

**PHASE 1  
FINAL  
RESTORATION PLAN  
FOR THE  
WEYERHAEUSER PLYMOUTH MILL  
MARTIN COUNTY, NC**

**November 2006**

*Prepared by:*

**National Oceanic and Atmospheric Administration,  
North Carolina Department of Environmental and Natural Resources  
and  
United States Fish and Wildlife Service  
on behalf of the  
U.S. Department of the Interior**

## TABLE OF CONTENTS

1 INTRODUCTION .....	1
1.1 AUTHORITY .....	1
1.2 NEPA COMPLIANCE .....	2
1.3 PUBLIC PARTICIPATION .....	3
1.4 ADMINISTRATIVE RECORD .....	3
2 OVERVIEW OF THE SITE .....	4
2.1 HUMAN USE CHARACTERISTICS .....	5
2.2 SURFACE WATER CHARACTERISTICS .....	5
2.3 HABITAT CHARACTERISTICS.....	5
3 THE AFFECTED ENVIRONMENT .....	6
3.1 THE PHYSICAL ENVIRONMENT .....	6
3.2 THE BIOLOGICAL ENVIRONMENT .....	6
4 RESTORATION ALTERNATIVES ANALYSIS .....	8
4.1 RESTORATION ALTERNATIVES .....	8
4.1.1 Alternative 1: No Action.....	8
4.1.2 Alternative 2: Reduce Intake Volume at the Weyerhaeuser Plymouth Mill Cooling Water Intake.....	9
4.1.3 Alternative 3: Additional Modifications to the Weyerhaeuser Plymouth Mill Cooling Water Intake System .....	10
4.1.4 Alternative 4: Filling Levee Breaches in the Lower Roanoke River Floodplain ....	11
4.1.5 Alternative 5: Acquisition of Land for Habitat Protection .....	11
4.1.6 Alternative 6: Improving Recreational Fishing Public Access.....	12
4.1.7 Alternative 7: Reduction of impingement/entrainment at other cooling water intakes in the lower Roanoke River .....	12
4.2 PREFERRED ALTERNATIVE.....	13
5 PRELIMINARY CONCLUSIONS .....	14
6 REFERENCES .....	15
7 LIST OF PERSONS/AGENCIES CONSULTED.....	15
8 LIST OF PREPARERS.....	15

## 1 INTRODUCTION

This Final Phase 1 Restoration Plan (Final Phase 1 RP) has been developed by the National Oceanic and Atmospheric Administration (NOAA) of the U. S. Department of Commerce, the United States Fish and Wildlife Service (USFWS) on behalf of the U.S. Department of the Interior (DOI), and the North Carolina Department of Environmental and Natural Resources (NCDENR) (collectively, “the Trustees”) to address natural resources, including recreational and ecological services, injured, lost or destroyed due to releases of hazardous substances in areas at or adjacent to the Weyerhaeuser Plymouth Mill Site (the “Site”) in Plymouth, Martin County, North Carolina.

The Final Phase 1 RP identifies the restoration action that a Potentially Responsible Party (PRP), Weyerhaeuser Paper Company (Weyerhaeuser), and the Trustees will implement as part of Phase 1 of a natural resource damages claim for natural resource injuries in areas at or adjacent to the Site. For Phase 1 of the natural resource damages claim, the Trustees and the PRP cooperatively reached a tentative agreement concerning a subset of natural resource injuries at or adjacent to the Site in an effort to take advantage of a timely and high priority restoration opportunity, and because of a mutual desire to find a partial resolution to the Trustees’ natural resource damages claims as to Weyerhaeuser.

In this Final Phase 1 RP, the Trustees’ propose that the natural resource injury claim would potentially be partially compensated by the restoration of fish stocks by reducing fish mortality due to impingement and entrainment at the Site’s cooling water intakes. As a first step toward accomplishing this goal, the PRP will implement a restoration project for reduction of cooling water intake volume at the Site from the Roanoke River (hereinafter, “intake reduction project”). The Trustees will then complete the injury assessment, determine credits for the Phase 1 restoration project, and propose further restoration projects in the Phase 2 Restoration Plan. Any restoration credits for the proposed intake reduction project (for Phase 1 restoration) will be determined and presented for comment in the Phase 2 Restoration Plan. Damages associated with natural resource injuries in areas at or adjacent to the Site will be compensated in terms of habitat and ecological services restored under Trustee supervision as set forth in the Phase 1 and Phase 2 RPs.

### 1.1 AUTHORITY

This Final Phase 1 RP was prepared jointly by the Trustees pursuant to their respective authority and responsibilities as natural resource trustees under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. § 9601, *et seq.*; the Federal Water Pollution Control Act, 33 U.S.C. § 1251, *et seq.* (also known as the Clean Water Act [CWA]), and other applicable Federal or State laws, including Subpart G of the National Oil and Hazardous Substances Contingency Plan (NCP), at 40 C.F.R. §§ 300.600 through 300.615, and DOI’s CERCLA natural resource damage assessment regulations at 43 C.F.R. Part 11 (NRDA regulations) which provide guidance for this restoration planning process under CERCLA.

