



**FINAL RESTORATION PLAN AND
ENVIRONMENTAL ASSESSMENT
FOR THE
LONE MOUNTAIN PROCESSING INC.
COAL SLURRY SPILL
NATURAL RESOURCE DAMAGE ASSESSMENT**

Prepared by:
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Region 5
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“Our mission is working with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people.”

PREFACE

“Some paintings become famous because, being durable, they are viewed by successive generations, in each of which are likely to be found a few appreciative eyes. I know a painting so evanescent that it is seldom viewed at all, except by some wandering deer. It is a river who wields the brush, and it is the same river who, before I can bring my friends to view its work, erases it forever from human view. After that it exists only in my minds eye.”

Aldo Leopold 1949
A Sand County Almanac

EXECUTIVE SUMMARY

On October 24, 1996, a failure in a coal slurry impoundment associated with a coal processing plant owned by Lone Mountain Processing, Inc. (LMPI) in Lee County, Virginia, resulted in the release of six million gallons of coal slurry to the Powell River watershed. The spill occurred when subsidence in the coal slurry impoundment caused the coal slurry to enter a system of abandoned underground coal mine-works. The coal slurry exited through a mine-works surface portal at Gin Creek, causing the release of the coal slurry into a series of tributaries to the Powell River. “Blackwater,” a mix of water, coal fines, and clay, and associated contaminants, extended far downstream. The ultimate repository for the components of the spill material is Norris Reservoir in Tennessee, located approximately 65 miles downstream from the spill discharge. The coal slurry spill impacted fish, endangered freshwater mussels, other benthic organisms, supporting aquatic habitat, and designated critical habitat for two federally listed fish. Federally listed bats and migratory birds may have also been affected acutely due to a loss of a food supply, and chronically due to possible accumulation of contaminants through the food chain.

A Consent Decree (CD) was entered with the U.S. District Court for the Western District of Virginia, Big Stone Gap Division by the United States and LMPI on March 5, 2001, to address natural resource damages resulting from the 1996 release. The CD required that LMPI pay \$2,450,000 to the Department of Interior Natural Resource Damage Assessment and Restoration (NRDAR) Fund. The CD stipulates that these funds are to be “...utilized for reimbursement of past natural resource damage assessment costs, and restoration, replacement or acquisition of endangered and threatened fishes and mussels located in the Powell River and its watershed, or restoration, replacement or acquisition of their habitats or ecosystems which support them, or for restoration planning, implementation, oversight and monitoring.”

Section 111(i) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) requires natural resource trustees to develop a restoration plan prior to allocating recoveries to implement restoration actions, and to obtain public comment on that plan. Under the National Environmental Policy Act (NEPA), Federal agencies must identify and evaluate environmental impacts that may result from Federal actions. A notice of availability of the Draft Restoration Plan and Environmental Assessment (RP/EA) was published in the Federal Register on February 15, 2003 and a 30 day public comment period ended on March 15, 2003. Public comments were received and are addressed in this document. This Final RP/EA integrates CERCLA and NEPA requirements by summarizing the affected environment, describing the purpose and need for action, and selecting and describing the preferred restoration alternative.

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ACRONYMS AND ABBREVIATIONS

AWCC	Aquatic Wildlife Conservation Center at Buller Hatchery, Marion, VA
AML	abandoned mine lands
BMPs	best management practices
CD	consent decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CREP	Conservation Reserve Enhancement Program
CWA	Federal Water Pollution Control Act (Clean Water Act)
DMME	Virginia Department of Mines, Minerals and Energy
DOI	Department of the Interior
DOJ	Department of Justice
EA	Environmental Assessment
ESA	Endangered Species Act
LCSWCD	Lee County Soil and Water Conservation District
LMPI	Lone Mountain Processing, Inc.
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEPA	National Environmental Policy Act
NRDAR	natural resource damage assessment and restoration
PAHs	poly aromatic hydrocarbons
RP/EA	restoration plan / environmental assessment
Service	U.S. Fish and Wildlife Service
USDA	U.S. Department Agriculture
UTRB	Upper Tennessee River Basin
VAFO	U.S. Fish and Wildlife Service, Virginia Field Office
Virginia Tech	Virginia Polytechnic Institute and State University
VCA	Virginia Coal Association
VDCR	Virginia Department of Conservation and Recreation
VDEQ	Virginia Department of Environmental Quality
VDGIF	Virginia Department of Game and Inland Fisheries
VMA	Virginia Mining Association, Inc.
VWCB	Virginia Water Control Board
WQIA	Water Quality Improvement Act

1.0 INTRODUCTION: PURPOSE AND NEED FOR RESTORATION

This document constitutes the final Restoration Plan and Environmental Assessment (RP/EA) on proposed restoration actions associated with the Lone Mountain Processing, Inc. (LMPI) coal slurry spill natural resource damage assessment and restoration (NRDAR). The U.S. Fish and Wildlife Service (Service) has prepared this RP/EA to address and evaluate restoration alternatives related to natural resource injuries within the Powell River watershed. The purpose of this RP/EA is to document the selected restoration alternative that will restore, rehabilitate, replace, or acquire natural resources and the services provided by those resources that approximate those injured as a result of the spill. Funds to accomplish such actions were collected as natural resource damages for injuries, pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).

1.1 Authorities

The Department of the Interior (DOI) acting through the Service evaluated damages to natural resources that resulted from the release of hazardous substances to the Powell River watershed near St. Charles, Virginia. Section 107 of CERCLA [42 U.S.C. § 9601 *et seq.*], Section 311 of the Federal Water Pollution Control Act (CWA) [33 U.S.C. § 1321], and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) [40 CFR Part 300] provide authority to the Department to seek such damages and effect appropriate restoration actions.

A Consent Decree (CD) was entered with the U.S. District Court for the Western District of Virginia, Big Stone Gap Division by the United States and LMPI on March 5, 2001, to address natural resource damages resulting from the 1996 release. The CD required that LMPI pay \$2,450,000 to the Department of Interior Natural Resource Damage Assessment and Restoration (NRDAR) Fund. The CD stipulates that these funds are to be “...utilized for reimbursement of past natural resource damage assessment costs, and restoration, replacement or acquisition of endangered and threatened fishes and mussels located in the Powell River and its watershed, or restoration, replacement or acquisition of their habitats or ecosystems which support them, or for restoration planning, implementation, oversight and monitoring.”

