NORTH CAROLINA
Coastal Nonpoint Source Program

Five-Year Implementation Plan: 2010 through 2014

October 2009

NC DIVISION OF COASTAL MANAGEMENT

Sea Grant North Carolina

DIVISION OF WATER QUALITY DWQ

NOAA NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION U.S. DEPARTMENT OF COMMERCE

Funding for this project was provided by the North Carolina Department of Environment and Natural Resources' Division of Coastal Management to the North Carolina Sea Grant, through the US Department of Commerce, National Oceanic and Atmospheric Administration (NOAA) Office of Ocean and Coastal Resource Management (OCRM), under award NA08NOS4190436. The statements, findings, conclusions, and recommendations are those of the authors and do not necessarily reflect the views of NOAA or any of its sub-agencies.

The Water Quality Planning Specialist at North Carolina Sea Grant staffed this process. The majority of work was conducted between April and October 2009.

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I. Purpose of Document

The purpose of this document is to provide the North Carolina Coastal Nonpoint Source Program's Five-Year Implementation Plan for 2010 through 2014 as a series of recommendations to highlight current and future nonpoint source needs. These recommendations are intended to help focus and prioritize efforts and utilization of grant funds by the North Carolina Department of Environment and Natural Resources' Divisions of Water Quality (DWQ) and Coastal Management (DCM), and other state agencies and programs to improve protection and restoration of coastal waters and resources.

In addition, these recommendations could serve to support and/or inform the first biennial revision to the DWQ's strategic plan and, within the Division, the Planning Section's strategic plan development process, which is currently underway.

II. Background

North Carolina's Coastal Nonpoint Source Program (CNPSP) was fully approved by the National Oceanic and Atmospheric Administration (NOAA) and the US Environmental Protection Agency (EPA) in August 2003. The Program's initial 15-Year Strategy / 5-Year Implementation Plan was submitted to NOAA and EPA in September 2004 (Appendix I).

The strategy consisted of the following:

Phase I: Assessment, Implementation, and Review (2004-2008)
Phase II: Implementation, Program Modification, and Review (2009-2013)
Phase III: Implementation, Program Modification, and Review (2014-2019).

Phase I has been completed. The state's progress in implementing the National Coastal Nonpoint Source Pollution Control Management Measures (see Management Measures in Appendix II) during the period from 2002 to 2006 was presented in the "Progress Report on Implementation of the NC Coastal Nonpoint Source Program: June 2007." The 2007 report is available online at: *http://h2o.enr.state.nc.us/nps/CNPSCP/documents/FinaldraftCNPSPAssessmentJUNE2007.pdf*.

Overall, the state's achievements in recent years to improve management of coastal nonpoint source pollution reflect the level of federal and state funding allocated to or secured by the state during this period; the strength of the North Carolina nonpoint source

programs; and the willingness of the NCDENR and local government staff to be constructively critical of operations and implement improvements to programs and procedures.

III. Accomplishments of the N.C. Coastal Nonpoint Source Program

The CNPSP contributed to improved coastal nonpoint source pollution management in the state by supporting initiatives with full or partial funding, project oversight and coordination, and technical assistance. Many of the projects supported by the CNPSP assisted state and local governments in developing program enhancements and helped to secure additional funding for expansion of staff and/or activities. The areas where the most significant accomplishments occurred are listed below.

Improved Urban Stormwater Runoff Management at the State Level
The CNPSP funded and coordinated three projects for DWQ's coastal stormwater permitting program that contributed to improved management of stormwater generated from new development. The program has more than 8,000 permitted sites in the 20 CAMA counties. Projects focused on assessing and improving permit compliance and led to an improved system for issuing and tracking permits and permit renewals; increased educational efforts and inspections to improve compliance; and provided the justification for two new permanent coastal stormwater compliance officers within DWQ.

Improved Management of Boating Related NPS Impacts
The CNPSP helped establish the North Carolina Clean Marina Program, educate boat owners, and improve management of multi-slip docking facilities. Funding helped create educational documents for marinas and boaters; designed/installed stormwater treatment devices at the state-owned Carolina Beach State Park Marina; and supported a Clean Marina staff position that increased marina certifications, marketed the program to marinas and boaters, and hosted workshops.

The CNPSP also funded and helped coordinate a steering committee composed of state and federal agencies to improve management of boat docks with three to 10 slips (multi-slip docking facilities or MSDF). Committee recommendations contributed to increased consideration of environmental impacts in newly permitted MSDFs.

Improved Management of Shellfishing Waters
Coordination and funding from the CNPSP enabled geo-referencing of the Division of Environmental Health's designated shellfish growing areas and water quality monitoring sites. This multi-agency effort has allowed better assessment, tracking, delineation, and management of water quality and resources. A watershed characterization study was also completed with CNPSP funds to support development of the Total Maximum Daily Load for fecal coliform for shellfishing waters in Jarrett Bay and Nelson's Bay in the White Oak River Basin.

Improved NPS Planning and Management by Local Governments
Funding from the CNPSP helped create a position at NC Sea Grant that provides nonpoint source management technical and planning assistance to local governments.

Assistance and information has been provided to more than 15 counties/municipalities as they completed their CAMA land-use plans. Through a collaborative effort, an environmental leadership program was also developed for elected/appointed officials. Representatives from more than 25 communities attended the one-day training focused on water quality protection and restoration.

Funding and coordination has also helped advance the use of Low Impact Development (LID) concepts and strategies. Technical advisory committees were supported in Brunswick and New Hanover Counties that developed manuals and draft resolutions to promote the use of LID in their jurisdictions and the City of Wilmington. The project also led to development of a spreadsheet modeling tool that enables DWQ to permit LID techniques for meeting state stormwater requirements. Funding also supported work in North Carolina's northern Outer Banks to evaluate how to effectively use LID. Current stormwater management strategies were evaluated as well as the potential for LID techniques to be used based on the local hydrology.

Funds from the program also supported Swansboro, Nags Head, Beaufort, and Wrightsville Beach in the voluntary development of stormwater management or water quality restoration plans; and assisted 11 local governments in developing stormwater management programs required as part of the Tar-Pamlico River Basin Nutrient Sensitive Waters Management Strategy. Carteret County was also able to use CNPSP funds to develop and populate an on-site wastewater treatment permitting database that is enabling improved tracking and compliance of these systems.

Increased Education on NPS Regulations

Funding and coordination was provided to develop training for local governments and contractors with the goal of improving compliance with erosion and sedimentation control and buffer regulations. Workshops were developed and held in cooperation with the Division of Land Resources and the U.S. Army Corps of Engineers for locally designated Erosion and Sediment Control Programs. More than 25 local governments attended. In addition, "Clear Water Contractor" workshops were held along the coast for heavy equipment operators and contractors on the proper installation of erosion and sedimentation control devices. More than 50 participants attended these workshops. Funds and assistance also helped DWQ develop educational materials and regional workshops to improve compliance with state riparian buffer rules in the Neuse and Tar-Pamlico River Basins. Eighty-three people attended these events. Funds were also provided to local governments to implement buffer education initiatives for their citizens and the real estate community within the City of Greenville, Pitt County, Craven County, and Hyde County.

