwater line." Because of this authority, the Board's regulations require a permit for construction and alteration activities in navigable waters and tidal freshwaters. Projects requiring permits include "dredging, filling, construction, or alteration in, on, or over a navigable water; or in, or on the bed under navigable waters subject to a public navigational servitude, including submerged lands." A S.C. Budget and Control Board permit is not required for activities under the exclusive permit authority of the SCCC.

The S.C. Water Resources Commission (SCWRC) is assigned responsibility for administering this permit program. State agencies, such as the SCDHEC and SCCC, influence the process significantly and are collectively responsible for the total assessment of the project. The SCWRC must assess the project's total impact on navigable waters, jurisdictional lands, and the state's economy and natural resources. Recent regulation revisions have increased SCWRC's authority to include project impact assessment "on conservation, economics, aesthetics, general environmental concerns, cultural values, fish and wildlife, navigation, erosion and accretion, recreation, water quality, supply and conservation, and whether the projected activity is consistent with the needs and welfare of the public."

If a project is determined to produce an unavoidable adverse impact on navigable waters or other natural resources, but the project benefits are greater than the adverse impacts, then the applicant may have to compensate for or replace the natural resource loss. This compensation or replacement must result in a net gain of the resource. The permit regulations specify an appeals process for the applicant and others.

Each of the permits granted under this program must be reviewed by the SCWRC every ten years. At this time, the SCWRC can "recommend renewal, revocation, or modification of a permit, as appropriate."

• S.C. Land Resources Conservation Commission Mining Permit Program

The SCLRCC is responsible for administering the provisions and requirements of the S.C. Mining Act and pursuant Rules and Regulations. This includes the process and issuance of mining permits, review and approval of reclamation plans, collection of reclamation performance bonds, conduct of environmental appraisals, and inspections of all mining operations and reclamation. Any commercial mining operation in a wetland is regulated under this program. SCLRCC cooperates on these permits with the SCCC and all mining permits in the eight coastal counties require certification by the SCCC. Mining permits which occur in wetlands may require mitigation which could include wetland restoration and enhancement. SCLRCC reviews plans for this type of reclamation, makes regular inspections, and monitors the success of wetlands restoration as a reclamation alternative. SCLRCC permits all commercial dredging operations in streams and rivers of the state and conducts regular inspections for compliance. SCLRCC also cooperates with the SCWRC, which permits dredging operations in navigable waters of the state.

Wetlands Activities Presently Regulated

There are numerous activities which alter wetlands. These activities can be broadly categorized as filling and deposition of materials, excavation and dredging of materials, hydrologic alteration including draining and flooding, placement of structures and obstructions, wastewater discharge, and commercial mining. Table 1 lists these broad categories of activities and identifies the agencies which currently regulate these activities. In general, filling and deposition of materials, wastewater discharge, and commercial mining are currently regulated in virtually all wetlands of the state. Most activities, are also regulated in tidal freshwater wetlands. The non-tidal freshwater wetlands outside the coastal zone, which comprise about 90 percent of the state's wetlands, receive the least regulatory protection. In these wetlands, excavation and dredging, hydrologic alteration and placement of structures and obstructions are not specifically regulated by state or federal agencies. Quantitative information on these unregulated activities in non-tidal wetlands is unavailable.

Wetlands Mitigation Programs

Mitigation is a process by which impacts to wetlands are avoided, minimized, rectified, reduced or eliminated over time, or compensated. Mitigation is applied in situations where all other standards and requirements have been met; for example, development in wetlands might be required to be water-dependent and have a public benefit, some wetland loss may be unavoidable. "No net loss" concepts are usually incorporated into mitigation policies or programs.

Table 1: Activities Presently Directly or Indirectly Regulated in South Carolina Wetlands: Wetland Types, Area, and Regulatory Agencies

Regulated Activity	Saltwater or Brackish (369,500 ac)	Tidal Freshwater (67,000 ac)	Non-Tidal Freshwater Coastal Zone (4,517,000 ac)	Non-Tidal Freshwater Non-Coastal Zone
Filling/Depositions	COE,CC,DHEC	COE,CC,DHEC,WRC	COE,CC,DHEC	COE,DHEC
Excavation/Dredging	COE,CC,DHEC	COE,CC,DHEC,WRC	CC	not regulated
Drainage/Flooding	COE,CC,DHEC	COE,CC,DHEC,WRC	CC	not regulated
Structures/Obstructions	COE,CC,DHEC	COE,CC,DHEC,WRC	CC	not regulated
Wastewater Discharge	DHEC,CC	DHEC,CC	DHEC,CC	DHEC
Commercial Mining	COE,LRCC,CC, DHEC	COE,LRCC,WRC, CC,DHEC	COE,LRCC,CC, DHEC	COE,LRCC,DHEC