The Service has prepared this final RP/EA to fulfill requirements under CERCLA to develop a restoration plan prior to allocating recovered natural resource damages on restoration. In addition, this document constitutes an environmental assessment as defined under the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. 4321 *et seq.*) and addresses the potential impacts of proposed restoration actions on the quality of the physical, biological, and cultural environment. Authority for NRDAR also lies under the Federal Water Pollution Control Act of 1972, as amended, commonly referred to as the Clean Water Act (33 U.S.C. 1251

et seq.). The NRDAR regulations for hazardous substances are codified at 43 CFR Part 11. The NRDAR regulations are available for developing natural resource damage claims based on the cost of restoration and the value of interim public losses, and also contain useful concepts and guidance for post-recovery restoration planning where no formal damage assessment was prepared. Other laws, regulations, and policies that may be applicable to or otherwise inform the development and implementation of this NRDAR RP/EA include the following: the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*); the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. 703 *et seq.*); the Wilderness Act of 1964, as amended (16 U.S.C. 1131 *et seq.*); and the Fish and Wildlife Coordination Act of 1958, as amended (16 U.S.C. 661 *et seq.*). Any restoration actions undertaken pursuant to this document will be conducted in compliance with all applicable State, Federal, and local regulations.

1.2 Trustee Responsibilities Under CERCLA and Federal Agency Obligations under NEPA

The National Contingency Plan, 40 CFR 300.600, designated Federal officials to act on behalf of the public as Trustees for natural resources. The Secretary of Interior was designated Trustee for natural resources, including their supporting ecosystems, belonging to, managed by, held in trust by, pertaining to, or otherwise controlled by the DOI. Among these trust resources are: migratory birds; inter-jurisdictional fish; some marine mammals; endangered species and their respective habitats; and Federal lands managed by DOI. The Service's Region 5 Regional Director has been designated as the Authorized Official to act on behalf of the Secretary as Trustee for natural resources related to this NRDAR action.

Under CERCLA, Trustees are authorized to assess damages for injury to, destruction of, or loss of natural resources resulting from the release or threat of release of hazardous substances for those resources under their trusteeship, and may seek to recover such damages from responsible parties. Monetary damages recovered by Trustees can only be used to restore, replace, or acquire natural resources equivalent to those injured (42 U.S.C. 9607 (f)(1)).

Section 111(i) of CERCLA requires the Trustees to develop a Restoration Plan (RP) prior to spending recoveries to implement restoration actions, and to obtain public comment on that plan. To fulfill this requirement, this final RP/EA describes the preferred alternative for achieving restoration of natural resource injuries. Moreover, this RP/EA identifies and describes how settlement monies will be spent to achieve restoration goals.

Under NEPA, Federal agencies must identify and evaluate environmental impacts that may result from Federal actions. Federal agencies can prepare an Environmental Assessment (EA) to

facilitate such an evaluation. The draft RP/EA which preceded this Final RP/EA, integrated NEPA requirements by: summarizing the affected environment; describing the purpose and need for action; identifying alternative actions¹; assessing each alternative's applicability and environmental consequences; and, summarizing opportunities for public participation in the decision process.

1.3 Affected Area

1.3.1 Spill Event Background

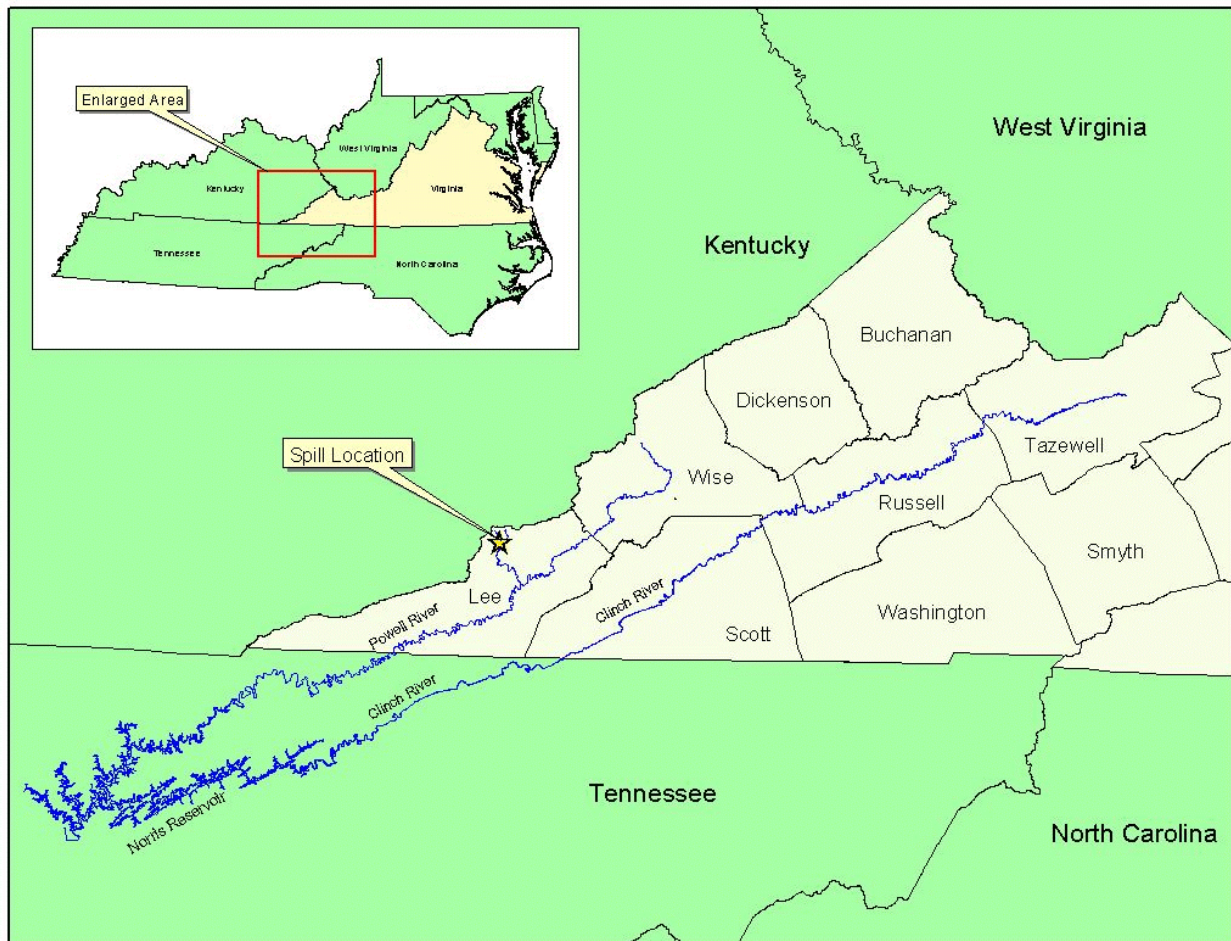
On October 24, 1996, a failure in a coal slurry impoundment associated with a coal processing plant owned by LMPI in Lee County, Virginia, resulted in the release of six million gallons of coal slurry to the Powell River watershed. The spill occurred when subsidence in the coal slurry impoundment caused the coal slurry to enter a system of abandoned underground coal mine-works. The coal slurry exited through a mine-works surface portal at Gin Creek, causing the release of the coal slurry into a series of tributaries to the Powell River. "Blackwater," a mix of water, coal fines, and clay, and associated contaminants, extended far downstream. The ultimate repository for the components of the spill material is Norris Reservoir in Tennessee, located approximately 65 miles downstream from the spill discharge. There was little opportunity for wildlife emergency response or restoration activities for this incident. Environmental response actions taken at this site did not prevent injury to natural resources, and do not address potential residual natural resource injuries resulting from the coal slurry release.