Increased Aquatic Habitat Protection

The CNPSP supported development and implementation of the Coastal Habitat Protection Plan (CHPP) and subsequent action plans, with many items focused on nonpoint source pollution issues. The CNPSP provided representation on the CHPP Development Team for over six years, and supported an extensive public and legislative outreach campaign for the plan. The outreach increased awareness of the CHPP;

provided opportunity for public involvement; and increased support for the CHPP recommendations and continued coordination among agencies and commissions.

For a full list of projects funded by the CNPSP please see http://h2o.enr.state.nc.us/nps/CNPSCP/CNPSProjectsbyGrantYearDescriptions.htm.

IV. Five-Year Implementation Plan: 2010 through 2014

This document is intended to provide priority project guidance for DWQ, DCM and other agencies and parties for the next five years. As detailed in the following pages, North Carolina should continue to prioritize these key areas:

1) reducing stormwater impacts from new and existing development;
2) improving performance of existing regulatory programs by refining program delivery and monitoring compliance; and
3) improving local capacity to implement management measures, in particular those in the urban category.

The following recommendations (pages 6-19) generally represent actions that address: emerging coastal nonpoint source pollution issues or new regulations and data (new contaminants, data from assessing effectiveness of existing rules); pollution categories that received less attention or action in previous years of the program (e.g., existing development, hydromodification, marinas and boating; forestry); and educating and empowering local communities to manage coastal nonpoint source pollution.

Development and Organization of Recommendations

The recommendations contained in this document were generated from interviews with NCDENR staff and the previous CNPSP Coordinator, and by reviewing the following documents: the 2007 *Progress Report on Implementation of the North Carolina Coastal Nonpoint Source Program,* the 2006 CNPSP project report entitled *Multi-Slip Docking Facilities in NC's Coastal Waters – Are They Sufficiently Managed*; and the 2009 *Neuse River Basinwide Water Quality Plan.*

A table of recommendations is provided for each of the eight program areas listed below. Within each table, high priority recommendations are listed first.

Within the table, agencies identified as **lead agencies** are those viewed most logical to coordinate or initiate the recommendation. The **cooperating agencies** are those that may have some regulatory authority or program related to the subject matter, or could contribute technical or financial assistance for implementing the recommendation.

A list of agency/program acronyms is provided in Appendix III. The NCDENR agency staff that provided input are identified in Appendix IV.

Recommendations are categorized in tables according to the following program areas:

1) **Management Research –** gathering new information to help improve coastal management of nonpoint source pollution;

2) **Program Assessment –** evaluating existing program(s) by gathering and/or analyzing data for the purpose of providing new information that could improve effectiveness or participation;

3) **Regulatory –** involving change in an existing or creation of a new regulation or guideline;

4) **Internal Coordination/Addressing Gaps -** improving coordination among the N.C. Department of Environment and Natural Resources' agencies / programs to more efficiently manage coastal nonpoint source pollution;

5) **Education and Outreach –** providing stakeholders with information or training to improve the management of nonpoint source pollution;

6) **Compliance/ Enforcement/ Voluntary Participation –** improving compliance with regulatory programs or participation in voluntary programs;

7) **Information Management** – improving the sharing or dissemination of information and data;

8) **Capacity Building –** improving the ability of a state or local program to perform existing or new duties by increasing knowledge, skills, technical assistance or funding.

1) MANAGEMENT RESEARCH			
HIGHEST PRIORITY RECOMMENDATIONS		**LEAD/ COOPERATING AGENCY**	**NONPOINT SOURCE CATEGORY**
1	Research pollutant removal and hydrologic improvements provided by grassy swales installed under DWQ permitted low density coastal development. Investigate potential for improving treatment effectiveness with design modifications of existing swales, including designs used in other states. Source: Interview	Lead: DWQ	URBAN: Existing Development
2	Identify successful policies, procedures and other methods used by local governments to improve development by incorporating water quality protection features, and promote adoption of these methods in other communities. Source: Interview	Leads: DCM and DWQ	URBAN: Site Development
3	Examine how other states are addressing stormwater management to control sediment, nutrients, and fecal coliform and determine how N.C. might incorporate successful strategies. Source: Interview	Lead: DWQ	URBAN: New Development, Construction, Existing Development
4	Track locations of wastewater application sprayfields and innovative infiltration basins and coordinate instream monitoring to assess loading to adjacent surface waters and downstream assimilative capacity; and impacts of adjacent surface waters and wetlands where systems utilize dewatering. Source: Neuse Basinwide Plan	Lead: DWQ	URBAN: On-Site Disposal
5	Assess the localized cumulative impacts of marinas and boats on water quality, including nutrient and bacterial loading, and ecosystem integrity. Source: Neuse Basinwide Plan	Lead: DWQ /DCM	MARINAS AND RECREATIONAL BOATING: All
6	Conduct a review of marina siting and management by assessing state regulatory	Leads: DWQ,	MARINAS AND

	authorities, including agency roles and responsibilities, and enforcement authorities for potential environmental impacts to determine if additional authorities or resources are needed to adequately address water quality concerns. Also, determine adequacy of the current environmental impact review process for marinas, including consideration of cumulative water quality impacts. Source: Interview	DCM Cooperators: Albemarle Pamlico National Estuary Program (APNEP), NC Sea Grant	RECREATIONAL BOATING: All
7	Examine currently permitted use of existing wetlands for treating stormwater runoff and assess, as possible, long term potential impacts to this resource from this practice. Source: Interview	Lead: DWQ	WETLANDS, RIPARIAN AREAS AND VEGETATED TREATMENT SYSTEMS: Wetlands Protection
8	Quantify nutrient contributions of existing development to coastal waters and devise strategies to address these sources. Source: Interview	Lead: DWQ Cooperator: NC National Estuarine Research Reserve (NCNERR)	URBAN: Existing Development
9	Conduct research to quantify the nutrient contributions of functioning conventional single-family onsite wastewater systems to surface waters in the coastal plain, in particular within the Neuse River Basin. Source: Agency Review	Lead: DWQ	URBAN:Onsite Disposal Systems
10	Evaluate opportunities to permanently protect suitable tract(s) of forestland and establish a new Educational State Forest that conserves and demonstrates a coastal-influenced forest ecosystem. Source: Agency Review	Lead: Division of Forest Resources (DFR)	FORESTRY: All
11	Explore means to institutionalize tracking the conversion of agricultural lands to other land uses to better characterize the pace, nature and impacts of growth. Source: CNPSP Progress Report on Implementation	Lead: DWQ Cooperators: Division of Soil & Water Conservation	AGRICULTURE: All

