COASTAL NONPOINT POLLUTION CONTROL PROGRAM

FINAL PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

Office of Ocean and Coastal Resource Management
Coastal Programs Division
1305 East-West Highway
Silver Spring, MD 20910

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U.S. DEPARTMENT OF COMMERCE
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DESIGNATION: Final Programmatic Environmental Impact Statement

TITLE: Coastal Nonpoint Pollution Control Program

ABSTRACT: This final programmatic environmental impact statement (Final PEIS) is prepared pursuant to the National Environmental Policy Act (NEPA), 42 U.S.C. 4321 et seq. to assess the environmental impacts associated with the approval of state and territory coastal nonpoint pollution control programs (coastal nonpoint programs). Section 6217 of the Coastal Zone Act Reauthorization Amendments (CZARA), 16 U.S.C. 1455b, requires states and territories with coastal zone management programs that have received approval under section 306 of the Coastal Zone Management Act to develop and implement coastal nonpoint programs. Coastal states were required to submit their coastal nonpoint programs to NOAA and the Environmental Protection Agency (EPA) for approval in July 1995. Once approved, these programs will be implemented through changes to the state nonpoint source program approved by EPA under section 319 of the Clean Water Act and through changes to the state coastal zone management program. This PEIS will form the basis for the subsequent NEPA documents (environmental impact statements or assessments) NOAA will prepare on each of the state coastal nonpoint programs submitted for approval.

Management measures to control the addition of pollution to coastal waters have been developed by EPA for five source categories of nonpoint pollution: agricultural runoff, urban runoff, forestry runoff, marinas, and hydromodification. Measures were also developed for wetlands, riparian areas, and vegetated treatment systems. State programs must provide for the implementation of management measures that are in conformity with the EPA-developed measures. This PEIS describes the environmental impacts on coastal waters of the pollutants associated with each nonpoint source category and describes the direct and indirect impacts associated with implementation of the 56 management measures and with the implementation of state and territory coastal nonpoint programs.

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EXECUTIVE SUMMARY

The National Oceanic and Atmospheric Administration (NOAA) has prepared this programmatic environmental impact statement (PEIS) to assess the environmental impacts associated with the approval of state and territorial coastal nonpoint pollution control programs (coastal nonpoint programs) under section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990. This PEIS will form the basis for the subsequent environmental documents (environmental impact statements or assessments) NOAA will prepare on each of the state coastal nonpoint programs submitted for approval.

Section 6217 requires states and territories with coastal zone management programs that have received Federal approval under section 306 of the Coastal Zone Management Act (CZMA) to develop and implement coastal nonpoint programs. States were required to submit their coastal nonpoint programs to NOAA and the Environmental Protection Agency (EPA) for approval in July 1995. Once approved, these programs will be implemented through changes to the state nonpoint source program approved by EPA under section 319 of the Clean Water Act and through changes to the state coastal zone management program.

For purposes of this PEIS, the proposed action is NOAA's decision on the approvability of the state and territory coastal nonpoint programs. At the time of program submission, NOAA's alternatives will be to approve the state and territory programs, conditionally approve programs, or deny approval of programs, depending on whether the programs meet the requirements of section 6217. Programs will be approved after a joint NOAA/EPA review determines that all the requirements of section 6217 are met. Conditional approval will be granted to state and territory programs that fulfill certain aspects of these requirements but need changes or additions in order to be fully approvable. NOAA and EPA will provide up to five years of conditional approval to allow states and territories to complete development of their coastal nonpoint programs. Denial of approval of a program will have the effect of relying on existing nonpoint control programs and coastal zone management programs and accepting the reductions in Federal funding penalties associated with nonapproval.

The core of the 6217 program is the implementation by states and territories of management measures to protect coastal waters from nonpoint source pollution. Management measures are economically achievable measures to control the addition of nonpoint pollution to coastal waters. EPA has developed guidance specifying management measures for five source categories of nonpoint pollution: agricultural runoff, urban runoff, forestry runoff, marinas, and hydromodification. Management measures were also developed for wetlands, riparian areas, and vegetated treatment systems. State and territory programs must provide for the implementation of management measures that are in conformity with these EPA - developed measures. The primary pollutants associated with the source categories that affect coastal waters are sediment, nutrients, pesticides, pathogens, hydrocarbons, heavy metals, salts, and toxic chemicals. The adverse effects of these pollutants range from aesthetically displeasing turbid water to eutrophication, loss of habitat, and localized fish kills. The application of the 56 management measures described in the PEIS will reduce the input of these pollutants into coastal waters and improve water quality.

Section 6217 requires that each state and territory's program also contain a number of specific elements including identification of additional management measures to be applied, if necessary, to meet water quality standards; enforceable policies and mechanisms to ensure

implementation of the management measures and the additional management measures; technical assistance to local governments and private individuals; administrative coordination mechanisms; public participation; identification of critical coastal areas; monitoring; and a description of the 6217 management area.

As part of its responsibilities under the statute, NOAA reviewed existing state coastal zone boundaries and, in consultation with EPA, made recommendations to each state on the geographic scope of its program (also known as the "6217 management area"). NOAA's recommendations were generally based on coastal watersheds. NOAA and EPA recognize that states may have more specific information to better delineate the geographic scope of their programs, and expect that some states may submit an alternative, less extensive management area than that originally recommended by NOAA. Because the actual geographic scope of each state's program is unknown at this time, this PEIS will use NOAA's original recommendation - coastal watersheds - for purposes of generally describing the environment to be affected by this program.

NOAA has determined that the approval and conditional approval of coastal nonpoint programs will not result in any significant adverse environmental impacts and that these alternatives will have an overall beneficial effect on the environment. Approval and conditional approval will help to control sources of nonpoint pollution and will result in fewer pollutants reaching coastal waters. Denying approval of the programs may have an adverse environmental effect because it may cause the state to not implement management measures that are meant to control coastal nonpoint pollution, restore degraded coastal waters, and protect critical coastal areas. There may be some slight and localized socioeconomic impacts associated with approval and conditional approval that are unavoidable because of implementation of management measures and because of changes in patterns of land and water uses made by states and individuals to avoid activities that degrade water quality and habitats.

1. OVERVIEW

1.A Background

The Coastal Zone Management Act of 1972 (CZMA) established a national program under which states and territories can voluntarily develop programs to protect and manage coastal resources. In order to receive Federal approval and funding, states and territories must demonstrate that they have programs that are comprehensive enough to control land and water uses which have a direct and significant impact on coastal waters. While water quality protection is integral to the management of many coastal resources, it was not specifically cited as a purpose of the original CZMA.

The year 1972 also saw the passage of the Clean Water Act which has been instrumental in controlling point sources of pollution. As point sources have come under control, nonpoint source pollution has emerged as a major problem in many coastal areas. Based on information provided by states and territories, EPA determined that the most significant nonpoint contributors to coastal waters are urban runoff, agriculture, forestry, marinas, and hydromodification. In addition, the loss and degradation of wetlands and riparian areas has adversely affected coastal waters.

In 1990, Congress enacted section 6217 of the Coastal Zone Act Reauthorization Amendments (CZARA), entitled "Protecting Coastal Waters", to help address the problem of nonpoint source pollution and its effect on coastal waters. The purpose of the section is to strengthen the links between Federal and state coastal zone management and water quality programs in order to enhance state and local efforts to manage land use activities that degrade coastal waters and habitats. Section 6217 requires states and territories with federally approved coastal management programs to develop coastal nonpoint pollution control programs (coastal nonpoint programs) and submit them to NOAA and EPA in July 1995 for approval. Once approved, these programs will be implemented through changes to the state nonpoint pollution program approved by EPA under section 319 of the Clean Water Act (CWA) and through changes to the state or territorial coastal zone management program approved by NOAA under the CZMA.

Section 6217 utilizes a two-tiered management approach for the control of nonpoint sources of pollution. The purpose of the first tier is to protect coastal waters generally. It requires that states and territories implement, at a minimum, management measures in conformity with guidance that was developed by EPA in consultation with NOAA and other Federal agencies. The management measures developed by EPA address the nonpoint pollution source categories of urban runoff, agricultural runoff, forestry runoff, hydromodification, and marinas. Management measures must also be implemented for wetlands protection, riparian areas, and vegetated filter strips. Once the first tier of management measures are implemented to protect coastal waters generally, the state or territory will need to develop additional management measures to implement, as necessary, to meet water quality standards and protect designated uses.

The administration of section 6217 is a joint NOAA- EPA responsibility. In order to ensure coordination during review and approval of the programs submitted by the states and territories, NOAA and EPA established review teams that included representatives from NOAA, EPA Headquarters, and the appropriate EPA Regional Office. The responsibility for review of the technical aspects of the program submission was assigned to EPA Headquarters, while NOAA accepted responsibility for review of the enforceable policies and mechanisms

required to ensure that the management measures will be implemented. The review of other programmatic elements of the program were shared between NOAA staff and the EPA Regional representative. As a result of this review, NOAA and EPA will issue Findings for each program submission, which will identify how the coastal nonpoint program meets the requirements of section 6217, and what conditions, if any, must be met for final program approval. NOAA is also responsible for developing an environmental document for each of the state programs in compliance with the National Environmental Policy Act (NEPA). When completed, the NEPA document and the draft program Findings will be made available for a thirty day public review.

1.B Purpose and Need for Action

NOAA has prepared this programmatic environmental impact statement (PEIS) to assess the environmental impacts associated with the approval of state and territory coastal nonpoint programs. This PEIS will form the basis for the subsequent NEPA documents NOAA will prepare on each of the state and territorial coastal nonpoint programs submitted for approval. When a specific state or territory program is proposed, a subsequent NEPA document will be prepared which addresses the state- or territory-specific environmental impacts arising from that method of implementing the program. These subsequent NEPA documents will present a summary of the issues addressed in the PEIS and, as appropriate, incorporate by reference the analyses presented in the PEIS.

2. ALTERNATIVES

For purposes of this PEIS, the proposed action involves NOAA's decision on the approvability of the state and territorial coastal nonpoint programs. At the time of program submission, NOAA's alternatives will be to approve the state and territory programs, conditionally approve programs, or deny approval of programs, depending on whether the programs meet the requirements of section 6217. Those alternatives are described below. NOAA will select a preferred alternative for each state and territory program after a review of each program.

2.A Approval of State and Territory Programs

In enacting section 6217, Congress sought to address the impact of nonpoint source pollution on coastal waters. The section requires each state and territory with an approved coastal zone management program to develop and submit to NOAA and EPA for approval a coastal nonpoint program in July 1995. NOAA and EPA then have six months to review the programs.

The statute required EPA to publish technical guidance specifying management measures for sources of nonpoint pollution in coastal waters (USEPA, 1993). The 56 management measures contained in this guidance, known as the (g) guidance, became the technical basis of the coastal nonpoint program.

To assist states and territories in the development of their programs, NOAA and EPA jointly published a program development and approval guidance document (NOAA/EPA, 1993). The state programs will be approved after a joint NOAA/EPA review if they meet all of the requirements of section 6217 as specified in the statute and in the program guidance documents. Specifically, each program must contain the following components:

- Coordination with Existing State Programs
- Determination of the 6217 Management Area
- Implementation of Management Measures in Conformity with (g) Guidance
- Identification and Implementation of Additional Management Measures
- Technical Assistance
- Public Participation
- Administrative Coordination
- Identification of Enforceable Policies and Mechanisms
- Monitoring

As part of the approval process, a subsequent NEPA document (an environmental impact statement or assessment) will be prepared which addresses the state-specific environmental impacts arising from the state or territory proposal for implementing the program.

The alternative of approving state and territory programs would generally be expected to have a beneficial effect on the environment because it will enhance state efforts to control sources of nonpoint pollution which will result in fewer pollutants reaching coastal waters. It will make existing programs more effective by strengthening the links between Federal and state coastal zone management and water quality programs, thereby improving state and local efforts to manage land use activities that degrade coastal waters. The incremental impact of approving state and territory programs will add to the positive environmental effect of the

present nonpoint control efforts being conducted under section 319 of the CWA and the resource management activities undertaken by approved state and territory coastal management programs. The identification and implementation of additional management measures will help prevent future water quality degradation by addressing new or expanding land uses within critical coastal areas adjacent to impaired or threatened waters.

The approval of state and territory nonpoint programs should also have positive socioeconomic benefits. The improvements in coastal water quality that will result from controlling nonpoint source pollution will increase the aesthetic value of coastal areas which will benefit recreation and tourism by providing opportunities for boating and swimming and other water related activities. Public health and safety will benefit through the prevention of pathogen contaminated runoff which can lead to beach and shellfish bed closures and contaminated drinking water supplies. There may be some slight and localized socioeconomic impacts from implementation of management measures and because of changes in patterns of land and water uses that may occur because of restrictions resulting from designation of critical coastal areas.

2.B Conditional Approval of State and Territory Programs

States and territories are expected to submit a coastal nonpoint program in July 1995 that meets all of the requirements of section 6217. However, NOAA and EPA realize that in some situations, a state or territory's program may require changes before final approval can be granted. In these situations, NOAA and EPA will grant conditional approval in order to provide states and territories an opportunity to make necessary changes. Conditional approvals are intended primarily to provide states with additional time to:

(1) address identified gaps, including obtaining new statutory or regulatory authority, if necessary;

(2) demonstrate that existing authorities are adequate for ensuring implementation of the management measures; and,

(3) develop other incomplete program components (e.g., identification of critical coastal areas).

NOAA and EPA will provide states and territories up to five years from the time of conditional approval to complete their coastal nonpoint programs. The length of the conditional approval will depend on which program components are subject to conditions and how long it will take to finalize those components. A state or territory may request conditional approval if it is unable to complete development of a portion of its program prior to the July 1995 program submission deadline. Conditional approval may also be granted if NOAA and EPA find that a program submission does not fully meet section 6217 requirements. In each case, NOAA and EPA will work with a state or territory to establish a schedule and milestones for meeting specific conditions. Final program approval will be granted only after all requirements are met.

The alternative of conditionally approving state and territory programs would generally be expected to have a beneficial effect on the environment because it will produce many of the same results as full approval, only over a longer period of time, and will avoid the adverse impacts associated with denial of approval, provided the state or territory satisfies the conditions. The implementation of the completed portions of a program will begin to fulfill the intent of section 6217 by helping to control sources of nonpoint pollution thus resulting in

fewer pollutants reaching coastal waters. Conditional approval will also produce the same socioeconomic and incremental effects as final approval.

2.C Deny Approval of State and Territory Programs [No Action]

NOAA and EPA will base their review of a coastal nonpoint program on whether the state or territory has met the requirements of section 6217 as described in the statute and in the program guidance documents. NOAA and EPA will consult with states and territories during the six month review period and will provide them with an opportunity to amend their programs during this review. If it is determined that a state or territory has failed to submit an approvable program, section 6217(c)(3) and (4) require that penalties be levied through reductions in Federal funds awarded under section 306 of the CZMA and section 319 of the CWA.

The decision to deny approval of a coastal nonpoint program has the same effect as the "no action" alternative under the National Environmental Policy Act. Although section 6217 requires states and territories to develop and implement coastal nonpoint programs, approval of the programs is not assured until NOAA and EPA find that all the requirements of section 6217 have been met. Denial of approval of a coastal nonpoint program will have the effect of relying on existing nonpoint control efforts and levying the penalties associated with nonapproval.

All states and territories have undertaken efforts to control nonpoint source pollution through their nonpoint programs developed under section 319 of the CWA. However, nonpoint source pollution continues as a major contributor to the impairment of inland and coastal waters. The section 6217 program was designed to apply a more uniform approach to the prevention and control of nonpoint pollution so as to halt the continued degradation of water quality with its subsequent adverse environmental and socioeconomic impacts. Adverse socioeconomic impacts can result from poor water quality through destruction of habitats, declines in estuarine-dependent fish, reductions in already overexploited commercial fishery stocks, a decrease in tourism, and restricted opportunities for recreation and water contact activities. The incremental impact of disapproving coastal nonpoint programs will be the loss of the opportunity to improve and expand existing state and territory nonpoint source programs to more comprehensively address nonpoint pollution sources and the failure to implement additional management measures when necessary to meet water quality standards.

3. AFFECTED ENVIRONMENT

The approval of coastal nonpoint programs and the implementation of management measures could affect varying areas in the coastal zones of at least 29 states and territories. As required by section 6217, NOAA, in consultation with EPA, made recommendations to each state on the geographic scope of its program (also known as the "6217 management area").

A state or territory need not adopt NOAA's boundary recommendation; a state or territory may propose an alternative 6217 management area at the time of program submission. Because the actual geographic scope of each coastal nonpoint program is unknown at this time, this PEIS will use NOAA's original recommendation - which was based on coastal watersheds - for purposes of generally describing the affected environment.

The description of the affected environment provided in this PEIS is of a general nature because of the widely diverse areas encountered across all of the states and territories that are expected to submit coastal nonpoint programs. A more detailed description will be included in the NEPA document prepared on each state or territory's program submission.

3.A The Physical Environment

1. Geographic Setting - Coastal Zone Boundary

Figure 1 shows the locations of the 29 states and territories with approved coastal zone management programs. Also shown are the five states that are developing coastal zone management programs under section 305 of the CZMA. Of the 29 approved coastal programs, three states - Florida, Delaware, and Rhode Island - as well as all island territories, have a CZMA-defined coastal zone (which is set by each state) that encompasses the entire state or territory. The other states have defined boundaries based on a set distance from coastal waters, physical features (e.g., mountain ranges) or political boundaries (e.g., coastal counties). In all instances, the boundaries were defined to include those land uses having a direct and significant impact on the coastal waters.

The geographic extent of the coastal regions, as defined by the coastal states and territories in their coastal zone management programs, is indicated in Table 1 which shows the tidal shoreline lengths and the coastal land area of the coastal states and territories.

2. The 6217 Management Area

As directed by section 6217(a), the geographic scope of each coastal nonpoint program must be sufficient to ensure implementation of management measures to "restore and protect coastal waters." As stated above, NOAA selected coastal watersheds as its basic recommendation for the 6217 management area. Coastal watersheds were selected because they provide a logical physical unit when dealing with nonpoint source pollution. The boundary of the coastal watershed was defined, for purposes of NOAA's recommendation, by the inland extent of the U.S. Geological Survey (USGS) hydrologic cataloging units that contain the upstream extent of tidal influence, or, in the Great Lakes region, that are located adjacent to the coast (a cataloging unit is the smallest USGS mapping unit). Figure 2 shows the national coastal watershed boundary.

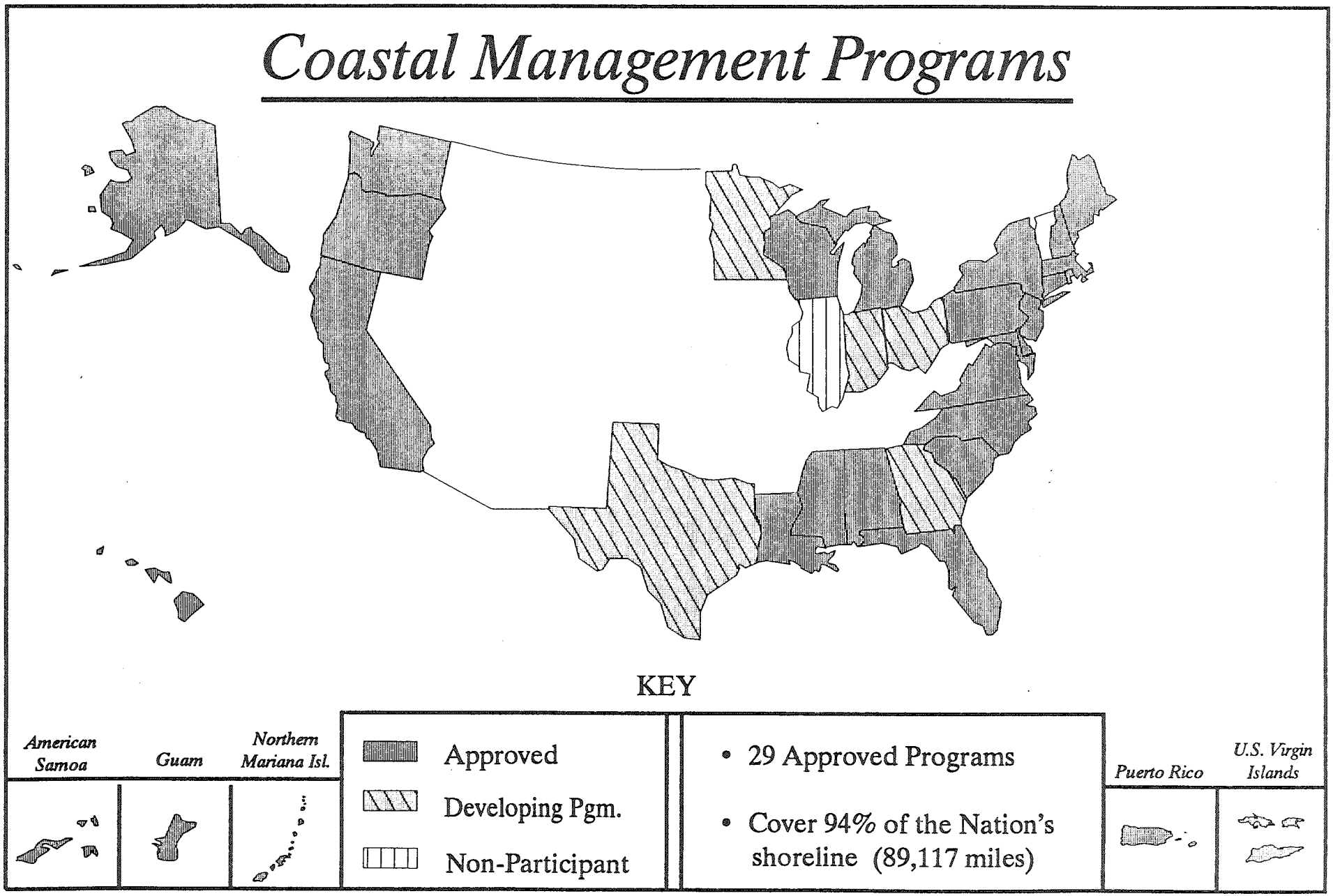

Coastal Management Programs
KEY
American Samoa
Guam
Northern Mariana Isl.
Approved
Developing Pgm.
Non-Participant
• 29 Approved Programs
• Cover 94% of the Nation's shoreline (89,117 miles)
Puerto Rico
U.S. Virgin Islands

FIGURE 1.

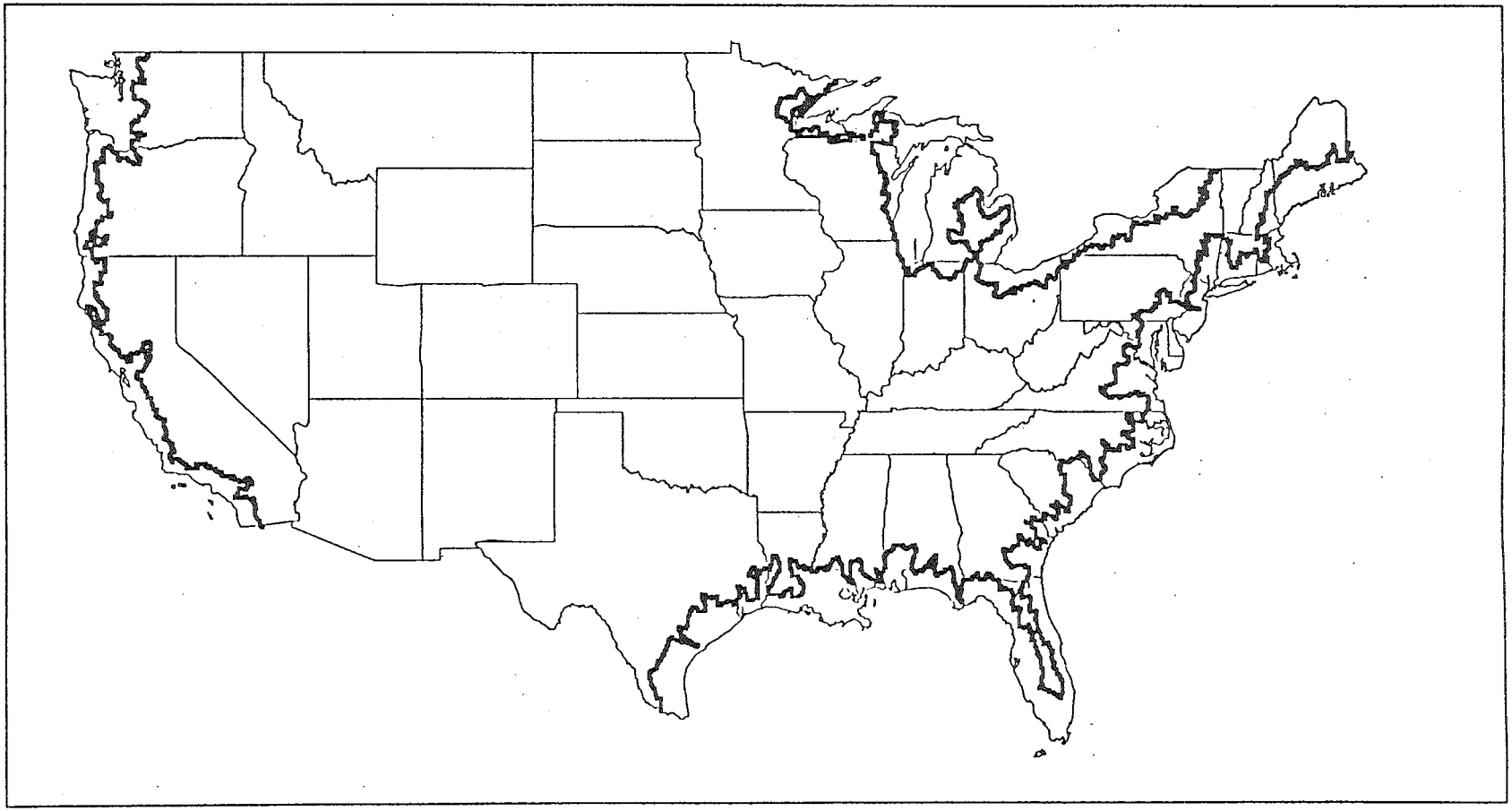
TABLE 1. LENGTH AND AREA OF COASTAL REGIONS OF THE UNITED STATES

State or Territory	Tidal Shoreline (Statute Miles)	Coastal Land Area (Square Miles)
Maine	3,478	12,128
New Hampshire	131	1,069
Massachusetts	1,519	3,535
Rhode Island	384	1,055
Connecticut	618	2,284
New York	2,625	17,515
New Jersey	1,792	5,686
Pennsylvania	140	1,734
Delaware	381	1,932
Maryland	3,190	6,444
Virginia	3,315 (5,242)	8,914
North Carolina	3,375	9,378
South Carolina	2,876	7,806
Georgia*	2,344	2,887
Florida	8,436	54,153
Alabama	607	2,827
Mississippi	359	1,790
Louisiana	7,721	16,535
Texas*	3,359	20,784
California	3,427	38,188
Oregon	1,410	19,669
Washington	3,026	20,645
Alaska	33,904	380,161
Hawaii	1,052	6,425
Ohio*	312	3,774
Michigan	3,224	31,477
Indiana*	45	1,519
Wisconsin	820	10,515
Minnesota*	189	9,590
Puerto Rico	700	3,515
U.S.Virgin Islands	175	132
Guam	110	209
Commonwealth of N.Mariana Islands	206	184
American Samoa	126	77
TOTAL	95,376	704,536

* states developing coastal zone management programs

FIGURE 2.

The National Coastal Watershed Boundary



Source: Strategic Environmental Assessments Division and Coastal Ocean Programs Division, 1992: *Coastal zone boundary review. National summary: State characterization reports.* Rockville, MD: National Oceanic and Atmospheric Administration, 111 pp.

NOAA evaluated each watershed that drains into coastal waters and determined whether significant indicators of pollution potential were present within four analysis areas: (1) the existing coastal zone; (2) the coastal watershed; (3) the area inland of the coastal watershed within the state's borders; and, (4) the area beyond the state's borders that drains into coastal waters. Based on this evaluation, NOAA made its basic recommendation of coastal watersheds, and also recommended other areas that states might want to evaluate as part of their program development process. While NOAA and EPA believe that coastal watersheds provide a logical basis for establishing the geographic scope of coastal nonpoint programs, it is expected that states will have more specific information to better delineate the scope of their programs.

3. Coastal Environment

The coastal environment most directly impacted by the coastal nonpoint program is the "coastal zone", including the "coastal waters" of the participating states and territories, and the inland areas defined in the 6217 management area. The term "coastal zone" is defined in the CZMA as coastal waters (including the lands therein and thereunder) and the adjacent shorelands (including the waters therein and thereunder), and includes islands, transitional and intertidal areas, salt marshes, wetlands, and beaches. The zone extends, in the Great Lakes, to the international boundary between the United States and Canada, and, in other areas, seaward to the outer limit of state title and ownership. The coastal zone extends inland from the shorelines only to the extent necessary to control shorelands, the uses of which have a direct and significant impact on the coastal waters. Each state and territory established its own coastal zone when it submitted its program to NOAA for approval. The extent of the CZMA coastal zones varies widely, from 100 feet in the San Francisco Bay Conservation and Development Commission segment of the California coastal zone to entire states and territories as mentioned above. The term "coastal waters" in the Great Lakes area is defined as the waters within the territorial jurisdiction of the United States consisting of the Great Lakes, their connecting waters, harbors, roadsteads, and estuary-type areas such as bays, shallows, and marshes. In other areas it means those waters, adjacent to the shorelines, which contain a measureable quantity of sea water, including sounds, bays, lagoons, bayous, ponds, and estuaries.

Beach closures, fish consumption advisories, and evidence of toxic substances in sediments and fish tissue are all indications of pollution-related declines in the quality of estuarine and coastal waters (NOAA, 1991, 1990a; Coast Alliance, 1995; Coastal Ocean Policy Roundtable, 1992; Environmental Health Center, 1994). Based on an assessment of 75% of United States estuarine waters, current best estimates are that 35% of these waters are impaired and 10% are threatened (NOAA/EPA, 1993). Nonpoint source pollution is increasingly recognized as a significant factor in this coastal water degradation. For example, according to the *National Water Quality Inventory: 1992 Report to Congress,* states estimate that agriculture is responsible for 43 percent of all estuarine water quality impairments.

a. Biogeographic Provinces

A broad classification system for the different types of marine and estuarine environments found in the diverse 6217 management areas is the biogeographic province classification system (U.S. Fish and Wildlife Service, 1979; Ketchum, 1972). The

characteristics associated with each province are:

- Acadian Province - Extends from Newfoundland to Cape Cod. Has a well-developed algal flora and boreal biota. The shoreline is heavily indented, frequently rocky, has a large tidal range, and is strongly influenced by the Labrador Current.

- Virginian Province - Extends from Cape Cod to Cape Hatteras. Has a primarily temperate biota with some boreal representatives. The tidal range is moderate, with the Labrador Current occasionally extending down to the southern boundary of the province at Cape Hatteras. EXTENSIVE MARSHES + WELL developed barrier islands

- Carolinian Province - Extends from Cape Hatteras to Cape Kennedy. Contains extensive marshes and well-developed barrier islands. The biota is temperate but has seasonal tropical representatives. Tidal range is small to moderate. The Gulf Stream is the primary influence on this province.

- West Indian Province - Extends from Cape Kennedy to Cedar Key, Florida; includes the Caribbean Islands. Has tropical biota, including coral reefs and mangroves. Tidal range is small. Shoreland is usually either limestone with calcareous sands and marls, or volcanic.

- Louisianian Province - Extends from Cedar Key, Florida to Port Aransas, Texas. Has characteristics similar to the Carolinian Province, reflecting the past submergence of the Florida peninsula. The biota ranges from temperate to subtropical. The topography is relatively low and the tidal range is small.

- Californian Province - Extends from Mexico to Cape Mendocino, California. Has temperate biota, including off-shore kelp beds, rocky coasts, and a moderate tidal range. The climate is Mediterranean and is influenced by the California Current.

- Columbian Province - Extends from Cape Mendocino to Vancouver Island. Has mountainous shorelands with rocky foreshores. The biota is primarily temperate with some boreal components, and extensive algal communities. The province is influenced by both the Aleutian and California currents. The tidal range is large.

- Great Lakes Province - Extends along the Great Lakes of North America. Has rocky, glaciated topography, extensive sandy beaches and dunes, large and localized marshes and mudflats, and contains fresh water only. The biota are a mixture of boreal and temperate species together with anadromous and marine invaders.

- Fjord Province - Extends from Vancouver Island to southern tip of Aleutian Islands. Has precipitous mountains, deep estuaries (some with glaciers), and a heavily indented shoreline subject to winter icing. The biota is boreal to subarctic. The province is influenced by the Aleutian and Japanese Currents, and the tidal range is large.

- Sub-Arctic Province - Extends from Newfoundland , northward around Canada to the

west coasts of the Arctic Ocean, Bering Sea, and Baffin and Labrador Basins. Has arctic biota, and is characterized by the southern extension of floating ice and the 4° C summer isotherm.

- Insular Province - Includes Hawaiian Islands and Pacific territories. The coasts have precipitous mountains and strong wave action. The biota is largely endemic and composed of tropical and subtropical forms. The tidal range is small.

b. Geology

Three basic types of shorelines are found in the coastal zone: rocky shores; sandy beaches; and, wetlands.