Regulatory Agencies:

COE: U. S. Army Corps of Engineers

CC: S. C. Coastal Council (Direct permit authority in critical area and certification of other state or federal permits in 8 coastal counties of the coastal zone. This does not include complete regulatory authority in non-tidal wetlands; another agency permit must be required for SCCC to gain regulatory access.)

DHEC: S. C. Department of Health and Environmental Control

WRC: S. C. Water Resources Commission (for S. C. Budget and Control Board)

LRCC: S. C. Land Resources Conservation Commission

Mitigation options are generally not used to determine whether to issue or deny a wetlands permit, but are considered as means to minimize or offset impacts if a permit is issued. Compensation mitigation can include wetlands creation, wetlands restoration, wetlands enhancement, and/or monetary compensation for losses. Further consideration must be given to whether on-site or off-site and/or in-kind or out-of-kind mitigation will be allowed, and at what ratios to the impacted wetlands.

Currently, mitigation is incorporated into the regulatory and management programs of the USACOE, USEPA, USF&WS, and the S.C. Budget and Control Board. Regulation 33 CFR 325.4 of the USACOE states that permit conditions may be accomplished on-site, or may be accomplished off-site for mitigation of significant losses which are "specifically identifiable, reasonably likely to occur, and of importance to the human or aquatic environment." The USEPA has an Advanced Identification Program which delineates wetlands for their suitability for dredge and fill activities under 40 CFR 230. USEPA encourages that avoidance be considered first, that in-kind management be a priority, and, if mitigation is allowed, that it be in-kind and on-site. The USF&WS prefers the use of in-kind replacement of fish and wildlife habitat using biologically-based methods, "after public need and water dependence is demonstrated, the project is shown to be the least damaging alternative, the impact is unavoidable, and when no on-site mitigation is available."

Regulatory Recommendations

Introduction

To assist the Forum members in evaluating the need for change, simplification and/or additions to existing freshwater wetland regulatory programs, brief descriptions of alternatives were prepared for review. The alternatives were organized into seven categories as follows:

A. **Wetlands Management Alternatives** - The most basic question the Forum had to consider was whether regulatory management of South Carolina freshwater wetlands was necessary. A determination that some type of regulatory management is needed leads to consideration of an overall regulatory goal.

B. **Jurisdictional Boundaries of Regulated Wetlands** - Given the need for regulatory programs, the area of regulatory jurisdiction must be determined.

C. **Wetlands Classification Alternatives** - The issue of establishing a wetlands classification system for regulatory purposes was considered by the Forum.

D. **Activities to be Regulated** - The Forum decided on the types of activities to be regulated.

E. **Activities Exempted from Regulation** - Just as important was the consideration of those activities to be specifically exempted from freshwater wetlands regulation.

F. **Alternatives for Wetlands Mitigation** - The use of mitigation as a means to prevent or compensate for wetlands

degradation or loss as a result of a permitted activity was discussed in detail by the Forum. Importantly, mitigation measures were considered in the context of the Forum's recommended regulatory goal.

G. **Regulatory Program Alternatives** - Once the recommended regulatory framework was established, the Forum considered, from a wide variety of options, the mechanism for program implementation.

Regulatory Recommendations

A. Wetlands Management Alternatives – The Governor's Freshwater Wetlands Forum supports a freshwater wetland regulatory program that establishes an overall goal, defines regulatory jurisdiction, specifies regulated activities and exemptions, describes acceptable mitigation policies and actions, assigns regulatory responsibility to one state agency, and supports improvements in the federal wetlands regulatory process.

South Carolina should adopt a broad overall goal for managing its wetlands resources. Consistent with goals expressed in the report of the National Wetland's Policy Forum, the Governor's Freshwater Wetlands Forum finds that:

27. The primary goal of the wetlands program in South Carolina is to achieve no overall net loss of regulated wetlands, based on function and value, to be accomplished through a program of wetland classification and mitigation.