1.3.2 Overview of the Powell River Watershed

The Upper Tennessee River Basin (UTRB) is primarily located in southwestern Virginia and eastern Tennessee (Figure 1). Most of the UTRB above the Norris Reservoir is forested or in crops and pasture. A minor portion of the remaining land use is industrial, residential, or commercial. The population of nearly 500,000 residents is concentrated along rivers and highways in urban centers. The UTRB, which includes the Powell River watershed (Figure 1), is considered one of the Nation's most biologically diverse aquatic ecosystems. The upper regions of the Clinch and Powell Rivers drain areas of approximately 1912 square miles and 938 square miles, respectively.

¹Stipulated restoration criteria outlined in the CD rendered a broad consideration of restoration alternatives normally required under NEPA impracticable.

FIGURE 1 - POWELL RIVER WATERSHED



Both rivers flow in a southwesterly direction through the Cumberland Plateau and the Valley and Ridge physiographic provinces, though only small portions of the Clinch (mainly tributaries) are found within the Cumberland Plateau. The Powell River begins in Wise County, Virginia, and flows approximately 120 miles, where it now enters Norris Lake, a Tennessee Valley Authority impoundment. The Powell River is a valuable water source, supplying the municipal water needs for over 6,575 area residents in Lee County, Virginia (Mark Smith, Lee County Public Service Authority, personal communication). The Clinch and Powell Rivers are multiple-use recreation areas that provide vital habitat for many forms of wildlife. These rivers are inhabited by one of the world's richest and most diverse assemblages of mussels. The UTRB in Virginia harbors 30 species that are federally listed threatened or endangered. Of these, 18 species are freshwater mussels. Historically, 41 species of freshwater mussels were documented in the Powell River (Ortmann, 1918) downstream of the mouth of the North Fork Powell River. However, in recent decades abundance and diversity of fish and mussel species have declined. One report noted that most of the declines of the molluscan fauna from the upper Powell River are due to a combination of inorganic silt, coal waste deposits, and water quality degradation from mining activities (Terwilliger et al. 1995). Twelve federally listed mussel species (Table 1) and designated critical habitat for two federally listed fish species occur in the Powell River downstream of the mouth of the North Fork Powell River.

1.4 Natural Resource Injury

Natural resource injury is defined under 43 CFR 11.14 as "... a measurable adverse change, either long- or short-term, in the chemical or physical quality or the viability of a natural resource resulting either directly or indirectly from exposure to a ... release of a hazardous substance, or exposure to a product of reactions resulting from the ... release of a hazardous substance." Injuries to biological resources include death, behavioral abnormalities, cancer, genetic mutations, physiological malformations (including malfunctions in reproduction), and physical deformation (43 CFR 11.62 (f)). Biological resources may also be injured when they contain hazardous substance concentrations that exceed action or tolerance levels under Federal or State laws regulating human consumption. Injury to surface and ground water resources is defined to include concentrations of hazardous substances in the water or sediment of sufficient concentrations to have caused injury to other natural resources, such as biological resources (43 CFR 11.62 (b) & (c)).

The coal slurry spill released sediments and hazardous substances that impacted 12 federally listed mussels and critical habitat for two federally listed fish. Table 1 provides a list of these species. These species represent a remarkably diverse and imperiled aquatic fauna in the Powell River watershed. Additionally, the Virginia Department of Environmental Quality (VDEQ) released a conservative estimate that at least 11,240 fish of a number of species were killed as a

result of the LMPI release, including known host species for federally listed endangered mussels. Many hazardous substances listed in 40 C.F.R. § 302.4 were released and include: 1,2,5,6-dibenzanthracene, 1,2-benzanthracene, acenaphthalene, acenaphthene, anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, biphenyl, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene. The Service documented the presence of coal fines from the coal slurry in sediments and mussels collected from the Powell River, and the presence of hazardous substances in sediments collected from the Powell River and from the slurry impoundment. Coal fines, silts, and clays in the initial coal slurry spill buried fish, mussels, and other benthic organisms, and their habitat, and designated critical habitat for the federally listed fish. In addition, spill materials clogged the gills of fish and mussels, interfering with oxygen uptake and feeding. Federally listed bats and migratory birds could have been affected acutely, indirectly, due to a loss of a food supply, and, chronically, due to probable accumulation of contaminants through the food chain.

Studies by Temple (1997) generally noted that coal fines and sediments in the steeper gradient North Fork Powell River drainage flush downstream as turbidity “slugs” during high flow events. Turbidity slugs enter the lower gradient, mainstem Powell River and result in deteriorated water quality during high flow events. As high flow events subside and subsequently reoccur, further redeposition and resuspension of fines and sediments have taken place in the mainstem Powell River. As a result of the spill, the aquatic fauna of the Powell River continued to suffer the adverse effects of sedimentation as slurry fines and sediments were resuspended and redeposited throughout the lower gradient, mainstem Powell River. Burkhead and Jenkins (1982) generally found that coal fines and sediments transported from the upper Powell River watershed tend to collect in pools in the mainstem Powell River, thereby detrimentally altering pool habitat for aquatic organisms.

TABLE 1 - Federally listed species affected by the coal slurry spill.