Rocky shores are found on high energy coasts such as northern California, Washington, Oregon, Alaska, and Maine. They are formed by glacial scouring, strong wave action, and faulting associated with earthquakes. Marine rocky habitats vary from steep bedrock found on promontories and sea stacks, to flat benches dotted with tidepools. High wave energy produces a continuous erosional process and a highly productive ecosystem with a diverse assemblage of resilient plant and animal species. Organisms typically form zonation patterns depending on their tolerance and exposure to wave action, tidal levels, air and sunlight, and the presence or absence of predators (Steelquist, 1987). Rocky shores are also found along the Great Lakes as nonerodible bluffs and cliffs composed of bedrock or rock rubble. Extensive areas of the low plains along the Great Lakes are composed of bedrock and rock beaches.

Sandy beaches may be of the mainland, pocket, or barrier type. Mainland beaches stretch uninterrupted for long distances along the coasts of New Jersey, Florida, and southern California. They receive the sand from rivers and coastal erosion. Pocket beaches are formed in small bays that are protected from erosion by surrounding headlands or rocky cliffs. Many pocket beaches are found on the coasts of Maine, Washington and Oregon. Barrier beaches are part of the dynamic environment of barrier islands where they are constantly shifting in response to the forces of nature. Extensive barrier beaches are found along the Gulf of Mexico, Cape Cod, and North and South Carolina. Extensive sandy beaches and sand dunes are also found along the shores of the Great Lakes. For example, nearly the entire eastern coast of Lake Michigan consists of sand which forms dunes, banks, ridges, and beaches. Michigan's 275,000 acres of sand dunes are the most extensive freshwater dunes in the world (State of the Great Lakes Annual Report, 1991).

Wetlands in the form of salt marshes, swamps, and mangroves are found along all coastal areas and are closely linked to estuaries. Wetlands are important fish and wildlife habitats. More than two-thirds of the commercially important fish and shellfish harvested along the Atlantic coast and in the Gulf of Mexico depend on wetlands as critical habitat at some time during their life (NOAA, 1994a); for the Pacific coast the figure is almost one-half (Horwitz, 1978). Wetlands provide food sources, spawning grounds, and nurseries for the young of these species. Wetlands also provide essential resting, wintering, and nesting grounds for many species of migratory waterfowl, other waterbirds, and many songbirds. They also are important in maintaining groundwater supplies, serving as pollution filtration systems, and temporarily storing floodwaters. Salt marshes stretch almost continuously along the Atlantic coast and are particularly luxuriant in the mid-Atlantic and south Atlantic regions. They are also abundant in the Gulf of Mexico and along the coast of Alaska. On the Pacific

coast, they are found in relatively isolated areas. Salt marshes are vegetated by salt-tolerant plants, predominantly cordgrass and marsh hay. Marshes along coasts and rivers protect shorelines and banks from erosion. Mangroves are saltwater wetland systems common in southern Florida, Hawaii, and the island territories. Mangroves are of ecological importance because their many-branched root system emerges from the sediment, providing support for the trees and forming impenetrable tangles of growth at the edge of tidal creeks. These roots provide shelter for fish and invertebrates and are areas of attachment for large communities of estuarine and marine organisms which feed on the nutrient material released by the bacterial decomposition of mangrove leaves that drop into the water.

Coastal wetlands in the form of swamps, marshes, bogs, fens, interdunal ponds, and submerged aquatic beds in coastal lakes and rivers are found along the shores of the Great Lakes, especially Lake Huron and Lake Erie.

c. Estuaries

Estuaries are important features of the coastal zone, especially along the Atlantic Coast and the Gulf of Mexico. An estuary is a "semi-enclosed coastal body of water which has free connection with the open sea and within which sea water is measurably diluted with fresh water derived from land drainage" (Pritchard, 1967). Estuaries are among the most productive of natural systems. They provide food, habitat, and refuge from predation for many commercially important species of fishes and invertebrates. Estuaries are especially important as nursery areas for many species during their early and juvenile life stages. Wetlands are a vital component of estuaries, comprising over 32,000 square miles, or about 12 percent of the total estuarine drainage area (NOAA, 1990a). There are 130 estuaries in the United States (Coastal America, 1994). Chesapeake Bay is the largest estuary with 3,830 square miles of water surface area (NOAA, 1990a).

The estuaries of the United States display some variations. Estuaries in the North Atlantic contain the smallest water surface area among regions, are the deepest, receive the least freshwater inflow, and are dominated by strong tidal forces with tidal ranges of almost 20 feet in northern Maine. They were formed by glaciers that removed soil cover, leaving rocky shorelines and steep-sided river channels. Estuaries in the Mid-Atlantic, e.g., Chesapeake Bay and Long Island Sound, are the most susceptible to pollutant retention because of their relatively large volumes, moderate to low freshwater inflow, and low tidal exchange. They were formed by rising sea level that drowned the mouths of rivers extending across the continental shelf. Estuaries in the South Atlantic contain the smallest volumes among regions, but their shallow waters support extensive wetlands. These estuaries are characterized by shorelines of low-lying marshes or by lagoons bounded by barrier islands. The Gulf of Mexico estuaries contain the greatest amount of water surface area, are the most shallow overall, and receive the largest freshwater inflow. As a result, they support the largest area of wetlands and are the least susceptible to pollutant retention. These estuaries are characterized either by deltas with a complex, interconnected web of estuarine channels or by offshore bars enclosing shallow bar-built estuaries. With the exception of Puget Sound and the Columbia River, estuaries of the Pacific coast are relatively small compared to other regions. Their origins are directly related to coastal mountain formations which have produced narrow, deep, steep-sided estuaries.

NOAA's National Estuarine Inventory is a program established to define and characterize the estuarine resource base and develop a national estuarine assessment capability.

For a more detailed description of the physical and hydrological features, natural resources, and economic activities of all U.S. estuaries, the reader is referred to the NOAA publication "Estuaries of the United States: Vital Statistics of a National Resource Base," October, 1990 (NOAA, 1990a).

d. Marine Mammals and Sea Turtles

At least 35 species of marine mammals are found in the western North Atlantic Ocean and the Gulf of Mexico, including 32 species of whales, dolphins, and porpoises; harbor and gray seals; and the West Indian manatee (NOAA, 1993). Seven species found off the east coast and Gulf of Mexico are listed as endangered under the Endangered Species Act (ESA): the sei, sperm, blue, fin, humpback, North Atlantic right whales, and the manatee. At least 50 species of marine mammals occur in the United States waters of the eastern North Pacific Ocean and eastern tropical Pacific, including 36 species of whales, dolphins, and porpoises; 11 species of seals and sea lions; walrus; polar bear; and sea otter (ibid.). Nine species are listed as endangered or threatened under the ESA: the Northern right, bowhead, fin, and humpback whales, and the Hawaiian monk seal are listed as endangered; the California stock of gray whales, stellar sea lion, Guadalupe fur seal, and Southern sea otter are listed as threatened. The California stock of gray whales was removed from the endangered species listing in June 1994. The endangered Hawaiian monk seal is found only on the small islands and atolls of the northwest portion of the Hawaiian Islands. The total population is approximately 1,550.

The West Indian manatee is found in small numbers in Puerto Rico, but is no longer found in the U.S. Virgin Islands (NOAA, 1992c). The range of the Florida manatee, a sub-species of the West Indian manatee, is limited primarily to rivers and coastal waters of peninsular Florida and southern Georgia. The population of Florida manatees cannot be directly estimated because they are often difficult to see, but recent surveys indicate population counts ranging from 1,268 to 1,856 individuals (LaRoe et al., 1995).

For additional information on marine mammals, the reader is referred to NOAA, 1976; NOAA, 1994b; Leatherwood et al, 1988; Jefferson et al., 1993; and Marine Mammal Commission, 1992.

Six species of sea turtles regularly inhabit the Atlantic and Pacific coasts and the United States territorial waters of the Caribbean and western Pacific Ocean: the Kemp's ridley, olive ridley (Pacific only), loggerhead, green, hawksbill, and leatherback (NOAA, 1993). All marine turtles are listed either as endangered or threatened under the ESA. Historical data on sea turtle numbers are limited, making it difficult to assess their long-term status. Loggerhead, leatherback, and olive ridley turtles are most commonly reported off the west coast of the United States. In Hawaiian waters, the green and hawksbill are most abundant. An estimated 450 to 475 green turtles nest annually in Hawaii; however, the hawksbill turtle population is very small, with only 12 to 15 nests recorded each year. With the exception of the olive ridley, all turtle species are reported to nest on beaches of the southeastern United States, but only the loggerhead and green turtles do so in substantial numbers. The beaches of Florida, particularly in Brevard and Indian River counties, host what may be the world's largest population of loggerheads (LaRoe, et al., 1995). An estimated 20,000 to 28,000 female loggerheads nest annually along Florida's east coast. Approximately 400 to 500 green turtles nest annually along the Florida coast. The leatherback and hawksbill rarely nest on the southeastern coast of the United States, but do use offshore waters for feeding, resting, and as migratory corridors. St Croix, in the U.S. Virgin Islands, is a major nesting area for

leatherback turtles and is the principal population of nesting leatherbacks under United States jurisdiction (Eckert et al., 1986).

3.B Terrestrial Environment and Land and Water Uses

This section provides a description of the terrestrial environment and land and water users and uses in the 6217 management area. The coastal zones and watersheds of all the states and territories support extensive and varied commercial and recreational activities. The intensity and nature of land and water uses in many areas has threatened and degraded coastal water quality. Trends indicate continued growth in population, economic activities, and uses of this environment.

1. Population

The coastal zone is the most intensively used geographic region of the nation. Many coastal areas of the United States are under increasing pressures from population growth and related economic activities. About 110 million people - almost one-half of our total population - now live in coastal areas. From 1960 to 2010, the coastal population will have grown from 80 million to more than 127 million people (NOAA, 1990b). Coastal population density is 341 persons per square mile, more than four times the national average. Figure 3 shows the regional distribution of the coastal population of the United States. The state and territory population data below were taken from the "1992 Coastal Status Report: A Pilot Study of the U.S. Coastal Zone and its Resources" (COPR, 1992).

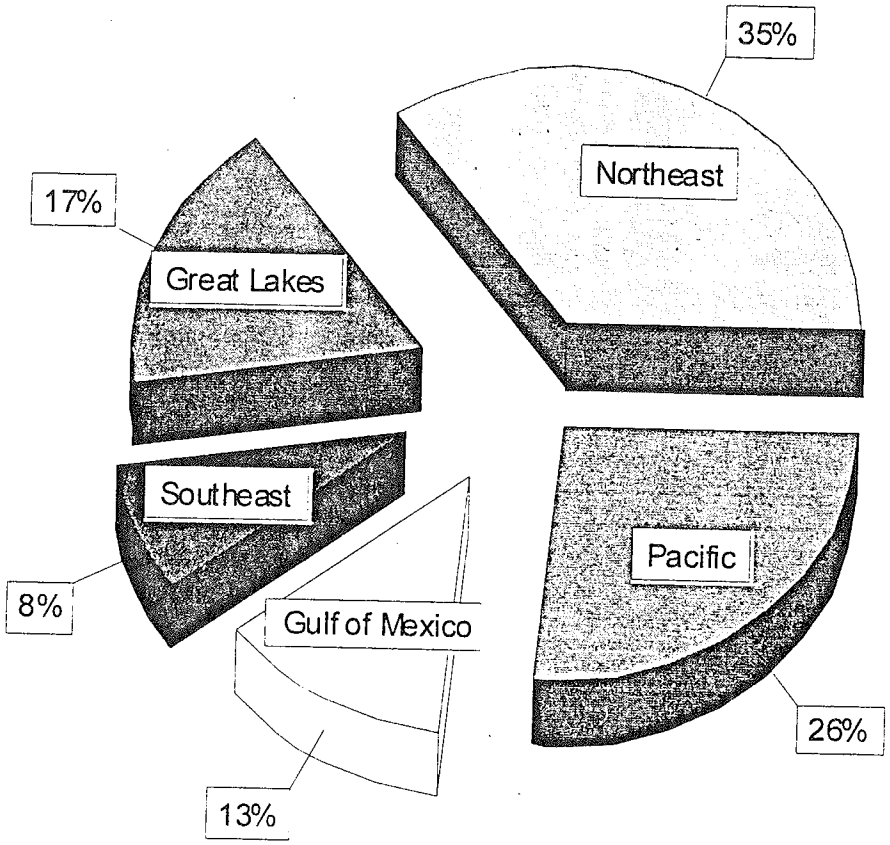
- The Northeast region, stretching from the northern coast of Maine to the Tidewater region of Virginia, is the most populated of the five regions, accounting for more than one-third of the coastal population of the United States. The 1990 coastal population of the states in this region and the percent population in the coastal zone are:

  Maine: 885,703 (72.1%)
  New Hampshire: 350,078 (31.5%)
  Massachusetts: 4,494,398 (74.7%)
  Rhode Island: 1.003,464 (100%)
  Connecticut: 2,030,017 (61.7%)
  New York: 15,026,340 (83.5%)
  Virginia: 3,861,122 (62.4%)
  New Jersey: 6,978,509 (90.2%)
  Pennsylvania: 2,949,974 (24.8%)
  Delaware: 666,168 (100%)
  Maryland: 3,339,056 (69.8%)

- The Pacific region, including Alaska and Hawaii, with 26 percent of the coastal population is the second most populated coastal region. However, 77 percent of this total lives in California. The 1990 coastal population of the states in this region and the percent population in the coastal zone are:

  California: 21,859,530 (73.5%)
  Oregon: 1,085,935 (38.2%)
  Washington: 3,389,033 (69.6%)
  Alaska: 466,410 (84.8%)
  Hawaii: 1,108,229 (100%)

Figure 3. Regional Distribution of the Nation's Coastal Population



Source: 50 Years of Population Change Along the Nation's Coast, 1960 - 2010. NOAA, 1990

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- The Great Lakes region is the third most populous coastal region. The coastal portions of the eight states surrounding the five Great Lakes contain 17 percent of the coastal population of the United States. The 1990 coastal population of the states in this region (Pennsylvania and New York are given above) and the percent population in the coastal zone are:

  Ohio: 2,738,400 (25.2%)
  Michigan: 4,640,981 (49.9%)
  Indiana: 746,428 (13.5%)
  Wisconsin: 1,907,789 (39.0%)
  Minnesota: 212,496 (4.9%)
  Illinois: 5,659,040 (49.5%)

- The Gulf of Mexico region, which includes Texas, Louisiana, Mississippi, Alabama, and the west coast of Florida, ranks fourth in total population with 13 percent of the total U.S.coastal population. The 1990 coastal population of the states in this region and the percent population in the coastal zone are:

  Alabama: 476,923 (11.8%)
  Louisiana: 2,044,880 (48.5%)
  Mississippi: 312,368 (12.1%)
  Texas: 3,878,800 (22.8%)

- The Southeast region, extending from North Carolina to southeastern Florida, accounts for only eight percent of the U.S. coastal population. However, four out of five people living in the coastal southeast are located in eastern Florida. The 1990 coastal population of the states in this region and the percent population in the coastal zone are:

  North Carolina: 710,903 (10.7%)
  Georgia: 326,382 (5.0%)
  South Carolina: 833,519 (23.9)
  Florida: 12,356,550 (95.5%)

- The 1990 coastal population of the territories and the percent population in the coastal zone are:

  Puerto Rico: 3,008,274 (100%)
  U.S. Virgin Islands: 101,809 (100%)
  Guam: 133,152 (100%)
  American Samoa: 46,773 (100%)
  Commonwealth of N. Mariana Islands: 43,345 (100%)

The regional characterization of coastal population distribution presented above was taken from the NOAA publication entitled "50 Years of Population Change along the Nation's Coasts, 1960-2010"(April, 1990). This publication contains a much more detailed analysis of coastal population statistics, including population trends, population density, and "hot spots" of growth for all coastal counties in the five regions of the U.S. These data also were used in the NOAA/EPA review of state coastal zone boundaries (NOAA, 1992a).

2. Social and Economic Activities

The type and extent of land and water uses in coastal watersheds are an indication of the pollutants entering coastal waters and the extent to which the environment of the surrounding watershed has been altered. The development of agricultural, forested, and urban lands and the activities associated with them alter the landscape and are the source of a

significant portion of the pollutants entering coastal waters.

The report, "The State of the Coasts" (Coast Alliance, 1995), provides a state-by-state breakdown of the economic values of healthy coastal resources. As an indication of the economic importance of maintaining healthy coasts, the report states that "U.S. coasts support 34 percent of national employment, providing more than 28 million jobs. These jobs come from serving 180 million Americans who visit ocean and bay beaches each year. They come from the commercial fishing industry that employs hundreds of thousands of people and runs 95,000 vessels. And jobs come from the recreational fishing industry that pumps nearly $15 billion into the economy annually." Another indication of the importance of the coastal zone is the measurement of the Gross State Product (GSP) for coastal states and its contribution to the national economy (Gross National Product or GNP). In 1985, the GSP for all coastal states and territories amounted to $1.27 trillion or 31.7 percent of the GNP (CURS, 1991).

NOAA's National Estuarine Inventory groups the estuaries and estuarine drainage areas of the contiguous United States into five geographic regions (Alaska and other coastal regions will be added in the future) and describes land uses and other human activities for each.

- The North Atlantic region extends from Maine to the tip of Cape Cod in Massachusetts. Urban land use comprises only about seven percent of estuarine drainage areas in this region. Agricultural lands also account for seven percent of land use. The remaining majority of land is forested. Urban land is dominant only in the Boston Bay area. The estuaries and bays of this region support an extensive fisheries industry. Over 300 million pounds of seafood were landed at ports in the region in 1989 (NOAA, 1990c). The American lobster, Atlantic cod, and sea scallop are currently the top commercial species. Approved shellfish growing areas exceed 1,000 square miles. There are almost 400 public outdoor recreation sites adjacent to estuarine waters.

- The Middle Atlantic region extends from Buzzards Bay, Massachusetts through Chesapeake Bay in Virginia. Although urban land use ranks behind forest and agricultural land uses, this region contains the greatest percentage of urban land among all regions of the United States. While agricultural land use is modest in the region, it still occupies over 30 percent of the estuarine drainage areas of Delaware, Chincoteague, and Chesapeake Bays, and the Delaware Inland Bays. About 1.1 billion pounds of seafood were landed in this region in 1989. The sea scallop was the leading commercial species; the estuarine-dependent blue crab was the second most valuable. Approximately half of the total blue crab catch in the United States was taken from this region, the majority from Chesapeake Bay. About 6,300 square miles of shellfish growing waters are approved for harvest, the largest amount for all U.S. regions. There are over 1,100 public outdoor recreation sites adjacent to tidal waters; this number is also more than any other region.

- The South Atlantic region extends from North Carolina to southern Florida. Forested lands are the dominant land use, accounting for about one-third of all land in the estuarine drainage areas. This region's forests constitute a significant percentage of the commercial forest lands of the United States (NOAA, 1987). Agriculture is also a major land use, accounting for 22 percent of the drainage area. Although urban land

comprises only four percent of the land, Florida is heavily developed along all of its eastern coast. About 250 million pounds of seafood were landed in this region in 1989 (NOAA, 1990c). Over half of this catch was estuarine-dependent species such as croaker, blue crab, shrimp and menhaden. The region also has an important estuarine recreational fishery. The South Atlantic accounts for about one-fifth of all classified shellfish growing waters in the U.S. There are almost 2,700 public outdoor recreation sites in the estuarine areas.

- The Gulf of Mexico region extends from the southern tip of Florida west to the Texas/Mexico border. Forested lands are an important land use in this region. Pulpwood for making paper is the major forest product. Agricultural activity accounts for 31 percent of land use. In the drier western sections of the region, agriculture becomes irrigation-based. The coast along the Gulf of Mexico is one of the most productive fishery areas in the world. Almost 1.8 billion pounds of seafood were produced in 1989. Over three-quarters of this catch was species dependent on estuarine waters and wetlands. Shrimp account for more than half of the value of the seafood catch. This region contains almost 9,000 square miles of classified shellfish-growing waters, however only about 3,800 square miles are approved for harvesting. There are more than 3,700 public outdoor recreation sites in the region, of which 564 are adjacent to estuarine waters. The region contains almost one-third of the U.S. private charter boats and private campgrounds and almost one-quarter of its marinas.

- The Pacific region extends from Tijuana Estuary to Puget Sound. Urban land use dominates only two relatively small drainage areas: San Pedro and Santa Monica bays. Other land uses, especially forest land, dominates the region's estuaries because of the large inland extent of their drainage areas. Forest land, for example, is the major land use in estuaries north of San Francisco Bay. The Pacific region has the second highest percentage of urban land (12 percent) and the fourth highest percentage of agricultural land (11 percent) among the U.S. regions. About 750 million pounds of seafood were landed in the region's ports in 1989. One-fifth of this catch was from estuarine-dependent species. The Pacific contains the least amount of shellfish-growing waters, only about 455 square miles. Because of pollution, only about 30 percent of this total is approved for harvesting. There are over 6,500 public outdoor recreation sites in this region, the largest of all regions.

a. Agriculture

The extent of agricultural activities in 734 coastal counties was summarized by EPA during its economic analysis of agricultural management measures (USEPA, 1992b) and by the U.S. Department of Agriculture in its economic impact report of proposed management measures (Heimlich and Barnard, 1995). Although these analyses included all mainland coastal states, not just the 29 with currently approved coastal zone management programs, the data are indicative of regional coastal agricultural activities.

Based on the 1987 Census of Agriculture, about 13 percent of U.S. farms (275,000) and seven percent of farmland are located in the 734 coastal counties encompassing the coastal watersheds delineated by NOAA. Fifty-two percent of coastal farmland is cropland. Some 24 million acres of cropland are harvested, while the rest is fallowed, idled, or used for pasture.

More than 25 million acres is grazing land, including all types of pasture, rangeland, cropland used only for pasture, and grazed woodland. About 10 million acres of farmland is woodland. The Great Lakes region has the largest number of farms in the coastal zone (7 percent of the United States agricultural production occurs if the Great Lakes basin) , followed by the Gulf region. The Southeast region has the fewest farms.

Farms in coastal counties total about 67 million acres, which is 28 percent of total coastal land area. The Gulf region, including Texas, has the largest amount of farmland, followed by the Great Lakes region.

The average farm in coastal counties is smaller (243 acres) than the average U.S. farm (462 acres). Coastal county farms account for 15 percent of total U.S. agricultural sales, including 11 percent of livestock and poultry sales and 20 percent of crop sales.

b. Forestry

Over 730 million acres in the United States are classified as forestland. Of these, 482 million acres are categorized as timberland (USDAFS, 1989). The United States contains six major "natural forest regions": Northern Forest, Central Hardwood Forest, Southern Forest, Rocky Mountain Forest, Pacific Coast Forest, and Alaska Forest (Sharpe, Hendee, and Allen, 1976). These six regions are primarily defined by the uniqueness in their mix of species of trees and by their climate and topography. In its economic analysis of forestry management measures, EPA (RTI, 1992a) further grouped these regions into four geographic areas: South, North, West, and Alaska. Hawaii and the other Pacific Islands were not included in this analysis because only a small percentage of their land is classified as timberland (the land base that is capable of producing a sustainable yield of forest products).

- The South region includes Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas. High temperatures and abundant precipitation make the climate of this region the most favorable in the United States for forests. The South contains many diverse forest types; one-third of the area is comprised of various species of pine, with loblolly pine being the most abundant species. Timberland is a predominant land use in the South, accounting for 40 to 60 percent of the land area (USDAFS, 1988a). Harvesting of trees is made easier by the relatively level topography and roads existing from extensive agricultural activities. The major forest types found in this region are:

Hardwoods		*Softwoods*	
Ash	Sweetgum	Cypress	Shortleaf Pine
Black Gum	Tupelo	Loblolly Pine	Slash Pine
Hickory	White Oak	Longleaf Pine	White Pine
Maple	Yellow Poplar	Red Pine	
Red Oak			

- The North region includes the coastal states of Minnesota, Wisconsin, Michigan, Illinois, Indiana, Ohio, Pennsylvania, New York, Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New Jersey, Delaware, and Maryland. This region is predominately covered with hardwood forests. Timberland is also a predominant land use in the North, with 37 percent of the total land area classified as

commercial timberland. Harvesting of trees is also made easier by the topography and existing agricultural road systems. The major forest types found in this region are:

Hardwoods		*Softwoods*	
Ash	Hickory	Balsam Fir	Spruce
Aspen	Maple	Jack Pine	White Pine
Basswood	Red Oak	Red Pine	Yellow Pine
Beech	White Oak	Eastern Hemlock	
Black Cherry	Yellow Birch		
Cottonwood	Yellow Poplar		

- The West region of Washington, Oregon, and California has some of the most diverse and valuable forests in the nation with most forest types, including old growth forests, located on relatively steeply sloped mountainous terrain (Tappeiner et al., 1986). The terrain and lack of existing road systems makes harvesting more difficult and expensive than in other regions. Timberland in the West comprises 13 percent of the land area. Douglas fir is the most abundant and valuable forest type. The major forest types found in this region are:

Hardwoods	*Softwoods*	
Ash	Douglas Fir	Sitka Spruce
Aspen	Engleman Spruce	True Firs
Cottonwood	Incense Cedar	Western Hemlock
Oak	Jeffrey Pine	Western White Pine
Red Alder	Lodgepole Pine	Western Larch
	Ponderosa Pine	Sugar Pine

- Alaska region - the coastal forests of Alaska are significantly different from any other coastal forests of the United States. About 64 percent of commercial timberland is in the coastal area within 50 miles of the coast. Timberland in Alaska comprises 4 percent of all land in the state. Other forestland that is not capable of producing a sustainable yield of forest products occupies 30 percent of all land in Alaska. Hemlock-sitka spruce is the major forest type. A large number of forested wetlands are also present. The major forest types found in Alaska are:

Hardwoods		*Softwoods*	
Birch	Willow	Alaska-Cedar	White Spruce
Black Cottonwood		Fir	Western Redcedar
Poplar		Mountain Hemlock	Pacific Yew
Aspen		Western Hemlock	Black Spruce
Red Alder		Lodgepole Pine	Sitka Spruce

c. Urbanization

Urbanization first occurred in coastal areas and this historical trend continues (USEPA, 1993). Coastal counties are among the most heavily developed areas in the United States.

The extent of this development can be seen by the fact that approximately 110 million people - almost one-half of our total population - now live in coastal areas. This creates a population density of more than four times the national average. Urban land use accounts for about 9 percent of the land use in coastal areas. Since coastal populations are also increasing at a faster rate than the national average, more coastal land is being converted to urban uses.

Almost 20,000 square miles of land in the estuarine drainage areas in NOAA's National Estuarine Inventory are classified as having urban land uses (NOAA, 1990a). As indicated by population patterns, urban land use in estuarine drainage areas is concentrated in the Middle Atlantic and southern portion of the Pacific region.

The Great Lakes region is also the site of extensive urbanization. One-tenth of the population of the United States lives in the Great Lakes watershed (Environmental Health Center, 1994).

In addition to population data, development activity data is indicative of growth in coastal areas. According to the NOAA report "Building Along America's Coasts, 20 Years of Building Permits, 1970 - 1989" (NOAA, 1992b) about half of all residential and non-residential construction in the United States between 1970 and 1989 occurred in coastal areas. Residential construction includes single- and multi-housing units. Non-residential construction includes commercial/industrial and hotel/recreational categories.

Coastal residential development during the last 20 years was unevenly distributed across the nation. The Pacific and Northeast regions, with 29 percent and 26 percent respectively, accounted for more than half of all coastal housing units authorized by building permit. The Gulf of Mexico region accounted for 18 percent, the Southeast region for 16 percent, and the Great Lakes region for 11 percent.

The distribution of coastal commercial and industrial development authorized by permit also showed regional variations. The Pacific and Northeast regions, with 28 percent and 24 percent respectively, were the leading regions. The Gulf of Mexico region accounted for 21 percent, the Great Lakes region for 14 percent, and the Southeast region for 13 percent.

The regional distribution of coastal hotel and recreational buildings authorized by permit again showed the Pacific region as the leader with 30 percent of all permits. The Northeast region had 25 percent, the Gulf of Mexico region had 17 percent, the Southeast region had 15 percent, and the Great Lakes region had 13 percent.

d. Fisheries

The estuaries and coastal waters of the United States support a large variety of commercially and recreationally important fishes and invertebrates. The economic viability of commercial and recreational fisheries is dependent on the water quality of the estuaries and the coastal waters. Estuarine dependent species, which are the most vulnerable to habitat and water quality impacts, make up 77% by weight and 71% by value of the nation's commercial seafood harvest (Chambers, 1991). Excluding Alaskan fisheries, the estimated annual landed value of all commercially caught estuarine-dependent species was $1.9 billion in 1989 (NOAA, 1990a). Bottom-dwelling shellfish are especially susceptible to degraded water quality because, as filter-feeders, they pump large quantities of water through their bodies, potentially accumulating pollutants which may be passed on to humans.

Overexploitation, bycatch waste, loss of habitat through the destruction of wetlands, and nonpoint source pollution have all played a role in the decline of marine fishery stocks. About half of the nation's coastal finfish stocks are now overexploited, i.e., more are being

caught than are replenished by natural reproduction (Covering the Coasts, 1994). Species such as haddock, cod, striped bass, flounder, red snapper, salmon, weakfish, mackerel, cobia, snook, drum, halibut, and shad have been reduced to historic low levels of abundance by heavy exploitation, limited reproduction and growth, and habitat degradation and loss. (COPR, 1992). In spite of this decline, fish consumption continues to grow in importance in the United States. The Coastal Ocean Policy Roundtable (COPR, 1992), in its study of the nation's coastal zone and its resources, states that the "health and abundance of living marine resources are important national concerns because fish and fish products are an increasingly important element of U.S. diets."

Table 2 shows the state-by-state commercial fish landings for 1990 and 1991. These data do not include U.S. flag landings outside of the 50 states, joint venture transfers, aquaculture products other than oysters and clams, or Mississippi River Drainage States landings.

TABLE 2. U.S. DOMESTIC FISH LANDINGS: 1990-1991

State	1990 (000 lbs)	1991 (000 lbs)	State	1990 (000 lbs)	1991 (000 lbs)
Maine	169,294	191.880	Alabama	22,669	21,907
N.Hampshire	10,704	10,675	Mississippi	319,585	238,388
Massachusetts	327,933	288,924	Louisiana	1,061,228	1,192,539
Rhode Island	131,782	139,805	Texas	99,191	108,315
Connecticut	9,471	14,905	California	347,139	348,238
New York	48,823	50,823	Oregon	139,335	150,023
New Jersey	149,369	175,841	Washington	137,186	152,290
Pennsylvania	291	315	Alaska	5,403,787	5,144,800
Delaware	8,550	7,881	Hawaii	26,582	27,662
Maryland	80,705	88,462	Ohio	4,758	5,360
Virginia	786,791	681,163	Michigan	17,428	14,434
N. Carolina	176,038	212,609	Indiana	353	658
S. Carolina	14,516	19,138	Illinois	301	229
Georgia	13,191	15,987	Wisconsin	20,976	17,903
Florida	179,940	162,731	Minnesota	505	309

SOURCE: *Fisheries of the United States*, in Coastal Ocean Policy Roundtable, 1992.

Commercial and recreational shellfish harvests have also been adversely affected by overharvest, loss of habitat, disease, and nonpoint source pollution. Pollution-related shellfish harvest restrictions exist in 37% of all classified shellfish growing areas in the nation. Over the last three decades, commercial stocks of wild estuarine shellfish have continued to decline nationwide despite restoration efforts such as oyster reef replenishment, hatchery operations, and selective breeding (NOAA, 1991). Exceptions to the nationwide decline are the increase in the harvest of non-estuarine scallops along the Atlantic coast, and the harvesting of Pacific oysters which increased slightly because of successful aquaculture.

According to the National Shellfish Register of Classified Estuarine Waters (NOAA, 1991), Washington was the leading producer of oysters in 1989 with 8,982,000 pounds

landed. Louisiana was the second leading producer with 8,673,000 pounds, followed by Maryland and Virginia with 2,160,00 and 2,000,000, respectively. New Jersey was the leading producer of clams in 1989 with 71,106,000 pounds; New York was second with 9,233,000 pounds. Washington, Maryland, and Virginia each produced slightly less than 9,000,000 pounds. Massachusetts was the leading producer of scallops in 1989 with 18,553,000 pounds, followed by Virginia with 7,702,000 pounds. Florida (Atlantic and Gulf coasts) produced 4,861,000 pounds while New Jersey produced 3,986,000 pounds. Maine was the major producer of mussels with 4,759,000 pounds. New York was second with 585,000 pounds.

e. Recreation

The increasing population and continued urbanization of the nation's coastal areas has increased the demand for recreational activities that are close to population centers. Between 1972 and 1984, public recreation lands in estuarine and coastal areas increased by about 27 percent (NOAA, 1990a). Public recreation sites include parks, boat ramps, marinas, fishing piers, beaches, and picnic areas. The availability of recreation sites varies across the coastal areas of the nation. There are more than 2,600 public outdoor recreation sites along the estuaries of the North Atlantic, 400 of which are adjacent to estuarine waters. Estuaries in the Middle Atlantic region contain over 10,000 public outdoor recreation sites; over 1,100 are adjacent to tidal waters. The South Atlantic region has almost 2,700 public outdoor recreation sites, almost 900 have access to water. There are more than 3,700 public outdoor recreation sites in the Gulf of Mexico region; 564 are adjacent to estuarine waters.