B. Jurisdictional Boundaries of Regulated Wetlands – Within the state's freshwater wetlands regulatory program, the Forum supports the establishment of specific jurisdictional policies.

The Governor's Freshwater Wetlands Forum recommends:

28. The adoption of a regulatory program that includes all contiguous and isolated freshwater wetlands of the state. The area of jurisdiction would encompass all of the approximately 4.5 million acres of wetlands of the state.

C. Wetlands Classification Alternatives – Furthermore, the Forum recommends:

29. The establishment of a specific classification system for the state's freshwater wetlands, based on hydrologic type. The recommended system classifies South Carolina's freshwater wetlands into four broad groups:

- Class 1: Wetlands Adjacent to Navigable Streams - are wetlands that are located adjacent to and are hydrologically contiguous with navigable waterways as defined by R.19-450.2C., S.C. Code of Laws, 1976.

  [Note: Navigable waters means those waters which are now navigable, or have been navigable at any time, or are capable of being rendered navigable by the removal of accidental obstructions, by rafts of lumber or timber or by small pleasure or sport fishing boats.]

- Class 2: Wetlands Adjacent to Non-Navigable Streams - are wetlands that are located adjacent to and are hydrologically contiguous with streams which flow into navigable waters.
- Class 3: Isolated Wetlands - are wetlands not hydrologically contiguous with the surface water tributary system discharging into a lake, pond, river, stream, or other surface water feature.
- Class 4. Manmade Wetlands constructed in areas that were not wetlands in their natural state and Natural Isolated Wetlands less than five acres in size - This class does not include wetlands constructed for mitigation purposes.

The Forum recommends that any activity which could adversely impact the important functions of wetlands in Classes 1, 2, and 3 should require a permit. Consideration should be given to allow the regulatory agency to issue general permits. Furthermore, any activity specifically exempted could be conducted in any class of wetlands without a permit. No permit would be required for any activity conducted in Class 4 wetlands, unless endangered species or critical ecological habitat is impacted.

D. Activities to be Regulated – The Forum recommends:

30. That specific types of alterations which could impact wetlands be regulated if not presently regulated. Some of these alterations include:

a. **Filling or Deposition of Materials** - including such alterations necessary for the construction of dams or dikes. This activity is currently regulated in virtually all wetlands of the state.

b. **Dredging Without Fill or Deposition, Excavation, or Removal of Materials** - Commercial mining is currently regulated in all wetlands. Other dredging and excavation activities are regulated in saltwater and tidal freshwater wetlands only.

c. **Placement of Structures or Obstructions** - These activities are now regulated in saltwater and tidal freshwater wetlands.

d. **Hydrologic Alteration including Draining and Flooding** - Again, these activities are currently regulated in saltwater and tidal freshwater wetlands.

e. **Discharge of Wastewater** - This activity is currently regulated in all wetlands.

E. Activities Exempted from Regulation – Nearly all wetlands regulatory programs nationwide exempt certain activities from regulation. Many activities which alter wetlands in some fashion are considered not to have significant adverse impacts as long as certain stated conditions are fulfilled.

The Forum supports the concept that certain activities be exempted from wetlands regulatory oversight. However, the Forum specifically

supports the position that an exempted activity must be conducted in accordance with the protection of endangered species and critical ecological habitat. Specifically, the Forum recommends:

31. Exemption from regulation of the following activities in order to avoid duplication of existing regulatory programs and simplify the regulatory program.

a. Normal farming or ranching, with approved "Best Management Practices" (BMPs)
b. Normal silviculture, with BMPs
c. Maintenance of currently serviceable structures
d. Maintenance of farm or stock ponds
e. Maintenance of irrigation canals and construction of ponds of five acres or less
f. Maintenance of drainage ditches and canals
g. Construction of temporary sedimentation basins - at construction sites
h. Construction/maintenance of temporary roads for moving mining equipment, with BMPs
i. Repair, rehabilitation or replacement of any previously authorized, currently serviceable structure or fill
j. Fish and wildlife harvesting devices and structures - such as deer stands, duck blinds, traps, etc.
k. Discharges of dredged or fill material into isolated wetlands of less than five acres in size - with due consideration of endangered species and critical habitat
l. Dredging isolated wetlands of less than five acres in size - with due consideration of endangered species and critical habitat
m. Draining isolated wetlands of less than five acres in size - with due consideration of endangered species andcritical habitat
n. Normal maintenance and repair of functional rice field and wildlife management impoundments, including dikes and water control structures, with BMPs
o. Activities associated with routine maintenance of existing public and private highways, roads, streets, and bridges, or replacement of, or minor improvements to structurally deficient or functionally obsolete structures located in regulated freshwater wetlands - where the improvements are necessary to meet current design and safety standards. These activities must be implemented in accordance with approved BMPs to assure the protection of freshwater wetland functions and values. Maintenance, replacement, or minor improvement includes adding extra lanes or increasing the right-of-way for public roads within a regulated wetland only in the case where five acres or less of wetlands will be impacted per project.
p. Any emergency activity commenced under an emergency order to protect the public's health and safety when ordered by the following elected officials or their appointees: the Governor of the State of South Carolina, the Chairman of the County Council of the county in which