<u>COMMON NAME</u>	<u>SCIENTIFIC NAME</u>	<u>STATUS</u>	<u>DESIGNATED CRITICAL HABITAT IN THE POWELL RIVER</u>
<u>Mussels</u>			
Appalachian monkeyface	<i>Quadrula sparsa</i>	endangered	no
birdwing pearlymussel	<i>Lemiox rimosus</i>	endangered	no
Cumberland bean	<i>Villosa trabilis</i>	endangered	no
Cumberland monkeyface	<i>Quadrula intermedia</i>	endangered	no
cracking pearlymussel	<i>Hemistena lata</i>	endangered	no
dromedary pearlymussel	<i>Dromus dromus</i>	endangered	no
fine-rayed pigtoe	<i>Fusconaia cuneolus</i>	endangered	no
fanshell	<i>Cyprogenia stegaria</i>	endangered	no
shiny pigtoe	<i>Fusconia cor</i>	endangered	no
Cumberland combshell	<i>Epioblasma brevidens</i>	endangered	no
rough rabbitsfoot	<i>Quadrula cylindrica strigillata</i>	endangered	no
oyster mussel	<i>Epioblasma capsaeformis</i>	endangered	no
<u>Fish</u>			
yellowfin madtom	<i>Noturus flavipinnis</i>	threatened	yes
slender chub	<i>Erimystax cahni</i>	threatened	yes

1.4.1 Physical Effects

Mussel habitat was adversely impacted by the coal slurry spill. Historically, one third of all freshwater mussel species in the United States was located in the UTRB, which includes the Powell River and its tributaries. Currently, half of those mussel species are extinct, federally listed as endangered, or are considered rare. The remaining mussel species are restricted to just a few isolated river reaches (Richard Biggins, U.S. Fish and Wildlife Service, personal communication). Wolcott and Neves (1993) noted that the density of the mussel fauna in the Powell River had declined over the past 15 years, and that contamination and siltation from coal processing facilities and abandoned mine lands likely contributed to the decline. The endangered freshwater mussels in the Powell River rely on clean, stable substrate for their continued existence. The contribution of coal fines and sediments from the LMPI spill has further decreased the availability of clean stable substrate for mussel habitat, limited secondary production and restricted vertical movement of mussels (juvenile and adult) and other macroinvertebrates within the substrate. When very light coal fines (such as those from the spill) are added to the stream substrate, they destabilize the substrate and make it more susceptible to movement during storm events (S.A. Ahlstedt, U.S. Geological Survey, personal communication). Free-flowing stream habitat without stable substrate will not support unionid mussel populations.

Mussel larvae, known as glochidia, are obligate parasites upon a particular host fish, which renders them very sensitive to disturbances of the freshwater ecosystem (Bogan 1993). Mussels are threatened not only by actions that directly impact them, but also any actions that affect their host fish. Without the host fish, many of which are species specific, mussels cannot complete their reproductive cycle. Decreases in fish host populations directly affect reproductive success in mussels (Kuznik 1993). There is a significant correlation between the incidence of glochidial encystment on fish hosts and fish species richness (Wiess 1993). The significance of host fish abundance is evident when considering that only 0.0004% of released glochidia become encysted on fish hosts (Young and Williams 1984). Fish species capable of acting as hosts to mussel glochidia that were killed by the LMPI spill were likely to have been infected by mussel glochidia, including the glochidia of endangered mussels. Glochidia parasitizing host fish killed during the spill would have perished along with the host. Also, those fish capable of acting as hosts to mussel glochidia but killed by the spill were rendered unavailable as hosts. Many of the fish species identified as host fish for the endangered mussels of the Powell River by the U.S. Fish and Wildlife Service (1983c), Hill (1986), Bruenderman (1989), Neves (1991), Yeager and Saylor (1995) and Neves et al. (1996), or species closely related to these host fish, have been shown to be intolerant of sedimentation in the Powell River (Temple 1997).

Sedimentation on fish spawning beds also has a negative impact on fish populations. Fish eggs require a clean surface, and silt that settles on spawning substrate prevents successful incubation

and hatching. Sedimentation also clogs the interstitial spaces in gravel, reducing water flow and oxygen availability to eggs, ultimately causing them to suffocate (Doudoroff 1957; McQuinn et al. 1983). Berkman and Rabeni (1987) found that siltation altered fish community structure, and reduced the number of benthic insectivores and herbivores, upon which many fish species feed.

The slender chub and yellowfin madtom and/or their designated critical habitat may be impacted by sedimentation that reduces heterogeneity of the stream bottom, increases water turbidity, limits aquatic plant growth, alters invertebrate communities and increases mortality of fish eggs and larvae. Thus, for many species of fish, sedimentation limits survival, availability of food, cover and spawning habitat (Chutter 1969; Gammon 1970; Muncy et al. 1979; Berkman and Rabeni 1987). Temple (1997) found two species of the genus *Erimystax*, closely related to the slender chub, to be intolerant of sedimentation in the Powell River. The continued existence of the slender chub and the yellowfin madtom depends upon reductions in chemical pollution and sedimentation (Jenkins and Burkhead 1994). Sedimentation from coal mining activities in the upstream portions of the Powell River adversely affects stream habitat for the slender chub and the yellowfin madtom, and water quality degradation resulting from coal processing and other activities (i.e., habitat and water quality degradation) must be reduced if the species are to recover (Etnier and Starnes 1993; U.S. Fish and Wildlife Service 1983a; U.S. Fish and Wildlife Service 1983b). In particular, the VDGIF (1999) noted that the persistence of the slender chub, and the potential for this species to establish itself upriver in the Powell is dependent of the reduction of coal fines.

Sediment from the spill contributed to the degradation of habitat for the slender chub and the yellowfin madtom in the Powell River. The yellowfin madtom, slender chub, and their habitat in the Powell River continue to suffer from this stream's heavy load of coal fines (Burkhead and Jenkins 1991; Etnier and Starnes 1993; Jenkins and Burkhead 1994); sedimentation from the spill has further contributed to degradation of critical habitat for the slender chub and the yellowfin madtom and reduced the likelihood of recovering these species. In the weeks following the spill, much of the slurry had settled out along the river margins where yellowfin madtoms reside under leaf packs in the fall (Peggy Shute, Tennessee Valley Authority, personal communication). As fines and other sediments from the spill settle out over the substrate following high flow events, they fill cracks and crevices beneath rocks, especially in pool areas, where yellowfin madtoms nest, seek cover and feed. In riffles, fine sediments contribute to declining macroinvertebrate abundance in the hyporheos (Richards and Bacon 1994), which may explain why Temple (1997) classified two species closely related to the slender chub as intolerant of sedimentation in the Powell River.

1.4.2 Chemical Effects

There are a number of potentially toxic or harmful inorganic and organic elements present in the wastes from coal preparation (Wewerka et al. 1976). The spill from the LMPI coal processing plant slurry impoundment released numerous toxic and hazardous substances, including heavy metals, various flocculants and coagulants used in coal processing, and at least 17 polycyclic aromatic hydrocarbons. Juvenile freshwater mussels depend upon the streambed as a medium for nourishment, and contaminants that partition in the sediments may have adverse impacts on both growth and survival of juveniles. The ingestion of fines noted following the spill (R.J. Neves, VPI, personal communication) exposed mussels to slurry contaminants, many of which are toxic to aquatic organisms. For example, polyacrylamide, a flocculent used at the LMPI facility that was spilled into the Powell River system, has been shown to have significant toxic effects on invertebrates and other aquatic organisms (Beim and Beim 1994). In most instances, the combined effects of numerous contaminants and induced physiological stresses are the ultimate cause for acute or chronic mortality in a population of mussels (Neves 1993).