It is estimated that there are 18,000 private coastal recreation facilities and 2,500 not for profit industrially owned outdoor recreation facilities (COPR, 1992). There are over 3,800 private marinas and over 4,500 private charter boats located within the nation's coastal areas (NOAA, 1990a).

In 1988, there were ten National Seashores and four National Lakeshores in the National Park system. Seven national parks are located on the shores of the Great Lakes. Indiana Dunes National Lakeshore draws over 1.6 million visitors a year.

The economic value of coastal recreational activities can be shown by the money spent on only three such activities: boating, finfishing, and shellfishing. The Coastal Ocean Policy Roundtable (1992) states that nearly 17.5 million recreational finfishers spent $4.9 billion in 1985; 3.9 million recreational shellfishers spend $2.3 billion yearly; and in 1989, $17.1 billion was spent on recreational boating at retail.

4. ENVIRONMENTAL CONSEQUENCES

The approval of state and territorial coastal nonpoint programs and the implementation of the requirements of section 6217 of the CZARA will result in certain environmental, social and economic impacts. Environmental documents are usually prepared for individual projects and analyze the impacts of a proposed action on a specific area. However, the section 6217 program includes the large and diverse lands and waters of twenty-nine coastal states and territories with varying laws and management systems. The impacts of the program will vary from one area to another, therefore the consequences of the program can only be discussed in general terms in this PEIS. Subsequent NEPA documents (environmental impact statements or assessments) will address the specific impacts associated with each state or territory coastal nonpoint program submitted for approval.

In accordance with NEPA, this PEIS uses the term "impacts" to encompass both direct impacts, which are caused by the action and occur at the same time and place, and indirect impacts, which are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect impacts may include growth inducing impacts and other impacts related to induced changes in the pattern of land use, population density or growth rate, and related impacts on other natural systems, including ecosystems. Impacts include ecological, aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Cumulative impacts result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. NOAA has considered all types of impacts, whether direct, indirect, or cumulative.

4.A MANAGEMENT MEASURE IMPLEMENTATION

1. ENVIRONMENTAL IMPACTS

Management measures are defined in section 6217 of the CZARA as "economically achievable measures to control the addition of pollution to coastal waters, which reflect the greatest degree of pollutant reduction achievable through the application of the best available nonpoint pollution control practices, technologies, processes, siting criteria, operating methods, or other alternatives." EPA developed guidance, Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters (USEPA, 1993), also known as the (g) guidance, specifying management measures for the following nonpoint pollution source categories: agricultural runoff; urban runoff; forestry runoff; marinas; hydromodification; and, wetlands, riparian areas, and vegetated treatment systems. Coastal nonpoint programs must provide for the implementation of management measures that are in conformity with this guidance. The guidance also lists and describes management practices that EPA has found to be representative of the types of practices that can be applied successfully to achieve the management measures. State and territory programs are not required to specify or require implementation of these particular management practices, but are to select practices to implement the management measures that are applicable to local conditions.

The following discussion of management measures and of the pollutants associated with each nonpoint source category are taken primarily from the EPA (g) guidance.

a. Agricultural Nonpoint Pollution Source Category

Management measures have been developed for the following six subcategories of sources of agricultural nonpoint pollution that affect coastal waters:

- Erosion and sediment control
- Confined animal facilities
- The application of nutrients
- The application of pesticides
- Grazing management
- Irrigation water management

Each subcategory, with the exception of confined animal facilities which has two management measures, has one management measure specified to control nonpoint source pollution.

The five primary agricultural nonpoint source pollutants that affect water quality are nutrients, sediment, animal wastes, salts, and pesticides. Agricultural activities also have the potential to directly impact the habitat of aquatic species through physical disturbances caused by livestock or equipment, or through the management of water. The environmental effects of these pollutants on water quality are discussed below. The management measures are designed to prevent the environmental degradation caused by these pollutants.

(1) NUTRIENTS - Nitrogen and phosphorus are the two major nutrients from agricultural lands that degrade water quality. Nutrients are applied to agricultural lands in different forms and come from various sources, including commercial fertilizer; manure from animal production facilities; municipal and industrial treatment plant sludge and effluent; legumes and crop residues; irrigation water; and, atmospheric deposition. Potassium, sulphur, micro-nutrients, salts, bacteria, and viruses are also present. Surface water runoff and ground-water infiltration from agricultural lands also carries these substances. Although all plants require nutrients for growth, when these nutrients are introduced into a stream, lake, or estuary at rates higher than normally available, aquatic plant productivity may increase dramatically. This process, referred to as cultural eutrophication, may adversely affect the suitability of the water for other uses. Increased plant productivity increases the amount of organic material in the system, which eventually dies and decays. The decaying organic matter produces unpleasant odors and depletes the oxygen supply required by aquatic organisms. Depleted oxygen levels in bottom waters have led to large fish kills of bottom-dwellers such as fluke and flounder. Depleted oxygen levels can also reduce the quality of fish habitat and change the species composition to fish that are adapted to less oxygen or to warmer surface waters. Highly enriched waters will stimulate increased algae production which increases turbidity which in turn reduces sunlight penetration and the production of submerged aquatic vegetation (SAV). Since SAV provides habitat for juvenile fish and other aquatic organisms, the loss of SAV may severely disrupt the food chain. Increased algal growth is also believed to be harmful to coral reefs. The algae can smother the corals and reduce the strength of their calcium carbonate skeletons. Excess plant growth may also produce a surface algal scum which interferes with recreational activities such as swimming and boating.

Nitrogen in any form is a potential contributor to eutrophication in lakes, estuaries, and some coastal waters. In most cases, nitrogen is the limiting nutrient for plant growth in marine ecosystems. Excessive nitrogen causes other water quality problems. The most biologically important inorganic forms of nitrogen are ammonium, nitrate, and nitrite. Dissolved ammonia at concentrations above 0.2 mg/l may be toxic to fish, especially trout. Nitrates in drinking water are potentially dangerous, especially to newborn infants. Nitrate is converted to nitrite in the digestive tract, which reduces the oxygen-carrying capacity of the blood, causing brain damage or death. The chemical form of nitrogen affects its impact on water quality. Even if nitrogen is not in a biologically available form when it is carried from an agricultural field, it can be converted to an available form either during transport or after delivery to a waterbody.

Phosphorus can also contribute to the eutrophication of both freshwater and estuarine systems. While phosphorus is usually the limiting nutrient in freshwater systems, in some estuarine systems both nitrogen and phosphorus can limit plant growth. Phosphorus is rarely found in concentrations high enough to be toxic to higher organisms. Phosphorus is found in the soil in dissolved, colloidal, or particulate forms. After it is carried to waterbodies, the dissolved inorganic form (orthophosphate phosphorus) is probably the only form directly available to algae. Particulate and organic phosphorus may later be released and made available to algae when bottom sediment becomes anaerobic, causing water quality problems.

(2) SEDIMENT - Sediment is eroded from agricultural land by sheet and rill erosion and by gully erosion. Pesticides, fertilizers, organic matter and other pollutants are adsorbed on the sediment and are transported with it. These chemicals may be released from the sediment once it is carried to a waterbody. Adsorbed phosphorus may not be immediately available for aquatic plant growth but does remain as a long-term contributor to eutrophication. Sediments from different sources vary in the kinds and amounts of pollutants that are adsorbed to the particles. Sediment that originates from topsoil is usually richer in nutrients and other chemicals because of past fertilizer and pesticide applications, as well as nutrient cycling and biological activity. Sediment eroded from cropland usually contains a higher percentage of finer and less dense particles that will remain suspended for longer periods in the receiving waterbody. Sediments affect coastal waters in many adverse ways. Suspended solids reduce the amount of light available to aquatic plants, decrease the amount of submerged vegetation, thus reducing photosynthesis and the level of dissolved oxygen in the water column. Sediments also cover fish spawning areas and food supplies, smother coral reefs, clog the filtering capacity of filter feeders, and impair respiration by clogging the gills of fish. Turbidity interferes with the feeding habits of fish, reducing prey capture for sight-feeding predators. These effects combine to reduce fish, shellfish, coral, and plant populations and decrease the overall productivity of aquatic ecosystems. Turbid water also is aesthetically displeasing and may limit human uses such as fishing, swimming, and boating.

(3) ANIMAL WASTES - Animal wastes (manure) includes the fecal and urinary wastes of livestock and poultry; process water (such as from a milking parlor); and the feed, bedding, litter, and soil with which they become intermixed. These wastes contain many pollutants that can be transported by runoff water and process wastewater from confined animal facilities. The pollutants include nitrogen, phosphorus, and other major and minor nutrients, sediments, oxygen-demanding substances, salts, organic solids, and bacteria, viruses

and other microorganisms.

The decomposition of organic materials can deplete the dissolved oxygen content of the water causing anaerobic conditions. Methane, amines, and sulfide are produced under these conditions, causing the water to aquire an unpleasant odor, taste, and appearance. This renders the water unsuitable for drinking, fishing, and other recreational uses. Fish kills may result from the low dissolved oxygen or from ammonia in the water, possibly threatening commercial species of fin and shellfish. Because of the high nutrient and salt content of manure and runoff from manure-covered areas, eutrophication of waterbodies and contamination of ground water can occur. Animal diseases can be transmitted to humans through contact with animal feces. Runoff from fields receiving manure will contain extremely high numbers of bacteria. Contaminated water can cause disease either through direct contact, which threatens recreational water users, or by ingestion of contaminated shellfish. High fecal coliform counts have been responsible for shellfish contamination and the closure of shellfish beds and beaches. Pathogenic microorganisms associated with fecal waste can cause a variety of diseases including typhoid fever, cholera, and hepatitis.

(4) SALTS - Salts are a product of the natural weathering process of soil and rocks. They are found in varying concentrations in all soils and waters. In soils with poor subsurface drainage, high salt concentrations are created in the root zone. The movement and deposition of salts depend on the amount and distribution of rainfall and irrigation, the soil and underlying strata, evapotranspiration rates, and other environmental factors. Salts may be leached from the soil by rainfall or irrigation water. Soluble salts that are fairly easily leached include calcium, magnesium, sodium, potassium, carbonate, bicarbonate, sulfate, and chloride ions. Irrigation water has a natural base load of dissolved salts. As the water is consumed by plants or lost by evaporation, the salts remain and become concentrated in the soil. Irrigation return flows carry the salts to the receiving streams or ground-water reservoirs.

High salt concentrations in streams can harm freshwater aquatic plants by increasing the salinity of the water. Although salts are a more significant pollutant for freshwater ecosystems than for saline ecosystems, they may also adversely affect anadromous fish such as salmon that depend on freshwater systems near the coast for crucial portions of their life cycles.

(5) PESTICIDES - Pesticides include any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest or intended for use as a plant regulator, defoliant, or desiccant. Pesticides and their degradation products may enter surface or ground water in solution, in emulsion, or bound to soil colloids. Some of these chemicals are resistant to degradation and may persist and accumulate in aquatic ecosystems. Pesticides are transported to aquatic ecosystems primarily by direct application; in runoff; in aerial drift; through volatilization and subsequent atmospheric deposition; and through uptake by biota and movement in the food web. Domestic sewage and spills are additional sources. Surface water runoff from agricultural lands is considered to be the major route of transport into the aquatic environment (Pait et al., 1992).

The fate and effects of a pesticide in the aquatic environment are determined by factors such as toxicity, persistence, and bioconcentration. Exposure of aquatic communities to repeated or continuous pesticide inputs may have lethal effects on the environment that range from localized fish kills to eliminating or reducing populations of desirable organisms,

including endangered species. Pesticide-related fish kills have a distinct seasonal pattern with most events occurring in the spring and summer months during the major growing season. Pesticides may also produce sublethal effects by causing behavioral and structural changes in an organism. These changes may affect the ability of an organism to escape predation, may inhibit bone development in young fish, or may interfere with normal growth, development and reproduction. Bioconcentration of pesticides may occur as lower organisms on the food chain are eaten by animals higher in the food chain. Herbicides in the aquatic environment may destroy the food source of higher organisms and reduce the amount of vegetation available for protective cover and the laying of eggs by aquatic species. The decay of plant matter exposed to herbicide containing water can cause reductions in dissolved oxygen.

(6) HABITAT IMPACTS - The habitat of aquatic species may be adversely affected through physical disturbances caused by livestock, equipment, or through the management of water. Proper functioning of riparian-wetland areas may be impaired through changes to the four components of the water-riparian system: banks/shores, water column, channel, and aquatic and bordering vegetation.

Improper livestock grazing may cause shearing or sloughing of streambank soils, changes in species composition or elimination of streambank vegetation, and increases in the streambank angle which increases water width, decreases water depth, and alters fish habitat. Withdrawal of water from streams for irrigation or draining of wet meadows to increase grazing access can increase sediment and fecal contamination of the water column. Changes in sediment transport processes can cause changes in the stream channel morphology.

Management Measures for Agricultural Sources

1. *Erosion and Sediment Control Management Measure*

Apply the erosion component of a Conservation Management System (CMS) as defined in the Field Office Technical Guide of the U.S. Department of Agriculture Natural Resources Conservation Service to minimize the delivery of sediment from agricultural lands to surface waters, or

Design and install a combination of management and physical practices to settle the settleable solids and associated pollutants in runoff delivery from the contributing area for storms of up to and including a 10-year, 24-hour frequency.

This management measure is intended to be applied to activities that cause erosion on agricultural lands and lands converted from other uses to agricultural lands. This includes cropland; irrigated cropland; range and pasture; orchards; permanent hayland; specialty crop production; and, nursery crop production. Conservation Management Systems are any combination of conservation practices and management that achieves a level of treatment of natural resources that satisfies criteria in the SCS Field Office Technical Guide. The problems associated with soil erosion are the movement of sediment and associated pollutants by runoff into a waterbody (see discussion of environmental effects of agricultural pollutants above).

Application of this management measure will reduce the mass load of sediment and

associated pollutants (e.g., nitrogen, pesticides) reaching a waterbody. This will improve water quality and the use of the water resource. It may increase the potential for movement of water and soluble pollutants through the soil profile to the ground water. However, ground water protection will also be provided through application of the nutrient and pesticide management measures.

2a. *Management Measure for Facility Wastewater and Runoff from Confined Animal Facility Management (Large Units).*

Limit the discharge from the confined animal facility to surface waters by:
(1) Storing both the facility wastewater and the runoff from confined animal facilities that is caused by storms up to and including a 25-year, 24-hour frequency storm.

Storage structures should:
(a) Have an earthen lining or plastic membrane lining, or
(b) Be constructed with concrete, or
(c) Be a storage tank;
and

(2) Managing stored runoff and accumulated solids from the facility through an appropriate waste utilization system.

This management measure is intended to be applied to all new facilities regardless of size and to all new or existing confined animal facilities that contain the following number of head or more:

	Head	Animal Units
Beef Feedlots	300	300
Stables (horses)	200	400
Dairies	70	98
Layers	15,000	150
		495
Broilers	15,000	150
		495
Turkeys	13,750	2,475
Swine	200	80

This measure does not apply to those facilities that are defined as concentrated animal feeding operations by Federal regulation 40 CFR 122 and are required to obtain NPDES discharge permits. This regulation allows the Director of a NPDES discharge program to designate any animal feeding operation as a concentrated animal feeding operation (thus subjecting the operation to NPDES program requirements) upon determining that it is a significant contributor of pollution. If an NPDES permit is issued, the terms of the permit apply and this management measure is not required.

A confined animal facility is a lot or facility (other than an aquatic animal production facility) where the following conditions are met:

- Animals (other than aquatic animals) have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period, and

- Crops, vegetation forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility.

The problems associated with animal facilities result from runoff, facility wastewater, and manure (see discussion of environmental effects of agricultural pollutants above). Application of this management measure will greatly reduce the volume of runoff, manure, and facility wastewater reaching a waterbody, thereby improving water quality and the use of the water resource. This measure eliminates the pollutants leaving a facility by storing runoff and using practices that reduce the amount of water that comes into contact with animal waste materials. Implementation of this measure may increase the potential for movement of water and soluble pollutants through the soil profile to the ground water. However, ground water protection will also be provided by utilizing methods that minimize seepage to ground water and by using the nutrient and pesticide management measures.

2b. *Management Measure for Facility Wastewater and Runoff from Confined Animal Facility Management (Small Units)*

Design and implement systems that collect solids, reduce contaminant concentrations, and reduce runoff to minimize the discharge of contaminants in both facility wastewater and in runoff that is caused by storms up to and including a 25-year, 24-hour frequency storm. Implement these systems to substantially reduce significant increases in pollutant loadings to ground water. Manage stored runoff and accumulated solids from the facility through an appropriate waste utilization system.

This management measure is intended to be applied to all existing confined animal facilities that contain the following number of head:

	Head	Animal Units
Beef Feedlots	50-299	50-299
Stables (horses)	100-199	200-399
Dairies	20-69	28-97
Layers	5000-14,999	50-149[3]
		165-494[4]
Broilers	5,000-14,999	50-149[3]
		165-494[4]
Turkeys	5,000-13,749	900-2,474
Swine	100-199	40-79

[3] If facility has a liquid manure system, as used in 40 CFR Section 122, App.B.
[4] If facility has continuous overflow watering, as used in 40 CFR Section 122, App.B.

This measure is subject to the same NPDES designation criteria mentioned for large unit animal facilities. Facilities containing fewer than the number of head listed above are not subject to this management measure. Existing facilities that meet the requirements of management measures for large units are in compliance with the requirements of this measure. Existing and new facilities that already minimize the discharge of contaminants to surface waters, protect against contamination of ground water, and have an appropriate waste utilization system may already meet the requirements of this measure. Such facilities may not need additional controls for the purposes of this measure.

The problems associated with small unit animal facilities are the same as those discussed for large units. This management measure reduces the amount of pollutants leaving a facility by using practices that reduce the amount of water that comes in contact with animal waste materials. This will improve water quality by reducing the volume of runoff, manure, and facility wastewater reaching a waterbody. The same potential for movement of pollutants to ground waters is present as it is with large animal units, but this can also be prevented by utilizing nutrient and pesticide management measures.

3. Nutrient Management Measure

Develop, implement, and periodically update a nutrient management plan to: (1) apply nutrients at rates necessary to achieve realistic crop yields, (2) improve the timing of nutrient application, and (3) use agronomic crop production technology to increase nutrient use efficiency. When the source of the nutrients is other than commercial fertilizer, determine the nutrient value and the rate of availability of the nutrients. Determine and credit the nitrogen contribution of any legume crop. Soil and plant tissue testing should be used routinely.

Nutrient management plans contain the following core components: (1) Farm and field maps showing acreage, crops, soils, and waterbodies.

(2) Realistic yield expectations for the crop(s) to be grown, based primarily on the producer's actual yield history, State Land Grant University yield expectations for the soil series, or SCS Soils-5 information for the soil series.

(3) A summary of the nutrient resources available to the producer, which at a minimum include:

- *Soil test results for pH, phosphorus, nitrogen, and potassium;*
- *Nutrient analysis of manure, sludge, mortality compost or effluent;*
- *Nitrogen contributions to the soil from legumes grown in the rotation;*
- *Other significant nutrient sources (e.g., irrigation water).*

(4) An evaluation of field limitations based on environmental hazards or concerns, such as,

- *Sinkholes, shallow soils over fractured bedrock, and soils with high leaching potential,*
- *Lands near surface water,*

- Highly erodable soils, and,
- Shallow aquifers.

(5) Use of the limiting nutrient concept to establish the mix of nutrient sources and requirements for the crop based on a realistic yield expectation.

(6) Identification of timing and application methods for nutrients to: provide nutrients at rates necessary to achieve realistic crop yields; reduce losses to the environment; and avoid applications as much as possible to frozen soil and during periods of leaching and runoff.

(7) Provisions for the proper calibration and operation of nutrient application equipment.

This management measure is intended to be applied to activities associated with the application of nutrients to agricultural lands. The problems associated with this activity include the entrance of nutrients into ground and surface waters and the degradation of water quality (see discussion of the environmental impacts of nutrients above). The goal is to minimize edge-of-field delivery of nutrients and the leaching of nutrients from the root zone. This measure will reduce the amount of nutrients entering both ground and surface waters and promote more efficient use of all sources of nutrients available to the producer.

4. ***Pesticide Management Measure***

To reduce contamination of surface water and ground water from pesticides:
(1) Evaluate the pest problems, previous pest control measures, and cropping history;
(2) Evaluate the soil and physical characteristics of the site including mixing, loading, and storage areas for potential leaching or runoff of pesticides. If leaching or runoff is found to occur, steps should be taken to prevent further contamination;
(3) Use integrated pest management (IPM) strategies that:
(a) Apply pesticides only when an economic benefit to the producer will be achieved (i.e., applications based on economic thresholds); and
(b) Apply pesticides efficiently and at times when runoff are unlikely;
(4) When pesticide applications are necessary and a choice of registered materials exists, consider the persistence, toxicity, runoff potential, and leaching potential of products in making a selection;
(5) Periodically calibrate pesticide spray equipment; and
(6) Use anti-backflow devices on hoses used for filling tank mixtures.

This management measure is intended to be applied to activities associated with the application of pesticides to agricultural lands. The problems associated with this activity are caused by the runoff and leaching of pesticides into surface and ground waters and its adverse effect on the biota and water quality (see discussion of environmental effects of pesticides above). This measure will reduce contamination of surface and ground water by fostering effective and safe use of pesticides without causing environmental degradation.

5. *Grazing Management Measure*

Protect range, pasture and other grazing lands:
(1) By implementing one or more of the following to protect sensitive areas (such as streambanks, wetlands, estuaries, ponds, lake shores, and riparian zones):

(a) Exclude livestock,
(b) Provide stream crossings or hardened watering access for drinking,
(c) Provide alternative drinking water locations,
(d) Locate salt and additional shade, if needed, away from sensitive areas, or
(e) Use improved grazing management (e.g., herding)
to reduce the physical disturbance and reduce direct loading of animal waste and sediment caused by livestock; and

(2) By achieving either of the following on all range, pasture, and other grazing lands not addressed under (1):

(a) Implement the range and pasture components of a Conservation Management System (CMS) as defined in the Field Office Technical Guide of the USDA-SCS by applying the progressive planning approach of the USDA Soil Conservation Service (SCS) to reduce erosion, or
(b) Maintain range, pasture, and other grazing lands in accordance with activity plans established by either the Bureau of Land Management of the U.S. Department of the Interior or the Forest Service of the USDA.

This management measure is intended to be applied to activities on range, irrigated and nonirrigated pasture, and other grazing lands used by domestic livestock. Its focus is on the riparian zone, but this measure also encourages the control of erosion from range, pasture, and other grazing lands above the riparian zone. The problems associated with grazing are the physical disturbance of sensitive areas and the runoff of sediment, animal wastes, nutrients, and chemicals to surface waters (see discussion of environmental effects of agricultural pollutants above). Application of this management measure will improve aquatic habitat by reducing the amount of pollutants entering waters through proper livestock management.

6. *Irrigation Water Management*

To reduce nonpoint source pollution of surface waters caused by irrigation:
(1) Operate the irrigation system so that the timing and amount of irrigation water applied match crop water needs. This will require, as a minimum: (a) the accurate measurement of soil-water depletion volume and the volume of irrigation water applied, and (b) uniform application of water.
(2) When chemigation is used, include backflow preventers for wells, minimize the harmful amounts of chemigated waters that discharge from the edge of the field, and control deep percolation. In cases where chemigation is perfomed with furrow irrigation systems, a tailwater management system may be needed.

The following limitations and special considerations apply:

(1) In some locations, irrigation return flows are subject to other water rights or are required to maintain stream flow. In these special cases, on-site reuse could be precluded and would not be considered part of the management measure for such locations.
(2) By increasing the water use efficiency, the discharge volume from the system will usually be reduced. While the total pollutant load may be reduced somewhat, there is the potential for an increase in the concentration of pollutants in the discharge. In these special cases, where living resources or human health may be adversely affected and where other management measures (nutrients and pesticides) do not reduce concentrations in the discharge, increasing water use efficiency would not be considered part of the management measure.
(3) In some irrigation districts, the time interval between the order for and the delivery of irrigation water to the farm may limit the irrigator's ability to achieve the maximun on-farm application efficiencies that are otherwise possible.
(4) In some locations, leaching is necessary to control salt in the soil profile. Leaching for salt control should be limited to the leaching requirement for the root zone.
(5) Where leakage from delivery systems or return flows supports wetlands or wildlife refuges, it may be preferable to modify the system to achieve a high level of efficiency and then divert the "saved water" to the wetland or wildlife refuge. This will improve the quality of water delivered to wetlands or wildlife refuges by preventing the introduction of pollutants from irrigated lands to such diverted water.
(6) In some locations, sprinkler irrigation is used for frost or freeze protection, or for crop cooling. In these special cases, applications should be limited to the amount necessary for crop protection, and applied water should remain on-site.

This management measure is intended to be applied to activities on irrigated lands, including agricultural crop and pasture land (except for isolated fields of less than 10 acres in size that are not contiguous to other irrigated lands); orchard land; specialty cropland; and nursery cropland. A problem associated with irrigation is the movement of pollutants from the land into ground or surface water (see discussion of environmental effects of agricultural pollutants above). Return flows, runoff, and leachate from irrigated lands may transport particulate-bound nutrients, chemicals, and metals, soluble nutrients, and bacteria, viruses, and other microorganisms. Application of this management measure will reduce the waste of irrigation water, improve water use efficiency, and reduce the total pollutant discharge from an irrigation system.

b. Urban Nonpoint Pollution Source Category

Management measures have been developed for the following six subcategories of sources of urban nonpoint pollution that affect coastal waters:

- o Runoff from developing areas
- o Runoff from construction sites
- o Runoff from existing development
- o On-site disposal systems
- o General sources (households, commercial, and landscaping)
- o Roads, highways, and bridges

Urbanization usually results in changes to the physical, chemical, and biological characteristics of the land. Site clearing, grading, and the addition of impervious surfaces and maintained landscapes results in increased runoff of sediment and pollutants that degrade surface waters. The eight primary pollutants in urban runoff are sediment, nutrients, oxygen-demanding substances, pathogens, road salts, hydrocarbons, heavy metals, and toxics. The environmental effects of these pollutants on water quality are discussed below. The management measures are designed to prevent the environmental degradation caused by these pollutants.

(1) SEDIMENTS - Suspended sediments constitute the largest mass of pollutant loadings to surface waters. Pesticides, fertilizers, organic matter, metals, nutrients, hydrocarbons, and toxic compounds are adsorbed on the sediment and transported with it. These chemicals may be released from the sediment once it is carried to a waterbody. Sediments from different sources vary in the kinds and amounts of pollutants that are adsorbed to the particles.

Sediments have many adverse short- and long-term impacts on coastal waters. Suspended solids reduce the amount of light available to aquatic plants, decrease the amount of submerged aquatic vegetation, thus reducing photosynthesis and the level of dissolved oxygen in the water column. Sediments also cover fish spawning areas and food supplies, clog the filtering capacity of filter feeders, and impair respiration by clogging the gills of fish. Dredging and land disturbances from urban development are the primary cause of coral reef degradation. Turbidity interferes with the feeding habits of fish, reducing prey capture for sight-feeding predators. These effects combine to reduce fish, shellfish, coral, and plant populations and decrease the overall productivity of aquatic ecosystems. Turbid water is also aesthetically displeasing and may limit human uses such as fishing, swimming, and boating.

(2) NUTRIENTS - Nitrogen and phosphorus are the two main nutrients from urban runoff that degrade water quality. Sources of these nutrients are the erosion of sediment with attached soil nutrients and organic matter, plant debris, animal excrement, and onsite disposal systems. Although all plants require nutrients for growth, when these nutrients are introduced into a stream, lake or estuary at rates higher than normally available, aquatic plant productivity may increase dramatically. This process, referred to as cultural eutrophication, may adversely affect the suitability of the water for other uses. Increased plant productivity increases the

amount of organic matter in the system, which eventually dies and decays. The decaying organic matter produces unpleasant odors and depletes the oxygen supply required by aquatic organisms. Depleted oxygen levels in bottom waters have led to large fish kills of bottom-dwellers such as fluke and flounder. Depleted oxygen levels can reduce the quality of fish habitat and change the species composition to fish that are adapted to less oxygen or to warmer surface waters. Highly enriched waters will stimulate increased algae production which increases turbidity which in turn reduces sunlight penetration and the production of submerged aquatic vegetation (SAV). Since SAV provides habitat for juvenile fish and other aquatic organisms, the loss of SAV may severely disrupt the food chain. Increased algal growth is also believed to be harmful to coral reefs. The algae can smother the corals and reduce the strength of their calcium carbonate skeletons. Excess plant growth may also produce a surface algal scum which interferes with recreational activities such as swimming and boating.

Nitrogen in any form is a potential contributor to eutrophication in lakes, estuaries, and some coastal waters. In most cases, nitrogen is the limiting nutrient for plant growth in marine ecosystems. Excessive nitrogen causes other water quality problems. Dissolved ammonia at concentrations above 0.2 mg/l may be toxic to fish, especially trout. Nitrates in drinking water are potentially dangerous, especially to newborn infants. Nitrate is converted to nitrite in the digestive tract, which reduces the oxygen-carrying capacity of the blood, causing brain damage or death. The chemical form of nitrogen affects its impact on water quality. The most biologically important inorganic forms of nitrogen are ammonium, nitrate, and nitrite. Even if nitrogen is not in a biologically available form when it is carried from its source, it can be converted to an available form either during transport or after delivery to a waterbody.

Phosphorus can also contribute to the eutrophication of both freshwater and estuarine systems. While phosphorus is usually the limiting nutrient in freshwater systems, in some estuarine systems both nitrogen and phosphorus can limit plant growth. Phosphorus is rarely found in concentrations high enough to be toxic to higher organisms. Phosphorus is found in the soil in dissolved, colloidal, or particulate forms. After it is carried to waterbodies, the dissolved inorganic form (orthophosphate phosphorus) is probably the only form directly available to algae. Particulate and organic phosphorus may later be released and made available to algae when bottom sediment becomes anaerobic, causing water quality problems.

(3) OXYGEN-DEMANDING SUBSTANCES - Decomposition of organic matter by microorganisms may deplete dissolved oxygen levels in the water column enough to cause anaerobic conditions. Methane, amines, and sulfides are produced under these conditions, causing the water to aquire an unpleasant odor, taste, and appearance. This renders the water unsuitable for drinking and recreational uses. Urban runoff containing high concentrations of decaying organic matter can severely lower dissolved oxygen levels after storms. (Adverse effects of low oxygen levels are discussed above under sediments and nutrients).

(4) PATHOGENS - Urban runoff typically contains elevated levels of pathogenic organisms such as bacteria and viruses. Although bacteria normally inhabit coastal waters and are an important part of the food web, urban runoff may add too many bacteria or introduce species that cause diseases. Elevated levels of pathogenic organisms may result in closed beaches, contaminated drinking water sources, and shellfish bed closings. Human exposure to

pathogens may occur from eating contaminated shellfish and from swimming or other water contact uses. These pathogenic organisms can cause diseases such as gastroenteritis, dysentery, typhoid fever, cholera, and hepatitis. Areas polluted by fecal coliform or other harmful bacteria are closed to shellfish harvesting and recreational uses.

(5) ROAD SALTS - Road salts can be a major urban pollutant in northern climates. Road salts may contaminate lakes, streams, and wells. Runoff from melting snow causes high salt/chlorine concentrations to form at the bottom of ponds, lakes, and bays. This condition is toxic to benthic organisms and may also prevent the vertical mixing of surface and bottom waters that occurs in waterbodies in the Spring. High salt concentrations in freshwater can harm freshwater aquatic vegetation by increasing the salinity of the water. This may also adversely affect anadromous fish such as salmon that depend on freshwater systems near the coast for crucial portions of their life cycles.

(6) HYDROCARBONS - Petroleum hydrocarbons, derived mainly from automobile and truck engines, may be found in high enough concentrations to cause mortalities in aquatic organisms. Hydrocarbons have a high affinity for sediment and may persist in lake and estuary bottom sediments for long periods of time. Aromatic hydrocarbons are the most soluble and toxic components of oil. Some polynuclear aromatic hydrocarbons (PAHs) are known to be toxic to aquatic organisms at low concentrations. PAHs and other hydrocarbons are human carcinogens that have been found in seafood, leading to a ban on fishing or advisories on the consumption of fish or waterfowl. Genetic and physiological defects, such as tumors in fish, have been attributed to hydrocarbon contamination.

(7) HEAVY METALS - Urban runoff containing heavy metals such as cadmium, lead, zinc, copper, mercury, and chromium has toxic effects on aquatic life and has the potential to contaminate ground water. Copper, lead, and zinc are the most prevalent metals found in urban runoff. Heavy metals can settle to the bottom of waterbodies and accumulate in the sediment. Here they may enter the foodchain, gradually concentrating in higher forms of life and eventually leading to human exposure. Shellfish are especially susceptible to contamination from heavy metals because they in the same location for most of their lives.