		(DSWC), DCM	
12	Identify regulatory and economic obstacles to implementing environmentally superior alternatives for waste lagoon and spray field systems for managing swine waste and develop solutions to address them. Source: Agency Review	Lead: DSWC	AGRICULTURE: Confined Animal Facility Management
13	Evaluate the effectiveness of the Coastal Resources Commission's (CRC) 30-foot buffer rule (15 A NCAC 07H .0209) in contributing to stormwater treatment and habitat protection. Source: Agency Review	Leads: DCM and DWQ Cooperator: NCNERR	URBAN: Existing and New Development
ADDITIONAL RECOMMENDATIONS			
14	Assess whether and how coastal counties and local governments limit development in areas identified in their Coastal Area Management Act (CAMA) land-use plans as least suitable for development. Source: CNPSP Progress Report on Implementation	Lead: DCM	URBAN: Watershed Protection
15	Evaluate the extent to which agricultural lands remain under cost-share practices after an Agricultural Cost-Share Program contract ends. Also identify the reasons for discontinuing these practices. Source: CNPSP Progress Report on Implementation	Lead: DSWC Cooperator: DWQ	AGRICULTURE: All
16	Assess the nonpoint source benefits that could be derived from requiring riparian buffers on agricultural lands without causing undue adverse economic impacts. Source: Interview	Lead: DWQ Cooperator: DSWC	AGRICULTURE: All
17	Survey Wildlife Resources Commission (WRC) staff to determine if there is a need, because of water quality impacts, to install education signage on proper disposal of fish wastes. Source: CNPSP Progress Report on Implementation	Lead: DWQ	MARINAS AND RECREATIONAL BOATING: Fish Waste Management
18	Research local government actions to develop drainage management plans for agricultural ditches and see if an exemption under agricultural rules is still warranted in the case where a watershed becomes primarily non-agricultural. Source: CNPSP Progress Report on Implementation	Lead: DWQ Cooperator: DSWC	HYDROMODIFICATION: Channelization and channel modification

20	Research and provide guidance on cost effectiveness stormwater retrofit practices and strategies for different water quality improvement goals in various coastal developments. Source: Interview	Lead: DWQ	URBAN: Existing Development
21	Survey and prioritize for modification, N.C. Department of Transportation (NCDOT) and local roads that impact tidal exchange or have other significant hydromodification impacts. Source: Agency Review	Lead: DWQ Cooperator: N.C. Department of Transportation (NCDOT)	URBAN: Roads, Highways, and Bridges
22	Research effectiveness of current compensatory mitigation strategies to restore the lost ecological functions in the impacted watershed for which mitigation is being required. Source: Agency Review	Lead: DWQ	URBAN: Watershed Protection
23	Identify priority shellfish areas for targeting of nonpoint source restoration and protection efforts. Source: Interview	Leads: DWQ, Division of Marine Fisheries (DMF), Division of Environmental Health (DEH)	URBAN: All

2) PROGRAM ASSESSMENT

	HIGHEST PRIORITY RECOMMENDATIONS	LEAD / COOPERATING AGENCY	NONPOINT SOURCE CATEGORY
1	Assess potential pollutant loading from and need to retrofit existing stormwater treatment devices installed under the coastal stormwater regulations (15A NCAC .02H .1005) existing prior to October 1, 2008. Source: Interview	Lead: DWQ	URBAN: Existing Development
2	Examine the need to include additional communities under the stormwater requirements of the Neuse and Tar-Pamlico Nutrient Sensitive Waters Management Strategies.	Lead: DWQ	URBAN: New Development

	Source: Interview		
3	Develop an interagency work group to discuss the Clean Marina Program and outline a strategy to make the program sustainable, focusing on long term funding needs. Include an investigation of the feasibility to emulate Florida's Clean Marina Program; increase awareness of the program to boaters; assure long-term compliance of certified marinas; and establish mechanisms to recertify marinas. Source: Interview	Lead: DCM Cooperators: NC NERR, APNEP, DWQ, DEH, North Carolina Sea Grant	MARINAS AND RECREATIONAL BOATING: All
4	Evaluate Tar-Pamlico River Basin and Neuse River Basin riparian buffer rules compliance tracking and assessment needs. Source: Interview	Lead: DWQ	WETLANDS, RIPARIAN AREAS AND VEGETATED TREATMENT SYSTEMS: Riparian Area Protection
5	Establish audit criteria for local stormwater programs under the Neuse and Tar-Pamlico Nutrient Sensitive Waters Management Strategies. Assess/audit all programs. Source: Interview	Lead: DWQ	URBAN: New Development
6	Develop a fate and transport model for the Tar-Pamlico Nutrient Sensitive Waters Management Strategy and use it to improve implementation of point source and trading elements. Model would at a minimum need to address delivery from a 14-digit hydrologic unit. Source: Interview	Lead: DWQ	URBAN: Existing Development
7	Assess North Carolina's revised coastal stormwater rules (15A NCAC .02H .1005) that became effective October 1, 2008 for effectiveness at removing pollutants and reducing hydrological changes by examining runoff quality and quantity, infiltration, and instream water quality and use support. Source: Interview	Lead: DWQ	URBAN: New Development, Site Development
ADDITIONAL RECOMMENDATION			
8	Fund a study to be conducted by a third party to assess the impacts of inadequate staffing	Lead: Division of	URBAN:

	for sediment and erosion control compliance and enforcement, and present results to legislature and media. Source: Agency Review	Land Resources (DLR) Cooperator: DWQ	Construction

3) REGULATORY

HIGHEST PRIORITY RECOMMENDATIONS		LEAD/ COOPERATING AGENCY	NONPOINT SOURCE CATEGORY
1	Integrate on-going research results from fate and transport of emerging contaminants (e.g., endocrine disruptors) and microbes into regulatory and management programs for on-site disposal systems and land development. Source: CNPSP Progress Report on Implementation	Lead: DEH Cooperator: DWQ	URBAN: All
2	Consider expanding DWQ's riparian buffer requirements to basins beyond the Neuse and Tar-Pamlico Rivers. Source: Interview	Lead: DWQ	WETLANDS AND RIPARIAN AREAS AND VEGETATED TREATMENT SYSTEMS: Riparian Area Protection
3	DWQ consider initiating regulatory requirement for local governments to treat post-construction runoff from new and widening local government road projects. Source: Agency Review	Lead: DWQ	URBAN: Roads, Highways, and Bridges
4	Incorporate findings from DWQ's boat washwater study into appropriate aquifer protection permit guidelines and follow-up on non-regulatory recommendations. Source: CNPSP Progress Report on Implementation	Lead: DWQ	MARINAS AND RECREATIONAL BOATING: Boat Cleaning
ADDITIONAL RECOMMENDATIONS			

5	Examine possibility and benefits of expanding the state's Forest Development Act to include incentives for management of forestlands for water quality improvements/watershed protection and other conservation benefits. Source: CNPSP Progress Report on Implementation	Lead: DFR	FORESTRY: All
6	Establish an interagency working group to develop guidance on best management practices for routine and emergency maintenance activities for drainage ditches (especially if funded by the Clean Water Management Trust Fund or Division of Water Resources' grants). As needed develop "hands on" training on the guidance to ensure minimal impact. Source: CNPSP Progress Report on Implementation	Lead: DWQ Cooperators: DSWC, DMF, Wildlife Resources Commission (WRC)	HYDROMODIFICATION: Channelization and channel modification

4) INTERNAL COORDINATION / ADDRESSING GAPS

HIGHEST PRIORITY RECOMMENDATIONS		**LEAD/ COOPERATING AGENCY**	**NONPOINT SOURCE CATEGORY**
1	Improve coordination and cooperation between DFR, Cooperative Extension, and Soil and Water Conservation Districts on outreach, education and technical assistance for forest landowners in emphasizing the benefits of working with a Registered Forester and/or natural resources technical specialist when managing forestlands. Source: CNPSP Progress Report on Implementation	Lead: DFR Cooperators: N.C. Cooperative Extension (NCCE), DSWC	FORESTRY: All
2	Improve coordination between DCM and DWQ for review of Coastal Area Management Act (CAMA) land use plans and consider how to best utilize DWQ comments to improve plans and share with local government staff and officials. Source: Interview	Lead: DCM Cooperator: DWQ	URBAN: All
ADDITIONAL RECOMMENDATIONS			
3	Establish DENR interagency protocol and methods for DWQ, DEH, DCM and other	Lead: DWQ	URBAN: All