## 1.2 NEPA COMPLIANCE

Actions undertaken by the Trustees to restore natural resources or services under CERCLA and other Federal laws are subject to the National Environmental Policy Act (NEPA), 42 U.S.C. § 4321 *et seq.*, and the regulations guiding its implementation at 40 C.F.R. Parts 1500 through 1517. NEPA and its implementing regulations outline the responsibilities of Federal agencies under NEPA, including for preparing environmental assessments (EAs). In general, Federal agencies contemplating implementation of a major Federal action must produce an environmental impact statement (EIS) if the action is expected to have significant impacts on the quality of the human environment. When it is uncertain whether a contemplated action is likely to have significant impacts, Federal agencies prepare an EA to evaluate the need for an EIS. If the EA demonstrates that the proposed action will not significantly impact the quality of the human environment, the agency issues a Finding of No Significant Impact (FONSI), which satisfies the requirements of NEPA, and no EIS is required.

The NOAA Administrative Order (NAO) 216-6, Environmental Review Procedures for Implementing the National Environmental Policy Act, issued on June 3, 1999, provides for categorical exclusions for restoration plans under CERCLA that do not individually or cumulatively have significant impacts on the human environment (*i.e.*, actions with limited degree, geographic extent, and duration). USFWS has a similar categorical exclusion which excludes CERCLA restoration projects that cause only negligible changes to surrounding lands. This Final Phase 1 RP's selected restoration action involves only minor or negligible change in the use of the affected areas at the Site.

If the restoration plan addresses an action that involves minor or negligible change in the use of the affected areas, then the plan is given a categorical exclusion and neither an EA nor EIS is required. Categorical exclusions are classes of actions which do not individually or cumulatively have a significant effect on the human environment.

This Final Phase 1 RP summarizes the current environmental setting, describes the purpose and need for restoration actions, identifies alternative actions, assesses their applicability and potential impact on the quality of the physical, biological and cultural environment, and summarizes the opportunity the Trustees provided for public participation in the decision-making process. This information was used to make a threshold determination as to whether preparation of an EA or EIS was required prior to selection of the final restoration action. Based on this Final Phase 1 RP, the Federal Trustees have determined that the proposed restoration action does not meet the threshold requiring an EA or EIS. Given the negligible impact on the human environment by the selected restoration action, the Trustees will utilize the categorical exclusion provision under NAO 216-6, as well as the equivalent USFWS categorical exclusion.

### 1.3 PUBLIC PARTICIPATION

The Trustees have prepared this Final Phase 1 RP to provide the public with information on the partial natural resource injuries and service losses assessed in connection with the Site, the restoration objectives that have guided the Trustees in developing this plan, the restoration alternatives that were considered, the process used by the Trustees to identify preferred restoration alternatives and the rationale for their selection. Public review of the Draft Phase 1 RP is an integral and important part of the restoration planning process and is consistent with all applicable State and Federal laws and regulations, including CERCLA and the guidance for restoration planning found within 43 C.F.R. Part 11.

The restoration plan proposed in this Final Phase 1 RP was made available for review and comment by the public for a period of 30 days on June 6, 2006. The deadline for submitting written comments on the Final Phase 1 RP was specified in two public notices issued by the Trustees to announce its availability for public review and comment.

The Trustees considered all written comments received prior to approving and adopting this Final Phase 1 RP. Written comments received and the Trustees' responses to those comments, whether in the form of plan revisions or written explanations, are summarized in this Final Phase 1 RP.