(8) TOXICS - Many different toxic compounds (priority pollutants) have been associated with urban runoff. EPA (USEPA,1983) estimated that at least ten percent of urban runoff samples contained toxic pollutants. These include pesticides, paints, solvents, antifreeze, polychlorinated biphenyls (PCBs), and industrial and household chemicals. Some of these chemicals are resistant to degradation and may persist and bioaccumulate in aquatic ecosystems. They may have lethal effects on aquatic communities ranging from localized fish kills to reducing populations of desirable organisms. They may also produce sublethal effects by causing behavioral and structural changes in an organism. These changes may affect the ability of an organism to escape predation, may inhibit bone development in young fish, or interfere with normal growth, development, and reproduction. PCBs are human carcinogens that have been found in seafood, leading to fishing bans and advisories against eating certain fish and waterfowl.

Other impacts not related to a specific pollutant are also the result of urbanization. Impervious surfaces act as heat collectors and increase the temperature of urban runoff as it passes over the surfaces. An increase in water temperature lowers the dissolved oxygen of the water and adversely affects aquatic organisms that are intolerant of fluctuations in water temperature. Large increases in freshwater inflow due to increased runoff may temporarily alter the salinity in estuaries enough to adversely affect organisms that are used to a narrow range of salinity. The alteration of natural hydrology by channelization and destruction of natural drainage systems has degraded or destroyed wetlands and riparian areas.

Management Measures for Urban Areas

1. *New Development Management Measure*

(1) By design or performance:

(a) After construction has been completed and the site is permanently stabilized, reduce the average annual total suspended solid (TSS) loadings by 80 percent. For the purposes of this measure, an 80 percent TSS reduction is to be determined on an average annual basis, or*

(b) Reduce the postdevelopment loadings of TSS so that the average annual TSS loadings are no greater than predevelopment loadings, and

(2) To the extent practicable, maintain postdevelopment peak runoff rate and average volume at levels that are similar to predevelopment levels.

Sound watershed management requires that both structural and nonstructural measures be employed to mitigate the adverse impacts of storm water. Nonstructural Management Measures 2 and 3 can be effectively used in conjunction with Management Measure 1 to reduce both the short-and long-term costs of meeting the treatment goals of this management measure.

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* *Based on the average annual TSS loadings from all storms less than or equal to the 2-year/24 hour storm. TSS loadings from storms greater that the 2-year/24 hour storm are not expected to be included in the calculation of the average annual TSS loadings.*

This management measure is intended to be applied to control urban runoff and treat associated pollutants generated from new development, redevelopment, and new and relocated roads, highways, and bridges. Application of this management measure will: (1) decrease the erosive potential of increased runoff volumes and velocities associated with changes in hydrology; (2) remove suspended solids and pollutants entrained in runoff; (3) retain predevelopment hydrological conditions; and (4) preserve natural systems. The net result will be increased watershed protection and a reduction in the erosion, flooding, and pollutants associated with poorly planned development.

2. *Watershed Protection Management Measure*

Develop a watershed protection program to:
(1) Avoid conversion, to the extent practicable, of areas that are particularly susceptible to erosion and sediment loss;

(2) Preserve areas that provide important water quality benefits and/or are necessary to maintain riparian and aquatic biota; and

(3) Site development, including roads, highways, and bridges, to protect to the extent practicable the natural integrity of waterbodies and natural drainage systems

This management measure is intended to be applied to new development or redevelopment including construction of new and relocated roads, highways, and bridges that generate nonpoint source pollutants. Application of this management measure will reduce the generation of nonpoint source pollutants and mitigate the impacts of urban runoff. It will provide general goals to be used in developing programs for guiding future development and land use activities in a manner that will prevent and mitigate the effects of poorly planned growth on watersheds.

3. *Site Development Management Measure*

Plan, design, and develop sites to:
(1) Protect areas that provide important water quality benefits and/or are particularly susceptible to erosion and sediment loss;

(2) Limit increases of impervious areas, except where necessary;

(3) Limit land disturbance activities such as clearing and grading, and cut and fill to reduce erosion and sediment loss; and

(4) Limit disturbance of natural drainage features and vegetation.

This management measure is intended to be applied to all site development activities including those associated with roads, highways, and bridges. Application of this management measure will reduce the generation of nonpoint source pollution and mitigate the impacts of urban runoff through proper design and development of individual sites. It provides controls and policies that are to be applied during the site planning and review process.

4. *Construction Site Erosion and Sediment Control Management Measure*

(1) Reduce erosion and, to the extent practicable, retain sediment onsite during and after construction, and

(2) Prior to land disturbance, prepare and implement an approved erosion and

sediment control plan or similar administrative document that contains erosion and sediment control provisions.

This management measure is intended to be applied to all construction activities on sites less than five acres in areas that do not have an NPDES permit in order to control erosion and sediment loss from those sites. This measure does not apply to: (1) construction of a detached single family home on a site of one-half acre or more or (2) construction that does not disturb over 5,000 square feet of land on a site. Application of this management measure will minimize the sediment being transported outside the perimeter of a construction site by reducing erosion and retaining sediment onsite.

5. ***Construction Site Chemical Control Management Measure***

(1) Limit application, generation, and migration of toxic substances;

(2) Ensure the proper storage and disposal of toxic materials; and

(3) *Apply nutrients at rates necessary to establish and maintain vegetation without causing significant nutrient runoff to surface waters.*

This management measure is intended to be applied to all construction sites less than five acres in area and to new, resurfaced, restored, and reconstructed road, highway, and bridge construction projects. This management measure does not apply to: (1) construction of a detached single family home on a site of one-half acre or more or (2) construction that does not disturb over 5,000 square feet of land on a site. Potential pollutants other than sediment associated with construction sites include pesticides, fertilizers, petrochemicals, wood, garbage, sanitary wastes, and paints and sealers. Application of this management measure will prevent the generation of these pollutants at construction sites due to improper handling and usage, and prevent their movement from the construction site.

6. ***Existing Development Management Measure***

Develop and implement watershed management programs to reduce runoff pollutant concentrations and volumes from existing development:

(1) Identify priority local and/or regional watershed pollutant reduction opportunities, e.g., improvements to existing urban runoff control structures;

(2) Contain a schedule for implementing appropriate controls;

(3) Limit destruction of natural conveyance systems; and

(4) Where appropriate, preserve, enhance, or establish buffers along surface waterbodies and their tributaries.

This management measure is intended to be applied to all urban areas and existing development in order to reduce surface water runoff pollutant loadings from such areas. Application of this management measure will protect or improve surface water quality by developing and implementing watershed management programs that pursue the following objectives: (1) reduce surface water runoff pollution loadings from areas already developed; (2) limit surface water runoff volumes in order to minimize sediment loadings caused by erosion of streambanks; and (3) preserve, enhance, or establish buffers along waterbodies.

7. *New Onsite Disposal Systems Management Measures*

(1) Ensure that new Onsite Disposal Systems (OSDS) are located, designed, installed, operated, inspected, and maintained to prevent the discharge of pollutants to the surface of the ground and to the extent practicable reduce the discharge of pollutants into ground waters that are closely hydrologically connected to surface waters. Where necessary to meet these objectives: (a) discourage the installation of garbage disposals to reduce hydraulic and nutrient loadings; and (b) where low-volume plumbing fixtures have not been installed in new developments or redevelopments, reduce total hydraulic loadings to the OSDS by 25 percent. Implement OSDS inspection schedules for preconstruction, construction, and postconstruction.

(2) Direct placement of OSDS away from unsuitable areas. Where OSDS placement in unsuitable areas is not practicable, ensure that the OSDS is designed or sited at a density so as not to adversely affect surface waters or ground water that is closely hydrologically connected to surface water. Unsuitable areas include, but are not limited to, areas with poorly or excessively drained soils; areas with shallow water tables or areas with high seasonal water tables; areas overlaying fractured bedrock that drain directly to ground water; areas with floodplains; or areas where nutrient and/or pathogen concentrations in the effluent cannot be sufficiently treated or reduced before the effluent reaches sensitive waterbodies;

(3) Establish protective setbacks from surface waters, wetlands, and floodplains for conventional as well as alternative OSDS. The lateral setbacks should be based on soil type, slope, hydrologic factors, and type of OSDS. Where uniform protective setbacks cannot be achieved, site development with OSDS so as not to adversely affect waterbodies and/or contribute to a public health nuisance.

(4) Establish protective separation distances between OSDS system components and groundwater which is closely hydrologically connected to surface waters. The separation distances should be based on soil type, distance to ground water, hydrologic factors, and type of OSDS;

(5) Where conditions indicate that nitrogen-limited surface waters may be adversely affected by excess nitrogen loadings from ground water, require the installation of OSDS that reduce total nitrogen loadings by 50 percent to ground water that is closely hydrologically connected to surface water.

This management measure is intended to be applied to all new OSDS including package plants and small-scale or regional treatment facilities not covered by NPDES regulations in order to manage the siting, design, installation, and operation and maintenance of all such OSDS. Application of this management measure will protect the 6217 management area from pollutants by preventing the installation of conventional OSDS in areas where soil absorption systems will not provide adequate treatment of effluents containing solids, phosphorus, pathogens, and nitrogen, prior to entry into surface or ground waters.

8. ***Operating Onsite Disposal Systems Management Measure***

(1) Establish and implement policies and systems to ensure that existing OSDS are operated and maintained to prevent the discharge of pollutants to the surface of the ground and to the extent practicable reduce the discharge of pollutants into ground waters that are closely hydrologically connected to surface waters. Where necessary to meet these objectives, encourage the reduced use of garbage disposals, encourage the use of low-volume plumbing fixtures, and reduce total phosphorus loadings to the OSDS by 15 percent (if the use of low-level phosphate detergents has not been required or widely adopted by OSDS users). Establish and implement policies that require an OSDS to be repaired, replaced, or modified where the OSDS fails, or threatens or impairs surface waters;

(2) Inspect OSDS at a frequency adequate to ascertain whether OSDS are failing:

(3) Consider replacing or upgrading OSDS to treat influent so that total nitrogen loadings in the effluent are reduced by 50 percent. This provision applies only:

(a) where conditions indicate that nitrogen-limited surface waters may be adversely affected by significant ground water nitrogen loadings from OSDS;
(b) where nitrogen loadings from OSDS are delivered to ground water that is closely hydrologically connected to surface water.

This management measure is intended to be applied to all operating OSDS. This management measure will minimize pollutant loadings from operating OSDS by requiring that they be modified, operated, repaired, and maintained to reduce nutrient and pathogen loadings in order to protect and enhance surface waters.

9. ***Pollution Prevention Management Measure***

Implement pollution prevention and education programs to reduce nonpoint source pollutants generated fron the following activities, where applicable:
o The improper storage, use and disposal of household hazardous chemicals, including automobile fluids, pesticides, paints, solvents, etc.,
Lawn and garden activities, including the application and disposal of lawn and garden care products, and the improper disposal of leaves and yard trimmings;
o Turf management on golf courses, parks, and recreational areas;

o Improper operation and maintenance of onsite disposal systems;
o Discharge of pollutants into storm drains including floatables, waste oil, and litter;
o Commercial activities including parking lots, gas stations,and other entities not under NPDES purview; and
o Improper disposal of pet excrement.

This management measure is intended to be applied to reduce the generation of nonpoint source pollution in all areas within the section 6217 management area. It is meant to prevent and reduce pollutant loadings generated from a variety of activities within urban areas not addressed by other management measures in this source category. It is intended to ensure that communities implement solutions that may result in behavioral changes that reduce the generation of pollutants, thus reducing water quality impacts from these sources.

10. Management Measure for Planning, Siting, and Developing Roads and Highways

Plan, site, and develop roads and highways to:
(1) Protect areas that provide important water quality benefits or are particularily susceptible to erosion or sediment loss; and

(2) Limit land disturbance such as clearing and grading and cut and fill to reduce erosion and sediment loss; and

(3) Limit disturbance of natural drainage features and vegetation.

This management measure is intended to be applied to site development and land disturbing activities for new, relocated, and reconstructed roads and highways in order to reduce the generation of nonpoint source pollutants and to mitigate the impacts of urban runoff from such activities. This measure emphasizes the importance of planning to identify potential problems early in the design process. Highway locations selected and designed with consideration of environmental features such as topography, drainage patterns, soils, climate, and existing land use will greatly minimize erosion and sedimentation and prevent pollutants from entering water during and after construction.

11. *Management Measure for Bridges*

Site, design, and maintain bridge structures so that sensitive and valuable aquatic ecosystems and areas providing important water quality benefits are protected from adverse effects.

This management measure is intended to be applied to new, relocated, and rehabilitated bridge structures in order to control erosion, streambed scouring, and surface runoff from such activities. The measure requires that nonpoint source runoff impacts on surface waters from bridge decks be assessed and that appropriate management and treatment be employed to

protect critical habitats, wetlands, fisheries, shellfish beds, and domestic water supplies. This will ensure that bridges will not be sited over sensitive waters and tributaries in the coastal zone.

12. *Management Measure for Construction Projects*

(1) Reduce erosion and, to the extent practicable, retain sediment onsite during and after construction and;

(2) Prior to land disturbance, prepare and implement an approved erosion control plan or similar administrative document that contains erosion and sediment control provisions.

This management measure is intended to be applied to new, replaced, restored, and rehabilitated road, highway, and bridge construction projects in order to control erosion and offsite movement of sediment from such project sites. This measure emphasizes the importance of erosion and sediment control plans as effective methods in mitigating erosion problems at construction sites before any land-disturbing activity begins.

13. *Management Measure for Construction Site Chemical Control*

(1) Limit the application, generation, and migration of toxic substances;

(2) Ensure the proper storage and disposal of toxic materials; and

(3) Apply nutrients at rates necessary to establish and maintain vegetation without causing significant nutrient runoff to surface water.

This management measure is intended to be applied to new, resurfaced, restored, and rehabilitated road, highway, and bridge construction projects in order to reduce toxic and nutrient loadings from such project sites. The objective of this measure is to safeguard surface and ground waters from toxic spills and hazardous loadings at construction sites from equipment and fuel storage, and also from road salt, fertilizers, and pesticides stored at maintenance areas.

14. *Management Measure for Operation and Maintenance*

Incorporate pollution prevention procedures into the operation and maintenance of roads, highways, and bridges to reduce pollutant loadings to surface waters.

This management measure is intended to be applied to existing, restored, and rehabilitated roads, highways, and bridges. This measure will ensure that pollutants generated by operation and maintenance procedures for roads, highways, and bridges, and from sparsely vegetated areas, cracked pavements, potholes, and poorly operating urban runoff control structures, are minimized through the development and implementation of a program that

includes standard operating procedures and maintenance guidelines.

15. *Management Measure for Road, Highway, and Bridge Runoff Systems*

Develop and implement runoff management systems for existing roads, highways, and bridges to reduce runoff pollutant concentrations and volumes entering surface waters.

(1) Identify priority and watershed pollutant reduction opportunities (e.g., improvements to existing urban runoff control structures; and

(2) Establish schedules for implementing appropriate controls.

This management measure is intended to be applied to existing, resurfaced, restored, and rehabilitated roads, highways, and bridges that contribute to adverse effects in surface waters. This measure requires that maintenance and operation systems include the development of retrofit projects, where needed, to collect nonpoint source pollutants from roads, highways, and bridges. Surface waters will be protected through the use of runoff management systems such as vegetated filter strips, grassed swales, detention basins, constructed wetlands, and infiltration trenches.

c. **Forestry Nonpoint Pollution Source Category**

Management measures have been developed for the following six subcategories of sources of forestry nonpoint pollution that affect coastal waters:

- o Road construction and use
- o Timber harvesting
- o Regeneration methods
- o Site preparation
- o Prescribed burning
- o Application of forest chemicals

Forestry activities have been identified as nonpoint pollution sources in coastal area water quality assessments and control programs. On a national level, silviculture contributes about 3 to 9 percent of nonpoint source pollution to United States waters (Neary et al., 1989; USEPA, 1992a). Environmental impacts depend on site characteristics, climatic conditions, and the forest practices employed.

The six primary pollutant types associated with forestry operations are sediment, nutrients, forest chemicals, organic debris, temperature, and streamflow. The environmental effects of these pollutants on water quality are discussed below. The management measures are designed to prevent the environmental degradation caused by these pollutants.

(1) SEDIMENT - Sediment is often the primary pollutant associated with forestry activities (Pardo, 1980). Pesticides, fertilizers, organic matter and other pollutants are adsorbed on the sediment and are transported with it. These chemicals may be released from

the sediment once it is carried to a waterbody. Adsorbed phosphorus may not be immediately available for aquatic plant growth but does remain as a long-term contributor to eutrophication. Sediments from different sources vary in the kinds and amounts of pollutants that are adsorbed to the particles. Sediment that originates from topsoil is usually richer in nutrients and other chemicals because of past fertilizer and pesticide applications, as well as nutrient cycling and biological activity.

Sediments affect coastal waters in many adverse ways. Suspended sediment increases water turbidity, reduces the amount of light available to aquatic plants, thereby reducing photsynthesis and the amount of dissolved oxygen in the water column. Sediments that settle to the bottom of a stream or lake may smother benthic organisms as well as reduce the capacity of stream channels to carry water and reservoirs to hold water. Sediments also cover fish spawning areas and food supplies, smother coral reefs, clog the filtering capacity of filter feeders, and impair respiration by clogging the gills of fish. Turbidity interferes with the feeding habits of fish, reducing prey capture by sight-feeding predators. These effects combine to reduce fish, shellfish, coral, and plant populations and decrease the overall productivity of aquatic ecosystems. Turbid water also is aesthetically displeasing and may limit human uses such as fishing, swimming, and boating.

(2) NUTRIENTS - Nitrogen and phosphorus are the two major nutrients from forestry activities that degrade water quality. Forest fertilizers enter surface waters through direct application, drift, mobilization in ephemeral streams, overland flow, and leaching. They may be adsorbed to sediments, in solution, or transported by aerial deposition. The removal of large quantities of vegetation through harvesting can increase leaching of nutrients from the soil by disrupting the nitrogen cycle. Although all plants require nutrients for growth, when these nutrients are introduced into a stream, lake, or estuary at rates higher than normally available, aquatic plant productivity may increase dramatically. This process, referred to as cultural eutrophication, may adversely affect the suitability of the water for other uses. Increased plant productivity increases the amount of organic material in the system, which eventually dies and decays. The decaying organic matter produces unpleasant odors and depletes the oxygen supply required by aquatic organisms. Depleted oxygen levels in bottom waters have led to large fish kills of bottom-dwellers such as fluke and flounder. Depleted oxygen levels can reduce the quantity of fish habitat and change the species composition to fish that are adapted to less oxygen or to warmer surface waters. Highly enriched waters will stimulate increased algae production which increases turbidity which in turn reduces sunlight penetration and the production of submerged aquatic vegetation (SAV). Since SAV provides habitat for juvenile fish and other aquatic organisms, the loss of SAV may severely disrupt the food chain. Increased algal growth is also believed to be harmful to coral reefs. The algae can smother corals and reduce the strength of their calcium carbonate skeletons. Excess plant growth may also produce a surface algal scum which interferes with recreational activities such as swimming and boating.

Nitrogen in any form is a potential contributor to eutrophication in lakes, estuaries, and some coastal waters. In most cases, nitrogen is the limiting nutrient for plant growth in marine ecosystems. Excessive nitrogen causes other water quality problems. Dissolved ammonia at concentrations above 0.2 mg/l may be toxic to fish, especially trout. Nitrates in drinking water are potentially dangerous, especially to newborn infants. Nitrate is converted

to nitrite in the digestive tract, which reduces the oxygen-carrying capacity of the blood, causing brain damage or death. The chemical form of nitrogen affects its impact on water quality. The most biologically important inorganic forms of nitrogen are ammonium, nitrate, and nitrite. Even if nitrogen is not in a biologically available form when it is carried from a forested area, it can be converted to an available form either during transport or after delivery to a waterbody.

Phosphorus can also contribute to the eutrophication of both freshwater and estuarine systems. While phosphorus is usually the limiting nutrient in freshwater systems, in some estuarine systems both nitrogen and phosphorus can limit plant growth. Phosphorus is rarely found in concentrations high enough to be toxic to higher organisms. Phosphorus is found in the soil in dissolved, colloidal, or particulate forms. After it is carried to waterbodies, the dissolved inorganic form (orthophosphate phosphorus) is probably the only form directly available to algae. Particulate and organic phosphorus may later be released and made available to algae when bottom sediment becomes anaerobic, causing water quality problems.

(3) PESTICIDES - Pesticides (herbicides, insecticides, and fungicides) used to control forest pests and undesirable plant species can be toxic to the environment. Pesticides with high solubilities are extremely harmful, causing either chronic or acute effects in aquatic organisms. Pesticides that are applied to forest foliage, or soils, or are applied by aerial means, are most easily carried to surface or ground waters. These chemicals and their degradation products may enter the water in solution, in emulsion, or bound to soil colloids. Some are resistant to degradation and may persist and accumulate in aquatic ecosystems. The fate and effects of a pesticide are determined by factors such as toxicity, persistence, and bioconcentration. Exposure of aquatic communities to repeated or continuous pesticide inputs may have lethal effects ranging from localized fish kills to elimination or reduction of desirable organisms. Pesticides may also produce sublethal effects such as reducing species diversity or causing behavioral and structural changes in an organism. These changes may affect the ability of an organism to escape predation, may inhibit bone development in young fish, cause organ malfunction or failure, or interfere with normal growth, development, and reproduction. Bioconcentration may occur as organisms lower on the food chain are eaten by animals higher on the food chain. Herbicides in the aquatic environment may destroy the food source of higher organisms and reduce the amount of vegetation available for protective cover and the laying of eggs by aquatic species. The decay of plant matter exposed to herbicide-containing water can cause reductions in dissolved oxygen.

(4) ORGANIC DEBRIS - Organic debris includes residual logs, slash, litter, and soil organic matter. The decomposition of organic debris may cause increased biochemical oxygen demand, resulting in decreased dissolved oxygen. Fish kills may result from the low oxygen content of the water. Low oxygen levels can also reduce the quality of fish habitat and change the species composition to fish that are adapted to less oxygenated waters. Logging slash can alter streamflows by forming debris dams or rerouting streams; it may also cause bank erosion and sedimentation by redirecting flow in the stream channel (adverse effects of sediments are discussed above). The alteration of streamflows can result in loss or change in habitat through shearing or sloughing of streambank soils and elimination of streambank vegetation. The presence of naturally occurring woody debris in streams can also have a beneficial effect by

creating habitat and stabilizing streambeds and banks. Organic materials such as leaves and twigs that fall into streams are also beneficial because they provide an external energy source by adding detritus for the instream detrital food chain.

(5) TEMPERATURE - Increased water temperature can result from removal of vegetation in the riparian zone during harvesting of trees or use of herbicides. Increases in stream temperature result from increased solar radiation to the water surface after the removal of vegetative cover that provided shade that moderated water temperatures. The vegetation also provided detritus that serves as an energy source for stream ecosystems. Increased solar radiation shifts the energy sources for stream ecosystems from outside the stream sources, allochthonous organic matter, to instream producers, autochthonous aquatic plants such as algae. Increased water temperatures adversely affect aquatic organisms by decreasing dissolved oxygen in the water and increasing biological oxygen demand. Increased water temperatures in smaller streams can adversely affect the species composition of organisms and fish, such as trout, that are adapted to cooler water habitats.

(6) STREAMFLOW - Increased streamflow often results from vegetation removal. Harvesting of trees reduces evapotranspiration, thus increasing water availability to stream systems. Increased streamflows can scour channels, erode streambanks, and increase sedimentation. (Adverse impacts of sediments and increased streamflow are discussed above).

Management Measures for Forestry

1. ***Preharvest Planning***

Perform advance planning for forest harvesting that includes the following elements where appropriate:

(1) Identify the area to be harvested including location of waterbodies and sensitive areas such as wetlands, threatened or endangered aquatic species habitat areas, or high-erosion-hazard areas (landslide-prone areas) within the harvest unit.
(2) Time the activity for the season or moisture conditions when the least impact occurs.
(3) Consider potential water quality impacts and erosion and sedimentation control in the selection of silvicultural and regeneration systems, especially for harvesting and site preparation.
(4) Reduce the risk of occurrence of landslides and severe erosion by identifying high-erosion-hazard areas and avoiding harvesting in such areas to the extent practicable.
(5) Consider additional contributions from harvesting or roads to any known existing water quality impairments or problems in watersheds of concern.

Perform advance planning for forest road systems that includes the following elements where appropriate:

(1) Locate and design road systems to minimize, to the extent practicable, potential sediment generation and delivery to surface waters. Key components are:

- *o locate roads, landings, and skid trails to avoid to the extent practicable steep grades and steep hillslope areas, and to decrease the number of stream crossings;*
- *o avoid to the extent practicable locating new roads and landings in Streamside Management Areas (SMAs); and*
- *o determine road usage and select the appropriate road standard.*

(2) Locate and design temporary and permanent stream crossings to prevent failure and control impacts from the road system. Key components are:

- *o size and site crossing structures to prevent failure;*
- *o for fish-bearing streams, design crossings to facilitate fish passage.*

(3) Ensure that the design of road prism and the road surface drainage are appropriate to the terrain and that road surface design is consistent with the road drainage structures.

(4) Use suitable materials to surface roads planned for all-weather use to support truck traffic.

(5) Design road systems to avoid high erosion or landslide hazard areas. Identify these areas and consult a qualified specialist for design of any roads that must be constructed through these areas.

Each state should develop a process (or utilize an existing process) that ensures that the management measures in the chapter are implemented. Such a process should include apppropriate notification, compliance audits, or other mechanisms for forestry activities with the potential for significant adverse nonpoint effects based on the type and size of operation and the presence of stream crossings or SMAs.

This management measure pertains to lands where silvicultural or forestry operations are planned or conducted. The planning process components of this management measure are intended to apply to commercial harvesting on areas greater than five acres and any associated road system construction or reconstruction conducted as part of normal silvicultural activities. Through its advance planning process, this measure will ensure that silvicultural activities, including timber harvesting, site preparation, and associated road construction, are conducted without significant nonpoint source pollution delivery to streams and coastal areas.

2. *Streamside Management Areas (SMAs)*

Establish and maintain a streamside management area along surface waters, which is sufficiently wide and which includes a sufficient number of canopy species to buffer against detrimental changes in the temperature regime of the waterbody, to provide bank stability, and to withstand wind damage. Manage the SMA in such a way as to protect against soil disturbance in the SMA and delivery to the stream of sediments and nutrients generated by forestry activities, including harvesting. Manage the SMA canopy species to provide a sustainable source of large woody debris needed for instream channel structure and aquatic species habitat.

This management measure pertains to lands where silvicultural or forestry operations are planned or conducted. It is intended to apply to surface waters bordering or within the area of operations. The vegetation in SMAs will protect water quality and aquatic habitat by reducing runoff and trapping sediment and nutrients before they reach surface waters. Canopy species serve to moderate water temperatures by providing shade. They also provide the detritus for the detrital food chain, stabilize stream banks, and provide habitat for aquatic and terrestrial organisms.

3. ***Road Construction/Reconstruction***

(1) Follow preharvest planning (as described under Management Measure 1) when constructing or reconstructing the roadway.

(2) Follow designs planned under Management Measure 1 for road surfacing and shaping.

(3) Install road drainage structures according to designs planned under Management Measure 1 and regional storm return period and installation specifications. Match these drainage structures with terrain features and with road surface and prism designs.

(4) Guard against the production of sediment when installing stream crossings.

(5) Protect surface waters from slash and debris material from roadway clearing.

(6) Use straw bales, silt fences, mulching, or other favorable practices on disturbed soils on unstable cuts, fills, etc.

(7) Avoid constructing new roads in SMAs to the extent practicable.

This management measure is intended for application on lands where silvicultural or forestry operations are planned or conducted. It applies to the clearing, pioneering, construction, and surfacing phases of road development. This management measure will reduce erosion and the runoff of sediment to surface waters by minimizing the disturbance of soil and rock during road development.

4. ***Road Management***

(1) Avoid using roads where possible for timber hauling or heavy traffic during wet or thaw periods on roads not designed and constructed for these conditions.

(2) Evaluate the future need for a road and close roads that will not be needed. Leave closed roads and drainage channels in a stable condition to withstand storms.

(3) Remove drainage crossings and culverts if there is a reasonable risk of plugging or failure from lack of maintenance.

(4) Following completion of harvesting, close and stabilize temporary spur roads and seasonal roads to control and direct water away from the roadway. Remove all temporary stream crossings.

(5) Inspect roads to determine the need for structural maintenance. Conduct maintenance practices, when conditions warrant, including cleaning and replacement of deteriorated structures and erosion controls, grading or seeding of road surfaces, and, in extreme cases, slope stabilization or removal of road fills where necessary to maintain structural integrity.

(6) Conduct maintenance activities, such as dust abatement, so that chemical contaminants or pollutants are not introduced into surface waters to the extent practicable.

(7) Properly maintain permanent stream crossings and associated fills and approaches to reduce the likelihood (a) that stream overflow will divert onto roads, and (b) that fill erosion will occur if the drainage structures become obstructed.

This management measure pertains to lands where silvicultural or forestry operations are planned or conducted. It applies to active and inactive roads constructed or used for silvicultural activities. This management measure will protect water quality by managing existing roads to maintain stability and utility in order to minimize sedimentation and pollution from runoff-transported materials.

5. ***Timber Harvesting***

The timber harvesting management measure consists of implementing the following: (1) Timber harvesting operations with skid trails or cable yarding follow layouts determined under Management Measure 1.

(2) Install landing drainage structures to avoid sedimentation to the extent practicable. Disperse landing drainage over sideslopes.

(3) Construct landings away from steep slopes and reduce the likelihood of fill slope failures. Protect landing surfaces used during wet periods. Locate landings outside of SMAs.

(4) Protect stream channels and significant ephemeral drainages from logging debris and slash material.

(5) Use appropriate areas for petroleum storage, draining, dispensing. Establish

procedures to contain and treat spills. Recycle or properly dispose of all waste materials.

For cable yarding:
(1) Limit yarding corridor gouge or soil plowing by properly locating cable yarding landings.

(2) Locate corridors for SMAs following Management Measure 2.

For groundskidding:
(1) Within SMAs, operate groundskidding equipment only at stream crossings to the extent practicable. In SMAs, fell and endline trees to avoid sedimentation.

(2) Use improved stream crossings for skid trails which cross flowing drainages. Construct skid trails to disperse runoff and with adequate drainage structures.

(3) On steep slopes, use cable systems rather than groundskidding where ground-skidding may cause excessive sedimentation.

This management measure pertains to lands where silvicultural or forestry operations are planned or conducted. It is intended to apply to all harvesting, yarding, and hauling conducted as part of normal silvicultural activities on harvest units larger than five acres. This management measure will protect water quality by locating landings according to preharvest planning thus minimizing sedimentation resulting from the siting and harvesting of timber, and by properly managing petroleum products.

6. ***Site Preparation and Forest Regeneration***

Confine on-site potential NPS pollution and erosion resulting from site preparation and the regeneration of forest stands. The components of the management measure for site preparation and regeneration are:

(1) Select a method of site preparation and regeneration suitable for the site conditions.

(2) Conduct mechanical tree planting and ground-disturbing site preparation activities on the contour of sloping terrain.

(3) Do not conduct mechanical site preparation and mechanical tree planting in streamside management areas.

(4) Protect surface waters from logging debris and slash material.

(5) Suspend operations during wet periods if equipment used begins to cause excessive soil disturbance that will increase erosion.

(6) Locate windrows at a safe distance from drainages and SMAs to control movement of the material during high runoff conditions.

(7) Conduct bedding operations in high-water-table areas during dry periods of the year. Conduct bedding in sloping areas on the contour.

(8) Protect small ephemeral drainages when conducting mechanical tree planting.

This management measure pertains to lands where silvicultural or forestry operations are planned or conducted. It is intended to apply to all site preparation and regeneration activities conducted as part of normal silvicultural activities on harvested units larger than five acres. Regeneration of harvested forest lands provides water quality protection by stabilizing disturbed soils. Tree roots hold soil in place and aid soil aggregation, decreasing the potential for slope failure. Vegetation decreases erosion by slowing storm runoff. Maintenance of an unbroken forest litter layer prevents raindrop detachment, maintains infiltration, and slows runoff.

7. *Fire Management*

Prescribe fire for site preparation and control or suppress wildfire in a manner which reduces potential nonpoint source pollution of surface waters:

(1) Intense prescribed fire should not cause excessive sedimentation due to the combined effect of removal of canopy species and the loss of soil-binding ability of subcanopy and herbaceous vegetaion roots, especially in SMAs, in streamside vegetation for small ephemeral drainages, or on very steep slopes.

(2) Prescriptions for prescribed fire should protect against excessive erosion or sedimentaion to the extent practicable.

(3) All bladed firelines, for prescribed fire and wildfire, should be plowed on contour or stabilized with water bars and/or other appropriate techniques if needed to control excessive sedimentation or erosion of the fireline.

(4) Wildfire suppression and rehabilitation should consider possible NPS pollution of watercourses, while recognizing the safety and operational priorities of fighting wildfires.

This management measure pertains to lands where silvicultural or forestry operations are planned or conducted. It is intended to apply to all prescribed burning conducted as part of normal silvicultural activities on harvested units larger than five acres and for wildfire suppression and rehabilitation on forest lands. This management measure will minimize potential nonpoint source pollution by reducing erosion and sedimentation resulting from these operations.