	NPS agencies (beyond the Coastal Habitat Protection Plan Interagency Task Force's mission) to share information on current nonpoint source projects and needs for the purpose of improving the management value and quality of DENR supported projects. Source: Interview	Cooperator: DCM, DEH	

5) EDUCATION AND OUTREACH

	HIGHEST PRIORITY RECOMMENDATIONS	LEAD/ COOPERATING AGENCY	NONPOINT SOURCE CATEGORY
1	Develop an integrated adult education approach within DENR for coastal audiences that is science based, explains regulations, and shows how to go beyond current regulations to mitigate impacts. Provide educators to help agencies develop outreach/education plans. Source: Interview	Leads: DENR, DWQ, DCM Cooperator: NCNERR	URBAN: All; and MARINAS AND RECREATIONAL AND BOATING; HYDROMODIFICA-TION; WETLANDS AND RIPARIAN AREAS
2	Work collaboratively with other agencies to develop education materials and programs to educate home owners, developers and realtors about the special nonpoint source pollution management concerns of developing and owning property along North Carolina's estuarine shoreline. Source: 2006 Multi-Slip Docking Facilities	Leads: DCM and N.C. NERR Cooperators: North Carolina Sea Grant, N.C. Real Estate Commission, UNC Coastal Studies Institute, APNEP	URBAN: All
3	Provide outreach to local government staff and elected officials to increase adoption and implementation of watershed and site development protection strategies.	Leads: DCM and DWQ	URBAN: All

	Source: CNPSP Progress Report on Implementation	Cooperators: North Carolina Sea Grant and N.C. Cooperative Extension	
4	Develop a "green" certification program for landscapers. Source: Interview	Lead: DENR Cooperators: DWQ, WRC, N.C. Cooperative Extension, APNEP,	URBAN: Pollution Prevention
5	Educate landowners and developers about the DWQ Neuse and Tar-Pamlico Riparian Buffer Rules. Consult regional offices to identify items of specific concern. Source: Interview	Lead: DWQ	WETLANDS, RIPARIAN AREAS AND VEGETATED TREATMENT SYSTEMS: Riparian Area Protection
6	Facilitate information and technology transfer from the federal Environmental Protection Agency Stormwater Phase I and Phase II communities to other coastal communities in the areas of public participation, outreach and education, post-construction stormwater management and pollution prevention best practices for municipal or county government operations. Source: CNPSP Progress Report on Implementation	Lead: DWQ	URBAN: New Development, Site Development, Pollution Prevention
7	Explore development of an integrated local government assistance program, similar to existing agricultural technical assistance programs, for implementing Coastal Area Management Act (CAMA) land use plans (e.g., developing ordinances). Source: CNPSP Progress Report on Implementation	Lead: DWQ and DCM Cooperators: N.C. Department of Commerce, N.C. Cooperative Extension	URBAN: New Development, Watershed Protection, and Site Development
8	Promote and support adoption of Low Impact Development at the local government level. Source: Interview	Leads: DWQ and DCM Cooperators:	URBAN: Site Development

		NCNERR, APNEP, N.C. Cooperative Extension, NC Sea Grant	
ADDITIONAL RECOMMENDATIONS			
9	Examine usefulness and possibility of expanding the N.C. State University Cooperative Extension's Growth Readiness Program (currently in western N.C.) to coastal communities. Source: CNPSP Progress Report on Implementation	Leads: DWQ and DCM	URBAN: All
10	Strengthen education efforts for citizens on the relationship between proper disposal of pet waste and stormwater quality, especially bacteria levels. Source: CNPSP Progress Report on Implementation	Lead: DWQ	URBAN: Pollution Prevention
11	Facilitate the transfer of N.C. Department of Transportation's (NCDOT's) best management practices that reduce storm flow to regional and local governments. Specifically concentrate those practices used under their National Pollutant Discharge Elimination System permit, Operations and Maintenance Manual, and Design Techniques. Source: CNPSP Progress Report on Implementation	Lead: DWQ Cooperators: NCDOT and DCM	URBAN: Roads, Highways, and Bridges
12	Provide information to new marinas on boat washwater management and encourage control and treatment in development plans. Consider providing this information in the permitting and SEPA (State Environmental Policy Act) review process. Source: Interview	Lead: DWQ Cooperator: DCM	MARINAS AND RECREATIONAL BOATING: Boat Cleaning
13	Support the NCNERR wetlands training for staff and interested parties. Source: Interview	Lead: NCNERR and DCM	WETLANDS, RIPARIAN AREAS AND VEGETATED TREATMENT SYSTEMS: Wetlands Protection

6) COMPLIANCE / ENFORCEMENT / VOLUNTARY PARTICIPATION

HIGHEST PRIORITY RECOMMENDATIONS		LEAD/ COOPERATING AGENCY	NONPOINT SOURCE CATEGORY
1	Support results from the DEH, DCM, DWQ Coastal Habitat Protection Plan Interagency Taskforce's work examining data sharing and coordination of permit inspections and enforcement in shellfish growing areas. Source: Interview	Leads: DWQ,DCM, DEH	URBAN: Existing Development, Onsite Waste Disposal; MARINAS AND RECREATIONAL BOATING; and WETLANDS, RIPARIAN AREAS AND VEGETATED TREATMENT SYSTEMS
2	Educate landowners on the new requirement for a DWQ coastal stormwater permit (15A NCAC .02H .1005) for development with less than 10,000 square feet of disturbance. Source: Interview	Lead: DWQ Cooperator: DCM, NCNERR	URBAN: Site Development
3	Improve enforcement of and compliance with litter laws. Source: CNPSP Progress Report on Implementation	Lead: Division of Waste Management	URBAN: Pollution Prevention
4	Consider standardizing forest harvesting provisions across DWQ buffer rules to improve compliance rates and effectiveness. Source: Agency Review	Lead: DFR Cooperator: DWQ	Forestry: Streamside Management
ADDITIONAL RECOMMENDATIONS			