### 1.4 ADMINISTRATIVE RECORD

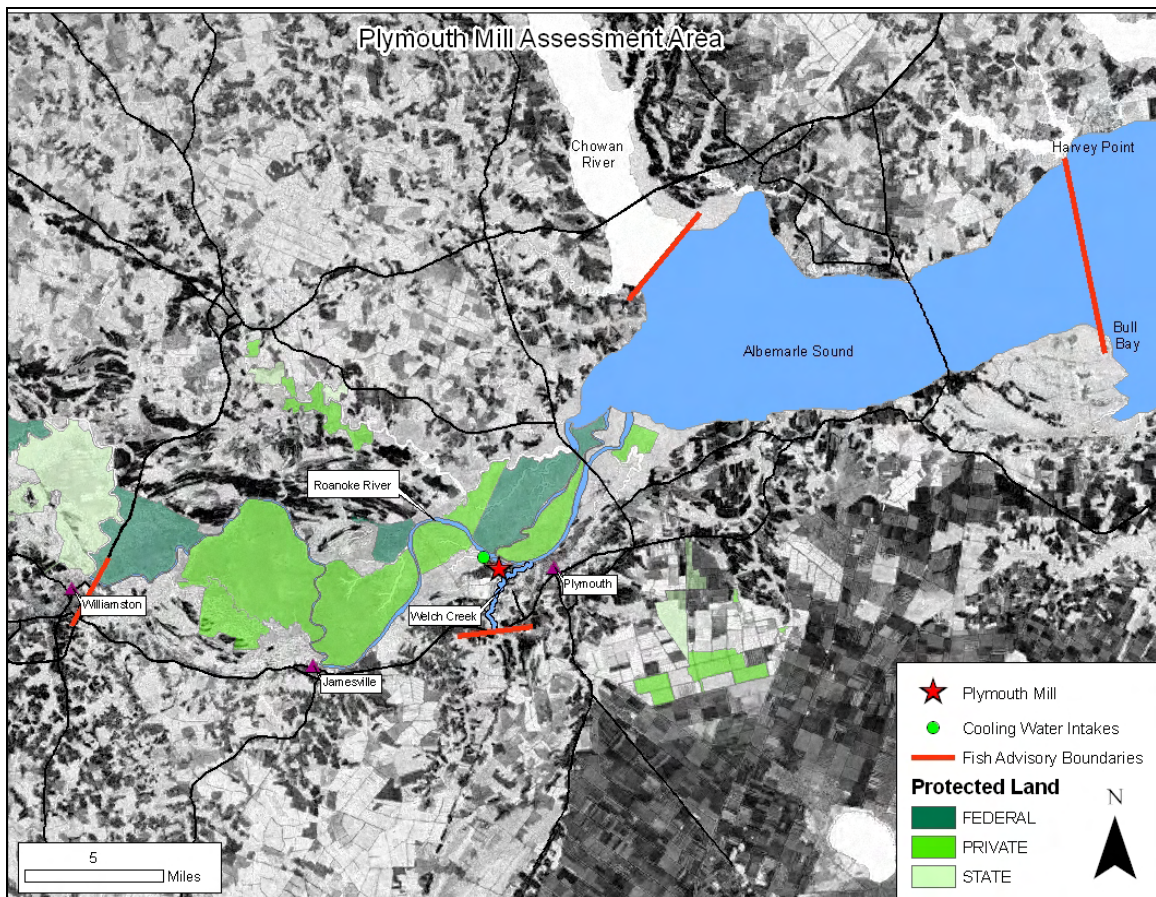
The Trustees have maintained records documenting the information considered and actions taken by the Trustees during this restoration planning process, and these records collectively comprise the Trustees' administrative record (AR) supporting this Final Phase 1 RP. Information and documents are included in this AR as received or completed. These records are available for review by interested members of the public. Interested persons can access or view these records at the:

NOAA Office of Response and Restoration  
28 Tarzwell Drive  
Narragansett, RI  
Phone: 401-782-3235  
Fax: 401-782-3201

Arrangements must be made in advance to review or to obtain copies of these records by contacting the office listed above. Access to and copying of these records is subject to all applicable laws and policies including, but not limited to, laws and policies relating to copying fees and the reproduction or use of any material that is copyrighted.

## 2 OVERVIEW OF THE SITE

The Weyerhaeuser Plymouth Mill facility (Mill) is an active wood and paper products manufacturing facility located on State Road 1565 in Martin County, North Carolina. Weyerhaeuser Paper Company has been the owner/operator of this facility since 1957, when the company merged with the Kieckhefer-Eddy Company, which began operations at the facility in 1937. The facility is situated on about 2,400 acres near the confluence of Welch Creek and the Roanoke River, about 1.5 miles from the Town of Plymouth and approximately 7 miles upstream from Albemarle Sound (Figure 1). The Site includes four Operable Units (OUs) adjacent to or on the Site: OU1, landfill #1; OU2, the Lower Roanoke River; OU3, the former chlorine plant; and OU4, Welch Creek. The landfill (OU1) and former chlorine plant (OU3) are located on the Site property and are currently undergoing remediation. Welch Creek (OU4), a tributary to the lower Roanoke River (OU2), flows through the eastern portion of the Site for approximately 4.1 miles. The Roanoke River is the northern boundary of the Site. Since 1937, Welch Creek and the Roanoke River received wastes from the Site containing contamination including dioxins, furans, and mercury. As a result of contaminant discharges from this and other sites in the



**Figure 1:** The Weyerhaeuser Plymouth Mill assessment area, in Plymouth, North Carolina. The red bars indicate the boundaries of the dioxin fish consumption advisory.

area, Welch Creek and the lower Roanoke River have had a State imposed fish consumption advisory due to dioxin since 1990. Western Albemarle Sound was added to this advisory in 1991. A fish consumption advisory for mercury was imposed for all State waters east of I-85 in 1997 and expanded to include all State waters in 2006.

## 2.1 HUMAN USE CHARACTERISTICS

The property is bordered by the Roanoke River to the north, Highway 64 to the south, residential and agricultural property and a golf course to the east, and wetlands to the west. The surrounding area is primarily forested, agricultural and residential. There is one school located within 3 miles of the Site. Recreational fishing, hunting and boating are popular in the area.