the activity will take place, or the Mayor of the municipality in which the activity will occur, and with notification to the primary permitting agency.

q. Routine and emergency repair, maintenance and replacement of or minor improvements to systems serving the public - such as electricity, natural gas, communications, water or sewer, and railroad systems
r. Fishing, trapping, hunting, swimming, boating, hiking
s. Maintenance, repair or operation of gas or oil pipelines, with BMPs
t. Maintenance of drinking water supply impoundments
u. Federal, state or local government mosquito control activities
v. Any activity for which an individual Section 404 or NPDES permit is required.

F. Alternatives for Wetlands Mitigation –Various types of mitigation measures can be used to prevent or compensate for degradation or loss of wetlands. The Forum supports and recommends:

32. Consideration of the use of mitigation to offset degradation and loss in regulated wetlands, with consideration given to the level of public benefit resulting from the activity.

33. Application of the following policies in the state considers the implemention of a wetlands mitigation program:

a. Mitigation must include - avoiding impacts, rectifying impacts, minimizing impacts, reducing or eliminating impacts, and/or compensation for impacts.
b. Compensation mitigation may not be used without first applying other types of mitigation.
c. Compensation mitigation must be considered for all unavoidable permitted losses of wetlands to achieve the no overall net loss goal.
d. Acceptable compensation mitigation could include:
   - restoration of degraded wetlands
   - creation of new wetlands, if technically feasible
   - enhancement of existing wetlands
   - preservation of existing non-regulated wetlands
   - reasonable cash payments into a freshwater wetlands mitigation program
e. In most cases a minimum of 1:1 acreage replacement of wetlands will be required to achieve no net loss of values. However, this ratio may be greater where the functional values of the area being impacted are demonstrably high. Conversely, the ratio may be less than 1:1 for areas where the functional values associated with the area being impacted are demonstrably low and the likelihood of success associated with the mitigation proposal is high.
f. Compensatory actions (e.g., restoration of existing degraded wetlands or creation of man-made wetlands) should be undertaken, when practicable, in areas adjacent or contiguous to the discharge site (on-site compensatory mitigation). If onsite compensatory mitigation is not prac-

ticable, off-site compensatory mitigation should be undertaken in the same geographic area (i.e., in close physical proximity and, to the extent possible, the same watershed). In determining compensatory mitigation, the functional values lost by the resource to be impacted must be considered.

g. A mitigation banking system should be established to assist in attaining no net loss goals.

G. Regulatory Program Alternatives – Eleven regulatory program options were presented before the Forum to consider. The Forum strongly endorsed the selection of a mechanism that consolidates regulatory programs and simplifies the permitting process. As discussed, various alternatives exist for assigning regulatory program responsibilities and authorities to an existing state agency within South Carolina.

The Forum has considered many alternatives and recommends:

34. The identification of an existing state agency, having representatives of all relevant state agencies as well as appointed members, which could consolidate all existing freshwater wetlands programs into a new program to fill existing gaps in regulation. The agency would use a single application process, public notice, review period, public hearing if needed, appeals process if needed, enforcement procedures, and issue a single state permit.

35. The federal law covering the Section 404 program establish clear policies and simplified procedures through federal legislation, allow program assumption for all wetlands of the state, and provide for financial support to states seeking to assume management of the program.

The Governor's Freshwater Wetlands Forum urges the South Carolina General Assembly, as part of the legislative process, to explore and recognize the economic impacts of any regulatory mechanisms and programs established to the citizens of South Carolina.