8. *Revegetation of Disturbed Areas*

Reduce erosion and sedimentation by rapid vegetation of areas disturbed by harvesting operations or road construction:

(1) Revegetate disturbed areas (using seeding or planting) promptly after completion of the earth-disturbing activity. Local growing conditions will dictate the timing for establishment of vegetative cover.

(2) Use mixes of species and treatments developed and tailored for successful vegetation establishment for the region or area.

(3) Concentrate revegetation efforts initially on priority areas such as disturbed areas in SMAs or the steepest areas of disturbance near drainages.

This management measure pertains to lands where silvicultural or forestry operations are planned or conducted. It is intended to apply to all disturbed areas resulting from harvesting, road building, and site preparation conducted as part of normal silvicultural activities. Disturbed areas are those localized areas within harvest units or road systems where mineral soil is exposed or agitated (e.g., road cuts, fill slopes, landing surfaces, cable corridors, or skid trail ruts). Revegetation of disturbed areas will prevent sediment and associated pollutants from entering nearby surface waters. Vegetation controls erosion by dissipating the erosive forces of raindrops, reducing the velocity of runoff, stabilizing soil particles, and increasing soil infiltration rates.

9. *Forest Chemical Management*

Use chemicals when necessary for forest management in accordance with the following to reduce nonpoint source pollution impacts due to the movement of forest chemicals off-site during and after application:

(1) Conduct applications by skilled and, where required, licensed applicators according to the registered use, with special consideration given to impacts to nearby surface waters.

(2) Carefully prescribe the type and amount of pesticides appropriate for the insect, fungus, or herbaceous species.

(3) Prior to applications of pesticides and fertilizers, inspect the mixing and loading process and the calibration of equipment, and identify the appropriate weather conditions, the spray area, and buffer areas for surface waters.

(4) Establish and identify buffer areas for surface waters. (This is especially important for aerial applications.)

(5) Immediately report accidental spills of pesticides or fertilizers into surface waters to the appropriate State agency. Develop an effective spill contingency plan to contain spills.

This management measure pertains to lands where silvicultural or forestry operations are planned or conducted. It is intended to apply to all fertilizer and pesticide applications (including biological agents) conducted as part of normal silvicultural activities. Chemicals can directly enter surface waters through five major pathways: direct application, drift, mobilization in ephemeral streams, overland flow, and leaching. Direct application is the most important pathway and is one of the most easily prevented by this management measure. Providing buffer areas around streams and waterbodies is an example of an effective method of preventing the chemicals from adversely affecting water quality.

10. ***Wetlands Forest***

Plan, operate, and manage normal, ongoing forestry activities (including harvesting, road design and construction, site preparation and regeneration, and chemical management) to adequately protect the aquatic functions of forested wetlands.

This management measure is intended for forested wetlands where silvicultural or forestry activities are planned or conducted. It is intended to apply specifically to forest management activities in forested wetlands and to supplement the previous management measures by addressing the operational circumstances and management practices appropriate for forested wetlands. This management measure will help to reduce incidental or indirect effects on forested wetlands whose beneficial functions include floodflow alteration, sediment trapping, nutrient retention and removal, and provision of habitat.

d. **Marinas and Recreational Boating Nonpoint Source Category**

Management measures have been developed for the following five subcategories of sources of nonpoint pollution from marinas and recreational boating that affect coastal waters:

- o Poorly flushed waterways where dissolved oxygen deficiencies exist,
- o Pollutants discharged from boats,
- o Pollutants transported in storm water runoff from parking lots, roofs, and other impervious surfaces,
- o The physical alteration or destruction of wetlands and of shellfish and other bottom communities during the construction of marinas, ramps, and related facilities, and
- o Pollutants generated from boat maintenance activities on land and in the water

Fifteen management measures specified for this source category are grouped under two broad headings: (1) siting and design, and (2) operation and maintenance. Effective implementation of these measures will avoid impacts associated with marina siting and prevent the introduction of nonpoint source pollutants.

The six main pollutant types associated with marina and boating activities that affect water quality include: toxicity in the water column; increased pollutant levels in aquatic organisms; increased pollutant levels in sediments; increased levels of pathogen indicators; disruption of sediment and habitat; and, shoaling and shoreline erosion. The environmental effects of these pollutants on water quality are discussed below. The management measures are designed to prevent the environmental degradation caused by these pollutants.

(1) WATER COLUMN TOXICITY - Sewage, metals, and petroleum hydrocarbons may enter marina waters from discharges from boats, spills, or storm runoff. These pollutants may have lethal or sublethal effects on aquatic organisms. The organic material in sewage discharged from boats lowers the dissolved oxygen content of the water during its decomposition. Accumulation of organic material in sediment will result in a sediment oxygen demand that also lowers water column dissolved oxygen. The effect of boat sewage on dissolved oxygen is increased in temperate regions because the peak boating season coincides with the highest water temperatures and thus the lowest solubilities of oxygen in the water and the highest metabolic rate of aquatic organisms. The decomposition of organic material may produce anaerobic conditions in the bottom waters and the production of methane, amines, and sulfides that are toxic to organisms. Fish kills may result, especially among bottom-dwellers like fluke and flounder. Metals such as lead, arsenic, copper, tin, iron, chromium, and zinc may be present in marina waters in concentrations that are toxic to aquatic organisms. Copper is the most common metal found at toxic concentrations in marina waters. Tin in the form of butyltin is an extremely toxic biocide. Petroleum hydrocarbons enter marina waters through refueling activities and bilge or fuel discharges. Many hydrocarbons, especially the aromatic hydrocarbons, are soluble compounds that are known human carcinogens and are toxic to aquatic organisms at low concentrations.

(2) POLLUTANTS IN AQUATIC ORGANISMS - Aquatic organisms can concentrate pollutants in the water column through their biological activity. Increased levels of copper, cadmium, chromium, lead, zinc, tin, polynuclear aromatic hydrocarbons, and PCBs have been found in oysters and other shellfish in marina waters. Concentrations of copper have been detected in green algae and other fouling organisms in marinas. These metals and chemicals are resistant to degradation and may be present in concentrations that are toxic to the aquatic organisms. They may also bioaccumulate in the environment and eventually move up the food chain to human consumption.

(3) POLLUTANTS IN SEDIMENTS - Many of the contaminants found in storm water runoff of marinas accumulate to higher concentrations in sediments than in the overlying water. Copper is the major contaminant of concern because cuprous oxide is the active biocide component in most antifouling paints. Copper, like other metals, has a higher affinity for sediment than for water, and tends to concentrate there. Lead, zinc, mercury, tin, cadmium, chromium, and arsenic are all found in the runoff from marinas and in the sediments. This exposes the benthic organisms to potentially toxic levels of these metals. Fish and invertebrates, especially at the larval or juvenile stage, are especially susceptible.

(4) PATHOGENS - Boats can be a significant source of fecal coliform bacteria in areas with high boat densities and low hydrologic flushing. NOAA identified boating activities as a contributing source in the closure to harvesting of millions of acres of shellfish growing waters on the east coast of the United States (Leonard et al., 1989). Fecal coliform bacteria and enterococci are used as indicators of pathogenic organisms (viruses, bacteria, and parasites) that may be present in sewage. High fecal coliform counts have been responsible for shellfish contamination and closure of beaches. Pathogenic organisms associated with fecal waste can cause a variety of diseases including dysentery, typhoid fever, cholera, and hepatitis.

(5) HABITAT DISRUPTION - Boat operation and dredging in marinas can destroy habitat, resuspend bottom sediments, and increase water turbidity. Propeller-driven boats can cause bottom scour and bank erosion. Dredging may affect marina waters by increasing turbidity, burying benthic organisms, changing bottom habitats, and altering water circulation patterns. Resuspension of sediments reintroduces toxic substances into the water column. The results of increased turbidity are a reduction in the amount of light reaching aquatic plants, a decrease in the amount of submerged vegetation, and a reduction in the amount of photosynthesis and dissolved oxygen in the water. Sediments also cover fish spawning areas, smother coral reefs, clog the filtering capacity of filter feeders, and impair respiration by clogging the gills of fish. Turbidity interferes with the feeding habits of fish, reducing prey capture for sight-feeding predators. These effects combine to reduce fish, shellfish, coral, and plant populations and decrease the overall productivity of aquatic ecosystems. Turbid water is also aesthetically displeasing and may limit human uses such as fishing, swimming, and boating.

(6) EROSION - Shoaling and shoreline erosion result from the physical transport of sediment due to natural or man-induced waves and/or currents. Boat wakes and man-made alterations in local currents can erode banks and the shallow edges of waterways. This washes away fringing vegetation and its associated animal life. A substantial amount of this eroded sediment forms shoals that may have to eventually be removed by dredging. (The environmental effects of increased sedimentation are discussed above).

Management Measures for Marinas and Recreational Boating

Siting and Design

1. *Marina Flushing Management Measure*

Site and design marinas such that tides and/or currents will aid in flushing of the site or renew its water regularly.

This management measure is intended to be applied to new and expanding marinas. Initial site selection is the most important factor influencing the long-term impact a marina will have on water quality within the immediate vicinity of the marina. Maintaining water quality within a marina basin depends primarily on flushing as determined by water circulation within

the basin. This management measure was selected because proper siting and design will greatly reduce or eliminate the potential for stagnation of water in a marina and will help maintain biological productivity and aesthetics.

2. ***Water Quality Assessment Management Measure***

Assess water quality as part of marina siting and design.

This management measure is intended to be applied to new and expanding marinas. Water quality assessments such as modeling of flushing rates, measuring water quality characteristics, and monitoring may be used to determine whether a proposed marina design will adversely affect water quality. The dissolved oxygen concentrations in the water can be used as an indicator of the general health of the aquatic ecosystem. The use of pathogen indicators, such as fecal coliform bacteria, can be used for assessing the risk to public health from ingestion of contaminated water or shellfish.

3. ***Habitat Assessment Management Measure***

Site and design marinas to protect against adverse effects on shellfish resources, wetlands, submerged aquatic vegetation, or other important riparian and aquatic habitat areas as designated by local, State, or Federal governments.

This management measure is intended to be applied to new and expanding marinas where site changes may impact on wetlands, shellfish beds, submerged aquatic vegetation, or other important habitats. Proper siting and design can reduce short-term impacts (habitat destruction during construction) and long-term impacts (water quality, sedimentation, circulation) on the surrounding environment.

4. ***Shoreline Stabilization Management Measure***

Where shoreline erosion is a nonpoint source pollution problem, shorelines should be stabilized. Vegetated methods are strongly preferred unless structural methods are more cost effective, considering the severity of wave and wind erosion, offshore bathymetry, and the potential adverse impact on other shorelines and offshore areas.

This management measure is intended to be applied to new and expanding marinas where site changes may result in shoreline erosion. The establishment of vegetation as a primary method of shore protection has been successful in low-wave energy areas where underlying soil types provide the stability needed for plants and where conditions are favorable for sustaining plant growth. This management measure has been shown to be effective in mitigating shoreline erosion and the resulting turbidity and shoaling.

5. *Storm Water Runoff Management Measure*

Implement effective runoff control strategies which include the use of pollution prevention activities and the proper design of hull maintenance areas. Reduce the average annual loadings of total suspended solids (TSS) in runoff from hull maintenance areas by 80 percent. For the purposes of this measure, an 80 percent reduction of TSS is to be determined on an average annual basis.

This management measure is intended to be applied to new and expanding marinas, and to existing marinas for at least the hull maintenance areas. The principal pollutants in runoff from marina parking areas and hull maintenance areas are suspended solids and organics (mainly oil and grease). These pollutants can be controlled through three techniques: filtration/infiltration; retention/detention; and, physical separation of pollutants.

6. *Fueling Station Design Management Measure*

Design fueling stations to allow for ease in cleanup of spills.

This management measure is intended to be applied to new and expanding marinas where fueling stations are to be added or moved. Spillage is a source of petroleum hydrocarbons in marinas. Marinas should be located and designed and a spill contingency plan developed so that pollutants released during fueling operations can be contained in a limited area to minimize spread through and out of the marina.

7. *Sewage Facility Management Measure*

Install pumpout, dump station, and restroom facilities where needed at new and expanding marinas to reduce the release of sewage to surface waters. Design these facilities to allow ease of access and post signage to promote use by the boating public.

This management measure is intended to be applied to new and expanding marinas in areas where adequate marine sewage collection facilities do not exist. Three types of onshore collection systems are available: fixed point systems; portable/mobile systems; and, dedicated slipside systems. The availability and use of these systems will reduce discharges of sanitary wastes to the coastal waters.

Operation and Maintenance

1. *Solid Waste Management Measure*

Properly dispose of solid wastes produced by the operation, cleaning, maintenance, and repair of boats to limit entry of solid wastes to surface waters.

This management measure is intended to be applied to new and expanding marinas.

Marina operators are responsible for determining what types of wastes will be generated at the marina and ensuring proper disposal. Under Federal law, marinas and port facilities must supply adequate and convenient waste disposal facilities for their customers (NOAA, 1988). If adequate disposal facilities are available there is less likelihood for disposal of solid waste in surface waters or on shore where the material may wash into the waters.

2. ***Fish Waste Management Measure***

Promote sound fish waste management through a combination of fish-cleaning restrictions, public education, and proper disposal of fish waste.

This management measure is intended to be applied to marinas where fish waste is determined to be a source of water pollution. Marina patrons and employees are more likely to properly dispose of fish waste if told of potential environmental effects and provided adequate and convenient disposal facilities.

3. ***Liquid Material Management Measure***

Provide and maintain appropriate storage, transfer, containment, and disposal facilities for liquid material, such as oil, harmful solvents, antifreeze, and paints, and encourage recycling of these materials.

This management measure is intended to be applied to marinas where liquid materials used in the maintenance, repair, or operation of boats are stored. This measure minimizes entry of potentially harmful liquid materials into marina and surface waters through proper storage and disposal. Many coastal states already have mandatory or voluntary programs that satisfy this management measure.

4. ***Petroleum Control Management Measure***

Reduce the amount of fuel and oil from boat bilges and fuel tank air vents entering marina and surface waters.

This management measure is intended to be applied to boats that have inboard fuel tanks. The amount of fuel and oil entering marina and surface waters can be reduced by using devices such as automatic shut-off nozzles, fuel/air separators, and oil-absorbing bilge pads.

5. ***Boat Cleaning Management Measure***

For boats that are in the water, perform cleaning operations to minimize, to the extent practicable, the release to surface waters of (a) harmful cleaners and solvents and (b) paint from in-water hull cleaning.

This management measure is intended to be applied to marinas where boat topsides are cleaned and marinas where hull scrubbing in the water has been shown to result in water or

sediment quality problems. When boats are cleaned over the water or onshore adjacent to the water, some cleaning material may enter the water. Boat bottom paint is released into the water when boat bottoms are cleaned in the water. This measure minimizes the use and release of potentially harmful cleaners and bottom paints to marina and surface waters.

6. ***Public Education Management Measure***

Public education/outreach/training programs should be instituted for boaters, as well as marina owners and operators, to prevent improper disposal of polluting material.

This management measure is intended to be applied to all environmental control authorities in areas where marinas are located. The best method of preventing pollution from marinas and boating activities is to educate the public about the causes and effects of pollution and methods to prevent it.

7. ***Maintenance of Sewage Facilities Management Measure***

Ensure that sewage pumpout facilities are maintained in operational condition and encourage their use.

This management measure is intended to be applied to marinas where marine sewage disposal facilities exist. This measure is effective in preventing failure of pumpouts and discourages improper disposal of sanitary wastes thus reducing the release of untreated sewage into marina and surface waters.

8. ***Boat Operation Management Measure (applies to boating only)***

Restrict boating activities where necessary to decrease turbidity and physical destruction of shallow-water habitat.

This management measure is intended to be applied in non-marina surface waters where evidence indicates that boating activities are impacting shallow-water habitats. Boat operation in shallow water can resuspend bottom sediment, increase turbidity, and damage submerged aquatic vegetation. This management measure will minimize damage to sensitive habitats by excluding boats from shallow-water areas not suitable for boat traffic because of their ecological importance. Establishing no-wake zones will minimize the indirect impacts of increased turbidity.

e. **Hydromodification Nonpoint Pollution Source Category**

Management measures have been developed for the following three subcategories of sources of nonpoint pollution from hydromodification activities that affect coastal waters:

- o Channelization and channel modification
- o Dams
- o Streambank and shoreline erosion

(1) *CHANNELIZATION OR CHANNEL MODIFICATION* - One form of hydromodification is channelization or channel modification. These terms (used interchangeably) mainly describe river and stream channel engineering undertaken for the purpose of flood control, navigation, drainage improvement, and reduction of channel migration potential (Brookes, 1990). The terms also may include the excavation of borrow pits, canals, underwater mining, or other practices that change the depth, width, or location of waterways or embayments in coastal areas. Activities such as straightening, widening, deepening, or relocating existing stream channels and clearing or snagging operations are examples of this category.

The general effects of channelization and channel modification activities include depriving wetlands and estuarine shorelines of sediments, changing the ability of natural systems to absorb hydraulic energy and filter pollutants from surface waters, and causing interruptions in the different life stages of aquatic organisms (Sherwood et al., 1990). These activities can also alter instream water temperature and the rates and paths of sediment erosion, transport, and deposition. A common result of these activities is a diminished suitability of instream and riparian habitat for fish and wildlife. Excavation projects can cause reduced flushing, lowered dissolved oxygen levels, saltwater intrusion, loss of streamside vegetation, accelerated discharge of pollutants, and changed physical and chemical characteristics of sediments in surface waters surrounding channelization projects. Levees may reduce overbank flooding and the subsequent deposition of sediment needed to nourish riverine and estuarine wetlands and riparian areas.

The specific effects associated with channelization projects are dependent on preproject site conditions and the extent of the activities. Some projects may result in additional nonpoint source pollution, while others may have no additional problems or even be beneficial. The major categories of effects and their problems and benefits include:

Changed Sediment Supply - Channelization projects will change the supply and delivery of sediment. Streamside levees may cause accelerated rates of erosion and decreased sediment supplies to some coastal areas and increased supplies to other areas. Beneficial changes may result from a diversion project that delivers sediment to eroding marshes.

Reduced Freshwater Availability - Some channelization practices may reduce the availability of freshwater for municipal, industrial, or agricultural purposes. They may also change the salinity in a channel which can cause changes in streamside vegetation. The diversion of freshwater by levees can reduce freshwater inputs to marshes causing increased marsh salinities and degradation of the marsh. The diversion of freshwater may produce a beneficial effect in areas where it reduces freshwater input to an estuary that was becoming too fresh because of changes in watershed land uses.

Accelerated Delivery of Pollutants - Channel alterations that increase the velocity of surface water or that increase flushing of the streambed can lead to more pollutants being transported downstream at faster rates. Pollutants that normally would be filtered out by natural vegetation along meandering streams can deteriorate the waters of the receiving bays or estuaries. In some cases, this may be beneficial if the downstream area is able to assimilate or beneficially use the transported pollutants.

Loss of Contact with Overbank Areas - Channelization activities may decrease surface water contact with overbank areas leading to reduced filtering of nonpoint pollutants by streamside vegetation and soils. Wetlands and riparian areas on the overbank area may change in character and function as the frequency and duration of flooding changes.

Changes to Ecosystems - Channel modifications can cause loss of instream and riparian habitats, disrupting pathways for wildlife migration or conditions favorable for reproduction and growth. Modifications to stream flows has caused reversal of flow regimes which has led to disorientation of anadromous fish that rely on flow to direct them to spawning areas. Eroded sediment may cover benthic communities, deteriorate spawning habitat, and change the types and amounts of food organisms. Many channel or streambank stabilization structures are beneficial because they provide instream habitat for epibenthic and bottom-dwelling insects.

Instream and Riparian Habitat Altered by Secondary Effects - Secondary instream and riparian habitat alteration effects from channelization projects include movement of estuarine turbidity maximum zones (zone of higher sediment concentrations caused by salinity and tide-induced circulation) with salinity changes, cultural eutrophication caused by inadequate flushing, and trapping of large quantities of sediment.

(2) *DAMS* - Dams are defined as constructed impoundments that are either 25 feet or more in height and greater than 15 acre-feet in capacity, or, 6 feet or more in height and greater than 50 acre-feet in capacity. Based on this definition, there are 7,790 dams located in coastal counties of the United States, of which 6,928 dams are located in states with approved coastal zone programs (Quick and Richmond, 1992). Dams serve many purposes, including flood control, power generation, irrigation, livestock watering, fish farming, recreation, and municipal water supply. Reservoir impoundments are also used for water sports, fish and wildlife propagation, and for augmentation of low flows.

Impacts can result from the siting, construction, and operation of dams. The siting of dams can result in the loss of habitat by the inundation of wetlands, riparian areas, and fastland in upstream areas of the waterway. Dams also block or impede migration routes of fish, such as salmon, and alter existing habitat by either reducing or eliminating the downstream flooding needed by some wetlands and riparian areas.

The construction of dams can cause increased sedimentation and turbidity in the waterway resulting from vegetation removal and soil disturbance. Fuel and chemical spills are also associated with construction activities. Sediments suspended in the water reduce the amount of light available to aquatic plants, decrease the amount of submerged vegetation, thus reducing photosynthesis and the level of dissolved oxygen in the water. Sediments also cover fish spawning areas, interfere with the feeding habits of fish, and impair respiration by clogging the gills of fish. These effects combine to decrease the overall productivity of the aquatic ecosystem. Chemical pollutants released during construction may include petrochemicals (oil, gasoline, lubricants) and other potentially harmful chemicals such as

pesticides, cement, lime, fertilizers, acids, soil additives or concrete-curing compounds. Exposure of aquatic communities to these pollutants may have lethal effects that range from localized fish kills to eliminating or reducing populations of aquatic organisms that are important components of the food chain.

The controlled releases of water associated with the operation of dams can change the timing and quantity of freshwater inputs into coastal waters. Dam operation may lead to reduced downstream flushing, which may then lead to changes in pH, increased loads of phosphorus, nitrogen and biological oxygen demand, and the potential for increased algal growth. The tendency of the water released from dams to contain very little sediment can cause erosion of the streambed and scouring of the channel below the dam. This may cause siltation of gravel bars and riffle pools, which serve as spawning and nursery habitat for fish.

The operation of dams can have positive as well as negative effects on water quality. Potential positive effects include: (1) creation of reservoir sport fisheries; (2) less scouring and erosion of streambanks as a result of lower velocities in downstream areas; and, (3) creation of above-the-dam summer pool refuge during low flows.

(3) *STREAMBANK AND SHORELINE EROSION* - Streambank erosion refers to the loss of fastland along nontidal streams and rivers. Shoreline erosion refers to the loss of beach or fastland in tidal portions of coastal bays or estuaries.

The erosion of shorelines and streambanks is a natural process that can have either beneficial or adverse impacts on the creation and maintenance of riparian habitat. Sands and gravels eroded from streambanks and deposited in the channel form instream habitat for many benthic organisms and fish. The same materials eroded from the shores of coastal bays and estuaries help maintain the beach as a natural barrier between the open water and the coastal wetlands. New material is added to wetlands and tidal flats when the finer-grained silts and clays derived from the erosion of shorelines and streambanks are sorted and carried to these areas.

Adverse impacts however are created by erosion that produces excessively high sediment loads that can smother submerged aquatic vegetation beds, cover shellfish beds and tidal flats, fill in riffle pools, and contribute to increased turbidity and nutrient levels.

Management Measures for Hydromodification

Channelization and Channel Modification

1. *Management Measure for Physical and Chemical Characteristics of Surface Waters*

(1) Evaluate the potential effects of proposed channelization and channel modification on the physical and chemical characteristics of surface waters in coastal areas;

(2) Plan and design channelization and channel modification to reduce undesirable impacts; and

(3) Develop an operation and maintenance program for existing modified channels that includes identification and implementation of opportunities to improve physical and chemical characteristics of surface waters in those channels.

This management measure is intended to be applied to public and private channelization and channel modification activities in order to prevent the degradation of physical and chemical characteristics of surface waters from such activities. The purpose of this management measure is to ensure that the planning process for new hydromodification projects addresses changes to physical and chemical characteristics of surface waters that may occur as a result of the proposed work.

2. ***Instream and Riparian Habitat Restoration Management Measure***

(1) Evaluate the potential effects of proposed channelization and channel modification on instream and riparian habitat in coastal areas;

(2) Plan and design channelization and channel modification to reduce undesirable impacts; and

(3) Develop an operation and maintenance program with specific timetables for existing modified channels that includes identification of opportunities to restore instream and riparian habitat in those channels.

This management measure pertains to surface waters where channelization and channel modification have altered or have the potential to alter instream and riparian habitat such that historically present fish or wildlife are adversely affected. The purpose of this management measure is to correct or prevent detrimental changes to instream and riparian habitat from the impacts of channelization and channel modification projects. Site-specific design and mathematical models can be used to mitigate impacts.

Dams

1. ***Management Measure for Erosion and Sediment Control***

(1) Reduce erosion and, to the extent practicable, retain sediment onsite during and after construction, and

(2) Prior to land disturbance, prepare and implement an approved erosion and sediment control plan or similar administrative document that contains erosion and sediment control provisions.

This management measure is intended to be applied to the construction of new dams, as well as to construction activities associated with the maintenance of dams. The purpose of this measure is to prevent sediment from entering surface waters during the construction or

maintenance of dams. Minimizing erosion and maximizing sediment retention onsite will reduce impacts on surface water quality.

2. *Management Measure for Chemical and Pollutant Control*

(1) Limit application, generation, and migration of toxic substances;

(2) Ensure the proper storage and disposal of toxic materials; and,

(3) Apply nutrients at rates necessary to establish and maintain vegetation without causing significant nutrient runoff to surface waters.

This management measure is intended to be applied to the construction of new dams, as well as to construction activities associated with the maintenance of dams. The purpose of this measure is to prevent downstream contamination from pollutants such as pesticides, petrochemicals, fertilizers, lime, cement, and construction chemicals. This measure will provide for retention onsite of the soluble pollutants that are not easily controlled by erosion and sediment control practices.

3. *Management Measure for Protection of Surface Water Quality and Instream and Riparian Habitat*

Develop and implement a program to manage the operation of dams in coastal areas that includes an assessment of:
(1) Surface water quality and instream and riparian habitat and potential for improvement and

(2) Significant nonpoint source pollution problems that result from excessive surface water withdrawals.

This management measure is intended to be applied to dam operations that result in the loss of desirable surface water quality, and of desirable instream and riparian habitat. The purpose of this measure is to protect the quality of surface waters and aquatic habitat in reservoirs and in the downstream portions of rivers and streams that are influenced by the quality of water contained in the releases (tailwaters) from reservoir impoundments.

Streambank and Shoreline Erosion

1. *Management Measure for Eroding Streambanks and Shorelines*

(1) Where streambank or shoreline erosion is a nonpoint source pollution problem, streambanks and shorelines should be stabilized. Vegetative methods are strongly preferred unless structural methods are more cost-effective, considering the severity of wave and wind erosion, offshore bathymetry, and the potential adverse impact on other streambanks, shorelines, and offshore areas.

(2) Protect streambank and shoreline features with the potential to reduce NPS pollution.

(3) Protect streambanks and shorelines from erosion due to uses of either the shorelands or adjacent surface waters.

This management measure is intended to be applied to eroding shorelines in coastal bays, and to eroding streambanks in coastal rivers and creeks. This measure applies only to eroding shorelines and streambanks that constitute a nonpoint source pollution problem in surface waters. The application of vegetative or engineering stabilization techniques are effective in controlling coastal erosion. These techniques also serve to halt the destruction of wetlands and riparian areas.

f. Wetlands, Riparian Areas, and Vegetated Treatment System

Management measures for wetlands, riparian areas, and vegetated treatment systems address multiple categories of nonpoint source pollution that affect coastal waters, including the five specific categories of sources previously addressed in this chapter. These measures promote the protection and restoration of wetlands and riparian areas and the use of vegetated treatment systems as means to control the nonpoint pollution emanating from such sources. Degradation of existing wetlands and riparian areas can cause the wetlands and riparian areas themselves to become sources of nonpoint pollution in coastal waters. Management measures are discussed for three categories:

- o Protection of wetlands and riparian areas
- o Restoration of wetlands and riparian areas
- o Promoting the use of vegetated treatment systems, such as constructed wetlands and vegetated filter strips

(1) *Wetlands and Riparian Areas*

Wetlands are defined as: Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas (USEPA, 1993).

Riparian areas are defined as: Vegetated ecosystems along a waterbody through which energy, materials, and water pass. Riparian areas characteristically have a high water table and are subject to periodic flooding and influence from the adjacent waterbody. These systems encompass wetlands, uplands, or some combination of these two land forms. They will not in all cases have all of the characteristics necessary for them to be classified as wetlands (USEPA, 1993).

The functions of wetlands and riparian areas include water quality improvement, aquatic habitat, stream shading, flood attenuation, shoreline stabilization, and ground-water exchange. They play an important role in reducing nonpoint source pollution by intercepting surface runoff, subsurface flow, and certain ground-water flows. Their role in water quality improvement includes processing, removing, transforming, and storing such pollutants as

sediment, nitrogen, phosphorus, and certain heavy metals. The pollutant removal functions combine the physical process of filtering and the biological processes of nutrient uptake and denitrification (Lowrance et al., 1983). Wetlands and riparian areas buffer receiving waters from the effects of pollutants, or they prevent the entry of pollutants into receiving waters. However, when hydrologic changes or pollutants exceed the natural assimilative capacity of these systems, wetland and riparian areas become stressed and may be degraded or destroyed to the point that they become sources of nonpoint pollution themselves.

(2) *Vegetated Buffers*

Vegetated buffers are defined as: Strips of vegetation separating a waterbody from a land use that could act as a nonpoint pollution source. Vegetated buffers are variable in width and can range in function from a vegetated filter strip to a wetland or riparian area.

Although this term is used in many contexts, the function of vegetated buffers is to filter pollutants from runoff. A buffer usually has a rough surface and typically contains a heterogeneous mix of ground cover, including herbaceous and woody species of vegetation. This mix of vegetation allows the buffer to function more like a wetland or riparian area.

(3) *Vegetated Treatment Systems*

Vegetated treatment systems (VTS) are defined to include either of the following or a combination of both: vegetated filter strips and constructed wetlands.

Vegetated filter strips (VFS) are defined as: Created areas of vegetation designed to remove sediment and other pollutants from surface water runoff by filtration, deposition, infiltration, adsorption, absorption, decomposition, and volatilization. A vegetated filter strip is an area that maintains soil aeration as opposed to a wetland that, at times, exhibits anaerobic soil conditions (Dillaha et al., 1989).

Constructed wetlands are defined as: Engineered systems designed to simulate natural wetlands to exploit the water purification functional value for human use and benefits. Constructed wetlands consist of former upland environments that have been modified to create poorly drained soils and wetlands flora and fauna for the primary purpose of contaminant or pollutant removal from wastewaters or runoff. Constructed wetlands are essentially wastewater treatment systems and are designed and operated as such though many systems do support other functional values (Hammer, 1992).

In areas where naturally occurring wetlands and riparian areas do not exist, VTS can be designed and constructed to perform some of the same functions. Vegetated filter strips can effectively prevent the entry of sediment, sediment-bound pollutants, and nutrients into waterbodies. They reduce nonpoint source pollution primarily by filtering water passing over or through the strips. VFS are often used with practices that reduce nutrient inputs, reduce soil erosion, or collect runoff. Constructed wetlands are designed to mimic the pollutant-removal functions of natural wetlands, but usually lack aquatic habitat functions. Pollutant removal is accomplished by sediment trapping, plant uptake, bacterial decomposition, and adsorption. Properly designed constructed wetlands filter and settle suspended solids while the vegetation converts some pollutants such as nitrogen, phosphorus, and metals into plant biomass. Nitrification, denitrification, and organic decomposition occur as a result of the bacteria found in the wetlands. Constructed wetlands are not intended to replace natural wetlands, but to remove nonpoint pollution before it enters a waterbody.

Management Measures for Wetlands, Riparian Areas and Vegetated Treatment Systems

1. *Management Measure for Protection of Wetlands and Riparian Areas*

Protect from adverse effects wetlands and riparian areas that are serving a significant NPS abatement function and maintain this function while protecting the other existing functions of these wetlands and riparian areas as measured by characteristics such as vegetative composition and cover, hydrology of surface water and ground water, geochemistry of the substrate, and species composition.

This management measure is intended to be applied to protect wetlands and riparian areas from adverse nonpoint source pollution impacts. The purpose is to protect the existing water quality improvement functions of wetlands and riparian areas as a component of nonpoint source programs. The overall approach is to establish a set of practices that maintains functions of wetlands and riparian areas and prevents adverse impacts to areas serving a nonpoint source pollution abatement function. These pollution abatement functions are most effective as parts of an integrated land management system that combines nutrient, sediment, and soil erosion control.

2. *Management Measure for Restoration of Wetland and Riparian Areas*

Promote the restoration of the preexisting functions in damaged and destroyed wetlands and riparian systems in areas where the systems will serve a significant NPS pollution abatement function.

This management measure is intended to be applied to restore the full range of wetlands and riparian functions in areas where the systems have been degraded and destroyed and where they can serve a significant nonpoint source abatement function. This management measure should be used in conjunction with other measures addressing the adjacent land and water use activities in order to protect coastal water quality.