## 2.2 SURFACE WATER CHARACTERISTICS

Contaminants from the Site have primarily reached adjacent surface waters through wastewater discharge. Surface water affected by contaminants from the Site includes, but may not be limited to, Welch Creek, and the lower Roanoke River. A fish consumption advisory for dioxin includes the surface waters of Welch Creek, the lower Roanoke River (and all distributaries) from Williamston to the mouth, and western Albemarle Sound from the mouth of the Roanoke River and east to Bull Bay and Harvey Point. The lower Roanoke River is predominantly freshwater with flows regulated by 3 major dams located upstream. The first dam on the system, the Roanoke Rapids Dam located approximately 135 miles upstream from the mouth, is an impediment to anadromous fish passage. The lower Roanoke River floodplain, which includes Welch Creek, contains the largest intact and least-disturbed bottomland hardwood forest ecosystem remaining in the mid-Atlantic region. The river discharges into the western portion of Albemarle Sound.

## 2.3 HABITAT CHARACTERISTICS

Currently, the Site property consists of a fully operational paper mill. Little natural habitat remains on-site. Most of the riparian corridor along Welch Creek is intact.

Off-site habitat is diverse. Habitats in the area include bottomland hardwood forest, wetlands, and blackwater creeks. These habitats support a wide variety of plant and animal species. The lower Roanoke River serves as a vital spawning, juvenile nursery, and adult habitat for more than 40 freshwater and anadromous fish species.

### 3 THE AFFECTED ENVIRONMENT

This section describes the physical, biological, and cultural and human environment in the project area that forms the basis for evaluation of the potential environmental impacts of the selected restoration actions. Resource areas described in this section correspond to the range of resource areas addressed in Section 5, “The Restoration Planning Process,” of this Final Phase 1 RP.

#### 3.1 THE PHYSICAL ENVIRONMENT

Flows in the lower Roanoke River are regulated by 3 major dams located upstream. The first dam on the system is the Roanoke Rapids Dam located approximately 135 miles upstream from the mouth. The lower Roanoke River floodplain, which includes Welch Creek, contains the largest intact and least-disturbed bottomland hardwood forest ecosystem remaining in the mid-Atlantic region. The river discharges into the western end of Albemarle Sound. The Roanoke River Basin and Albemarle Sound are part of the Albemarle-Pamlico National Estuary Program (APNEP). The National Estuary Program was established by Congress in 1987 to improve the quality of estuaries of national importance.

The Roanoke River National Wildlife Refuge (NWR) lands consist of bottomland hardwood forest interspersed with cypress-tupelo sloughs that includes forested wetlands in the lower 135 miles of the Roanoke River from the fall line at Weldon, NC, downstream to the Albemarle Sound near Plymouth, NC. The refuge includes part of an extensive wetland ecosystem that contains excellent examples of several southeastern plant communities and habitat types. These include levee forest, cypress-gum swamp, bottomland hardwoods, oxbows, beaver ponds and blackwater streams. In addition, The Nature Conservancy protects over 53,000 acres of similar land in the lower Roanoke River coastal plain.

#### 3.2 THE BIOLOGICAL ENVIRONMENT

Habitats in the area include woodlands, wetlands, rivers, and creeks. These habitats support a wide variety of plant and animal species. Aquatic organisms potentially affected by contamination of surface water and sediments include benthic macroinvertebrates, fish, and shellfish.

With 214 bird species, including 88 breeding species (44 of these being neotropical migrants), the Roanoke River floodplain has the highest diversity of breeding birds in the North Carolina coastal plain. These species include a large resident wood duck population, wintering waterfowl such as mallard and black ducks, and a number of landbirds including the Federally-listed threatened bald eagle. Birds typical of rich



floodplain forests are common here during the breeding season, including Louisiana waterthrush, American redstart, Kentucky warbler, red-eyed and yellow-throated vireos, great crested and Acadian flycatchers, and six species of woodpeckers. Some of the bird species that are easily observed on the Roanoke River are the barred owl, red-shouldered hawk, and great blue heron. More uncommon species that occur here include Swainson's and cerulean warblers, and Mississippi kite.