EDUCATION PROGRAMS

Existing Wetlands Education Programs

A small sub-committee consisting of representatives of the Governor's Forum on Freshwater Wetlands and various state agencies met several times to identify existing wetlands educational programs and develop recommendations for consideration by the Forum membership to enhance these efforts.

Existing wetlands educational programs identified by the subcommittee include:

S.C. Wildlife and Marine Resources Department - The SCWMRD includes wetlands topics in their PROJECT WILD program, which provides teacher training in the

use of PROJECT WILD materials in the classroom and in the training of other teachers. The SCWMRD publishes a number of booklets, brochures and other educational materials available to schools and the general public.

S.C. State Forestry Commission - The S.C. State Forestry Commission conducts workshops for the forestry industry based on its publication "Best Management Practices for South Carolina's Forest Wetlands;" some 10 to 12 sessions have been held across the state. They also have instituted PROJECT LEARNING TREE, a broad and multidisciplinary teacher-training program aimed at integrating forest conservation educational materials across the entire school curriculum. Like the SCWMRD, the Commission produces excellent printed material for schools and the general public.

S.C. Coastal Council - The SCCC develops and extends educational materials on wetlands and other coastal resources through its Coastal Zone Education Center, located in Bluffton, S.C. The Center provides information on, among other topics, the SCCC's direct permit authority over saltwater wetlands and certification authority over freshwater wetlands throughout the state's eight coastal counties. Publications available from the Center include the "Developer's Handbook for Freshwater Wetlands."

S.C. Governor's Office - The Governor's Office has implemented a Water Watch Program that encourages public involvement in the management of the state's water resources. Publications are available to assist South Carolina citizens in the procedures for adopting a water body (or segment thereof) and the associated responsibilities of the Water Watch group, which could include a "watch" for pollution, clean-up programs, and monitoring programs to examine water quality.

S.C. Department of Parks, Recreation and Tourism - The SCPRT is responsible for the State Comprehensive Outdoor Recreation Plan which includes the "South Carolina Wetlands Study" and work on several river corridor plans. Resource management and interpretive staff at state parks provide displays and regular educational programs on such topics as "Wetlands: Our Vanishing Heritage," "Forest Ecology," "Endangered Species," "Nature in the Marsh," and outings such as canoe trips, wildflower walks and "owl prowls." The Community Development and Tourism Investment staff work with communities and prospective tourism developers to find appropriate sites and identify proper permitting agencies.

S.C. Land Resources Conservation Commission - The SCLRCC, through its Conservation Districts, annually conducts poster and essay contests for grade K-12 students that focus on significant natural resource issues. SCLRCC also sponsors teacher certification workshops

that include wetlands and aquatic ecosystems study. SCLRCC works with Boy Scout troops and provides training toward merit badges on soil and water conservation. At its Conservation College held at Clemson University, SCLRCC emphasizes training in the wise use of the natural resource environment. The agency is also developing curriculum material (in cooperation with the S.C. Department of Education) on geography, to be introduced into the public school system as part of the state's Basic Skills Assessment Program (BSAP); wetland issues are an integral part of this workbook. SCLRCC is in the process of completing the National Wetlands Inventory mapping which, once completed, will greatly enhance our knowledge of South Carolina's wetlands resource.

S.C. Sea Grant Consortium - The S.C. Sea Grant Consortium (SCSGC) provides support for teacher training programs on coastal resources, including wetlands. The SCSGC has developed a number of educational materials on freshwater wetlands, including its 1988 Conference Proceedings entitled "Wealth or Wastelands: South Carolina's Freshwater Wetlands" and its Winter 1989 Coastal Heritage newsletter on wetlands. The SCSGC has also developed, with the support of a number of co-sponsors, an educational slide show on freshwater wetlands, to be accompanied by an explanatory brochure and a video on wetlands. These materials will be available from the SCSGC for use in the classroom and at meetings of civic and cultural organizations.

S.C. Department of Health and Environmental Control - The SCDHEC maintains a library of wetlands-related material; a primary source of these publications is the U.S. Environmental Protection Agency. For example, the USEPA published "Wetlands and 401 Certification: Opportunities and Guidelines for States and Eligible Indian Tribes" in April 1989 which describes how states can use 401 certification as a wetlands management tool.

The Sierra Club - The South Carolina Sierra Club has an active wetlands committee that has developed a slide presentation and associated materials on the state's wetland resources.