6	Work with the State Property Office to devise a method for tracking permitted uses for multi-slip docking facilities as per agreement in original development permit, in order to decrease potential for environmental damage resulting from more intense use than originally allowed in the permit. Source: 2006 Multi-Slip Docking Facilities	Lead: DCM Cooperator: DMF	MARINA AND RECREATIONAL BOATING: Siting and Design
7	Provide education to coastal landowners on DCM buffer regulations (15 A NCAC 07H .0209). Source: Interview	Lead: DCM and NCNERR	WETLANDS, RIPARIAN AREAS AND VEGETATED TREATMENT SYSTEMS: Riparian Area Protection
8	Encourage participation in the Conservation Reserve Enhancement Program (CREP) to restore riparian buffers and wetlands on eligible agricultural lands. Source: Agency Review	Lead: DSWC	WETLANDS, RIPARIAN AREAS AND VEGETATED TREATMENT SYSTEMS : Riparian Area Protection
9	Increase the number of CAMA counties participating in the Community Conservation Assistance Program. Source: Agency Review	Lead: DSWC	URBAN: Existing Development
10	Update agency procedures and inter-agency MOUs related to inspection of forestry sites for compliance with the Forest Practice Guidelines (FPGs) to increase the number of inspections, provide clearer guidance to agency staff, establish protocols to clarify questionable sites, and renew an emphasis on outreach to forest industry operators, forest landowners and local/state government agency staff. Source: Agency Review	Lead: DFR Cooperators: DWQ, DLR	FORESTRY: All
11	Participate in the expansion of the forestry practices offered under the Environmental Quality Incentives Program (EQIP) administered by the Natural Resources Conservation Service (NRCS). Expanded practices may be aimed at providing incentives for management of forestlands for water quality improvements, watershed protection,	Lead: DFR	FORESTRY: All

	conservation benefits, and/or ecosystem services. Source: Agency Review		
12	Support ongoing monitoring surveys of forestry BMP implementation to evaluate the degree of BMP use during forestry activities, and the use of portable bridgemats as a BMP for protecting stream crossings. Source: Agency Review	Lead: DFR Cooperator: DWQ	FORESTRY: All

7) INFORMATION MANAGEMENT

HIGHEST PRIORITY RECOMMENDATIONS		**LEAD/ COOPERATING AGENCY**	**NONPOINT SOURCE CATEGORY**
1	Advertise the availability of the DEH GIS Based Shoreline Sanitation Survey to increase it's use in planning and watershed protection/restoration efforts. Source: Interview	Leads: DWQ , DCM , DMF , DEH	URBAN: All
2	Devise methods to collect, sort and analyze violations of DWQ's nonpoint source permits to target compliance improvement efforts. Source: Interview	Lead: DWQ	URBAN: New Development, Watershed Protection, Site Development; WETLANDS, RIPARIAN AREAS AND VEGETATED TREATMENT SYSTEMS
ADDITIONAL RECOMMENDATION			
3	Examine developing a self-reporting website, in partnership with others, for sharing coastal data and restoration activities on a watershed scale. Source: Interview	Lead: DWQ Cooperators: DCM, APNEP,	URBAN: All

		University-based programs	

8) CAPACTIY BUILDING

HIGHEST PRIORITY RECOMMENDATIONS		LEAD/ COOPERATING AGENCY	NONPOINT SOURCE CATEGORY
1	Expand household hazardous waste recycling events and opportunities to all coastal counties. Source: CNPSP Progress Report on Implementation	Lead: Division of Waste Management	URBAN: Pollution Prevention
2	Coordinate an educational and working meeting for DENR agencies and other Clean Marina Program partners to discuss status of DWQ's investigation of washwater management. Determine potential areas of coordination to decrease impacts from this activity, for both existing and new facilities. Source: Interview	Leads: DWQ Cooperators: DCM, APNEP, North Carolina Sea Grant, DEH	MARINAS AND RECREATIONAL BOATING: Boat Cleaning
ADDITIONAL RECOMMENDATIONS			
3	Coordinate with the Division of Pollution Prevention and Environmental Assistance to provide community assistance for "N.C. Project Green" and local sustainability initiatives related to the pollution prevention management measures. Source: Interview	Lead: DWQ	URBAN: Pollution Prevention
4	Provide support to meet DCM field permitting staff training needs identified in the NCNERR 2009 training needs assessment. Training of interest includes that leading to improved decision-making for activities related to the siting and design of marinas, channelization and channel modification, streambank and shoreline erosion, and protection or restoration of wetlands and riparian areas. Source: Interview	Lead: DCM, NCNERR	W ETLANDS, RIPARIAN AREAS AND VEGETATED TREATMENT SYSTEMS: Wetlands Protection

Appendix I

North Carolina Coastal Nonpoint Source Program 15 Year Strategy and 5 Year Action Plan

This strategy is included as a component of the draft "North Carolina Nonpoint Source Pollution Management Program – Second Update" submitted to both the National Oceanic and Atmospheric Administration and the Environmental Protection Agency in September 2004. It is presented here as contained in the document identified above.

Coastal areas host over 50% of the total U.S. population within only 17% of the nation's land area. Between 1994 and 2015, coastal population is projected to increase by 28 million people. http://www.noaa.gov, 2002

B. North Carolina Coastal NPS Program

1. NC Coastal NPS Pollution Programs and Initiatives

This section contains background information and planning strategies for implementing the NC Coastal Nonpoint Source Program (CNPSP) including a 15-Year Program Strategy and a 5-Year Implementation/Action Plan. Note that North Carolina's CNPSP 5-Year Implementation Plan is integrated throughout each nonpoint source category and the Management Measures addressed are identified in each action plan. However, there are specific actions that will be undertaken by the CNPSP that are not included in the individual source categories and therefore are identified in an action plan in this section.

a. Background

Section 6217 of the 1990 Federal Coastal Zone Act Reauthorization Amendments (CZARA) requires every state participating in the Coastal Zone Management Act program to develop a Coastal Nonpoint Source Control Program. The purpose of this requirement, as stated in the Act, is to "strengthen the links between Federal and State coastal zone management and water quality management programs and to enhance State and local efforts to manage land use activities that degrade coastal waters and coastal habitats." To accomplish these goals, the federal agencies established 50 Management Measures[1] that are to be used by each state to address the following nonpoint source pollution categories:

- *Agriculture*
- *Forestry*
- *Urban Areas* (urban runoff; construction activities; existing development; onsite disposal systems; pollution prevention; and roads, highways, and bridges)
- *Marinas and Recreational Boating* (siting and design; and marina and boat operation/maintenance)
- *Hydrologic Modification* (channelization and channel modification; dams; and streambank and shoreline erosion)
- *Wetlands, Riparian Areas, and Vegetated Treatment Systems*

At the Federal level, the program is called the Coastal Nonpoint Pollution Control Program and is administered jointly by the National Oceanic and Atmospheric Administration (NOAA) and the Environmental Protection Agency (EPA). Within North Carolina, the state program is jointly administered by the Division of Water Quality (DWQ) and the Division of Coastal Management (DCM) and is referred to as the Coastal Nonpoint Source Program (CNPSP). The state program currently has one

[1] The Management Measures are defined in Section 6217(g)(5) of CZARA as: "economically achievable measures for the control of the addition of pollutants from existing and new categories and classes of nonpoint sources of pollution, which reflect the greatest degree of pollutant reduction achievable through application of the best available nonpoint pollution control practices technologies, processes, siting criteria, operating methods or other alternatives." Detailed descriptions of the management measures, where they are intended to be applied, their effectiveness, and their costs can be found in EPA's "Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters" at the following website: http://www.epa.gov/owow/nps/MMGI/. Originally there were 56 Management Measures, currently there are 50 (Measures for**:** Construction Site Erosion and Sediment Control; Construction Site Chemical Control; Roads, Highways, and Bridges including: Construction Project, Operation and Maintenance, and Runoff Systems have been removed; and Measures for New Development and Existing Development only apply outside EPA Phase II areas**).**

full-time staff and a temporary employee located in the Nonpoint Source Planning Unit of DWQ. The abbreviated list of the Management Measures is located in the Appendix.

b. Program Status

North Carolina's program approval notification was published in the Federal Register in May 2003. To receive this approval, North Carolina had to identify that it has programs and enforceable policies and mechanisms related to the Management Measures, and establish an acceptable program boundary within which to implement the measures. The plans in this section (and document) are to ensure the applicable Management Measures to protect and restore water quality are implemented in the program boundary within 15 years. The program boundary includes the 20 Coastal Area Management Act (CAMA) counties and small portions of Jones, Martin, and Pitt Counties. This management area encompasses the 14-digit hydrologic units that drain directly into coastal waters. The CAMA boundary is not be impacted or altered as a result of the CNPSP boundary.