In addition to having significant bird concentrations, the assessment area is a productive area for freshwater, estuarine and marine finfish, plant species, and other wildlife. Plant species in the assessment area include: wild hyacinth, trout lily, atamasco lily, fire pink, spring beauty, Virginia bluebells, pawpaw, spicebush, yellow buckeye, and eastern wahoo. Bottomland hardwood forests shelter wide-ranging mammals such as black bear and bobcat. The river supports one of North Carolina's most diverse resident and anadromous fish communities. Important recreational gamefish include largemouth bass, black crappie, bluegill, redear sunfish, pumpkinseed, channel catfish, white catfish, white perch, and yellow perch. The Roanoke River also boasts one of the mid-Atlantic's strongest migratory striped bass populations. Although near the verge of collapse in the 1980s, striped bass recovery, due primarily to improvements in flow management during the spawning season and conservative harvest regulations, occurred steadily until the population was officially declared recovered in 1997. Currently the striped bass population is estimated at 2,000,000 fish, with the population age structure continuing to expand to include age-10+ individuals. Atlantic sturgeon and the Federally-endangered shortnose sturgeon are also present in the area. Migratory fishes of recreational and commercial importance include river herring (blueback and alewife), hickory shad, and American shad. A 30-year restoration plan for American shad is currently being executed on the Roanoke River to restore this population. Fisheries management by the North Carolina Wildlife Resources Commission (NCWRC) includes the annual stocking of >2,000,000 American shad fry in the Roanoke River each year and the recovery of juvenile American shad in the vicinity of the Weyerhaeuser facility each fall. Stocks of river herring in the Roanoke River and Albemarle Sound are also severely diminished, and a moratorium on take and possession of river herring in inland waters was enacted into rule by the NCWRC on July 1, 2006. A moratorium on river herring in joint and coastal waters in the Roanoke River/Albemarle Sound area is also presently under consideration by the North Carolina Division of Marine Fisheries (NCDMF).

### 3.3 THE CULTURAL AND HUMAN ENVIRONMENT

The Albemarle Sound/Roanoke River environment represents one of the region's premier resources for recreational fishing. Species popular with sport anglers include striped bass, largemouth bass, black crappie, white perch, white catfish, channel catfish, bullheads, blue catfish, red ear sunfish, pumpkinseed sunfish, and bluegill, among others. Resource restoration efforts have significantly increased the population of striped bass in the Albemarle Sound/Roanoke River in recent years. The lower Roanoke River is also a popular location for camping, boating, kayaking, canoeing, birdwatching, and hunting. A

200-mile paddle trail explores the hardwood swamp forest of the lower Roanoke River and surrounding coastal plain. Hunting opportunities in the Roanoke River NWR include waterfowl, deer, turkey and small game.

The Roanoke River was historically important in the pre-colonial, colonial and Civil War periods. The river is central to the region's long history of farming, fishing and transportation. The Maritime Museum and Roanoke River Lighthouse in Plymouth, NC, reflect the maritime history of the area.

#### 4 RESTORATION ALTERNATIVES ANALYSIS

Consistent with the NRDA regulations, the following criteria were used to evaluate restoration project alternatives and identify the project(s) selected for Phase 1 implementation under this plan:

- Effectiveness: The extent to which each alternative can return the injured natural resources to baseline (primary restoration) or make the environment whole for the interim lost services provided by the resources (compensatory restoration);
- Protectiveness: The extent to which implementation of the alternative avoids additional injury to the environment;
- Technical feasibility: The level of uncertainty in the success of each alternative;
- Cross-benefits: The extent to which each alternative benefits more than one resource and/or service;
- Collateral effects: Concurrent effects of each alternative on the environment;
- Consistency: Consistency with policies and compliance with Federal, State, and local law; and
- Cost considerations.

##### 4.1 RESTORATION ALTERNATIVES

The Trustees were required to assess possible restoration alternatives identified prior to release of the Draft Phase 1 RP. Additional projects that have since been identified and may be identified in the future will be reviewed and considered for implementation in the Phase 2 RP. In their initial review of restoration alternatives, the Trustees identified desired characteristics for potential projects for Phase 1: 1) the restored habitat must be similar in type to the habitat impacted and provide similar services; 2) the project must, to the extent practicable, be in the same watershed as the impacted habitat; and 3) the project must provide long-term or perpetual benefits to those resources that were known to have been or were potentially impacted, including fish and wildlife.

The Trustees evaluated the following seven potential restoration alternatives:

###### 4.1.1 Alternative 1: No Action

Under the No Action Alternative, no restoration, rehabilitation, replacement, or acquisition actions would occur. This alternative costs the least because no action would be taken, but such savings must be weighed against the potential for losses to recover.

In this case, if no action were taken, the goal to restore or enhance recreational fisheries would not be realized. If the No Action Alternative were selected, which would not replace the lost resources at all, the public and environment would not be made whole for past injuries from Site releases. Therefore, the No Action Alternative is not selected as the preferred alternative but is retained for comparative purposes.

#### 4.1.2 Alternative 2: Reduce Intake Volume at the Weyerhaeuser Plymouth Mill Cooling Water Intake

Alternative 2 addresses reducing the volume of river water withdrawn at the Site's cooling water intake system. The current Site cooling water intakes, located just upstream of the facility, draws millions of gallons per day (MGD) of river water directly from the Roanoke River. Withdrawals for 2004 and 2005 averaged 56.54 MGD and 67.86 MGD, respectively (NCDENR DWQ 2006a). The withdrawal of river water in this location on the river has the potential to impinge and/or entrain millions of larval and juvenile fish each year, consequently killing an unknown percentage of these organisms. Impingement occurs when fish are pinned against water intake screens or other parts of an intake system. Entrainment occurs when fish in the cooling water are drawn into a cooling water system and subjected to thermal, physical, or chemical stresses. Based on the simple calculations of the densities of eggs and fry present near the Weyerhaeuser plant and the amount of water withdrawn daily, the Weyerhaeuser cooling water intakes could be one of the largest single contributors to annual fish mortality in the lower Roanoke River Basin (from an industrial source). Redesigning the cooling water intake system to reduce the volume of river water withdrawn has the potential to reduce annual fish mortality rates in the lower Roanoke River system and contribute to improving future fish abundance for recreational fishing. Net benefits to fish populations will be determined and restoration credits associated with this alternative will be presented in the Phase 2 RP.