Exceedences of water quality criteria for the protection of aquatic life by several orders of magnitude were observed in slurry samples collected from the Powell River tributaries in the days following the release. Iron, aluminum, and manganese can be detrimental to soils, sediments, plants, and aquatic life (Wewerka, et al. 1976). Mussels take up and concentrate heavy metals and other contaminants from the water column (Bogan 1993). Juvenile mussels are particularly sensitive to the effects of contaminants as they are both deposit and suspension feeders (Yeager et al. 1994). The toxicity of coal-related contaminants has not been adequately investigated, in particular for toxicity to adult and larval mussel species. There is, however, data regarding the toxicity of coal components to other invertebrate and vertebrate species (Birge 1978; Birge et al. 1978).

McCann and Neves (1992) conducted toxicity tests with juvenile and adult mussels using sediments collected from areas in the Powell River impacted from mining-related activities. They reported that sediments in the Powell River have the potential to adversely impact juvenile mussel populations either through direct toxicity of the metals bound to the sediments, or through impairment effects, such as reduced growth. McCann and Neves (1992) concluded that coal processing plants need tighter controls on their effluents to help lower metal concentrations in water and sediments. They also noted the need to reduce sedimentation and associated contaminants to help mussel recovery in the Powell River, and other drainages affected by mining activities. A late 1980s Virginia Water Control Board (VWCB) and Virginia Coal Association (VCA) joint study on discharges from various types of coal industry facilities showed that effluent from coal processing plants demonstrated acute toxicity to aquatic organisms and concluded that the potential for chronic toxicity of coal processing plant effluents should be further evaluated (Memorandum of April 14, 1992, from Ken Roller, VDEQ, to Bob

Burnley, VDEQ, transmitting report on VWCB/VCA Coal Pilot Study).

Massey and Barnhisel (1972) reported that less than 0.5 ppm of iron or aluminum is lethal to some species of fish. Concentrations of copper ranging from 1.5 to 11.6 ppm are also lethal to some fish species (Rehwoldt et al. 1971). Wewerka et al. (1976) noted that these effects can be caused by quantities of trace elements that are known to be present in the effluents from coal-waste materials. As noted above, aluminum and copper were detected at 2550 and 12.5 ppm, respectively, in a grab coal slurry sample the day after the initial release. Iron was detected at 9800 ppm from this same sample. These studies suggest that metals found in coal slurry are high enough to be acutely toxic to certain fish species.

Polynuclear aromatic hydrocarbons (PAHs) are a large group of compounds composed of carbon and hydrogen arranged in the form of two or more fused benzene rings. Effects on survival, growth, reproduction, and induction of neoplasms have been observed in many species following exposure to PAHs. Several of the higher molecular weight PAHs are among the most potent carcinogens known to exist, producing tumors in some organisms through single exposures in microgram quantities (Eisler 1987). Many of the lower molecular weight PAHs are acutely toxic to aquatic organisms, due to their higher solubilities. Available literature on PAHs indicates most species of aquatic organisms rapidly accumulate PAHs from low concentrations in the ambient medium. PAHs concentrate in sediments and on organic material. Freshwater mussels are in constant contact with the sediments and also ingest sediments that include organic materials, during respiration and feeding. Mussels rapidly accumulate PAHs whether water soluble, dispersed, or in particles adsorbed in their tissues (D'Adamo et al. 1997).

The release of six million gallons of coal slurry from the LMPI coal preparation plant has further slowed mussel and fish recovery by adding voluminous quantities of toxic contaminants and sediments/silt into an already impaired ecosystem. High water events continue to flush particles from the spill from the free-flowing reaches of the Powell River, but such events also serve to resuspend and redeposit these particles, thereby re-exposing mussels and fish to toxic effects of the coal slurry constituents. Contaminants adsorbed to clays and fine particles persist over time in a river system such as the Powell River (Bradley Bryan, U.S. Geological Survey, personal communication). The persistence of contaminants in the Powell River has resulted in sublethal and lethal effects to the aquatic fauna in parts of the Powell River.

1.4.3 Natural Resources Impacted and Nature of Impact

- freshwater mussels, including, but not limited to, federally and state listed endangered and threatened freshwater mussels
 - acute and chronic toxicity from exposure to hazardous substances in the slurry mixture (at time of spill and following resuspension over time)
 - behavioral changes due to impediment of normal filtering and ingestion of food caused by exposure to fine particles in slurry mixture
 - suffocation from silt and sedimentation
 - indirect lethality of glochidia due to loss of host fish
 - indirect loss due to habitat degradation from silt and sedimentation
- freshwater fish, including potential and known host species for federal and state listed endangered and threatened freshwater mussels
 - acute and chronic toxicity from exposure to hazardous substances in the slurry mixture (at time of spill and following resuspension over time)
 - acute lethality from suffocation from exposure to fine particles within the slurry mixture
 - behavioral changes (i.e., altered chemoreception) due to exposure to hazardous substances in the slurry mixture
- federally designated critical habitat for federally listed fish species
 - habitat degradation due to silt, sediment, and contaminant loading
- bats, including federally listed species, migratory birds, including waterfowl, raptors, and others
 - indirect effects due to a loss of a food supply
 - acutely and chronically due to exposure of contaminants through food chain accumulation
- lands, including wetlands, shorelines, floodplains, and instream
 - habitat degradation due to coal fines and contaminant loading
- surface water and sediment
 - increased levels of total suspended solids and total dissolved solids
 - increased contaminant loading

1.5 Natural Resources Compensation

Pursuant to the settlement with LMPI, the DOI NRDAR program fund received a lump sum of \$2,376,500 for reimbursement of past assessment costs, certain administrative expenses, and restoration of injuries resulting from the spill. This sum reflects an assessment levied against the settlement by the DOJ (3%) for reimbursement of litigation costs. A reimbursement of past assessment and litigation costs has also been made to the DOI and the Service. The remaining sum of \$2,040,000 has been placed in an interest bearing account and is managed by the NRDAR program office. By law the remaining settlement recovery, including interest, can only be used for the specific restoration, rehabilitation, replacement, or acquisition of equivalent natural resources injured or potentially injured by the spill and for the planning, implementation oversight, and monitoring of restoration projects.