The Audubon Society - The South Carolina Audubon Society distributes a national, bimonthly Audubon Activist publication that features articles on environmental issues and legislation including many articles about wetlands. National Audubon is in the process of initiating a wetlands program that would include a "Wetlands Watch" program. Proposed activities would include regularly-scheduled volunteer bird counts in wetland areas to monitor the "health" of wetlands habitat and assess impacts on wetland areas over a long period of time.

Education Recommendations

The recommendations developed to enhance wetlands education and awareness programs in South Carolina are targeted to five constituencies:

1. General public;
2. teachers of grades K-12;
3. local government officials, including those who serve on zoning and planning boards and development councils and commissions;
4. sector-based representatives, including homebuilders, attorneys, developers, and others; and
5. landowners whose properties contain wetlands.

The Governor's Freshwater Wetlands Forum recommends the following wetlands education programs:

36. A comprehensive bibliography should be compiled of all relevant wetlands publications from federal, state, and private sources.

37. An adequately staffed wetlands information office should be established within the state agency primarily responsible for freshwater wetlands regulation. The wetlands information office should:

a. have complete knowledge of the wetlands permitting process;
b. serve as the state wetlands information manager,
c. have an adequate supply of wetlands information materials to send to all interested persons inquiring about wetlands;
d. network closely with regional Councils of Government and other planning agencies to enhance information exchange with municipal government officials;
e. be responsible for updating the bibliography recommended above;
f. prepare wetlands-related information releases to the news media (newspaper, radio and television); and
g. coordinate the output of the recommended wetlands mapping process with the data available from local tax assessors to provide a periodic direct mail advisory to landowners who may have wetlands on their property. The advisory should inform the owners of the likely existence of a wetland on their property and the means to obtain wetlands information. The address and phone number of the wetlands information office shall be made available through the media and other sources, including state agencies.

38. A Speaker's Bureau should be established, represented by qualified persons from across the state, to speak on vari-

ous wetlands issues. The list of available speakers should be made available to the news media and other groups seeking presentations on wetlands-related topics.

39. A publication describing South Carolina wetlands and their functions and protection needs should be developed. The publication should be widely distributed throughout the state, and also be made available at all county extension offices and the State Library.
40. A joint meeting be held annually or semiannually of the commissioners, board chairmen and executive directors of the state's natural resource agencies and the directors of the state's councils of government. The purpose of these meetings shall be to exchange information and ensure coordination of all state programs and activities relevant to wetlands and other natural resource issues.

FOR FURTHER READING

Anon. 1989. Freshwater wetlands in Delaware: A framework for their conservation, protection, and management. (Delaware) Governor's Freshwater Wetlands Roundtable. Dover, DE.

Brenneman, Russell and Sarah Bates, eds. 1984. Land Saving Action. Conservation Law Foundation of New England, Inc., Island Press, Covelo, CA.

Burke, David, Erik Myers, Ralph Tiner, and Hazel Groman. 1988. Protecting nontidal wetlands. Planning Advisory Service Report #412/413, American Planning Association, Chicago, IL.

Cowardin, L.M.. V. Carter, F.C. Golet and E.T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Fish and Wildlife Service. FWS/OBS-79/31.

Early, Lawrence S., October. 1989 (October). Wetlands in the highlands. Wildlife in North Carolina, N.C. Wildlife Resources Commission, Raleigh, NC.

Federal Interagency Committee for Wetland Delineation. 1989. Federal manual for identifying and delineating jurisdictional wetlands. U.S. Environmental Protection Agency, Washington, D.C.

Hefner, John M. and James D. Brown. 1985. Wetlands trends in the Southeastern United States. Journal of the Society of Wetland Scientists, Vol. 4. The Society of Wetland Scientists, Wilmington, NC.

Krohe, J., Jr. 1989 (February). When it comes to wetlands, there's nothing like the real thing. Planning. American Planning Association, Chicago, IL.

Kusler, Jon A. 1983. Our National Wetland Heritage: A Protection Guidebook. Environmental Law Institute, Washington, DC.

Mitsch, William J. and James G. Gosselink. 1986. Wetlands. Van Nostrand Reinhold Company Inc., New York, NY.

National Wetlands Policy Forum. 1988. Protecting America's Wetlands: An Action Agenda. The Conservation Foundation, Washington, DC.

National Wetlands Policy Forum. 1989. Recommendations for Comprehensive State Wetlands Programs. The Conservation Foundation, Washington, DC.