At a minimum, improvements to the system would entail decreasing the volume of water withdrawn from the river. The effectiveness of the PRP's intake reduction plan will be dependent primarily on the magnitude of reduction from current water withdrawals, and scheduled seasonal reductions (March-October) in intake volume that coincide with peak biological activity near the plant. Weyerhaeuser is currently preparing designs for a new cooling water system that would recirculate river water within the facility and, therefore, decrease the volume needed to be withdrawn from the river. Because the cooling water system improvements would take place inside the Weyerhaeuser facility, no adverse ecological effects are anticipated. A partial plant shutdown will be necessary to perform the improvements to the cooling water system.

The Draft Phase 1 RP included a discussion of pending U.S. Environmental Protection Agency (EPA) regulations pursuant to section 316(b) of the Clean Water Act. These regulations could have required Weyerhaeuser to complete minimum cooling water intake upgrades irrespective of the NRDA process. The EPA final section 316(b) regulations promulgated in June 2006, however, did not regulate the Weyerhaeuser Plymouth Mill. (40 C.F.R. § 122; 33 U.S.C. § 1326 [b]). Therefore, the Trustees will grant full NRDA credit for all upgrades made to the cooling water intake system that benefit fish populations in the lower Roanoke River. It is anticipated that improvement of the cooling water intake process would benefit fish in the Roanoke River by decreasing fish mortality caused by the water intake withdrawal.

Several factors make Alternative 2 the preferred alternative for Restoration Planning Phase 1. Not only does this project meet all of the project evaluation criteria, but if implemented without delay, it will coincide with Weyerhaeuser's plant operations schedule for 2006. If the intake reduction project is not completed during Weyerhaeuser's 2006 plant operations schedule, then this project may not be implemented until 2007 or later. Thus, the Trustees are seeking early public comment on the intake reduction project in Phase 1 before completion of other natural resource damage assessment activities in Phase 2. Early implementation of the intake reduction project may significantly reduce fish mortality in the Roanoke River and begin restoration of natural resource injuries caused by the Site. The Trustees anticipate that this high priority project may partly, but not wholly compensate the public for recreational and ecological losses incurred due to injury to natural resources from the Weyerhaeuser facility. Therefore, the Alternatives discussed below will be retained for consideration in Phase 2 of the Restoration Planning Phase.

#### 4.1.3 Alternative 3: Additional Modifications to the Weyerhaeuser Plymouth Mill Cooling Water Intake System

Alternative 3 addresses modifications, in addition to Alternative 2, that would further reduce fish mortality due to impingement and/or entrainment at the Site's cooling water intake system. Most larval phases of fish in the lower Roanoke River are totally planktonic (unable to swim but drift with water currents) and are only a few millimeters in length and cross-sectional width. Because they are very feeble swimmers, they are unable to avoid particular flow velocities. In addition, juvenile anadromous fish in the Roanoke River have a downstream migration tendency during late summer to early fall that place them in the immediate vicinity of the Weyerhaeuser facility.

Technology exists to modify intake systems to exclude/divert juvenile and adult fish from entering the intakes. Such modifications may include, but are not limited to: 1) modifications to existing screens at Weyerhaeuser's intakes along the Roanoke River to exclude/divert juvenile and adult fish from entering the intakes, 2) further reduction of intake velocities to reduce entrainment of planktonic larval fishes and increase the chance of avoidance for juvenile fishes during their late summer downstream migration, and 3) relocation of the cooling water intake to a location that does not attract such large migratory fish populations. It should be noted that the present location of the intakes on

the river is vulnerable to occasional intrusion of saline water (<1.0 ppt). Although no movement of the intakes has been necessitated to date, Weyerhaeuser has requested the installation of temporary piping to more upstream locations in the past during periods of low river flow. Any permitted temporary intake facilities would also have the potential to entrain and/or impinge aquatic organisms.

While the implementation of some or all of these cooling water intake system modifications will benefit the resident and anadromous fisheries, they must be considered after the full benefits of Alternative 2 have been calculated. Therefore, Alternative 2 must be implemented prior to all or part of Alternative 3.