1.6 Purpose of the Proposed Action

The purpose of the proposed restoration plan is to restore, rehabilitate, replace, and/or acquire the equivalent of any natural resources injured or destroyed by the Lone Mountain Processing, Inc. coal slurry spill, pursuant to the requirements of the Consent Decree, and applicable State and Federal laws and regulations.

1.7 Need for the Proposed Action

The need for the proposed action is to ensure the restoration and recovery of natural resources injured as a result of the coal slurry spill.

1.8 Public Notification and Review

The Service believes that public comment and input is a critical aspect of a successful restoration. A notice of availability of the draft Restoration Plan and Environmental Assessment (RP/EA) was published in the Federal Register on February 15, 2003 and a thirty day public comment period ended on March 15, 2003. Public comments were received and are addressed in this document. Where appropriate, the Service has made changes to the RP/EA by incorporating concepts and ideas submitted by interested parties during the public comment period. Comments and suggestions received by the Trustee are addressed in Section 5 of this final RP/EA.

2.0 REVIEW OF CONSIDERED RESTORATION ALTERNATIVES

In developing the RP/EA, NEPA requires that the Service consider a reasonable number of possible restoration alternatives. The NRDAR regulations also provide procedures and criteria for developing and evaluating a reasonable number of restoration alternatives. Section 2.2 explains the criteria for identifying and evaluating alternatives. Section 2.3 reviews restoration alternatives dropped from consideration after the publication of the draft RP/EA. The proposed preferred restoration alternative is identified in Section 2.4.

2.1 Definition of Key Terms and Concepts

To provide perspective on the restoration planning methodologies presented in this RP/EA, key terms and concepts are defined and discussed.

Restoration refers to actions undertaken to return an injured resource to its baseline condition as measured by the services provided by that resource [43 CFR § 11.14 (II)]. Restoration includes rehabilitation, replacement, or acquisition of resources or services.

Restoration or rehabilitation actions are those actions undertaken to return injured resources to their baseline condition, as measured in terms of the physical, chemical, or biological properties that the injured resources would have exhibited or the services that would have been provided by those resources had the discharge of oil or release of the hazardous substance under investigation not occurred. Restoration can be accomplished by restoring or rehabilitating resources or by replacing or acquiring the equivalent of the injured natural resources and their services [43 CFR § 11.14 (II)].

Replacement or acquisition of the equivalent means the substitution for injured resources with resources that provide the same or substantially similar services, when such substitutions are in addition to any substitutions made or anticipated as part of response actions and when such substitutions exceed the level of response actions determined appropriate to the site pursuant to the NCP [43 CFR § 11.14 (a)].

Baseline refers to the conditions that would have existed in the assessment area had the release of hazardous substances not occurred [43 CFR § 11.14 (e)].

Services are defined as the “physical and biological functions performed by the resource, including the human uses of those functions” [43 CFR § 11.14 (nn)]. Restoration should be distinguished from *remediation* or *response actions* undertaken pursuant to CERCLA or the NCP.

2.2 Criteria for Identifying and Evaluating Restoration Alternatives

The primary restoration goal is to restore the fish and mussel assemblages and their supporting habitats to approximate baseline conditions. Under authorities outlined in Section 1, the Service will consider restoration actions within the Powell River watershed and associated habitats and/or resources to support faunal assemblages that were impacted following releases of the hazardous substances. With this general goal in mind, the Service will attempt to also achieve the following primary compensable restoration objectives:

- increase survival probabilities for federally listed endangered mussel and fish species;
- protect and restore federally designated critical habitat for listed fish species;
- restore/enhance water quality;
- improve the quality of bed and bank sediments; and
- improve and protect riparian buffer habitats.

The preferred restoration alternative seeks a set of actions that achieves these objectives in a coordinated and cost-effective manner. By undertaking restoration activities, the Service hopes to also achieve the added benefit of restoring/enhancing the public's ability to use and enjoy the restored resources, including the enhancement of local eco-tourism. The preferred restoration alternatives will restore, rehabilitate, replace, or acquire the equivalent of the injured resources. Unless otherwise indicated, the term "restoration" is used to refer generally to any and all of these types of actions (i.e., restore, rehabilitate, acquire, etc.). The preferred restoration alternative consists of actions, individually or in combination, that would achieve those purposes through site-specific projects. These actions reflect a combination of restoration or rehabilitation management activities and opportunities for resource replacement or acquisition.

Drawing upon the factors within the DOI NRDAR regulations and DOI policy for selecting a restoration alternative, the Service selected the preferred restoration alternative based on all relevant considerations including general consideration of the following factors:

- closeness of nexus between the restoration activity and the injuries;
- degree to which restoration activity will directly benefit injured resources;
- technical feasibility;

- relationship of the expected costs of the proposed actions to the expected benefits from the restoration action, including amount of desirable functions restored and ecological benefit to the surrounding watershed;
- cost-effectiveness;
- potential for additional injury resulting from the proposed actions, including long-term and indirect impacts, to the injured resources or other resources;
- natural recovery period;
- ability of the resources to recover with or without alternative actions;
- potential effects of the action on human health and safety;
- consistency with relevant Federal and State policies; and,
- compliance with applicable Federal and State laws.

The preferred restoration alternative described herein is based on conceptual plans for which some costs have been estimated. The size and design of recommended restoration alternatives may change based on additional public input or additional scientific findings. If, during implementation, the Service determines that significant changes are appropriate to the selected restoration alternative, or if the amounts of funding described in this plan are shifted significantly among the various components of the selected alternative, additional public review and comment may be sought. No restoration activities will be conducted by the Service that would incur ongoing expenses in excess of those that can be funded by settlement monies or the interest therefrom, unless such additional monies are allocated through the normal budget process.

2.3 Alternatives That Were Dropped From Consideration

2.3.1 No Action / Natural Recovery

This alternative was addressed to fulfill requirements under NEPA, and is consistent with the damage assessment process under the NRDAR regulations. Under this alternative no action would be taken to restore resources injured due to contamination within the Powell River watershed or to replace or acquire additional natural resources to restore ecological and human services provided by the injured resources. The funds recovered for DOI's natural resource damages claim for the site would not be spent. Restoration of the resource and resource function would be completely dependent upon natural processes. This alternative is technically feasible, has no cost, but also would result in no benefit from the funds specifically recovered for restoration. This alternative has been dropped from consideration.

2.3.2 In-kind Restoration Outside of the Powell River Watershed

When developing and evaluating restoration alternatives, the Service weighed an alternative to restore natural resources outside of the Powell River watershed where the injury occurred. This alternative considers the possibility of implementing restoration actions within the Clinch River or another watershed if such actions could not be completed, in whole or part, within the Powell River watershed. The Service has identified no specific restoration actions that would be required to take place outside of the Powell River watershed. Additionally, several comments received from the public stated a desire not to implement restoration actions outside of the Powell River. This alternative has been dropped from consideration.