North Carolina is relying on existing authorities and programs to implement the Management Measure, however it may become apparent in the future that additional Management Measures and new programs or regulations are needed to address significant contributors of nonpoint sources. If a need does arise for new regulations they would be proposed under existing agency frameworks.

The core of the state's CNPSP is increased communication and coordination between DWQ and key state agencies that have regulatory responsibilities for controlling nonpoint sources of pollution. This increased dialogue is facilitated in part by the state's CNPSP Coordinator, and will allow for improved identification of gaps, duplications, inadequacies, and/or inefficiencies of existing programs and policies. Responsibilities of the state program coordinator also include participation in the Nonpoint Source (NPS) 319 Workgroup to represent coastal water quality interests. The coordinator also participates in the development and implementation of the basinwide water quality management plans for the coastal draining rivers; serves as a liaison between DWQ and DCM; Team Member of the Coastal Habitat Protection Plan Program; and participates in the development of nonpoint source educational materials and outreach.

c. 15-Year Implementation Strategy

Pursuant to CZARA Section 6217 guidelines, each coastal state is charged with working to ensure that all applicable Management Measures to protect and restore coastal waters are implemented within 15 years of the date of conditional approval. While the date of conditional approval for North Carolina was February 1998, the 15-year strategy extends to 2019, rather than 2013. This date was selected because of the time required to achieve full program approval (5-years) and to coincide with other NPS planning timelines, namely the NPS Update.

The 15-year strategy, according to NOAA/EPA, must contain the following objectives:

- Implement applicable Management Measures identified in the 1993 (g) Guidance.
- Implement any additional Management Measures necessary to achieve and maintain applicable water quality standards and protect designated uses.
- Maintain a flexible and up-to-date long-term program strategy that reasonably assesses implementation of Management Measures and coastal water quality.

In addition, the plan must take a categorical or geographic approach to implement the Management Measures, identify how it will monitor and track progress, and how it will make any mid-course corrections to ensure full implementation.

<u>North Carolina's 15-Year Program Strategy</u>

Phase I: Assessment, Implementation, and Review (2004 – 2008)
Phase II: Implementation, Program Modification, and Review (2009 – 2013)
Phase III: Implementation, Program Modification, and Review (2014 – 2019)

d. Phase I

North Carolina will take both a geographic and a categorical approach to implementing the Management Measures. During 2004, discussions started in 2003 will continue with other states, EPA, and NOAA to further define federal implementation requirements and identify effective and efficient means of assessing achievements and reporting progress.

In general, our primary focus for Phase I implementation will include the following and will address both existing and emerging nonpoint source related issues:

- impaired waters;
- rapidly developing areas;
- areas with deteriorating water quality caused by nonpoint sources (in particular those identified in basinwide water quality management plans);
- areas where sources of nonpoint source pollution have been clearly identified;
- high resource waters (e.g., Outstanding Resource Waters); and
- programs implementing management measures that have clearly identified needs / inadequacies.

Within the primary watersheds of concern, the water quality impairment and other available information will dictate the category of NPS that will be addressed. All protection and restoration efforts will be closely linked to other programs, in particular the Total Maximum Daily Load (TMDL) Program. The CNPSP also convened an Ad Hoc Advisory Group composed of NC DENR staff and will hold NPS Category meeting with appropriate parties to assist with prioritizing issues and projects for 2004-2008.

The CNPSP will also coordinate with the DWQ Basinwide Planning Program schedule (see General Section of this document) to target implementation efforts and conduct periodic assessments of implementation impacts on water quality. Coordinating implementation efforts on a basinwide schedule will also be a topic of consideration for the CNPSP Ad Hoc Advisory Group mentioned above.

Ultimately, Management Measure implementation and project selection will be influenced by the following:

- available water quality data;
- ability to identify problems in existing programs and effect changes;
- political climates;
- state and federal budgets;
- basinwide water quality management plans;
- need for local capacity building and technical assistance;
- TMDL and implementation plan development;
- CAMA Land Use Plans (developing and approved);
- the 319 Grant Program;
- the Clean Water Management Trust Fund;
- the Albemarle-Pamlico National Estuary Program (APNEP); and
- the Ecosystem Enhancement Program.

Phase I will conclude with a 5-Year Program Evaluation, including assessing implementation philosophy and processes used during this phase. Phase II and III will consist of continued implementation and necessary adjustments in program implementation identified during Program Evaluations.

e. Tracking Progress

Progress tracking will occur on three scales: Program Improvements; Management Measure implementation; and water quality improvement. The primary methods of tracking implementation will be through existing programs and will require that information be readily available and therefore will be reliant on data from other agencies. The methods by which agencies/programs collect and store Management Measure related information and its usefulness in establishing a baseline for implementation will be the first step in tracking progress. The process of identifying existing data collection methods will begin in full in 2004 and a baseline of current implementation activities or results should be completed by 2005. This information will be compared with water quality data and reviewed periodically if it is evident that the data allows for establishment of a reliable correlation. Tracking may occur on a county, municipal, and watershed level, depending on information available and needs.

Water quality information and reports from existing programs may also be used to assess Management Measure implementation progress. The Division of Water Quality's Basinwide Water Quality Management Plans (BWQMP) and Integrated Reports (combined 303(d) and 305(b) reports) will be the primary data sources to help assess the Program's progress in improving water quality and will be used to make adjustments in implementation priorities. Basinwide plans are produced for each basin on a 5-year cycle, and include summary water quality data (physical, chemical, and biological) collected from the basin.

Water quality data from special studies (e.g., TMDLs, WARP, and EEP) and local monitoring efforts will be used, where available and deemed reliable, to supplement data collected on a regular schedule. Information from DWQ includes ambient surface monitoring, Ferry Mon, and biological sampling. Data from DEH will also be used for shellfishing and recreational waters, as well as from the National Estuarine Research Reserve (as applicable). Wetland data, including information retained by DCM, will be used to assess wetland protection.

Information and reports provided by the agencies that administer the various nonpoint source programs will be used to assess and demonstrate success in improving Management Measure implementation. Once a baseline assessment of Management Measure implementation is developed, incremental implementation goals may be developed for programs or categories of pollutants.

Phase I of the 15-Year Strategy will allow for implementation goals to be derived that can be used to assess progress. Implementation goals will include implementing Management Measures, protecting and restoring water quality, and education – as applicable. Goals will include parameters such as TMDL Implementation; changes in 303(d) listed waters; and changes in closure trends of shellfishing waters. Data for each source category (per agency and program) will be included and goals will be made quantitative where feasible. Implementation goals will be general for a five-year period and consist of implementation processes or approaches rather than numerical implementation rates for specific BMPs or enforcement actions.