#### 4.1.4 Alternative 4: Filling Levee Breaches in the Lower Roanoke River Floodplain

Alternative 4 addresses improving water quality in the lower Roanoke River floodplain by filling levee breaches that create low dissolved oxygen events. Man-made cuts in the natural river banks facilitated dewatering and removal of timber from the swamps. These cuts are no longer in use, but have not been filled. During high water events, water that would not normally overbank into the swamps fills the swamps through the man-made cuts. This water remains behind the levee for days or weeks and is exposed to high organic loads in the swamp which remove much of the dissolved oxygen (DO). Once the water level begins to recede, the low DO water that would normally exit the swamps and floodplain slowly through groundwater percolation or more sinuous surface routes, is instead, flushed back into the river rapidly through the straight cuts in the bank. This rapid flushing allows for a large volume of low DO water to enter the river system. The Roanoke River system recorded fish kills due to low DO in 1996, 1998, and 2003 (NCDENR DWQ 2006b). NC Division of Water Quality attributed the death of 93,500 fish in September of 2003 from Devils Gut (2.6 miles above Jamesville) to the mouth of the Roanoke River to low DO swamp water (2006b).

Filling the man-made cuts in the natural river bank with clean local sediments to restore the natural levees and hydrology of the bottomland hardwood forests would reduce the flushing of low DO water into the Roanoke River, thereby improving water quality, and reducing fish mortality.

While the filling of breaches will benefit the fisheries, cypress-tupelo forests and associated biota, and water quality, the expected benefits to the injured resource have not yet been fully evaluated, nor is implementation of this alternative as time sensitive as Alternative 2.

#### 4.1.5 Alternative 5: Acquisition of Land for Habitat Protection

Alternative 5 addresses acquisition of privately owned riverside properties for habitat protection. This alternative would protect riparian corridors in imminent danger of development and/or destruction, as well as protect bordering habitats (*i.e.*, fish spawning grounds) from the negative effects of development and/or destruction (*i.e.*, sedimentation). Several feasible sites for acquisition are located along the lower Roanoke

River. The Nature Conservancy knows of a number of privately owned pieces of land listed as high priority for acquisition. Most of these properties are a mix of low- and uplands and have been zoned for industrial use. One of these high priority properties, Mush Island, is an attractive industrial site due to its uplands and proximity to the highway. This parcel is also an important piece of land to preserve because the property is adjacent to vital spawning grounds in the Roanoke River system, and is within the acquisition boundary of Roanoke River NWR.

Acquisition of private property for habitat protection would ensure that land which is in danger of industrialization or habitat destruction will be conserved. Areas inside these large tracts of land that have been altered could also be further enhanced through restoring natural flow routes and elevations.

While the acquisition of imperiled land will benefit the fisheries, cypress-tupelo forests and associated biota, and water quality, the expected benefits to the injured resource have not yet been fully evaluated and may not be as large as those expected from Alternative 2. Further, it is not as time sensitive as Alternative 2.

#### 4.1.6 Alternative 6: Improving Recreational Fishing Public Access

Recreational fishing access in the western Albemarle Sound is currently limited. Several public boat launches are located near the Sound at the mouth of the Roanoke River (at Hwy 45), up Conaby Creek, and at the mouth of the Chowan River (at Hwy 17). However, the only public access point providing direct access to the western Albemarle Sound is located in Edenton, NC. Improvements to existing access points and/or construction of new access points may increase the ability for recreational fishermen to access the Sound and rivers.

While creation and/or enhancement of recreational fishing access locations will benefit the fisherman affected by the consumption advisory, the Trustees currently have not identified feasible locations to create access points, nor is it as time sensitive as Alternative 2.

#### 4.1.7 Alternative 7: Reduction of impingement/entrainment at other cooling water intakes in the lower Roanoke River

Alternative 7 addresses reducing the volume of river water withdrawn at other industrial cooling water intake systems along the lower Roanoke River. Several other industrial facilities along the lower Roanoke River withdraw a large volume of water from the river and the ecosystem would benefit from cooling water system upgrades. Such facilities include International Paper in Roanoke Rapids (formerly Champion International Corp.) with an approximate 30 MGD withdrawal, the North Carolina Department of Corrections / Caledonia Prison with an approximately 3 MGD withdrawal, and several private interests withdrawing between 2 and 8 MGD. As discussed in Alternative 2, the withdrawal of river water potentially impinges or entrains millions of larval and juvenile fish each year. A large percentage of these larval and juvenile fish die as a result of being

impinged or entrained. The Trustees believe that redesigning the cooling water intake systems in the Roanoke River can substantially reduce annual fish mortality rates in the system and thus, contribute to improving future abundance.

At a minimum, improvements to the systems where cooling water intakes are currently used would entail decreasing the volume of water withdrawn from the river. A facility shutdown will be necessary to perform the improvements to the cooling water intake system. The feasibility of improving the cooling water facilities at these, and other, facilities is unknown at this time.

While the intake volume reductions at other facilities will benefit the recreational fishery, the expected benefits to the injured resource may not be as large as those expected from Alternative 2, nor is it as time sensitive as Alternative 2.