2.4 Preferred Alternative

When developing and evaluating restoration alternatives, the Service considered an alternative to restore natural resources in-kind within the Powell River watershed where the injury occurred. Actions considered under the preferred alternative are technically feasible, and can be conducted with the intent to maximize cost-benefit. This alternative is based on a determination that the natural resources injured by the spill will not recover to baseline condition within a reasonable time frame and the services they provided will not be restored without taking alternative actions. All component actions of this alternative could be implemented within the Powell River watershed. Specific restoration actions included under the Preferred Alternative follow.

2.4.1 Riparian Habitat Protection and Enhancement

Habitat enhancement alternatives include a variety of management actions that would improve ecological productivity and facilitate recovery of habitat for injured trust resources through the addition of key structural or biological elements. Fish and mussel recovery enhancement includes actions that will improve recruitment and population stability. Implementation of the habitat protection and enhancement measures will restore the natural riparian structure and function, reduce nutrient and sediment input, provide organic debris as energy source, moderate and restore naturally occurring temperature regimes, and enhance natural mussel and fish recovery. This will help to improve water quality, riparian habitat function and endangered species recovery to restore the watershed to its relative pre-spill condition. Riparian habitat protection and enhancement restoration measures listed below can maximize the recovery of injured resources, yet provide flexibility for implementation.

2.4.1.1 Riparian Buffer Planting

The presence or absence of trees on land adjacent to stream channels significantly and directly affects the structure and function of macro-invertebrate communities in streams (Sweeney 1993). The physical, chemical, and trophic services that riparian vegetation provides to aquatic fauna are numerous. Organic substrates (leaves and woody debris) derived from stream side trees deposited on the bottom of the stream channel provide valuable habitat for aquatic organisms. Forest canopy shading greatly affects the intensity of sun light that strikes the stream and, in turn, seasonally affects the algal productivity within the stream. Canopy shading serves to reduce deleterious effects of ultraviolet light on aquatic organisms and has been shown to play a major role in the daily and seasonal patterns of stream temperatures. Riparian vegetation affects the chemistry of streams by releasing dissolved organic and inorganic compounds into the water and by removing excess nutrients from shallow groundwater and surface runoff that have a negative, eutrophying effect on a stream. Leaves and other coarse particulate detritus from stream-side vegetation are readily used as food by macroinvertebrates and constitute a major portion of the diets of aquatic primary consumers in healthy streams (Sweeney 1992). These data overwhelmingly indicate that as riparian habitats are enhanced, a positive ripple effect will be realized through the benthic macro-invertebrate, amphibian, fish, and avian communities of the Powell River watershed. This action will restore **native** vegetative cover types in certain disturbed riparian areas. This would include, but would not be limited to, wetland and forested upland cover types in order to enhance and protect stream water quality for the benefit of imperiled aquatic organisms.

2.4.1.2 Stream Bank Stabilization

Riparian habitat restoration will be designed and implemented with Service input and oversight

in accordance with specific project screening criteria (Appendix A). The goal of the riparian habitat restoration is to improve existing stream conditions by implementing stream bank stabilization in problem areas and by planting appropriate riparian buffers throughout the watershed where they are currently absent or insufficient. Stream bank stabilization projects might include planting trees, shrubs, and/or installation of natural rip-rap in areas where significant bank sloughing is taking place. Large scale projects requiring a significant amount of in-stream work may be beyond the scope of injury in this case.

2.4.1.3 Implementation of Best Management Practices

The selection of any form of habitat protection and/or agriculture/forest best management practices (BMP) implementation as a viable alternative must be based upon the supposition that the proposed activity will improve water quality in the Powell River. Implementation of non-point source runoff control BMPs within the Powell River watershed can include specific activities such as erecting livestock exclusion fencing, installing alternative watering sources, sedimentation control structures, and logging techniques that reduce road construction and minimize habitat disturbance. Projects that propose to implement agricultural/forest BMPs in areas or sites that are *ineligible* for funding through the Conservation Reserve Enhancement Program (CREP), Water Quality Improvement Act (WQIA), and/or other programs identified in the New Farm Bill would receive greater consideration than those projects that are eligible for funding through these programs.

2.4.1.4 Long-Term Protection of Riparian Areas

Temporary protection derived from riparian habitat enhancement provides only interim resource benefits. This action is advantageous for resource protection only when more permanent alternatives are unavailable or undesirable. Permanent protection of trust resources is far more beneficial to endangered species restoration as it provides assurance that enhanced areas will not fall back into disrepair and again degrade Powell River water quality in the future. Riparian restoration projects that include acquisition of permanent conservation easements or other legally binding land protection measures will receive higher priority than those projects that do not include such protections, in accordance with project screening criteria (Appendix A).

2.4.1.5 Request for Proposals

After the public notice of the availability of this Final RP/EA has been published in the Federal Register, the Service will issue a request for proposals (RFP) for riparian habitat enhancement and protection projects within the Powell River watershed. The RFP will be widely distributed,

will include detailed instructions for project development and submission, and will have a structured format. Projects will be examined on their own merit and with a focus on their applicability to this NRDAR action and the criteria set forth herein. Projects will be evaluated on a case-by-case basis to determine their suitability for meeting the needs of restoration set forth in this RP/EA. It is likely that not all projects submitted will be funded

2.4.1.6 Estimated Costs for Riparian Enhancement and Protection

Estimating costs for riparian habitat enhancement and protection is driven by several factors. These factors include the cost of reestablishing a desirable vegetative community and hydrology, parcel availability, size, and location, the parcel's development or commercial potential, current zoning, and market value. The Service will rely upon the project screening criteria outlined in Appendix A in making project funding determinations. The Service is proposing to allocate approximately \$1,000,000 over two to four years towards riparian habitat enhancement and protection.

2.4.2 Propagation and Augmentation of Freshwater Mussel Populations

This action proposes to restore the federally listed mussel species within the upper Powell River. The process for propagating listed and non-listed mussels has been developed and refined over the past two decades and is currently at a state where most mussel species can be propagated (O'Beirn *et al.* 1998, Henley *et al.* 2001). The process involves collecting gravid females from the wild, artificially infecting host fish with mussel larvae in the laboratory, and then collecting and holding transformed juvenile mussels. Mussels and host fish are held in the laboratory in recirculating systems for the majority of this process. Juvenile mussels are held in captivity as long as possible to improve their survival rate in the wild.