3. *Management Measure for Vegetated Treatment Systems*

Promote the use of engineered vegetated treatment systems such as constructed wetlands or vegetated filter strips where these systems will serve a significant NPS pollution abatement function.

This management measure is intended to be applied in cases where engineered systems of wetlands or vegetated treatment systems can treat nonpoint source pollution. Constructed wetlands and vegetated filter strips can serve a significant nonpoint source pollution abatement function. Vegetated filter strips can improve water quality by removing nutrients, sediment, suspended solids, and pesticides. Constructed wetlands can provide limited ecological benefits in addition to their nonpoint source control functions.

4.A MANAGEMENT MEASURE IMPLEMENTATION, continued

2. SOCIOECONOMIC IMPACTS

a. EPA has determined that all the management measures specified in its guidance document are economically achievable (USEPA, 1993). EPA prepared a Regulatory Impact Analysis (EPA, 1992c) that provides a summary of assessments of the economic implications of the management measure guidance. Because the management measure guidance is a nonregulatory document, and its final implementation will depend on the structure of state and territory nonpoint programs, national cost estimates could not be developed with precision. EPA also performed economic achievability analyses for all nonpoint pollution source categories. These analyses provide a relative sense of the economic impacts of the management measures on affected households, municipalities, and commercial enterprises. The methods used in these studies are briefly summarized below. Detailed descriptions of each economic analysis appear in the Regulatory Impact Analysis and in the studies cited with each source category below. All studies are incorporated into this PEIS by reference.

Agriculture

The economic achievability analyses for agricultural management measures (USEPA, 1992b; Ogg, 1992; DPRA, 1992) and a subsequent analysis of proposed agricultural management measures (Heimlich and Barnard, 1995) provide estimates of the national costs of compliance with the management measures. The economic achievability of the management measures was assessed by estimating the direct costs of practices that would typically be used to achieve compliance with each measure. These costs were then compared with measures of farm well-being, such as gross and net farm income, operating expenses, and total farm and nonfarm income for each of several farm profiles representing the kinds and sizes of operations found in the coastal zone. The analyses indicate that the small dollar cost for most farms and the relatively low percentages of gross cash income, operating expenses, and total farm and nonfarm incomes are evidence that the management measures are economically achievable on most profiled farms.

Urban

The economic achievability analysis for urban sources (Research Triangle Institute, 1992b) examined the economic and financial impacts incurred by communities, private developers, and households as a result of implementing sample programs consisting of possible sets of nonpoint source control practices in sample locations. Because of regional differences in the types and scales of urban nonpoint source pollution, and uncertainty regarding the specific practices individual communities will choose to implement, estimates of the costs of implementing urban management measures will vary greatly from one area to another. The approach taken in the economic analysis was therefore to analyze costs at sixteen representative municipalities across the coastal zone of the United States. The analysis indicates that management measures for roads, bridges, and highways are only likely to result in additional costs for the public sector. Management measures for site development and

construction activities will result in costs that will primarily affect private-sector activities.

Forestry

The economic achievability analysis for forestry nonpoint sources (Research Triangle Institute, 1992a) examined the anticipated income effect on representative groups of industrial forest owners, farmers, and other private owners. Costs were estimated that represent the additional costs that timberland owners may experience over costs of current compliance with state-recommended practices. Two methods were used to provide values for assessing economic achievability of management measures: societal welfare and individuals' welfare. The societal economic welfare method evaluated the costs of the measures in the aggregate. The individuals' welfare method used a set of hypothetical, representative, private landowners and measured the change in their economic welfare as a result of implementing the management measures. The analysis indicates that effects on income as seen in anticipated income losses will vary with size for industrial forest operations and with the regional location for farmers and other private owners.

Marinas

The economic achievability analysis for marinas (Research Triangle Institute, 1992c) developed typical compliance costs per slip for representative marinas with a range of characteristics, including marina size and public or private ownership. Per-slip costs varied depending on whether or not marinas had hull maintenance areas (and are therefore subject to an 80 percent total suspended solids removal requirement for hull maintenance areas). The analysis concluded that although the financial status of existing marinas will likely be affected by the management measures, the impacts are not severe enough to result in average firms falling to below-average status under the scenarios evaluated in the economic analysis.

Hydromodification

The economic achievability analysis for hydromodification (Research Triangle Institute, 1992b) examined compliance costs for channelization, dam operation, and shoreline erosion. Costs for shoreline and streambank erosion control were evaluated under several scenarios for municipalities, individual landowners, and farmers. Municipalities may issue bonds to cover costs of structural or vegetative techniques to stabilize the shore. For small capital projects, costs will be passed on to households. Individual landowners assumed the costs themselves, and, in most cases, implementing one management practice did not result in an excessive debt burden. Farmers were able to reduce their costs for shoreline erosion control measures by participating in a U.S. Department of Agriculture cost share program. Costs associated with channelization involve the development of hydrodynamic models. Costs are most likely to be borne by state or local governments. All types of dams contribute to nonpoint pollution, so owners such as businesses, hydroelectric utilties, municipalities, and individuals all may be affected by the management measures.

Wetlands and Riparian Areas

The economic achievability analysis for wetlands and riparian areas (Research Triangle Institute, 1992b) examined the costs associated with the pretreatment of surface runoff with engineered vegetated treatment systems and with the restoration of wetlands. While many

public and private entities may be affected by wetlands management measures, this analysis only considered representative municipalities, individual landowners, and farmers. Costs for municipalities were evaluated by issuing bonds or passing costs along to households. Costs for individuals were evaluated as a percentage of income; costs for farms were evaluated as a change in net worth.

b. Section 6217(g) of the CZARA requires management measures to be economically achievable. In developing the (g) guidance document, EPA adopted a flexible approach that emphasized broad principles or standards for nonpoint source pollution control that can be applied nationally. This allows states and territories to develop more specific programs that reflect the most cost-effective approaches in response to local conditions. This flexible approach was adopted instead of prescriptive guidance specifying management practices required for control of nonpoint pollutants.

While the implementation of management measures will entail some economic costs as discussed above, the flexibility embodied in the (g) guidance and in the NOAA/EPA Program Development and Approval Guidance document, as well as subsequent NOAA/EPA policy statements, will help to reduce the economic impacts associated with the coastal nonpoint program. For example, states and territories will have until the year 2004 to fully implement the (g) management measures and until 2009 to fully implement their coastal nonpoint programs, including additional management measures, where necessary. This ability to phase in program implementation over several years allows economic impacts to be absorbed over a longer time period. The flexibility for states and territories to focus their resources in implementing their programs also helps to reduce economic impacts. Since states and territories are expected to have more specific information to better delineate the geographic scope of their programs, they may submit an alternative, less extensive 6217 management area than that originally recommended by NOAA. States and territories may also exclude categories, subcategories or individual nonpoint sources where the sources do not exist or are not anticipated to exist, or do not, individually or cumulatively, present a threat to coastal waters. States and territories may also develop alternative management measures that are as effective as the (g) management measures. They may adopt voluntary, education, and market-based incentive systems in addition to regulatory programs as a means of management measure implementation.

Because the (g) guidance was developed with a flexible, cost-effective approach, it includes alternatives that states and territories can implement in order to meet the management measures. Since it is not necessary to select management practices from the (g) guidance, individuals will choose the cheapest management practice to comply with the management measures. The (g) guidance provides extensive information on the effectiveness of management practices and associated costs of implementation. This information on costs and effectiveness is intended to assist states and territories in developing those management practice systems that are most practical and cost-effective for local conditions. Most of the practices included in the (g) guidance have been extensively tested and are currently being utilized. Because these practices have been implemented and evaluated at least regionally or locally, sometimes without regulatory or economic incentives, their cost-effective advantages have already been demonstrated.

c. The implementation of management measures will also produce positive socioeconomic benefits. These benefits include improvements in water quality and resulting increased recreational opportunities, increased property values, health benefits, navigational and commercial fishery benefits, and ground water protection; they also include intrinsic or nonuse benefits, including aesthetic, existence, and bequest values (EPA, 1992c). Improved water quality will increase the aesthetic value of coastal areas which will benefit tourism and improve opportunities for boating and swimming activities. Water-enhanced, noncontact recreational activities such as picnicking, photography, and camping will also benefit. Improved water quality will reduce the risks to human health from water contact activities and through consumption of shellfish. The preservation of wetlands and an improvement in water quality in coastal waters that serve as spawning and nursery areas for fish and shellfish will produce improved commercial and recreational fishing. The diversion of clean waters for use in municipal drinking water supplies, for industrial process and cooling water, and for irrigation will reduce treatment costs and reduce human health risks.

4.B PROGRAM IMPLEMENTATION

1. ENVIRONMENTAL IMPACTS

Section 6217 of the CZARA requires that state and territory coastal nonpoint programs contain a number of specific components to be used in developing and implementing their programs. These components are:

- Coordination with Existing State Programs
- 6217 Management Area
- Implementation of Management Measures in Conformity with (g) Guidance
- Requirements for Implementation of Additional Management Measures
- Technical Assistance
- Public Participation
- Administrative Coordination
- Enforceable Policies and Mechanisms
- Monitoring

The environmental consequences of these components are discussed below.

a. Coordination with Existing State Programs

The statute requires that coastal nonpoint programs be closely coordinated with state and local water quality plans and programs and with state and territory coastal zone programs. This requirement is necessary to ensure that the new coastal nonpoint program can build upon and be integrated into existing state programs upon approval. States and territories should develop their programs to complement and strengthen existing coastal management and nonpoint source authorities. This should produce a positive environmental consequence by minimizing unnecessary duplication or conflicts at the Federal, state, or local levels and developing a coordinated and comprehensive program to effectively reduce the impact of nonpoint source pollution on coastal waters. It will also fulfill what the statute and legislative history indicate is the central purpose of section 6217, i.e., to strengthen the links between Federal and state coastal zone management and water quality programs in order to enhance state and local efforts to manage land use activities that degrade coastal waters.

b. 6217 Management Area

As directed by section 6217, NOAA, in consultation with EPA, reviewed each state's existing coastal zone boundary established under the CZMA, and made recommendations to the states on the geographic scope of their programs, i.e., the 6217 management area. This boundary recommendation, which was based on coastal watersheds, is a guide for states and territories to use during program development. States and territories may propose an alternative 6217 management area at the time of program submission. This proposal will then be evaluated by NOAA and EPA as part of the program review and approval process.

This requirement should have a positive environmental effect because it recognizes that land and water uses both within and outside of the existing coastal zone have the potential to

degrade coastal waters. Evaluating coastal watersheds, whether or not those watersheds are completely encompassed within a state's existing coastal zone, ensures that all potential sources of nonpoint pollution that significantly affect coastal waters are included in the coastal nonpoint programs.

c. Implementation of Management Measures in Conformity with 6217(g) Guidance

For program approval, each coastal nonpoint program must provide for the implementation, at a minimum, of management measures in conformity with the guidance published by EPA under section 6217(g). As discussed in section 4.A, this guidance addresses five categories of nonpoint pollution: agricultural runoff, urban runoff, forestry runoff, marinas,and hydromodification. Guidance is also provided for wetlands, riparian areas, and vegetated filter strips. The environmental consequences of implementing each of these management measures are discussed in section 4.A.1. In order to satisfy statutory requirements, state and territory programs must identify the nonpoint source categories that will be addressed; management measures for those categories; and the process by which the state or territory will ensure the implementation of the management measures. Each coastal nonpoint program must address each of the management measures by either implementing that measure (or an equally effective alternative), or justifying why the management measure is not included in the program.

This requirement that states and territories implement the appropriate measures should have a positive environmental effect because the management measures are designed to reduce pollution from categories and sources of nonpoint pollution that have been identified as significant. In addition, a state or territory may include management measures for sources not identified in the 6217(g) guidance (e.g., mining operations not subject to permitting under the NPDES requirements of the CWA), if it determines such measures are necessary to protect coastal waters. The guidance also lists management practices that can be used to effectively implement each management measure. States and territories can select among practices as appropriate.

d. Requirements for Implementation of Additional Management Measures

For program approval, coastal nonpoint programs must provide for the implementation of additional management measures where coastal water quality is impaired or threatened even after the implementation of the management measures specified in the (g) guidance. These additional measures apply both to existing land and water uses that are found to cause or contribute to water quality impairment and to new or substantially expanding land uses within critical coastal areas adjacent to impaired or threatened coastal waters.

This requirement should have a beneficial environmental effect because it provides a second tier of protection through the implementation of additional management measures whose purpose is to restore coastal waters and protect critical areas against future pollution problems. If the general level of protection provided by the (g) guidance management measures is insufficient to protect coastal waters, these additional management measures will enable the states and territories to attain and maintain applicable water quality standards and to protect designated uses.

e. Technical Assistance

For program approval, coastal nonpoint programs will be required to provide for technical and other assistance to local governments and the public for implementing the additional management measures. States and territories are also encouraged to provide assistance to local governments and the public on the implementation of the EPA guidance measures. Assistance may be provided in developing ordinances and regulations, technical guidance, training, financial incentives, or demonstration projects.

This requirement should be environmentally beneficial because the technical assistance will enable the management measures to be better implemented at the regional or local level. The assistance will address local needs with respect to implementation and will provide a better understanding of what the measures are trying to accomplish and how to best accomplish it. EPA has assembled a great deal of technical information during the development of its guidance document. This information will be available to the states in a variety of formats, including bibliographies and summaries, and by electronic bulletin board.

f. Public Participation

For program approval, states and territories must provide opportunities for public participation in all aspects of the nonpoint pollution program. Congress intended that the public be involved in the development and implementation of the program, calling not only for public participation, but also for public education.

Involving the public early in the development of the program should help improve acceptance of the program and promote and maintain the public's long-term commitment to support the goals of section 6217. Specifically providing opportunities for public comment, especially by those regulated or affected by the program, as part of program development and implementation, can ensure that the program will be accepted, and therefore more effective in controlling nonpoint pollution. The public education aspect of the requirement should be beneficial by making individuals more aware of the impact of their actions on coastal waters and by generating support for pollution control efforts at the state or territory and local level.

g. Administrative Coordination

For program approval, the coastal nonpoint program must include administrative coordination mechanisms. At a minimum, the program must include a list of state, regional and local agencies and the role that they will play in developing and implementing the program.

This requirement will be environmentally beneficial because it will help avoid conflicts and duplication of effort among the agencies involved in the coastal nonpoint program and ensure that the various agencies are fulfilling their responsibilities to implement the program. Agencies will be able to refine policies and procedures and maximize limited resources to more effectively support the goals of section 6217. NOAA and EPA will also work to assist in resolving any conflicts that may occur between states and Federal agencies during program development and implementation.

h. Enforceable Policies and Mechanisms

For program approval, the coastal nonpoint program must contain enforceable policies and mechanisms to implement the applicable requirements of section 6217, i.e., the (g)

measures and additional management measures. The term "enforceable policy" is defined in the CZMA to mean state policies which are legally binding through constitutional provisions, laws, regulations, land use plans, ordinances, or judicial or administrative decisions, by which a state exerts control over private and public land and water uses and natural resources in the coastal zone. Voluntary approaches, including economic incentives, may be used to implement management measures as long as they are backed by enforceable authorities.

This requirement will be environmentally beneficial because states and territories will be able to use a variety of regulatory and/or non-regulatory approaches in order to ensure implementation of the management measures. In addition, the selection and design of enforceable policies can be tailored to specific state or local circumstances. The success of the implementation of the policies can also be enhanced through public education and technical assistance programs.

i. Monitoring

For program approval, the coastal nonpoint program must contain a description of any necessary monitoring techniques to accompany the management measures to assess over time the success of the measures in reducing pollution loads and improving water quality. The EPA "g" guidance document provides guidance for measuring changes in pollution loads and in water quality that may result from the implementation of management measures and for ensuring that the measures are implemented, inspected, and maintained properly.

This requirement should have a beneficial environmental effect because water quality monitoring is the most direct and defensible tool available to evaluate water quality and its response to management measures and other factors. By tracking management measures and water quality simultaneously, states will be able to evaluate the performance of the management measures and determine the need for additional management measures to meet water quality objectives.

PROGRAM IMPLEMENTATION

2. SOCIOECONOMIC IMPACTS

The socioeconomic impacts associated with implementation of management measures were discussed in section 4.A.2 of this PEIS. While EPA has determined that all management measures specified in its guidance document are economically achievable, the implementation of management measures will entail some economic costs. However, the flexibility embodied in the (g) guidance and in the Program Development and Approval Guidance document will help to reduce the economic impacts. The implementation of management measures will also produce positive socioeconomic benefits in the form of improved recreational and commercial activities resulting from improvements in the quality of coastal waters. Although there should not be any significant socioeconomic impacts associated with the specific components required to be used in developing and implementing coastal nonpoint programs, some impacts may result from efforts to protect and restore coastal waters. The changes in the pattern of land and water uses that may result from program implementation may prohibit growth and certain land uses in some areas and induce growth in other areas because of restrictions resulting from

the designation of critical coastal areas and the implementation of additional management measures to protect these areas. Direction of development away from critical areas and concentrating it in other areas will result in changes in population density and the environmental effects that accompany development activity. Water uses for commercial and recreational activities may also be restricted in some coastal areas.

Additional technical assistance may be required by farmers to apply management measures to local conditions. However, states and territories are required to provide technical and other assistance to local governments and the public for implementing additional management measures developed by the state and territory. NOAA, EPA, and other Federal agencies also have expertise and technical information that is available to states, territories, local governments, and the public.

A positive impact will be attained through the public participation component which will help to improve acceptance of the program and lead to attitude and behavior changes as people become more aware of the coastal nonpoint program and its environmentally beneficial goals. This will produce an increased public awareness of the potential impacts of their activities on the environment.

4.C ENVIRONMENTAL / SOCIOECONOMIC IMPACTS OF ALTERNATIVES

a. Approval of State and Territory Programs

As discussed in preceding sections, the approval of state coastal nonpoint source pollution programs will have a beneficial effect on the environment because it will help to control sources of nonpoint pollution and will result in less pollutants reaching coastal waters. It will make existing programs more effective by strengthening the links between Federal and state coastal zone management and water quality programs, thereby improving state and local efforts to manage land use activities that degrade coastal waters and habitats. The requirement for the program to identify critical coastal areas, coastal waters that are not attaining or maintaining water quality standards, and the land uses that cause or threaten those coastal waters will have a positive environmental effect, especially for coastal water uses. The incremental impact of approving nonpoint programs will add to the positive environmental impact of the present nonpoint control efforts being conducted under section 319 of the CWA and the resource management activities undertaken by approved coastal management programs. The implementation of additional management measures will also prevent future water quality impairment by addressing new or expanding land uses within critical coastal areas. Although there will not be any significant adverse environmental impacts associated with approval of state programs, some socioeconomic impacts may result from implementation of management measures and from changes in the pattern of land and water uses that may occur because of restrictions resulting from designation of critical coastal areas. Positive socioeconomic benefits in the form of tourism, improved commercial and recreational fishing, and other water-related activities will also result from improved coastal water quality.

b. Conditional Approval of State and Territory Programs

The conditional approval of state programs will have a type of beneficial effect on the

because it will produce many of the beneficial results as final approval, and will, arily, avoid the adverse impacts of denying approval, provided the state or s the conditions. The implementation of portions of a conditionally approved in to fulfill the intent of section 6217 by helping to control sources of ollution and will result in fewer pollutants reaching coastal waters. NOAA and A will allow up to five years from the time of conditional approval for states and territories to complete development of their programs. The same types of socioeconomic impacts resulting from changes in the pattern of land and water uses that are associated with approval of state programs may also result from conditional approval.

c. Deny Approval of State and Territory Programs [No Action]

Denying of approval of a state's program would result in a reliance on existing programs to control nonpoint source pollution. It would result in the loss of Federal funds awarded under section 306 of the CZMA and section 319 of the CWA. This might have an adverse environmental effect because it may cause the state not to implement management measures that are meant to control coastal nonpoint pollution. It might also have an adverse economic impact because the continued degradation of water quality will affect the recreational and commercial uses and users of coastal waters. Denying approval might also cause a state not to implement the second tier of pollution control provided by additional management measures that are meant to restore degraded coastal waters and protect critical coastal areas against future pollution. The incremental impact of denying approval will be the loss of opportunity to improve and expand the existing nonpoint source program under section 319 and the failure to implement additional management measures which would be applied to both existing and to new or expanding land uses within critical coastal areas.

4.D ENDANGERED SPECIES ACT - SECTION 7 CONSULTATION

Section 7 of the Endangered Species Act (16 U.S.C. § 1536) requires federal agencies to insure that any action authorized, funded, or carried out by them does not jeopardize the continued existence of listed species or destroy or modify the critical habitat of any endangered or threatened species. The implementing regulations of Section 7, at 50 CFR Part 402, also require all federal agencies to consult with the Department of Commerce (National Marine Fisheries Service) and the Department of the Interior (U.S. Fish and Wildlife Service) when their actions may affect listed species. NOAA and EPA have initiated informal consultation with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service with respect to the 6217 program.

4.E UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS

The approval of state and territory coastal nonpoint pollution control programs and the implementation of management measures should not produce any unavoidable adverse environmental impacts. The coastal nonpoint pollution control program is intended to protect the environment by controlling nonpoint pollution and protecting and restoring coastal waters.

However, there may be some socioeconomic impacts that are unavoidable. As described in section 4.A, there are some costs associated with the implementation of the management measures. There may be some changes in the patterns of land and water uses in order to avoid activities that degrade coastal waters and habitats. These changes in activities, such as directing development away from critical coastal areas, should not result in any unavoidable adverse environmental impacts. Any unavoidable effects associated with development or other activities being directed to more suitable non-critical areas are regulated under existing state and Federal programs. In addition, section 6217(g) requires a description of any necessary monitoring techniques to accompany the management measures to assess over time the success of the measures in reducing pollution loads and improving water quality. Water quality monitoring is the most direct and defensible tool available to evaluate water quality and its response to management and other factors (Coffey and Smolen, 1990).

Denying approval of coastal nonpoint programs will have the effect of relying on existing nonpoint control programs and coastal zone management programs. This might produce adverse environmental impacts because it may cause the state not to implement management measures that are meant to control coastal nonpoint pollution, restore degraded waters, and protect critical coastal areas.

4.F RELATIONSHIP BETWEEN SHORT-TERM USES OF ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The overall purpose of section 6217 and state nonpoint pollution control programs is to protect and restore coastal waters and thus to enhance the long-term productivity of all coastal resources. The NOAA/EPA review of each program and NOAA's preparation of a subsequent NEPA document for each state program will ensure that the programs do not include any short-term uses of the environment which would degrade long-term productivity. Some short-term uses of the environment may have to be modified in response to implementation of management measures. This may result in short-term costs to the users, but will result in long-term benefits to the environment.

4.G IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

NOAA does not anticipate any irreversible or irretrievable commitment of resources as a result of the approval of state and territory coastal nonpoint programs. However, the section 6217 requirements for states and territories to establish a 6217 management area, to implement management measures in this area, and to identify and map critical coastal areas that need additional measures to protect them against present and future nonpoint pollution problems, may have the effect of reallocating resources for an indefinite period of time. The identification of critical areas may also have the effect of restricting development or other activities in the critical areas and concentrating these activities in other locations. Although development activity results in the affected site being committed to the new use for an indefinite period of time, and can practically be considered an irreversible and irretrievable commitment of resources, the amount of resources is expected to be minimal. Also, although critical areas may need special controls such as setbacks and low density zoning to protect coastal waters, these designations may change in the future.

5. LIST OF PREPARERS

Joseph P. Flanagan - Environmental Protection Specialist, Coastal Programs Division in the Office of Ocean and Coastal Resource Management, had lead responsibility for the preparation of the draft and final PEIS. He has been involved in the preparation of environmental impact statements and assessments since 1980, mainly in NOAA's Ocean Minerals and Energy Division. He has a B.S. in Geology/Chemistry from the University of Miami and an M.S. in Environmental Systems Management from The American University.

Marcella R. Jansen - Coastal Nonpoint Pollution Control Program Coordinator, Coastal Programs Division in the Office of Ocean and Coastal Resource Management, has lead responsibility in NOAA for administration of the coastal nonpoint program under Section 6217 of the Coastal Zone Act Reauthorization Amendments. She has been involved in the coastal nonpoint program since it was established in 1990, and has worked with the coastal management program in NOAA since 1979. She has a B.S. in Biology from Tufts University.

6. LIST OF AGENCIES, ORGANIZATIONS AND INDIVIDUALS RECEIVING COPIES OF FINAL PEIS

Federal Agencies

Council on Environmental Quality
Department of Agriculture
  Natural Resources Conservation Service
  Forest Service
Department of Commerce
  National Marine Fisheries Service
Department of the Interior
  Office of the Secretary
  Fish and Wildlife Service
Department of Transportation
  Maritime Administration
Environmental Protection Agency
  Office of Federal Activities
  Assessment and Watershed Protection Division
  Nonpoint Source Coordinator and Environmental Review Coordinator
  - Region I
  - Region II
  - Region III
  - Region IV
  - Region V
  - Region VI
  - Region IX
  - Region X
U.S. Army Corps of Engineers

State Agencies

Alabama
- Department of Environmental Management
- Department of Economic and Community Affairs

Alaska
- Department of Environmental Conservation
- Division of Governmental Coordination

American Samoa
- Coastal Management Program
- Office of the Governor

California
- California Coastal Commission
- Bay Conservation and Development Commission
- State Water Resource Control Board

Commonwealth of the Northern Mariana Islands
- Office of the Governor
- Division of Environmental Quality
- Division of Fish and Wildlife

Connecticut
- Department of Environmental Protection
- Office of Long Island Sound Programs

Delaware
- Department of Natural Resources and Environmental Control

Florida
- Department of Environmental Regulation
- Department of Community Affairs

Georgia
- Department of Natural Resources

Guam
- Environmental Protection Agency
- Bureau of Planning

Hawaii
- Office of State Planning
- Department of Health

Illinois
- Department of Transportation

Indiana
- Department of Natural Resources
- Department of Environmental Management

Louisiana
- Department of Natural Resources

Maine
- State Planning Office
- Bureau of Water Quality Control

State Agencies continued

Maryland
- Department of Natural Resources
- Department of Environment

Massachusetts
- Office of Environmental Affairs
- Department of Environmental Protection

Michigan
- Department of Natural Resources

Minnesota
- Department of Natural Resources
- Pollution Control Agency

Mississippi
- Department of Marine Resources
- Department of Environmental Quality
- Department of Wildlife, Fisheries and Parks

New Hampshire
- Office of State Planning
- Department of Environmmental Services

New Jersey
- Department of Environmental Protection and Energy

New York
- Department of Environmental Conservation
- Department of State

North Carolina
- Division of Environmental Management
- Division of Coastal Management

Ohio
- Office of Real Estate and Land Management
- Environmental Protection Agency

Oregon
- Department of Land Conservation and Development
- Department of Environmental Quality

Pennsylvania
- Bureau of Land and Water Conservation

Puerto Rico
- Department of Natural Resources
- Environmental Quality Board
- Coastal Management Office

Rhode Island
- Coastal Resources Management Council
- Department of Environmental Management

South Carolina
- Office of Ocean and Coastal Resource Management
- Department of Health and Environmental Control

State Agencies continued
Texas
- General Land Office
- Texas Water Commission
U.S. Virgin Islands
- Department of Planning and Natural Resources
Virginia
- Department of Environmental Quality
- Division of Soil and Water Conservation
Washington
- Department of Ecology
Wisconsin
- Department of Natural Resources
- Department of Administration

National Interest Groups
Center for Marine Conservation
Natural Resources Defense Council
Sierra Club

State Interest Groups
Coalition to Restore Coastal Louisiana
Maryland Conservation Council
Maryland Wetlands Committee

Individuals
Greg Tolbert (Weyerhauser Co.)
Terry Paulson (Wetlands Initiative)
David Guy (California Farm Bureau Federation)
Lloyd Woolsey (U.S. Geological Survey)
Michael Gregory (Arizona Toxics Information)
Stephen Duda (RUST Environment & Infrastructure)
Samuel Sage (Atlantic States Legal Foundation)
Al Engelland (Texas Utilities)
James Newman
Joel Runes
Laura Durazo
William Guy

7. APPENDICES

Appendix A. References

Appendix B. Comment Letters Received on Draft PEIS

APPENDIX A. References

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APPENDIX B. COMMENT LETTERS RECEIVED ON DRAFT PEIS

This Appendix contains the full texts of the 15 letters received on the draft programmatic environmental impact statement. Each commenter is listed below along with the page number on which the comment begins. Major points are underscored and numbered. NOAA's response, if required, appears on the right side of each page. Each response takes the form of either a note further explaining NOAA's position or a reference to a PEIS page on which the text has been changed to reflect concurrence with the commenters idea.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

AUG 31 1995

OFFICE OF
ENFORCEMENT AND
COMPLIANCE ASSURANCE

Marcella Jansen
Coastal Programs Division
Office of Ocean and Coastal Resource Management
National Oceanic and Atmospheric Administration
1305 East-West Highway
Silver Spring, Maryland 20910

Dear Ms. Jansen:

The Environmental Protection Agency (EPA), in accordance with its responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act, has reviewed the July 1995 Draft Programmatic Impact Statement on the approval of state coastal nonpoint pollution control programs.

The National Oceanic and Atmospheric Administration (NOAA) proposes to make a determination, in coordination with EPA, on the approval of state coastal nonpoint pollution control programs. Section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990 requires states with approved coastal zone programs to develop and implement coastal nonpoint pollution control programs. Coastal states were required to submit their coastal nonpoint pollution control programs to NOAA and EPA for approval by July 1995. The PEIS assesses the environmental impact of the requirements of the Section 6217 program. The PEIS will form the basis for subsequent NEPA documents (environmental impact statements or assessments) that NOAA will prepare on each of the 29 state coastal nonpoint pollution control programs submitted for approval.

We are pleased that staff from EPA's nonpoint pollution control program are continuing to work with NOAA on this PEIS. Close coordination between NOAA and EPA will enhance the effectiveness of the NEPA process and the Coastal Zone Management Act (CZMA) and Clean Water Act (CWA) goals. Accordingly we would like to request that, when the final PEIS is issued, NOAA provide two copies to each of EPA's coastal regions (list of contacts and addresses (enclosed). We would also like to request that subsequent state- or territory-specific nonpoint pollution control program NEPA documents be provided to the appropriate EPA Region for review.

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EPA's rating for this DEIS is "LO" (Lack of Objections); a summary of the EPA rating system is enclosed. While EPA finds the draft PEIS to be adequate, we are, as a cooperating agency on this PEIS, also including some suggestions which we believe will strengthen the document in providing a more thorough explanation of the program to the public and decision-makers. The PEIS can be a critical tool in promoting a dialog on the nonpoint control program and informing the public on the nature of problems it is designed to address.

Thank you for the opportunity to review the draft PEIS. If you have any questions regarding our comments, please feel free to contact me at 202-260-5053 or contact Joe Montgomery of OFA at 202-260-8793.

Sincerely,

Richard E. Sanderson
Director
Office of Federal Activities

Enclosures

COMMENTS ON COASTAL NONPOINT POLLUTION CONTROL PROGRAM PEIS

1. COORDINATION - The Final PEIS should describe in detail the coordination mechanisms which will be used to ensure adequate consultation with EPA and the alignment of EPA's and NOAA's plan approval processes. The plan approval processes for both agencies should be fully described within the Final PEIS.

2. It would also be useful if the final PEIS provided a brief description of the status (e.g., level of development and state of implementation) of the nonpoint pollution control programs which have been submitted for approval.

3. SCOPE and EMPHASIS - We recommend the Final PEIS provide a description of existing coastal fisheries, biological resources (e.g., whales, pinnipeds, aquaculture, seabirds), and recreation; and the potential direct, indirect, and cumulative impacts to these resources from proposed nonpoint pollution control programs. It is our belief that these resources would be affected by proposed nonpoint pollution control programs and should be evaluated in the Final PEIS.

In particular, we recommend that the scope of the PEIS be expanded to emphasize to the public that the problems in the American fisheries industry are being exacerbated by nonpoint source pollution. During the last several years, EPA has reviewed numerous fishery management plans and environmental impact statements, each describing a precipitous decline in fisheries stocks. This decline is attributable in large part to overfishing and nonpoint source pollution. Contributing to nonpoint source pollution is continuing development of our coastal areas and encroachment upon estuarine wetland systems. The U. S. Census Bureau projects that by the year 2000, the US population will reach 275 million. Already some 110 million live in the marine coastal zones, and their number is growing. Each year more beaches are closed because of contamination as waste from overloaded sewage systems is dumped into the oceans (NOAA, 1995).

Fisheries landings data graphically demonstrate a valuable food resource that is in serious decline. This marked reduction in heretofore readily available fish and shellfish, concomitant with rising population, should be part of a larger public dialogue on how to manage this nation's resources. The Coastal Nonpoint Pollution Control Program is an excellent format for this dialogue, and should present in graphic and unambiguous terms the seriousness of nonpoint pollution impacts on marine habitats and fisheries. Projections of seafood availability in five, ten, and twenty years hence - based upon trend analysis of historical landings data - yield a profoundly disturbing picture

Environmental Protection Agency

1. A description of the NOAA/EPA coordination process during joint review of coastal nonpoint programs has been added to the EIS on page 1.