As previously identified, water quality changes will be used to help analyze implementation success. Correlation between water quality changes and implementation of Management Measures will try to be established. This will occur by reviewing basinwide plans and other documents on a cycle to determine what Management Measures might help address the problems identified and coordinate with appropriate agencies to improve/increase implementation. Periodically the CNPSP will consult with the BWQMP and DWQ Environmental Sciences Branch to evaluate monitoring efforts and identify additional monitoring

needs that may help determine success of Management Measure implementation. A major emphasis of the CNPSP will be improving the performance of existing regulatory programs by refining program delivery, compliance monitoring, and enforcement.

The basinwide planning program, 303(d) list, 305(b) report, and TMDL program, water quality assessments, and special studies will provide data for assessing where additional Management Measures will be needed or the need to adopt additional enforceable policies and mechanisms. TMDL implementation may also include Management Measures beyond those recommended by 6217, and will be supported by the CNPSP. Population projections and local land use plans developed to meet requirements of CAMA will also be used to assess where increased Management Measure implementation should occur to protect water quality.

2. North Carolina Coastal NPS Program 5-Year Action Plans: 2004-2008

The coastal Management Measures identified in the last column of the table can be viewed here (link: http://h2o.enr.state.nc.us/nps/CNPSCP/measures.htm).
The nine key elements in the second to the last column are part of the 319 Grant Program and can be viewed in the draft North Carolina Nonpoint Source Pollution Management Program – Second Update here: http://h2o.enr.state.nc.us/nps/documents/draftnpsup07.doc.

Goal 1 – PROTECTION: Protect waters currently meeting uses					
Objective 1: Work with other agencies to improve data management capabilities/distribution to more effectively address NPS impacts					
Action(s)	**Lead Agency/ Cooperating Agency**	**Mechanism(s)**	**Milestone/ Target Date**	**Nine Key Element**	**Coastal MM***
1. Improve water quality data management for SA waters	Lead: Division of Environmental Health (DEH) Cooperators: Division of Water Qua (DWQ), Division of Marine Fisheries (DMF), and Division of Coastal Management (DCM)	CNPSP Funds	• Complete geo-locating all DEH monitoring sites and closure lines: Spring 2004 • Finalize new database: Fall 2004	1-3	Tracking & Monitoring
2. Improve local capacity to address NPS	Lead: NC Sea Grant Cooperators: DWQ, NC Cooperative Extension Service (NCCES)	CNPSP and 319 Grant Funds	Establish and fill Water Quality Planning Specialist Position at NC Sea Grant: By 2004	1-3	Urban: All

Objective 2: Improve implementation and enforcement of existing regulations and programs

Action(s)	Lead Agency/ Cooperating Agency	Mechanism(s)	Milestone/ Target Date	Nine Key Element	Coastal MM
1. Support Implementation of the Neuse and Tar-Pamlico Nutrient Sensitive Waters Management Strategies	Lead: DWQ Cooperators: DCM	CNPSP Funds	Hire temporary assistant to work with local governments to obtain approval of plans from Environmental Management Commission: 2004	1-3	Urban: I B III
2. Support the Coastal Habitat Protection Plan Program	Lead: DCM Cooperators: DWQ and DMF	CNPSP, DWQ, DMF and DENR Funds	Produce outreach materials and conduct public meetings: 2004	1-3	All
3. Examine current level of Management Measure implementation and evaluate processes to track implementation progress	Lead: DWQ Cooperators: DWQ/DCM and other DENR agencies	CNPSP Funds	Complete initial analysis: December 2005	1-3	Tracking & Monitoring
4. Prioritize issues and NPS projects that will be addressed during 2004-2008	Lead: DWQ Cooperators: DCM, NPS Workgroup, and Others	CNPSP	• Compile and review available coastal water quality related data on GIS to assist with goal setting in Program Management Area: 2004 - 2005 • Convene Ad Hoc Advisory Group and hold NPS Category meetings to develop list of priorities and project for 2004-2008: 2004	1-5	All
5. Conduct Urban Runoff Permitting Program(s) Analysis	Lead: DWQ Cooperators: DCM and DLR	CNPSP Funds	• Finalize scope of work for DENR urban runoff permit(s) study: 2004 • Contract and complete study: 2004 • Seek funding and avenues to implement study recommendations: 2005-2008	1-3	Urban: I, II, and III

Goal 2 – RESTORATION: Restore NPS-impaired waters					
Objective 1: Reduce fecal loading into impaired SA waters					
Action(s)	**Lead Agency/ Cooperating Agency**	**Mechanism(s)**	**Milestone/ Target Date**	**Nine Key Element**	**Coastal MM**
1. Support local initiatives for on-the-ground projects	Lead: DWQ Cooperators: NCSU/Others	CNPSP Funds Other funds	• Implement Demonstration BMPs in the White Oak River basin: 2004 - 2005 • Partner with Clean Water Management Trust Fund to fund coastal projects	1-4	Urban: I and III
2. Support TMDL Development for Coastal Waters	Lead: DWQ	CNPSP Funds	Complete watershed characterization study for Jarrett Bay and Nelson's Bay TMDLs: 2004	1-5	All

Goal 3 – EDUCATION: Educate all stakeholders on NPS issues to instill environmental stewardship and responsibility					
Objective 1: Develop effective and dynamic education and outreach programs					
Action(s)	**Lead Agency/ Cooperating Agency**	**Mechanism(s)**	**Milestone/ Target Date**	**Nine Key Element**	**Coastal MM**
1. Support education initiatives for the Neuse and Tar-Pamlico Nutrient Sensitive Waters Management Strategies	Lead: DWQ	CNPSP Funds	Fund local buffer education projects	1-3	Urban: I B and III
2. Improve local capacity to address NPS by improving education and outreach	Lead: NC Sea Grant Cooperators: DWQ, NCCES	CNPSP and 319 Grant Funds	• Establish and fill 2-year Water Quality Planning Outreach position at NC Sea Grant: 2004 • Provide funds to conduct Neuse and Tar-Pamlico River Nutrient Sensitive Waters Management Strategy education/outreach activities: 2004-2005 • Review and Update as needed: "Addressing Microbial Pollution in Coastal Waters – A Reference for Local Governments – 2003": 2007	1-3, 5	Urban: V

Appendix II

Coastal Nonpoint Pollution Control Program Management Measures

Information in this Appendix was taken directly from Appendix II of the "Progress Report on Implementation of the NC Coastal Nonpoint Source Program: June 2007." For additional information about these management measures see the background section in Appendix I of this document.

1. Management Measures for Agricultural Sources

A. 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 - Soil 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 delivered from the contributing area for storms of up to and including a 10-year, 24-hour frequency.

B1. 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:
• Have an earthen lining or plastic membrane lining, or
• Be constructed with concrete, or
• Be a storage tank; and

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

B2. Management Measure for Facility Wastewater and Runoff from Confined Animal Facility Management (Small Units)

1. 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.
2. Manage stored runoff and accumulated solids from the facility through an appropriate waste utilization system.