#### 4.2 PREFERRED ALTERNATIVE

The Trustees were required to evaluate each of the possible restoration projects based on all relevant considerations, including the selection criteria discussed in Section 4.1.

The Trustees retained all of the proposed restoration projects described above for further evaluation. For several reasons, the Trustees chose Alternative 2, reduction of intake volume at the Weyerhaeuser Plymouth Mill cooling water intake, as the preferred restoration alternative for Phase 1 implementation. This alternative has the potential to benefit the affected resource, reduces ongoing impacts to fish populations, has negligible impacts on the human environment, and, of all the alternatives considered, is the most time sensitive. Given the need to coordinate the intake reduction project with the plant's operating schedule for 2006 and reduce the ongoing fish mortality due to the cooling water intake system, the Trustees determined this project to be the highest priority for the Phase 1 RP. The Trustees will retain the remaining restoration alternative projects for consideration in the Phase 2 RP. Therefore, this Final Phase 1 RP identifies Alternative 2 as the preferred restoration alternative.

The Trustees are currently working with the RP to identify the most appropriate method for calculating the benefit, or credit, of the preferred alternative. The credit will be used to offset the recreational fishing losses, or debit, due to fish consumption advisories. If the calculated credit is less than the calculated debit, then additional restoration would be needed to compensate the public for the remaining recreational fishing losses. However, if the calculated credit meets or exceeds the calculated debit, then the project would fully compensate the public for recreational fishing losses and no further restoration would be required to compensate for the recreational fishing injury. Determining the appropriate credit for the preferred alternative will involve quantifying enhancements to the fish population as a result of reducing larval entrainment at the intakes. Determining the debit associated with fish consumption advisories will involve quantifying the lost or diminished services provided to recreational anglers. The precise methods and results for these calculations will be detailed in the Phase 2 RP.

## 5 PRELIMINARY CONCLUSIONS

Under 40 C.F.R. §§ 1501.5 and 1501.6 for the purposes of this NEPA analysis, NOAA is the lead agency and USFWS is a cooperating agency. Based on the analysis in this Section and the other information and analyses included throughout the Final Phase 1 RP as part of the environmental review process for the proposed restoration actions, the Federal Trustees conclude that the reduction in intake volume will result in minor or negligible impacts on the quality of the human environment. Construction to reduce intake volume at the Site will take place within the Mill and will not have any adverse impacts on any biological species or habitats in the affected areas. If the Preferred Restoration Alternative can substantially reduce the amount of water withdrawn from the facility, and if these reductions coincide with a peak in biological activity near the intakes as is intended, then improvements to the local fishery and the physical and biological environment found within the proposed project area may be realized. The Preferred Restoration Alternative will not impact the cultural and human environment except for providing for the improvement of recreational fishing.

Under NAO 216-6, a restoration action that does not individually or cumulatively have significant impacts on the human environment (*i.e.*, actions with limited degree, geographic extent, and duration) may be eligible for categorical exclusion, provided such action meet all of the following criteria:

- a) intended to restore the ecosystem, habitat, biotic community, or population of living resources to a determinable pre-impact condition,
- b) uses for transport only organisms currently or formerly present at the Site or in its immediate vicinity,
- c) does not require substantial dredging, excavation, or placement of fill, and
- d) does not involve a significant added risk of human or environment exposure to toxic or hazardous substances.

The reduction in water intake volume at the Site is intended to reduce fish mortality in the Roanoke River. This restoration action is intended to partially restore habitat to the pre-impact condition prior to release of the contaminants at this point in the river. This restoration action will not involve any transport of organisms. This restoration action will not require substantial dredging, excavation, or placement of fill. This restoration action will not add any risk of human or environment exposure to toxic or hazardous substances. Accordingly, this Restoration Plan qualifies for a categorical exclusion under NEPA. NOAA will prepare a Categorical Exclusion Memoranda documenting this determination. As stated above, this action also qualifies for categorical exclusion under USFWS regulations.



## 6 REFERENCES

North Carolina Department of Environment and Natural Resources (NCDENR) Division of Water Quality (DWQ). 2006a. Registered Facilities in the Central Coastal Plain Capacity Use Area. Retrieved from:

<[http://www.ncwater.org/Permits\\_and\\_Registration/Capacity\\_Use/Central\\_Coastal\\_Plain/index.php?menu=QuerytheData](http://www.ncwater.org/Permits_and_Registration/Capacity_Use/Central_Coastal_Plain/index.php?menu=QuerytheData)> September 20, 2006.

North Carolina Department of Environment and Natural Resources (NCDENR) Division of Water Quality (DWQ). 2006b. Fish Kill Event Update. Retrieved from:

<<http://h2o.enr.state.nc.us/esb/Fishkill/fishkillmain.htm>> September 20, 2006.

United States Environmental Protection Agency (EPA). 2006. Cooling Water Intake Structures – CWA Section 316B. Retrieved from: <

<http://www.epa.gov/waterscience/316b/ph3.htm>> September 20, 2006.

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