2. Disagree. Program approval is an ongoing process. NOAA and EPA are continuing to evaluate the degree to which each state program submitted for approval meets the requirements of section 6217. An environmental assessment (EA) and a Findings document will be prepared for each program as part of the approval process. A Notice of Availability and of a 30-day review period for these documents will then be published in the Federal Register.

3. Additional discussion has been added to the Alternatives (Section 2), the Affected Environment (Section 3), and the Environmental/Socioeconomic Impacts of Alternatives (Section 4.C) of the PEIS.

of deteriorating seafood resources and marine habitats, of which the public should be made aware. Program state and territorial environmental assessments would provide a legitimate vehicle with which to engage both policy makers and the public in seeking solutions to a critical food supply shortfall. (Literature Cited: Fishery Management Plan for the Scup Fishery and Draft Environmental Impact Statement, May, 1995, U.S. Department of Commerce, National Marine Fisheries, pgs 21-22.)

4. The document would also benefit from adding discussion of other specific examples of degradation including impacts on drinking water supplies and continued remediation costs which may occur due to a lack of preventive management measures.

4. Additional discussion of other specific examples of degradation are beyond the scope of the section 6217 program which focuses on the protection and restoration of coastal waters.

CUMULATIVE and INDIRECT IMPACTS - NEPA requires evaluation of indirect and cumulative effects which are caused by the proposed action (40 CFR 1508.8(b) and 1508.7). The Draft PEIS has very

5. little discussion of potential indirect and cumulative impacts of no action, conditional approval, or disapproval. We note that an overview, programmatic level of analysis is the ideal time to estimate potential indirect and cumulative impacts. The Final PEIS should evaluate the potential cumulative impact on the environment which may result from the incremental impact of the proposed action when added to other past, present and reasonably foreseeable future actions, e.g., management measures and restoration projects.

5. Additional discussion has been added to the Alternatives (Section 2) and to the Environmental/Socioeconomic Impacts of Alternatives (Section 4.C) of the PEIS.

ENDANGERED SPECIES - The Draft PEIS states that NOAA's Office of Ocean and Coastal Resource Management has determined that approval and implementation of nonpoint pollution control programs may affect listed species and their designated critical habitat (pg. 76). Given the Draft PEIS conclusion of beneficial environmental affect of approval, we recommend the Final PEIS

6. describe the rationale for this "may affect" determination.

6. The discussion in the Endangered Species Act section of the PEIS (Section 4.D) has been revised to reflect the initiation of informal consultation between NOAA / EPA and the National Marine Fisheries Service and the Fish and Wildlife Service on the 6217 program.

IMPLEMENTATION OF MANAGEMENT MEASURES - We recommend the Final

7. PEIS include, as examples, specific practices that implement selected management measures. For instance, temperature shutters and variable flow operations may be specific actions which would implement the management measure for protection of surface water quality and instream and riparian habitat during the development and operation of dams (pg. 62).

7. Examples of practices can be found in the EPA (g) guidance document.

ADDITIONAL SOURCE MATERIALS - EPA's Region 4 (Atlanta) has prepared the following reference material on coastal issues that may be of assistance in preparing the state/regional/provincial environmental assessments. Region 4 will make these copies available upon request.

1) Technical document "Coastal Marinas Assessment

Handbook", EPA 904/6-85-132, April, 1985 that examined environmental factors in siting, construction, operating and maintaining marinas in the southeastern waters of the US. It would be prudent to examine this document for NPS technology regarding marinas situated in the Carolinian and Louisianian Provinces.

2) Technical document "Utilization of a Saltwater Marsh Ecosystem for the Management of Seafood Processing Wastewater", EPA 904/9-86 142, October 1986.

3) An environmental impact statement entitled "Freshwater Wetlands for Wastewater Management", EPA 904/9-83-107, March 1983.

TECHNICAL COMMENT - Under 4 ENVIRONMENTAL CONSEQUENCES, d. Marinas: Please check the term "butyltin" (page 52), which
8. should be written as two words, "butyl tin". Additionally, tributyl, trialkyl, and triaryl tin compounds were also commonly used as biocides in marine paints, to which we assume this paragraph is alluding.

ORGANIZATIONAL COMMENTS - While reading the document we had
9. difficulty in assigning text material to its respective chapter/section because of the confusing style of headings and subheadings. The reader cannot readily determine what text material related to which section because of the confusing plethora of headings and subheadings, namely: upper case, bold, upper case underlined, lower case underlined, upper case letter header, lower case letter header, and combinations thereof.

We recommend instead an engineering numerical style format which is far easier to follow, particularly for the numerous subheadings found in the referenced document. The following example illustrates how this could be applied to the PEIS.

4 ENVIRONMENTAL CONSEQUENCES
4.1 Management Measure Implementation
4.1.1 Agricultural Nonpoint Source Pollution Category
4.1.1.1 Nutrients
4.1.1.2 Sediments
4.1.1.3 Animal Wastes
ETC.
4.1.1.1.1 Management Measures for Agricultural Sources
a. Erosion and sediment control
b. Management Measurement...(large Units)
c. Management Measurement...(Large Units)

4.1.2 Urban Nonpoint Source Pollution Category
4.1.2.1 Sediments

8. Butyltin and tributyltin are spelled as one word in EPA's (g) management measures guidance document (page 5-4) and in the literature cited in the references for this chapter on marinas and recreational boating (Stephenson et al., 1986; Maguire, 1986; and Grouhoug et al., 1986).

9. NOAA appreciates the suggestion for organization. However, we believe the more general outline structure of the program is appropriate for the general discussion embodied in the PEIS.

United States Department of Agriculture

Natural Resources Conservation Service

P O. Box 2890
Washington, D.C.
20013

SEP 0 7 1995

Mr. Clement Lawsey
Coastal Programs Division
SSMC-4, Room 11109
1305 East-West Highway
Silver Spring, Maryland 20910

Dear Mr. Lawsey:

I am responding to your letter of July 7, 1995 on the review of the Draft Programmatic Environmental Impact Statement (EIS) for the Coastal Nonpoint Pollution Control Program. My comments, on behalf of the Natural Resources Conservation Service (NRCS), formerly the Soil Conservation Service (SCS), concentrate on agricultural aspects of the document.

Overall the document is well balanced between the need to improve environmental conditions, while at the same time allowing for economic progress. We agree with the proposed use of NRCS's Field Office Technical Guide as a foundation for many of the conservation practices that could be applied to correct or ameliorate environmental problems.

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However, we disagree with the implied mandatory approach with which these conservation and best management practices would be applied by landowners and land users. NRCS has found that the voluntary approach to conservation always produces more, better and effective conservation and of longer duration than that of a mandatory approach.

I suggest that the Final Environmental Impact Statement (FEIS) be modified to reflect that the voluntary approach be used with a regulatory backup, which would be employed when individuals fail to implement needed conservation practices. This would allow for the wide application of conservation practices across the coastal zone without a large regulatory group to enforce the institution of practices.

Thank you again for writing to us. If we can be of further assistance, please do not hesitate to contact me.

Sincerely,

Thomas A. Weber
Deputy Chief for
Natural Resources Conservation Programs

The Natural Resources Conservation Service (NRCS), formerly the Soil Conservation Service, is an agency of the Department of Agriculture

An Equal Opportunity Employer

Natural Resources Conservation Service

Section 6217 requires that states and territories have enforceable policies and mechanisms to ensure implementation of the management measures. NOAA and EPA's March 1995 Guidance to the states provided states with time to demonstrate that the use of broad backup authorities, in combination with voluntary and incentive-based programs, can achieve widespread implementation of the management measures. This flexibility is discussed on pages 80-81 of the PEIS.

United States Department of the Interior

OFFICE OF THE SECRETARY
Washington, D.C. 20240

In Reply Refer To:
ER 95/568

SEP 13 1995

Mr. Clement Lewsey
Coastal Programs Division
SSMC-4, Room 11109
1305 East-West Highway
Silver Spring, Maryland 20910

Dear Mr. Lewsey:

The Department of the Interior has reviewed the Draft Programmatic Environmental Impact Statement for the Coastal Nonpoint Pollution Control Program. We have no comments to offer.

Thank you for the opportunity to review this important Draft Programmatic EIS. We look forward to receiving the Final EIS when it is completed. If you need to contact us, please call Ken Havran in the Office of Environmental Policy and Compliance at (202) 208-7116.

Sincerely,

Willie R. Taylor
Director
Office of Environmental Policy and Compliance

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State of Louisiana

EDWIN W. EDWARDS
GOVERNOR

JACK McCLANAHAN
SECRETARY

DEPARTMENT OF NATURAL RESOURCES

28 August 1995

Mr. Clement Lewsey, Chief
Coastal Programs Division
1305 East-West Highway - SSMC/4
Silver Spring, MD 20910

Re: Draft Programmatic Environmental Impact Statement for the Coastal Nonpoint Pollution Control Program - State of Louisiana Comments

Dear Mr. Lewsey:

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Coastal Management Division staff have reviewed the referenced document and we respectfully offer the following comments;

GENERAL

** Overall, the 6217(g) program is a beneficial and worthwhile undertaking and should have positive environmental impacts for coastal waters and habitats of the United States of America. The following comments are intended to be constructive and to support the continuation of the program. It is critical that the specific reasons for having it -- coastal water quality problems identified, benefits expected -- be communicated more clearly to the American public. Further, if the process of flexibly adjusting the program does not continue, an ill-conceived program will lead to indirect negative environmental impacts, in terms of further political backlash generated that damages all tangent programs, and by misdirection of funds from alternative programs.

** Role of the NRCS and federal agencies other than NOAA and EPA (See Page 25 as an example): It only seems reasonable that much of the responsibility for carrying out this part of the program, i.e., dealing with erosion and sediment control, and with nutrient management, should reflect the heavy involvement of the NRCS. It seems imperative that the NRCS, along with other federal agencies, such as the CFSA, USDA/ARS, USFWS, USGS, and even NMFS, should each make a commitment to this federally mandated program, articulate those commitments by way of memoranda of agreement with NOAA and EPA, and to pass down firm directives to their regional and local field offices regarding its agency's policy. Can we expect to see this happen?

1.

COASTAL MANAGEMENT DIVISION P.O. BOX 44487 BATON ROUGE, LOUISIANA 70804-4487
TELEPHONE (504) 342-7591 FAX (504) 342-9439
AN EQUAL OPPORTUNITY EMPLOYER

1. Many of the agencies cited, e.g., USDA, were involved in the development of the (g) guidance. In addition, NOAA and EPA have briefed Federal agencies on the goals and objectives of the section 6217 program. Although no new MOUs with these agencies are contemplated at this time, NOAA and EPA will continue to work informally with these agencies to encourage their support and involvement with states and territories in the implementation of the coastal nonpoint program.

2. As described in the *Program Development and Approval Guidance*, states and territories have flexibility in the development and implementation of their coastal nonpoint program. For example, states may implement the management measures as described in the (g) guidance, or may implement an alternative management measure which better suits local conditions, as long as the measure selected is as effective in controlling nonpoint pollution as the one described in the guidance. Similarly, the states have flexibility in deciding the practices that will be used to achieve the goals of the management measure. In addition, under some circumstances, states may exclude categories, subcategories, or individual nonpoint sources.
In March 1995, NOAA and EPA issued further guidance to states on the development and implementation of their coastal nonpoint programs, which provided further flexibility for the states. This included a decision by the Federal agencies that they would defer to the state determination of the boundary of the 6217 management area unless NOAA and EPA determined that the state's proposed boundary excludes: (a) existing land or water uses that reasonably can be expected to have a significant impact on coastal waters of the state, or (b) reasonably foreseeable threats to coastal waters from nearby activities landward of the state's 6217 management area. In addition, the guidance provided more flexibility in the type of enforceable policies that the state could use.

** As is noted later with reference to page 69 and flexibility, there is a general lack of flexibility throughout this program. There needs to be some measure of a state's ability to tailor a program to its specific needs. There also needs to be some thought given to long term goals of the program. Incentives for state's to perform certain tasks, e.g. the ability to remove categories from the program if and/or when they demonstrate that they are not a problem.

2.

** When discussing alternatives the PEIS rarely, if ever considers the impacts that could occur if a state were to abandon its coastal program rather than pursue 6217 approval. Apparently NOAA and EPA have made the assumption that no state would choose this alternative. Not only might a state not "implement management measures" it might also not continue to be able to manage its coastal resources as it had been doing.

3.

PEIS COMMENTS -- PAGE SPECIFIC:

PAGE	COMMENT
5	2.C - This "No Action" alternative fails to address, or raise the possibility that, a state may opt to abandon its coastal program altogether rather than comply with provisions of "6217". It is conceivable that a state may choose to do this which eliminates a tool in the effort to address conservation of vegetated coastal wetlands.
7	Approach to 6217 management area boundary delineation: The program was damaged early on by credibility plunges following the ill-advised strategy of using USGS coastal riverine watersheds to recommend 6217 management area boundaries. That approach is consistent with good environmental science, but NOAA/EPA is asking for changes in human behavior to be brought about through government, and people organize themselves and make corporate decisions by politically bounded units of land, not by watersheds. This is reflected in other NOAA documents that map study areas by "coastal counties."
10	Need for further supporting references documenting reasons for the program: This program would benefit greatly from a list of current references that would support PEIS p. 10, 3rd paragraph beginning "Beach closures ..." Similarly, while the Guidance Specifying Management Measures was fortified with chapter reference lists, it suffered a critical lack of documentation for the congressional findings section on pages 1-3 and 1-4.
11	On the Louisianian biogeographic province: Change "The biota is primarily temperate ..." to "The biota ranges from temperate to subtropical." Add " ... and the topography is relatively low."

3. The PEIS considers the alternatives available to the Federal agencies in their decision to approve or disapprove a state's program. A state decision to withdraw from the voluntary coastal zone management program and the impact of such a decision on the state and its resources is beyond the scope of this PEIS.

Page 5. See response to comment 3 above.

Page 7. The purpose of the section 6217 program is to control the addition of nonpoint pollution to coastal waters. Coastal watersheds were used to recommend 6217 management area boundaries because they provide a logical physical unit when dealing with nonpoint pollutants that are transported to coastal waters. The extent of watersheds, and hence the delivery of pollutants, is controlled by the geographic characteristics of the land and is not influenced by politically bounded units of land. States have the flexibility to propose an alternative 6217 management area that may be based on more specific state and local information. In addition, NOAA guidance on boundary modifications provided to the states with their boundary recommendation in March 1993, recognized that

modification to a watershed boundary to accommodate political jurisdictions was reasonable as long as the modification did not exclude sources that have or could have a significant impact on coastal waters.

Page 10. Additional references added to page 11 of the PEIS. NOAA does not find it necessary or appropriate to provide an analysis in the PEIS to document the Findings identified by the Congress in their passage of the Coastal Zone Act Reauthorization Amendments of 1990.

Page 11. Changes made to page 12 of PEIS.

Page 25. Agree. Change made to PEIS.

Page 26. The distinction between large and small units was made based on an economic analysis of costs associated with implementation of the management measures for existing facilities. The cutoffs in the number of head for the two measures complies with the statutory requirement to identify management measures that are "economically achievable".

25 Management Measures for Agricultural Sources, 1. Erosion and Sediment Control Measure - The Soil Conservation Service is now the Natural Resources Conservation Service.

26 2a. - When the document refers to "all new facilities regardless of size" does that mean that an individual with one horse or cow or goat must store and treat all wastes for the entire lot? Is it limited to commercial enterprises? If this management measure is to apply to all facilities why is there a distinction between large and small units?

28 3. Nutrient Management Measure - Who pays for all of these analyses and the development of all of these plans? What are "realistic yields" and who is going to set them?

29 4. Pesticide Management Measure - Who decides when "economic benefits to the producer will be achieved? Who does the analysis for and sets "economic thresholds"?

30 4.A.1.a.5 Grazing Management Measure - The document states that to protect range, pasture and other grazing lands livestock should be excluded from estuaries, ponds, and other wetland areas. If this action were instituted, would cattle grazing in coastal marshlands (e.g. Cameron and Plaquemines parishes in Louisiana) then be eliminated? Many ranchers in these marshes have raised cattle there for several generations and own or lease no other range lands. These herds are typically large but are far ranging and scattered.

35 Management Measures for Urban Areas, 1. New Development Management Measure (1) By design or performance - Who set the 80% figure? How was it derived? What is the scientific basis for this figure? Does this mean that for every development there has to be an on-going monitoring program? If so, for how long?

38 Management Measures for Urban Areas - &. New Onsite Disposal Systems Management Measures (1) and (5) and (8). Operating Onsite Disposal systems Management Measures (1) and (3)- Where are the loadings reductions numbers coming from? Who determined that these are the appropriate amounts? What is meant by "encouraging" use of low phosphate detergents? If the reductions are not demonstrated, do you require the use of low phosphate detergents, and if so how?

providing additional technical assistance to landowners to develop nutrient management plans. Although the development of the nutrient management plan may increase a farmer's workload and expense, it may also result in savings through the reduction in the amount of nutrients being applied.
Realistic yield expectations for a specific crop are obtained from the producer's actual crop yield history. One method is to average the three highest yields in five consecutive crop years for the planning site. State land grant university yield expectations for the soil series, or from Soil Conservation Service Soils-5 information for the soil series, may also be used.

Page 29. The producer and any additional expertise (e.g.,crop consultants, agricultural extension service) consulted by the producer decide when economic benefits will be achieved. The producer sets economic thresholds by knowing the costs of pesticides and the amount of crop yield loss.

Page 30. The measure does not intend that grazing be prohibited in wetland areas. The focus of this management measure is on the riparian zone, i.e, the vegetated areas along a waterbody. The control of erosion from grazing areas above the riparian zone is also encouraged.

Page 35. The 80 percent figure was used by EPA because: (1) it is assumed that the removal of 80 percent of total suspended solids (TSS) will control heavy metals, phosphorus, and other pollutants; (2) several coastal states, including Delaware and Florida, and the Lower Colorado River Authority of Texas require and have implemented a TSS removal treatment standard of at least 80 percent for new development; and (3) analysis has shown that constructed wetlands, wet ponds, and infiltration basins can remove 80 percent of TSS, provided that they are designed and maintained properly. This management measure can be achieved through performance or design, i.e., by performance monitoring or by the installation and correct operation and maintenance of structural runoff controls which have been designed to achieve this goal. The design alternative does not require monitoring.

67 4.A Management Measures Implementation, 2. Socioeconomic Impacts, Agriculture - Who is going to pay for all of these analyses? These regulatory compliance costs have to be born by someone.

69 "Flexibility" in the (g) guidance document: Throughout p. 69 of the PEIS, the "flexibility" of the (g) guidance document is touted, but that is not apparent in the document. If there is indeed flexibility allowed in interpretation of any part of that document, it very much needs highlighting and emphasis, because the opposite impression is given, and BMPs that may be optional or offered as examples are frequently understood to be specific program requirements

71 ENVIRONMENTAL CONSEQUENCES 4.b.1.a. Coordination with Existing State Programs - Has it occurred to NOAA/EPA that there may be some states who are "on the edge" with respect to their coastal programs and that the addition of other regulatory functions might cause legislative bodies and/or administrators to say that the burdens are not worth the monies involved? This should have been considered as an option some states might take. The loss of a viable coastal management program could have serious adverse impacts to efforts to protect coastal resources.

We very much appreciate the opportunity to comment on this document. It is our intention to continue to work with NOAA and EPA on this program. Only through a combined effort, in which each party shares its feelings frankly, can we hope to develop a program that meets the needs of the resources we are trying to protect and does so with a realistic assessment of the requirements of the program on the users of the resources.

If you have any questions regarding these comments please contact Mr. Gregory J. DuCote at 1-800/267-4019 or by e-mail at gregdu@dnr.state.la.us.

Sincerely,

Terry W. Howey

Terry W. Howey
Administrator

Page 38. The loadings reduction number for a 25 percent reduction in total hydraulic loadings to the OSDS is taken from current standards from the Energy Efficiency Act. Low-volume plumbing fixtures have been shown to reduce hydraulic loadings to OSDS by 25 percent. The 50 percent reduction number for reducing total nitrogen loadings to ground water is taken from the OSDS effectiveness and costs summary in the EPA (g) guidance document (page 4-104) and was developed by EPA in cooperation with the urban nonpoint source work group, through literature searches, and communication with technical experts in nonpoint source pollution. The 15 percent reduction number for reducing total phosphorus loadings to OSDS reflects the reduction that would be obtained if a program requiring low phosphate or phosphate - free detergent was implemented.
If phosphate reductions are not demonstrated, the (g) guidance document does not require a ban on phosphate detergents. Phosphate reductions have been encouraged in 15 states through programs that limit the percent of phosphorus in laundry, dishwashing, and industrial/institutional detergents.

Page 67. The economic analyses summarized on this page have already been completed as referenced. The analyses show that all agricultural management measures are economically achievable.

Page 69. See response to comment 1 above.

Page 71. Coordination with Existing State Programs is one of eight specific components that must be addressed in coastal nonpoint programs. Section 4 B.1 of the PEIS describes the environmental impacts associated with these components. A discussion of the ramifications of a possible state decision to withdraw from the national coastal management program is not within the scope of this PEIS. *(See responses for number 3 and page 5 above)*

STATE OF MICHIGAN

NATURAL RESOURCES COMMISSION

JOHN ENGLER, Governor

DEPARTMENT OF NATURAL RESOURCES

ROLAND HARMES, Director

REPLY TO
LAND & WATER MANAGEMENT DIVISION

July 31, 1995

Dr. Clement Lewsey
Coastal Programs Division
SSMC-4, Room 11109
1305 East-West Highway
Silver Spring, MD 20910

Dear Dr. Lewsey:

RE: Draft Programmatic Environmental Impact Statement (PEIS)
Coastal Nonpoint Pollution Control Program

Thank you for the opportunity to review the draft Programmatic Environmental Impact Statement (PEIS) for the Coastal Nonpoint Pollution Control Program. I have reviewed the draft document with my staff, and have only a few comments, as follows.

1. The map of the coastal watershed boundary on page 9 should be updated to reflect the geographic areas included in the state coastal nonpoint source program documents.

2. On page 11, the Great Lakes Province is described as having a rocky, glaciated topography, with limited wetlands. In fact, the Great Lakes shoreline, dominated by rocky and sandy features, also includes large and localized marshes and mudflats, especially when wetlands of the drowned river mouths and offshore reed beds are considered.

3. At the top of page 12, only ocean coastal beaches are described, while Michigan's vast freshwater beaches and sand dunes rival any in the nation. Similarly, the description of wetlands includes only saltwater varieties, and clearly omits freshwater marshes which are found in the coastal areas of the Great Lakes. While the description of social and economic activities, starting on page 15, provides some good general information on five coastal regions, it is unfortunate that the Great Lakes are not included at this time. In addition, although agriculture and forestry in the coastal zone are described, urbanization is not.

4. This seems to be an omission considering the statement made on page 15, "The development of urban, agricultural, and forested lands and the activities associated with them alter the landscape and generate most of the pollutants entering coastal waters."

Thank you again for the opportunity to comment on the draft document. If you have any questions concerning our comments, please feel free to contact Ms. Maureen Hein of my staff at 517-373-1950, or you may contact me.

Sincerely,

Chris A. Shafer

Chris A. Shafer, Chief
Great Lakes Shorelands Section
Land and Water Management Division

110

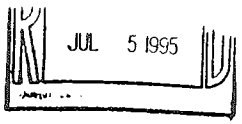
Michigan

1. The boundary of the Michigan 6217 management area will be shown in the environmental assessment being prepared by NOAA on the Michigan coastal nonpoint program.

2. Agree. Changes made on page 12 of the PEIS.

3. Agree. Changes made on pages 13 and 14 of the PEIS.

4. Agree. Changes made on pages 22 and 23 of the PEIS.



MISSISSIPPI
DEPARTMENT OF MARINE RESOURCES

July 17, 1995

Mr. Clement Lewsey
Coastal Programs Division
SSMC-4, Room 11109
1305 East-West Highway
Silver Springs, MO 20910

Re: Draft PEIS on the Approval of State and Territory Coastal Nonpoint Pollution Control Programs

Dear Mr. Lewsey:

After an initial review of the July, 1995 Draft PEIS for Coastal Nonpoint Pollution Control Programs, the Mississippi Department of Marine Resources concurs that approval of such a program will not result in any significant adverse environmental impacts and should result in an overall benefit to the environment. Our staff looks forward to working with all appropriate state and federal agencies in the implementation of Section 6217 programs to the maximum extent practicable.

Please note Mississippi agencies as listed on page 83 of the PEIS are somewhat outdated and probably should read -- Department of Environmental Quality, Department of Marine Resources, and Department of Wildlife, Fisheries and Parks.

Sincerely,

David Ruple

David Ruple
Director
Coastal Ecology Division

152 Gateway Drive • Biloxi, Mississippi 39531 • (601) 385 5860

111

Mississippi

Agree. Changes have been made on page 88.

State of North Carolina
Department of Environment,
Health and Natural Resources
Division of Coastal Management

James B. Hunt, Jr., Governor
Jonathan B. Howes, Secretary
Roger N. Schecter, Director

DEHNR

September 8, 1995

Mr. Clement Lewsey, Chief
Coastal Programs Division
1305 East-West Highway - SSMC/4
Silver Spring, MD 20910

Dear Mr. Lewsey:

Thank you for the opportunity to review the Draft Programmatic Environmental Impact Statement for the Coastal Nonpoint Pollution Control Program. We assigned the document the number DCM95-52 for our internal review tracking purposes.

Our reviewers were of the opinion that overall the document was too general and non-specific. Specific comments included the following:

1. The results of EPA's economic achieveability analysis published in the federal program guidance presented cost information only as it applies to the responsible party, i.e., cost to a farmer, cost per sedimentation basis, cost per maintenance of septic systems, etc. EPA's economic achieveability analysis did not mention or include estimates of the administrative and technical assistance. Since these costs are real and potentially significant impacts to implementing local programs, they should be included in the economic achieveability analysis.

2. Our reviewer is concerned that the Coastal Nonpoint Management Area boundary (coastal watershed) is defined based on the extent of tidal influence or head of tide. This boundary definition approach does not take into account nonpoint impacts upstream of the boundary within a given drainage basin.

3. We recommend that a consistency determination pursuant to 15 CFR 930 Subpart C - Consistency for Federal Activities be included in the final EIS.

Thank you again for the opportunity to review the document. Please call me at (919) 733-2293 if you have any questions.

Sincerely,

Stephen B. Benton
Consistency Coordinator

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North Carolina

1. EPA answered this concern in its response to public comments submitted on the analysis of economic achievability of management measures. Historically, in assessing the achievability of new environmental requirements, EPA has considered only the direct costs to entities actually responsible for employing the controls. State program implementation costs are separately considered in the Information Collection Requirement document prepared in response to Paperwork Reduction Act provisions.

2. The extent of tidal influence was only used to determine the boundary of coastal watersheds, which were the basis of the 6217 management area that NOAA recommended to states. NOAA, in determining the boundaries of its recommended 6217 management area, also evaluated whether significant indicators of pollution potential were present within areas inland of coastal watersheds, both within and outside each state's borders that drain into coastal waters. In areas where there were indicators of potentially significant contributions of nonpoint pollution inland of the coastal watershed, NOAA's recommendation suggested that states look beyond those coastal watersheds with the view to possibly including them in the state's 6217 management area.

3. After discussions between NOAA and North Carolina, the state has withdrawn its recommendation and comment.

SETBISION MAMPLANEHA
Bureau of Planning

GOVERNMENT OF GUAM
AGANA, GUAM 96910

AUG 18 1995

Clement Lewsey
Coastal Programs Division
SSMC-4, Room 11109
1305 East-West Highway
Silver Spring, MD 20910

Hafa Adai Dr. Lewsey:

The Bureau of Planning and the Guam Coastal Management Program have reviewed the draft Programmatic Environmental Impact Statement (PEIS) for the Coastal Nonpoint Pollution Control Program. In conducting our review, we find that most of the document presents an accurate view of the program as structured and the expected environmental impacts.

In the area of economic impact, however, we believe that these impacts are being understated and "averaged" to reduce their overall visibility. The Coastal Nonpoint Pollution Control Program, in its very short and underfunded implementation stage was administratively directed at various times toward a focus on economic achievability, best technology, and enforceability. In that the U. S. Environmental Protection Agency conducted evaluations of these prescribed management measures using a very Midwest oriented baseline, it is unlikely that a valid economic assessment was ever conducted. Combine a questionable baseline with narrow time frames, and limited funds, and the resulting analysis and planning are, in an economic sense, suspect. And we are not attempting to address the unique economic character of the Pacific Islands, such as they are, as that adds the complexity of bridging to dissimilar economies in an effort to perform a useful analysis. Finally, and this is recognized in the document, the objectives of ensuring these management measures are achievable on a National level are secondary to and rather frivolous when compared to the needs of the states to ensure that they could implement Coastal Nonpoint Pollution Programs within the limits of existing state and territorial resources and needs.

We believe that individual state assessments, or reasonable groupings of states, should have been analyzed for achievability determinations and that adequate additional time and resources are provided to the states and territories. Until realistic assessments are conducted, the economic assessments in the PEIS are reduced to stochastic platitudes.

Thank you for the opportunity to comment.

Sinseru,

MICHAEL J. CRUZ
Chief Planner

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Commonwealth Now!

113

Guam

Section 6217(g) of the Coastal Zone Act Reauthorization Amendments required EPA to assess the economic achievability of the management measures. EPA published economic achievability assessments for the agricultural, forestry, marinas, urban, and hydromodification management measures. Where data was available, EPA adjusted the economic achievability assessments to better address the potential costs associated with implementing management measures for the territories. However, in many cases, including Guam's, data did not exist to quantitatively assess economic achievability for these areas. However, EPA is presently funding contracts for the territories to study island-specific nonpoint source controls. The contract study for Guam covers urban nonpoint source controls.

GOVERNMENT OF PUERTO RICO/OFFICE OF THE GOVERNOR

Environmental
Quality Board

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1 9 1995

September 12, 1995

Mr. Clement Lewsey
Coastal Programs Division
SSMC - 4, Room 11109
1305 East - West Highway
Silver Spring, MD 20910

Dear Mr. Lewsey:

This is in response to your request for comments on the Programmatic Environmental Impact Statement (PEIS) draft for the Coastal Nonpoint Source Pollution Control Program.

In general terms, we concur with the development of the PEIS draft. The document is specific in explaining the environmental consequences, management measures implementation and benefits of the Program. We would like to commend your agency and EPA for the development of programs like this in order to control sources of nonpoint pollution, causing an overall beneficial effect on the environment. As you may be aware the Environmental Quality Board is committed to take an active role in the implementation of this Program.

Should you have any questions on this matter please contact Ms. Lucinia Ghigliotty, Water Quality Director at (809) 767-8073.

Cordially,

Héctor Russe Martínez
Chairman

EM/mqr
CPROENIM
1995-01-147

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P.O. BOX 11488/SANTURCE, P.R. 00910/TELEPHONE (809) 767-8181

114

Commonwealth of the Northern Mariana Islands
Division of Fish & Wildlife
Department of Natural Resources
Lower Base
Saipan, Mariana Islands 96950

Cable Address:
Gov. NMI Saipan
Telephone: 322-9729/9095

22 August 1995

US Department of Commerce
National Oceanic and Atmospheric Administration
National Ocean Service
Office of Ocean and Coastal Resource Management
1305 East-West Highway (N/ORM4)
Silver Spring, MD 20910

Subject: Comments on Draft Coastal Nonpoint Program Programmatic Environmental Impact Statement.

Thank you for the opportunity to comment on the draft Coastal Nonpoint Program Programmatic Environmental Impact Statement. I am recommending that you consider including 5 additional Management Measures to minimize non point pollution from marinas.