Nelson, John B. 1986. The natural communities of South Carolina. S.C. Wildlife and Marine Resources Dept.,Columbia, SC.

Ott, E. Eugene. 1989 (May). Taking a closer look before leaping into freshwater wetlands protection. Environmental Prospectus, Vol. 3, No. 9, Laurens, SC.

Postles, Barbara and John Mark Dean. 1987. The wetlands mitigation issue in South Carolina. Prepared for the S.C. Water Resources Commission. Belle W. Baruch Institute for Marine Biology and Coastal Research, University of South Carolina, Columbia, SC.

Rayner, Doug. 1987 (Nov.-Dec.). Bays of Carolina. South Carolina Wildlife, Vol. 34, No. 6, S.C. Wildlife and Marine Resources Dept., Columbia, SC.

Reed, Porter B. 1989. Wetland plants of the State of South Carolina. USDI-Fish and Wildlife Service, St. Petersburg, FL.

S.C. Coastal Council and U.S. Army Corps of Engineers. 1989. Developer's Handbook for Freshwater Wetlands. Charleston, SC.

S.C. Dept. of Health and Environmental Control. 1989. Environmental permitting in South Carolina. Columbia, SC.

S.C. Dept. of Health and Environmental Control. 1986. A feasibility study of assumption of the Section 404 Program by the state of South Carolina. Columbia, SC.

S.C. Dept. of Parks, Recreation and Tourism. 1988. South Carolina wetlands: A component of the South Carolina State Comprehensive Outdoor Recreation Plan. Columbia, SC.

S.C. Forestry Commission. (no date). Best management practices for South Carolina's forest wetlands. Columbia, SC.

S.C. General Assembly. Zoning and Planning. Title 5, Chapter 23, Code of Laws of South Carolina 1976 and 1988 Cumulative Supplement. The Lawyers Co-operative Publishing Co., Rochester, NY.

S.C. General Assembly. Planning by Local Governments. Title 6, Chapter 7, Code of Laws of South Carolina 1976 and 1988 Cumulative Supplement. The Lawyers Co-operative Publishing Co., Rochester, NY.

S.C. General Assembly. County Equalization and Reassessment. Title 12, Chapter 43, Code of Laws of South Carolina 1976 and 1988 Cumulative Supplement. The Lawyers Cooperative Publishing Co., Rochester, NY.

S.C. General Assembly. Conservation Restrictions and Easements. Title 27, Chapter 9, Code of Laws of South Carolina 1976 and 1988 Cumulative Supplement. The Lawyers Co-operative Publishing Co., Rochester, NY.

S.C. General Assembly. Heritage Trust Program. Title 51, Chapter 17, Code of Laws of South Carolina 1976 and 1988 Cumulative Supplement. The Lawyers Co-operative Publishing Co., Rochester, NY.

S.C. General Assembly. 1989. South Carolina Scenic Rivers Act. Title 49, Chapter 29, Code of Laws of South Carolina, 1976, as amended. Columbia, SC.

S.C. Wildlife and Marine Resources Dept. 1988 (Fall). Carolina Bays studied. The South Carolina Transect. Nongame and Heritage Trust Section, Columbia, SC.

Tiner, Ralph W., Jr. 1984. Wetlands of the United States: Current status and recent trends. U.S. Dept. of the Interior, Fish and Wildlife Service. Washington, DC.

U.S. Congress. Emergency Wetlands Resources Act of 1986. PL 99-645. Washington, DC.

U.S. Congress. Food Security Act of 1985. PL 99-198. Washington, DC.

U.S. Department of Agriculture. 1987. Hydric soils of the United States. U.S. Soil Conservation Service. U.S. Government Printing Office, Washington, DC.

U.S. Fish and Wildlife Service. 1985. 1985 National Survey of fishing, hunting and wildlife-associated recreation. U.S. Department of the Interior, Washington, DC.

U.S. Fish and Wildlife Service. 1989. National wetlands priority conservation plan. U.S. Dept. of the Interior, Washington, DC.
U.S. Forest Service. 1988. The South's fourth forest: Alternatives for the future. U.S. Department of Agriculture. Forest Resource Report No. 24.
U.S. Office of Technology Assessment. 1984. Wetlands: Their use and regulation. U.S. Congress, Office of Technology Assessment, OTA-0-206, Washington, DC.

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