C. 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:

Farm and field maps showing acreage, crops, soils, and waterbodies. Realistic yield expectations for the crop(s) to be grown, based primarily on the producer's actual yield history, Land Grant University yield expectations for the soil series, or SCS Soils-5 information for the soil series. 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 (birds, pigs, etc.), or effluent (if applicable);
- Nitrogen contribution to the soil from legumes grown in the rotation (if applicable); and
- Other significant nutrient sources (e.g., irrigation water).

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 erodible soils, and
- Shallow aquifers.

Use of the limiting nutrient concept to establish the mix of nutrient sources and requirements for the crop based on a realistic yield expectation. 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 or runoff. Provisions for the proper calibration and operation of nutrient application equipment.

D. Pesticide Management

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 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);
b. Apply pesticides efficiently and at times when runoff losses are unlikely; and
c. 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;
    - Periodically calibrate pesticide spray equipment; and
    - Use anti-backflow devices on hoses used for filling tank mixtures.

E. Grazing Management

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):

- Exclude livestock,
- Provide stream crossings or hardened watering access for drinking,
- Provide alternative drinking water locations,
- Locate salt and additional shade, if needed, away from sensitive areas, or
- 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):

- 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
- 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 USDA.

2. Forestry Management Measures

A. Preharvest Planning Management Measure

Perform advance planning for forest harvesting that includes the following elements where appropriate:
1. Identify the area to be harvested including location of water bodies 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: 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; avoid to the extent practicable locating new roads and landings in Streamside Management Areas (SMAs); and 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: size and site crossing structures to prevent failure; 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.

B. 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.

C. Road Construction/Reconstruction Management Measure

1. Follow preharvest planning (as described under Management Measure A) when constructing or reconstructing the roadway.
2. Follow designs planned under Management Measure A for road surfacing and shaping.
3. Install road drainage structures according to designs planned under Management Measure A 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.

D. 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.

E. 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 A.
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 B.

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 groundskidding may cause excessive sedimentation.

F. Site Preparation and Forest Management Measure

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 plag.

G. 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 vegetation 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 sedimentation 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.

H. Revegetation of Disturbed Areas

Reduce erosion and sedimentation by rapid revegetation 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.

I. 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.

J. Wetlands Forest Management

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.

3. Management Measures for Urban Areas

I. Urban Runoff

A. New Development Management Measure

1. By design or performance: 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 Reduce the post-development loadings of TSS so that the average annual TSS loadings are no greater than predevelopment loadings, and
2. To the extent practicable, maintain post-development 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.

NOAA and EPA no longer require implementation of the New Development Management Measure in areas subject to NPDES Phase I or II MS4 permits. (December 2002 NOAA and EPA Memorandum, "Clarification of the overlap between 6217 Coastal Nonpoint Programs and Phase I and II Storm Water Regulations Program")

B. 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.

C. 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.

III. Existing Development

A. Existing Development Management

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.

NOAA and EPA no longer require implementation of the Existing Development Management Measure in areas subject to NPDES Phase I or II MS4 permits. (December 2002 NOAA and EPA Memorandum, "Clarification of the overlap between 6217 Coastal Nonpoint Programs and Phase I and II Storm Water Regulations Program")

IV. Onsite Disposal Systems

A. 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 post construction.

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 within 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.

B. Operating Onsite Disposal Systems Management

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: where conditions indicate that nitrogen-limited surface waters may be adversely affected by significant ground water nitrogen loadings from OSDS, and where nitrogen loadings from OSDS are delivered to ground water that is closely hydrologically connected to surface water.

V. Pollution Prevention

A. Pollution Prevention Management Measure

Implement pollution prevention and education programs to reduce nonpoint source pollutants generated from the following activities, where applicable:

- 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;
- Turf management on golf courses, parks, and recreational areas; Improper operation and maintenance of onsite disposal systems;
- Discharge of pollutants into storm drains including floatables, waste oil, and litter;
- Commercial activities including parking lots, gas stations, and other entities not under NPDES purview; and
- Improper disposal of pet excrement.

VI. Management Measure for Roads, Highways, and Bridges

A. 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 particularly susceptible to erosion or sediment loss;
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.

B. 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.

E. 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.

NOAA and EPA no longer require implementation of both the Operation and Maintenance and the Runoff Systems Management Measures in areas subject to NPDES Phase I or II MS4 permits. (December 2002 NOAA and EPA Memorandum, Clarification of the overlap between 6217 Coastal Nonpoint Programs and Phase I and II Storm Water Regulations Program")

F. 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.

4. Management Measure for Marinas and Recreational Boating

I. Siting and Design

A. 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.

B. Water Quality Assessment Management Measure

Assess water quality as part of marina siting and design.

C. 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.

D. Shoreline Stabilization Management Measure

Where shoreline erosion is a nonpoint source pollution problem, 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 and offshore areas.

E. 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.

F. Fueling Station Design Management Measure

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

G. 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.

II. Marina and Boat Operation and Maintenance

A. 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.

B. Fish Waste Management Measure

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

C. 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.

D. Petroleum Control Management Measure

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

E. 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.

F. 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.

G. Maintainance of Sewage Facilities Management Measure

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

H. Boat Operation Management Measure (applies to boating only)

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

5. Management Measures for Hydromodification: Channelization and Channel Modification, Dams, and Streambank and Shoreline Erosion

I. Channelization and Channel Modification Management

A. 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.

B. Instream and Riparian Habitat Restoration Management Measure

Evaluate the potential effects of proposed channelization and channel modification on instream and riparian habitat in coastal areas; Plan and design channelization and channel modification to reduce undesirable impacts; and 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.

II. Dams Management Measures

C. 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.

III. Streambank and Shoreline Erosion

A. 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.

6. Management Measures for Wetlands, Riparian Areas, and Vegetated Treatment Systems

A. 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.

B. 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.

C. 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.

Appendix III

Agency and Program Acronyms

APNEP	Albemarle-Pamlico National Estuary Program
CRC	Coastal Resources Commission
CWMTF	Clean Water Management Trust Fund
DCM	Division of Coastal Management
DEH	Division of Environmental Health
DENR	Department of Environment and Natural Resources
DFR	Division of Forest Resources
DLR	Division of Land Resources
DMF	Division of Marine Fisheries
DSWC	Division of Soil and Water Conservation
DWM	Division of Waste Management
DWQ	Division of Water Quality
DWR	Division of Water Resources
EPA	Environmental Protection Agency
NCCE	North Carolina Cooperative Extension
NC CNPSP	North Carolina Coastal Nonpoint Source Program
NC DOT	N.C. Department of Transportation
NCNERR	N.C. National Estuarine Research Reserve
NCSU	North Carolina State University
NOAA	National Oceanic and Atmospheric Administration
WRC	Wildlife Resources Commission

Appendix IV

Contributors

The following agencies/individuals were contacted and interviewed to determine status of key projects previously funded by the N.C. Coastal Nonpoint Source Program and/or to obtain recommendations for improving coastal nonpoint source pollution control.

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N.C. Division of Forestry Resources - Bill Swartely and Sean Brogan
N.C. Division of Marine Fisheries - Anne Deaton
N.C. Division of Coastal Management - Guy Stefanski
N.C. Division of Water Quality - Rich Gannon
N.C. Wildlife Resources Commission (for one WRC-related recommendation - David Cox)