The Commonwealth of the Northern Mariana Island's Division of Fish and Wildlife has been conducting an analysis of the Smiling Cove Marina's compliance with best management practices to minimize non point source pollution. This analysis has resulted in a draft paper (Gilman, Eric. 1995. Non Point Source Pollution Problems Associated with Marinas and Best Management Practices: A Review of the Literature and Case Study of the Smiling Cove Marina, Saipan, CNMI." CNMI Division of Fish and Wildlife) that includes a description of best management practices for siting and design, and operation and maintenance of marinas. The following marina practices identified in this paper are not currently included as management measures by the Coastal Nonpoint Program:

1. (1) **Location and Human Health Risk for New or Expanding Marinas.** Marinas are potential sources for bacterial contamination. The marina should thus be located far from harvestable shellfish beds, and from beaches and waters used for recreation. For example, the state of Virginia automatically closes shellfish beds around marinas immediately after they are constructed. For a marina with 1 to 50 boats, Virginia condemns shellfish beds within 1/8 mile. For a marina with 51 to 100 boats, Virginia condemns shellfish beds within 1/4 mile. For a marina with more than 100 boats, Virginia condemns shellfish beds within 1/2 mile. It is a justified action to close adjacent shellfish beds because shellfish have been documented to bioaccumulate toxins. For example, tributyltin (TBT) levels in bivalve tissue has shown bioconcentration factors ranging from 5,000 to 50,000 greater than water column concentrations

115

CNMI

1. The management measures for marinas include consideration of the impact of marinas on shellfish beds and other habitat. Specifically, the marina habitat assessment management measure requires marinas to be sited and designed in order to protect against adverse effects to wetlands, shellfish beds and other important habitats. In addition, the marina water quality assessment management measure can also be used to ensure that water quality standards supporting a designated use, e.g., shellfish harvesting, are not exceeded. NOAA agrees that other factors, such as safety and the potential impact of secondary development, are important considerations in siting marinas and other facilities. Such considerations are an important part of effective coastal management, but are beyond the nonpoint pollution focus of section 6217

(Grovhoug 1989). Fish are also known to bioaccumulate TBT (Lau 1991). TBT at a concentration as low as 20 ng/L can harm various marine and freshwater organisms ranging from microscopic phytoplankton to crabs, fish, shrimp, and oysters (Lau 1991). All female whelks collected within 1 km of harbors and marinas (where there is high boat traffic), sampled from 38 sites throughout the Puget Sound, Straits of Juan de Fuca, Straits of Georgia, and the outer west coast of Washington, where found to have imposex (male genitalia imposed on the female) from contamination by TBT (Alvarez 1990). Whelk imposex is a biological indicator of TBT contamination and its environmental negative impacts. If whelks exhibit imposex, than the bivalve mollusc fisheries and farms in the vicinity are also contaminated. In addition, decision-makers should avoid conflicting water-dependent uses of the nearshore when determining the location for the marina: for instance, locating a marina near a popular swimming and SCUBA diving area could create a safety problem. Decision-makers should also consider the environmental and social impacts that will result from induced secondary development such as fuel docks, sewage treatment plants, hull and engine repair shops, upland boat storage areas, boat haul-out facilities (crane, travel lift, railroad), restrooms, bulk ice, picnic areas, parking lots, restaurants, stores, and hotels (Clark 1977, Chmura 1978).

(2) **Water Quality for Existing Marinas.** The EPA guidelines only discuss this management practice for new or expanding marinas. However, monitoring the water quality of existing marinas will let managers know when water quality is diminishing so that the cause can be identified and halted. Besides testing water samples for dissolved oxygen and pathogen indicators, it is also valuable to test for hazardous substances used in anti-fouling paints such as tributyltin (Evans 1995), wood preservatives such as creosite (used to preserve pilings), cleaning compounds, and petroleum products.

2. NOAA agrees that water quality monitoring can be an important tool for management of existing facilities to protect coastal water quality and resources, and that such monitoring should include substances which are present in the area and can potentially impact coastal resources. We also agree that construction of piers and docks as suggested would benefit water quality and bottom-dwelling organisms. However, while we support employment of these practices in areas where they are appropriate in order to protect and restore coastal waters, we believe that requiring such actions as management measures is more prescriptive that warranted.

(3) **Pier/dock.** Construct piers and docks with materials that maximize light penetration and block a minimum of water flow (Chmura 1978). Construct these structures high enough to allow light to reach the submerged land, or use a transparent material. Extend these structures to water that is deep enough so that dredging will not be required. Floating docks and pier on piles have a smaller effect on water circulation than do solid structures. Avoid the use of anti fouling wood preservatives such as creosite, copper napthenate, or copper and zinc salts. These compounds are water soluble and toxic to non-target species (Chmura 1978).

(4) **Sediment Sampling.** Analyze sediment samples at least once every two years. Characterize the marina's sediment according to an EPA-approved sampling and analysis plan, and comply with Clean Water Act Section 401 and 404 requirements. This plan will specify where samples will be taken, how they will be composited, where control and reference sediment will be derived, how quality assurance and quality control will be documented, and other specifications. Analyze sediment samples for the physical parameters, metals, and organics recommended in the EPA document, "EPA Region 9 General Recommendations for Sediment Testing of Dredged Material Proposed for Ocean Dumping," 1991, and in the document, "PSDDA Management Plan Report Unconfined Open-Water Disposal of Dredged Material, Phase II," 1989, a publication

used by a Washington program that sets biological and chemical standards for the disposal of dredged material at unconfined open water sites. Ensure that substances associated with marinas, such as tributyltin and creosite are included in the analysis, as well as other substances suspected to be released to marina waters. The PSDDA document provides guidelines on how to develop a sampling plan and evaluate the results of the analysis (Exhibit A: PSDDA Dredged Material Evaluation Procedures). If an analysis of the data indicates that a marina's sediment does surpass EPA thresholds for one or more parameter, the next step would be to determine the extent of the contamination, and to determine cleanup alternatives. Also, if a compound such as TBT were found to exist in high concentrations in the marina sediment, regulations prohibiting or limiting the use of the biocide have been shown to be effective means of reducing the problem (Evans 1995).

(5) **Fauna Sampling.** Regularly monitor benthic invertebrates for changes in diversity or abundance. A depression in diversity indicates that there are toxic pollutants present, while an increase in abundance of select taxa indicates that organic pollution is present. (McMahon 1989). Observed changes in the invertebrate community do not allow for an identification of cause. Therefore, if changes are observed, conduct experiments to determine a cause.

Thank you for considering my suggestion.

Yours Truly,

Eric Gilman

Eric Gilman
Natural Resources Planner
CNMI Division of Fish and Wildlife
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Saipan, MP 96950 USA
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Coalition to Restore Coastal Louisiana

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August 28, 1995

Clement Lewsey, Chief
Coastal Programs Division
National Oceanic and Atmospheric Administration
1305 East-West Highway - SSMC/4
Silver Spring, Maryland 20910

Dear Mr. Lewsey:

Thank you for the opportunity to review the Draft Programmatic EIS for the Coastal Nonpoint Pollution Control Program. We certainly agree that it is vital that the states implement Coastal Nonpoint Pollution Control Programs, for the continued health and productivity of our coastal and estuarine ecosystems. To that end, we support the management measures to control the five source categories of pollution, plus wetlands, riparian areas, and vegetated treatment systems, that are described in the EIS.

Our concern is that NOAA and EPA must ensure that the state's plans for their Coastal Nonpoint Pollution Control Program are adequate to achieve the protection warranted by the coastal zone. Specifically, regarding the 6217 Management Area, we support giving flexibility to define the area to the states. However, the state of Louisiana's Draft Plan contained a proposed boundary that we consider inadequate to protect the coastal zone. We believe that the Louisiana Draft Plan did not sufficiently consider the coastal impacts from nonpoint sources higher up in the Louisiana watersheds. 1.

In Louisiana's Draft Plan the major Louisiana water bodies such as the Sabine, Calcasieu, Vermilion, Atchafalaya, Bayou Lafourche, Mississippi, Tangipahoa and Pearl Rivers were treated as though they had little impact on coastal zone water quality. More of the watersheds drained by these water bodies should be included in the Louisiana plan for it to be acceptable. On the other hand, the NOAA proposed 6217 Management Area may be too extensive to be practicable. We want to encourage that the final coastal zone boundary is extensive enough to control the upstream sources of nonpoint pollution that directly impacts our coastal areas, yet is economically and politically doable.

The Mississippi River is the United State's major deltaic system, and as such, it has unique nonpoint pollution problems. The Mississippi River's role in coastal nonpoint pollution is complex. The Mississippi River drains approximately 40 percent of the United States. Some studies show that nitrogen concentration in the Mississippi River has increased by 50 percent since the 1950s. Yearly 'dead-zones' have been observed each summer in the Gulf of Mexico since the early 1980's and are correlated with the highly nutrient rich water discharge in the spring.

Coalition to Restore Coastal Louisiana

1. In the review of state and territory coastal nonpoint programs, NOAA and EPA will generally defer to a state's determination of the geographic scope of the 6217 management area unless NOAA and EPA determine that the boundary excludes: (a) existing land or water uses that reasonably can be expected to have a significant impact on coastal waters, or (b) reasonably foreseeable threats to coastal waters from nearby activities landward of the state's 6217 management area. NOAA and EPA are in the process of reviewing Louisiana's proposed boundary as part of the program approval process. The findings on the program submission will address this issue.

The Mississippi River and its upstream tributaries that drain the agricultural heartland, and the extensive levee system in place along the Mississippi River concentrate the nonpoint pollution problem and deliver it to the Gulf. The Gulf of Mexico and its rich fisheries 'pay the price' of the Nation's inability to control nonpoint pollution in the interior.

The NOAA Draft Programmatic EIS does not address this complex interstate situation. The Mississippi River example highlights how nonpoint pollution from upstream can significantly impact coastal areas. Considering how far upstream a nonpoint pollution control program may have to go to impact the Gulf of Mexico 'dead-zone' is also daunting. We are
2. aware that the NOAA Coastal Nonpoint Pollution Control Program can only address a portion of this issue, but it should be addressed. We hope that an equitable means for controlling this problem can be developed between NOAA, EPA, and other agencies and states. This is imperative for Louisiana because we lose 35 square miles of coastal wetlands per year. The Mississippi River will increasingly be used as a source of freshwater and sediments for coastal restoration in portions of the coastal zone. Mississippi River water quality must be adequate for this task.

We look forward to receiving additional information from you about the Coastal Nonpoint Pollution Control Program. Please telephone me at (504) 344-6555 with any questions you have about these comments.

Sincerely,

Ann Burruss
Science & Technology Director

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2. Section 6217 requires states to address nonpoint sources within their boundaries that impact the state's coastal waters. NOAA recognizes the contribution of nonpoint sources within the huge Mississippi drainage area to problems in the Gulf of Mexico, but the control of nonpoint pollution from states upstream in the Mississippi River system is beyond the scope of the coastal nonpoint program. However, we understand that Louisiana has recently initiated an effort among states in the Mississippi River watershed to address this issue. Currently, nonpoint pollution in these states is managed by existing programs such as section 319 of the Clean Water Act and through the Agricultural Conservation Program and the Natural Resources Conservation Service in the U.S. Department of Agriculture.

Maryland Wetlands Committee

Ms. Marcella Jansen
Coastal Programs Division (NORM/3)
Office of Ocean and Coastal Resource Management
NOS NOAA – 1305 East-West Highway
Silver Spring MD 20910

25 August 1995

Dear Ms. Jansen: Re: Coastal Nonpoint Pollution Control Program Draft PEIS

The following comments are submitted on behalf of the Maryland Wetlands Committee, a statewide network of individuals and groups concerned with protection and restoration of Maryland's wetlands and aquatic ecosystems. As the Committee's representative on the State's Coastal and Watershed Resources Advisory Committee (CWRAC), I have been a strong supporter of pollution prevention. These comments are therefore offered in the spirit of encouragement to the federal agencies to strengthen, rather than weaken, this important program.

We could not agree more with your statement that "the core of the 6217 program is the implementation by states and territories of management measures to protect coastal waters from nonpoint source pollution." But we could not agree less with your argument that the best hope for accomplishing this
1. would be to reduce the national standards to the lowest common denominator by granting approval to all, thus cancelling out the states' motivation to avoid the statutory penalties. We read this as a mental somersault by bureaucrats in response to political assumptions. In the same way that issuing high school diplomas to illiterates serves neither the individuals nor society, this would only mask the very deficiencies the program was meant to correct. Maryland's draft program document, for example, fails to
2. address several significant needs and new measures for the Coastal Bays and essentially proposes no improvements to current programs. We do not favor a rubber stamp approach that would so blatantly ignore your own approval guidance by not requiring these new measures. Although you claim that additional management measures are economically achievable and cite a report that agriculture is responsible for 43 percent of all estuarine water quality impairments, the PEIS implies that you could disregard the national lack of enforceable policies and mechanisms for agriculture.

We acknowledge and appreciate the accomplishments of the Coastal Nonpoint Program thus far. These include the commendable body of technical information, analyses, and guidance provided by the federal agencies, the new (though overdue) coordination among the agencies and levels of government, and the repeated recognition of the program's dependence on public education and participation. Regrettably, the general public has not yet been brought into the process during the program development. We and
3. many other community and environmental groups hope you will urge the states to enlist our assistance more actively in the implementation phase. Thank you for the opportunity to comment.

Sincerely,

Vivian Newman

Vivian Newman, Chair
Maryland Wetlands Committee

Reply to: 11194 Douglas Avenue
Marriottsville MD 21104

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Maryland Wetlands Committee

1. NOAA and EPA will not necessarily grant approval to all state coastal nonpoint programs. As discussed on pages 4 and 5 of the draft PEIS, the two alternatives to approving a state program are to conditionally approve or to deny approval of a program. A conditional approval may be granted to allow states to make necessary changes to their programs in order to meet all the requirements of section 6217, and final approval of the program will not be granted until all the conditions are met. During the period of conditional approval, the statutory penalties will not be applied. NOAA and EPA believe that the option of providing conditional approval will allow more states and territories to ultimately meet the requirements of section 6217, and thus advance the goals of the statute to protect and restore coastal waters.

2. NOAA and EPA are currently reviewing Maryland's submission as part of the program approval process. This review will assess whether Maryland's proposed program meets the requirements of section 6217 for all coastal waters, including the coastal bays. If the program is found not to meet those requirements, NOAA and EPA may either deny approval, or grant approval conditioned upon the state's filling any identified gaps.

3. See response to Maryland Conservation Council comment number 3.

Maryland Conservation Council

September 21,1995

Ms. Marcella Jan-
Coastal Prograi sion (NORM/3)
Office of Ocean . astal Resources Management
NOS NOAA – 1 st-West Highway
Silver Spring, Maryland 20910

FAX 3017134367

Re: Comments Regarding Coastal Nonpoint Pollution Control Program Draft Programmatic Environmental Impact Statement (PEIS) on the Coastal Nonpoint Pollution Program

Dear Ms. Jansen

Maryland Conservation Council has been working for more than twenty-five years to promote sound environmental policies and to conserve Maryland's natural resources. We appreciate the opportunity to comment.

We are supporters of the Coastal Nonpoint Source Program established by Section 6217 of the Coastal Reauthorization Amendments of 1990 and we are hopeful that it can be made fully effective. We are also supporters of the National Environmental Policy Act ((NEPA) process and hope to see that carried out with full implementation and maximum effectiveness.

The Coastal Nonpoint Pollution Program needs to be expanded and tightened. It is important for the National Oceanic and Atmospheric Administration (NOAA) to recognize the need for a strong response to the citizens' call for the protection of clean water and abundant fish and wildlife.

Though difficult, it is important to get states to cooperate on such matters as land use patterns and acting appropriately in response to the cumulative impacts this has on our waters. Education of the public is the most important element in building political support. The public cannot afford to remain uninformed, but must become aware of programs such as this. Political support will increase as the public becomes more aware of these programs. The information is available, but it is not being utilized and distributed to the public as well as it might be.

Budgetary cutbacks are happening at all levels perhaps most of all on the federal level. This will undoubtedly impact the gathering of critical information and application of many programs. A strong, informed public counting on NOAA's leadership would be the program's best ally.

1. We join the Sierra Club in their comments in support of this program. We also request a chapter on Additional Technical Assistance. We believe this is important.

2. Charts showing the overall economic benefits from a healthy environment should be featured, along with charts and other visual displays communicating the costs of degraded environments and the related economic, such as fish consumption advisories & beach closures. A map or chart of these individual areas will be an effective way to convey to the public the sometimes complex information. Maps of the watersheds and their place in the ecosystem would also be helpful. This would be good tool for protecting and restoring not only the watershed but also the ecological system it falls in. This would also aid in the conservation of biodiversity and aquatic habitats and also help get everyone involved in understanding the natural boundaries—not just the political.

3. The importance of our nation's and territories' coastal health is vital to our national well being. Public participation is the single most important and needed ingredient in strengthening this program and insuring its proper funding. We therefore request an effort be made to further involve the public in the next phase.

Sincerely,

Bonnie Bick

Bonnie Bick
President, Maryland Conservation Council

TOTAL P.02

Maryland Conservation Council

1. See response to Sierra Club comment number 3.

2. See response to Sierra Club comment numbers 5 and 6.

3. States must provide opportunities for public participation in all aspects of the states' program, including program development and implementation. NOAA and EPA will review this component of the state's program as part of the program approval process. In addition, a state must demonstrate that its program has undergone public review and comment prior to an approval decision by NOAA and EPA.

CENTER FOR MARINE CONSERVATION
NATURAL RESOURCES DEFENSE COUNCIL

August 28, 1995

VIA FAX

Clement Lewsey, Chief
Coastal Programs Division
1305 East-West Highway-SSMC/4
Silver Spring, MD 20910

Re: Comments of the Center for Marine Conservation and Natural Resources Defense Council Regarding the Draft Programmatic Environmental Impact Statement on the Coastal Nonpoint Pollution Control Program

Dear Mr. Lewsey:

The Center for Marine Conservation (CMC) and the Natural Resources Defense Council (NRDC) appreciate this opportunity to comment on the Draft Programmatic Environmental Impact Statement (draft PEIS) on the Coastal Nonpoint Pollution Control Program, which will form the basis for the analysis of the 29 state coastal nonpoint programs expected to be submitted to NOAA and EPA for approval.

Nonpoint source pollution is a critical threat to aquatic ecosystems, impairing more bodies of water nationwide than any other pollution source. This coastal pollution has significant environmental and economic repercussions: beach closures and advisories, reduced commercial fisheries, closed or harvest-limited shellfish beds, threats to drinking water and reduced property values from pollution. Unfortunately, federal and state governments have thus far seemed unable to implement strong and effective controls for this runoff. The draft PEIS provides NOAA with the opportunity to change that trend.

CMC and NRDC are very supportive of the Coastal Nonpoint Pollution Control Program established by §6217 of the Coastal Zone Reauthorization Amendments of 1990 (16 U.S.C. §1455b). It is one of the most innovative efforts designed to control polluted runoff into coastal waters and the only enforceable nonpoint source pollution program in existence. Accordingly, the procedure by which NOAA and EPA grant approval for states' coastal nonpoint pollution control programs will have a significant impact on the effectiveness of these programs. The draft PEIS should ensure that states follow the technical and procedural aspects of §6217 as well as addressing the broader impacts of the process on biological resources. We request that NOAA consider the following comments on the draft PEIS.

ALTERNATIVES

CMC and NRDC agree that the approval or conditional approval of state coastal nonpoint source pollution programs will not have an adverse effect on the environment; to the contrary, state programs will greatly enhance coastal water quality. As the draft PEIS notes,

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Center for Marine Conservation and Natural Resources Defense Council

1. As stated on page 4 of the PEIS, NOAA will provide states up to five years from the time of conditional approval to complete their nonpoint programs. The length of the conditional approval will depend on which program components are subject to conditions and how long it will take to finalize those components. NOAA and EPA will establish a schedule and milestones for meeting specific conditions. Programs that try to avoid specific requirements or cause excessive delays will not receive final approval when their conditional approval terminates and will be subject to reductions in Federal funds. No alternatives which allow delays longer than five years are being considered.

conditional approval is primarily intended only for limited circumstances; such as to obtain new statutory or regulatory authority. NOAA must adhere to the limited scope and effect of
1. conditional approvals to ensure that they do not become merely an avenue for avoidance of program requirements and a cause of excessive delays. Further, if alternatives are considered which allow delays to occur, NOAA must include consideration in the PEIS of the impacts of excessive delays to inform the public of the environmental damage which will follow.

AFFECTED ENVIRONMENT

CMC and NRDC agree that the description of the affected environment provided in this PEIS must be general in nature because of the diversity of the states expected to submit coastal nonpoint programs. However, we maintain that each specific draft coastal program must thoroughly address all notable characteristics of the affected environments, including
2. their role as habitat for fish and wildlife species.

ENVIRONMENTAL CONSEQUENCES

The draft PEIS provides a good general discussion of the environmental consequences associated with coastal nonpoint programs, including the positive socioeconomic benefits arising from operative programs. Subsequent state environmental impact statements should specifically evaluate the effects of state program approval or conditional approval on the
3. following issues:

- preservation and restoration of coastal water quality,
- protection of related estuaries and watersheds,
- protection of endangered and threatened species
- conservation of biodiversity, and
- conservation of aquatic habitats, such as marine sanctuaries.

By carefully looking at these concerns, the PEIS will secure the implementation of effective state nonpoint programs. In addition, the examination of the individual state
4. programs should take into consideration the environmental consequences associated with other possible alternatives, including the environmental benefits derived from more extensive programs. The PEIS should also recognize and spell out the harmful environmental and economic effects that would occur if state coastal nonpoint source programs are *not*
5. developed.

The draft PEIS states that "coastal nonpoint programs be closely coordinated with state and local water quality plans and programs and with state and territory coastal zone programs." We support this position. Both state and federal agencies must be able to work cooperatively in order to provide greater combined expertise, efficient use of resources and prevent unnecessary duplication of efforts. We also support providing technical and other assistance to local governments and the public for implementation of the guidance measures. This allows states to benefit from NOAA and EPA's invaluable experience and knowledge

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2. The environmental assessment prepared by NOAA on each coastal nonpoint program will include an Affected Environment section with information derived from the state nonpoint program submission and from the EIS prepared during the approval of each state coastal zone management program.

3. Agree.

4. The PEIS considers the alternatives available to the federal agencies in their decision to approve or disapprove a state's program based on statutory requirements. NOAA does not expect any nonpoint program to be more extensive than the requirements of the section 6217 program.

5. Although all coastal states with approved coastal zone management programs are required by section 6217 to develop nonpoint programs, there is a possibility that a state may decide not to develop a program. The environmental and economic effects of this action would be the same as the deny approval alternative discussed on page 5 of the PEIS because it would have the effect of relying on existing nonpoint control efforts.

6. Section 4.B of the PEIS discusses specific components of coastal nonpoint programs that are required by section 6217. The enforceable policies and mechanisms component ensures that a state has legal authority to require implementation of management measures and has sufficient penalties or incentives to ensure compliance. The implementation of management measures in conformity with the 6217(g) guidance component ensures that the state program provides controls over all sources of runoff covered by the 6217 program. The review of state enforceable policies, as well as the administrative coordination and coordination with existing state programs components, will ensure that a state can enforce its program in all geographic areas within the 6217 management area. Before program approval, each state nonpoint program submission will be evaluated to ensure that it addresses each component. Each component will also be discussed in the environmental assessment prepared for each program submitted for approval.

and enables them to adapt this knowledge to local or regional needs. We strongly agree with the draft PEIS that public participation is necessary for the development and implementation of all aspects of the nonpoint source pollution program.

State coastal nonpoint program must contain enforceable policies and mechanisms to implement the applicable requirements of §6217. The PEIS should consider whether the state provides legal authority to require implementation of management measures. To the extent
6. the §6217 submittal is the same as the state's current regulatory program, EPA and NOAA should ask the state to demonstrate that the state has actually used those tools in the past and will use them in the future. State authorities must be able to stop those who are unwilling or unable to stop polluting. Furthermore, the PEIS should review whether the program provides effective controls over *all* sources of runoff. The PEIS must also reveal whether the state is authorized to implement and enforce its program in all geographical locations within the state which significantly impact the coastal zone, and whether the state program contains sufficient penalties or incentives to ensure compliance with state runoff controls.

The PEIS should consider the need to include technology-based standards in the states'
7. programs in order to maximize control of polluted runoff. The PEIS should also consider
8. whether the state is seeking funding for §6217 programs under §306 and §319 of the Clean Water Act (33 U.S.C. §§1316, 1329); funding which can strengthen the states' work. In addition, the PEIS should review whether the proposed program is submitted in a timely
9. manner. Delays in implementation of programs and management measures threaten the health of our coasts and waterways. The PEIS must take into account that not all damage can be recovered.

The PEIS states that the approval of these types of programs "should not produce any unavoidable adverse environmental impacts," but that some socioeconomic impacts are unavoidable. The PEIS also states that denying approval of a nonpoint control program may produce adverse environmental impacts. We urge that, in accordance with NEPA, subsequent
10. impact statements include a "Mitigation Measures" section which would offset all identified adverse environmental impacts. States must be required to consider and implement ways in which damage can be avoided or mitigated.

CMC and NRDC appreciate the consideration of our comments. The draft PEIS and the specific state assessments to follow provide NOAA with a great opportunity to have a positive influence on the health of coastal ecosystems.

Sincerely,

Tim Eichenberg
Program Counsel
Center for Marine Conservation

7. Section 6217 prescribes a technology-based approach to the control of nonpoint sources. The management measures described in the (g) guidance reflect pollution control activities that experts agree will significantly reduce pollution. Where appropriate, considering the diverse physical and social environment where the measures will be applied, and where technically and economically achievable, standards for these activities have been identified in the measure.

8. Section 6217 authorizes NOAA to provide financial assistance to a designated state coastal management agency to develop its coastal nonpoint program. Once a state coastal nonpoint program is approved, implementation will occur through both the state's 319 program under the Clean Water Act, and the state's coastal management program with funding under section 306 of the Coastal Zone Management Act.

9. The environmental assessment prepared on each state program will include the date of submission.

10. The PEIS (pages 5 and 83) states that denying approval of a state program might have an adverse environmental impact. No actual impacts have been identified at this programmatic stage of program development. If NOAA and EPA deny approval of a state program, any adverse impacts identified will be addressed in the environmental assessment prepared on the state program.

Sierra Club Appalachian Regional Office

September 11, 1995

Ms. Marcella Jansen
Coastal Programs Division (NORM/3)
Office of Ocean and Coastal Resources Management
NOS NOAA -- 1305 East-West Highway
Silver Spring, Maryland 20910

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Re: Comments of the Sierra Club regarding Coastal Nonpoint Pollution Control Program Draft Programmatic Environmental Impact Statement (PEIS)

Dear Ms. Jansen,

We appreciate the opportunity to comment on behalf of the Sierra Club.

As supporters of the Coastal Nonpoint Source Pollution Control Program established by Section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990, we are hopeful that it can be made fully effective. We are similarly strong supporters of the National Environmental Policy Act ((NEPA) process, and hope to have it carried out with the greatest attention. We therefore offer our comments as constructive criticism.

In writing this PEIS as a mere description of the status quo, rather than an expansion of the programs, the National Oceanic and Atmospheric Administration (NOAA) fails to take a pro-active leadership role. It also fails to capitalize on the public demand for clean water and abundant fish and wildlife. We hope the comments you receive enable you to do what really needs to be done to protect this nation's coastal resources. It must be recognized that there is a necessary role for the Federal Government and perhaps that is one of the opportunities lost in this draft document.

1. This document should show the national and regional picture for the benefit of the states, territories, and the public as they are developing their programs. For example, it would have been extremely helpful to include detailed maps that would

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example, it would have been extremely helpful to include detailed maps that would make reading easier, and to act as a guideline . To illustrate this point : in NOAA's Estuarine Living Marine Resources (ELMR) report #12 dated March, 1994, page one maps the ELMR study regions and regional research institutions for the coastlines of the lower 48 states. If this ELMR could be coupled with the map on page 35 of NOAA Technical Memorandum NMFS-F/NEC 101, dated October, 1993, showing the 7 large marine ecosystems of the United States, including the insular Pacific Hawaiian Islands, the states and territories could see their place in the system and then hopefully the objective of the 6217 program would be easier to attain. It would also make it easier to reach out to the public and educate them about their watershed's role in the ecosystem they inhabit. This would also help define boundaries, to give a sense of place to those working on this problem, and to enhance regional and national cooperation.

Currently it is difficult to get states to cooperate on such matters as land use patterns and the cumulative impacts this has on our waters. Using fisheries as an illustration, while overharvesting of fish stocks is a major problem, failure to address other cumulative impacts for these fish stocks , such as toxic contamination and destruction of nursery & spawning habitat, is also a problem. NOAA needs to provide the regional and national perspective to assert the larger vision so each state and territory can understand its role.The information is out there but it is not being utilized to the maximum extent possible. We therefore urge NOAA to take a more proactive approach, and add more information to this document. This is important if this PEIS will be held up as the national standard for all subsequent state and territory environmental assessments and environmental impact statements.

We fail to see why a more detailed description (pg. 7) was not incorporated here especially if this document will serve as the basis for each subsequent individual state & territorial document. We want details available from the start. There is a role for NOAA besides just handing out the funds and expecting the States to have more specific information. Budgetary cutbacks are happening at all levels, not just the federal, and this will have an impact on the gathering of critical information and application of many programs.

2. A chapter on "Additional Technical Assistance" would be helpful. We realize all the available information could not be put into this document, so certain key sources should such as NMFS Tech.MOM. & ELMR referred to earlier could be listed here, among other documents.

3. NOAA must demand good science from states and territories seeking to adjust the 6217 boundaries. States and territories must be challenged to provide data that justifies their position that a given watershed does not contribute to coastal pollution.

4. Maps of the watersheds are needed. This would be a good tool for protecting and

Sierra Club

1. Additional information added to Affected Environment section.

2. Additional sources of information added to the Affected Environment are referenced and added to list of References in App. A.

3. NOAA and states and territories have been faced with limited specific information on the location of potential nonpoint sources and the relative contribution of the sources to water quality impairment. Indeed, this inability to link specific sources to nonpoint pollution was one of the reasons that Congress established the section 6217 program as a technology based program. NOAA recommended to the states that they include the coastal watershed in their 6217 management areas. In its boundary recommendation to states, NOAA also looked at indicators of nonpoint pollution potential such as land area, population, sewer systems, cropland, and fertilizer use and suggested that states look beyond coastal watersheds in areas where these indictors showed potentially significant nonpoint sources.

In its boundary recommendation, NOAA recognized that states may have more specific information to better define the 6217 management area. In the March 1995 Flexibility Guidance, NOAA agreed to defer to the states' proposed 6217 management area boundary unless NOAA and EPA determined that the boundary excludes: (a) existing land or water uses that reasonably can be expected to have a significant impact on coastal waters of the state, or (b) reasonably foreseeable threats to coastal waters from nearby activities landward of the state's 6217 management area. Thus the Federal agencies have

restoring not only watersheds but also the ecological systems involved. Maps would also aid in the conservation of biodiversity and aquatic habitats, and also help get all involved to address the natural boundaries and not just the political boundaries.

Charts showing overall economic benefits from a healthy environment should be featured along with maps showing degraded environments and the economic consequences such as fish consumption advisories & beach closures. The public needs to see this picture.. Such maps and charts could be incorporated under the socioeconomic category.

The maps and charts of shellfish closures, beach closings and contaminated fish advisories would allow those concerned and investigating such matters to address possible problems and remedies.

5. Maps of airsheds should also be included. This would be of significant help in many ways. Air quality and its role as a source of nonpoint pollution to the nation's waters needs more attention. We recommend a section to address the atmospheric deposition of pollutants be added , with a focus on airborne toxins and nutrients. This would be another useful tool to help states and territories identify areas of concern such as secondary and cumulative air pollution impacts outside of their political boundaries.

6. State or territory plans that reject enforceable policies should not be approved.

7. Page 15 cites " agricultural land use is modest in this (Mid- Atlantic) region ... it still occupies over 30% of the estuarine drainage areas of Delaware, Chincoteague, and Chesapeake Bays." This need to be more clearly defined. Are we including Delaware Bay, Delaware's Coastal bays of Rehoboth, Indian River and Little Assawoman and then ignoring Maryland's coastal bays of Big Assawoman, Isle of Wight and Sinepuxent?

8. Page 15- It would be helpful to indicate not only the the amount of seafood harvested but also the direct, secondary and cumulative economic impacts associated with the relationship of having a healthy environment and maintaining some degree of sustainability. This report should include the hard data. We offer the following example:

The report, "The State of the Coasts" produced by the Coast Alliance in June, 1995 states, " The U.S. coasts support 34 percent of national employment, providing more than 28 million jobs. These jobs come from serving 180 million Americans who visit ocean and bay beaches each year. They come from the commercial fishing industry that employs hundreds of thousands of people and runs 95,000 vessels. And jobs come from the recreational fishing industry that pumps nearly $15 billion into the economy annually." A few paragraphs later this report states, " Nearly 2,500 beach closures were reported in 1993 from human wastes and other contaminants. One out of three shellfish beds produces crustaceans that will make you sick. Fish landings have not just fallen in some regions, they have plummeted."

accepted the burden of proof in requiring changes to a state's proposed 6217 management area.

4. Disagree. A map of the watersheds in a state will be included in the discussion of the 6217 management area in the environmental assessment prepared on each state coastal nonpoint program submitted for approval. Figure 2 of the PEIS does show the national coastal watershed boundary.

5. Disagree. Congress directed the EPA to develop management measure guidance which concentrates on the large nonpoint sources that are widely recognized as major contributors of water pollution. While atmospheric deposition may be a significant contributor to water pollution in certain areas, air pollution is not widely recognized as a major contributor to coastal water quality.

6. Agree. A coastal nonpoint program must contain enforceable policies and mechanisms to implement the management measures before it is approved by NOAA and EPA.

7. The Delaware Inland Bays have been added to the list of estuarine drainage areas on page 19 of the PEIS. Maryland's coastal bays of Big Assawoman, Isle of Wight, and Sinepuxent are not included because they are not classified as estuaries or sub-estuaries in NOAA's National Estuarine Inventory.

8. Agree. Additional fisheries data added to Social and Economic Activities on pages 23-25 of PEIS.

9. Finally, references to public participation are laced throughout this document, but we are uncertain that this is translating into reality. We hope you will will urge the states and territories to enlist the support of the public, not just the regulated public but the general public, to take a more active role in implementing the next phase.

Thank you for the opportunity to comment on this document. We hope it proves useful.

Sincerely,

Michael J. D'Amico
Sierra Club Mid-Atlantic Water Quality Coordinator

9. See response to Maryland Conservation Council comment number 3.