A wealth of knowledge exists on the life history attributes of the mussel species that inhabit the Powell River. Source populations and reproductive periods are also known for most species. Similar propagation is currently being conducted by several agencies/researchers around the country and is generally accepted as a viable solution for species restoration. Furthermore, a diverse community of biologists from university, state, federal, and non-governmental organizations are working together to conserve this important natural resource and are available to assist in a variety of ways.

It is important to restore the mussel assemblage for a number of reasons. Mussels improve the water quality of a stream through their filter feeding activity. It is important to have large mussels of various species within the assemblage as their filtering and water-clarifying capacity is greater than that of juvenile mussels. Mussel assemblages serve to stabilize river and stream bottoms and add to the general biotic integrity and diversity of the river system. The habitat

heterogeneity is enhanced by a mussel assemblage of diverse age and size class make-up. The relic shells of the entire mussel assemblage provide important substrate and refugia for mussel host fish and sport fish eggs and also provide habitat for insect larvae that comprise mussel host fish and sport fish prey bases. By restoring the entire assemblage, non-listed mussels will serve to reduce predation on the endangered mussels. The restored mussel assemblage will provide vital aquatic ecosystem functions such as nutrient cycling, the conversion of food resources into forms readily assimilated by other organisms, and long-term storage and release of important elements such as calcium, phosphorous, and nitrogen (Neddeau *et al.* 2000).

2.4.2.1 Estimated Costs for Propagation and Augmentation of Freshwater Mussel Populations

The process of propagating freshwater mussels is time and labor intensive. Therefore, the bulk of the costs are associated with salaries and benefits and logistical support for technical staff. Full-time staff would be required throughout the year to: 1) conduct the necessary field work to locate, collect, and recover gravid mussels; 2) locate, collect and recover appropriate host fish; 3) maintain a healthy laboratory environment for mussels and host fish while in captivity (cleaning, feeding etc.); 4) conduct host fish infections; 5) collect juvenile mussels and culture them until released; and 6) release propagated juveniles.

Mussel propagation facilities at Virginia Polytechnic Institute and State University (Virginia Tech) and at the Virginia Department of Game and Inland Fisheries' Aquatic Wildlife Conservation Center (AWCC) will be required to meet the mussel restoration needs of this proposed action because neither facility alone could provide sufficient space and personnel to meet task requirements. Staff at Virginia Tech and AWCC are uniquely qualified to accomplish mussel restoration tasks and have decades of combined experience and knowledge of the Powell River mussel fauna assemblage. Additionally, both facilities are physically located in close proximity to the UTRB; a factor that significantly lowers operational and travel costs. Specific tasks and the division of labor for this effort will be further developed in separate cooperative agreements between these two entities and the Service. In general, biologists from both facilities would participate in a cooperative effort to obtain, culture, and grow-out mussel species of the UTRB.

Based on similar actions and past experience, the Service is considering allocating approximately \$650,000 over an estimated four-year period to propagate freshwater mussels and augment existing populations in a predetermined area within the Powell River watershed (Woodfin 2000). This estimated funding level does not include funds for capital improvements at either facility.

2.4.3 Propagation and Augmentation of Rare Fish Populations

The upper Powell River watershed in southwest Virginia is home to some of the rarest aquatic organisms in North America. However, the Powell River has suffered from the effects of water quality degradation to the point that several species of fishes are now in jeopardy (see Jenkins and Burkhead 1994 for a review). Several additional species have likely become extirpated from the Powell River over the past century. Despite this, Jenkins and Burkhead (1994) recognized that the Powell River has potential to recover and may indeed be considered to be in a state of recovery.

When fish species become imperiled to the extent that some species currently are in the Powell River, restoration is difficult without human intervention. Captive propagation and stocking can be a viable means of initiating this restoration and can also serve to augment already recovering populations. With this action the Service proposes to propagate and augment populations of two federally listed fish in the Powell River above Norris Reservoir. The two species are the slender chub (*Erimystax cahni*) and yellowfin madtom (*Noturus flavipinnis*). The slender chub was once relatively common in the Powell River upstream to Fletcher Ford. Etnier and Starnes (1993) list it as one of the most narrowly distributed minnows in North America, however, it has recently been collected from the Clinch River. Yellowfin madtoms are currently known from three or four locations within the Powell River just downstream and upstream of the Tennessee-Virginia line. Yellowfin madtoms occur in low, but self-sustaining numbers in the Powell River.

2.4.3.1 Estimated Costs for Propagation and Augmentation of Fish Populations

The process of augmenting imperiled fish populations is time and labor intensive. Therefore, the bulk of the costs are associated with salaries and benefits and logistical support for technical staff. Full-time staff would be required throughout the year to: 1) conduct the necessary field work to locate, collect, and recover rare fish; 2) locate, collect and recover fish egg masses; 3) maintain a healthy laboratory environment for fish while in captivity (cleaning, feeding etc.); 4) culture juvenile fish until released; 5) identify appropriate time frames and suitable locations for fish releases; and 6) release propagated juveniles. Based on similar actions and past experience, the Service is considering allocating approximately \$150,000 to implement this action over an estimated four to five year period.

2.4.4 Community Educational Outreach

Community educational outreach will focus on preserving the value of the Powell River watershed by providing the public with information concerning natural resources within the Powell River, general aquatic biology information, knowledge of the importance of preserving aquatic biodiversity, significance and requirements of the unique species in the Powell River, restoration and conservation management strategies, and the roles of the natural resource

agencies and private citizens involved in the natural resource conservation. These proposed activities will provide outreach to the public through distribution of information at schools, various organizational meetings, media events, and through communication with individuals in the watershed. Specific information will be tailored to meet anticipated needs of various audiences.

2.4.4.1 Estimated Costs for Community Educational Outreach

It is estimated that community outreach activities can proceed for at least four years and could be coordinated through the Lee County Soil and Water Conservation District office (LCSWCD). Currently, the Service is considering a cooperative agreement with LCSWCD to provide funding to hire a local outreach specialist to facilitate the attainment of the aforementioned educational outreach goals. The Service is considering allocating approximately \$166,000 to implement this action.

3.0 ENVIRONMENTAL COMPLIANCE AND CONSEQUENCES

Addressing the potential effects of restoration alternatives is required under NEPA. Section 3.0 discusses how the Service will comply with certain environmental regulations and describes the potential benefits and consequences of the actions of the preferred alternative.

3.1 Compliance with Other Environmental Regulations

3.1.1 National Historic Preservation Act

For any restoration actions considered, the potential to affect cultural resources, such as prehistoric and historic resources, Native American remains and cultural objects, will be determined early in project planning. To this end, the procedures in 36 CFR 800 implementing Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 *et seq.*), requirements of the Native American Graves Protection and Repatriation Act of 1990, as amended (25 U.S.C. 3001 *et seq.*), and policies and standards specified in the Fish and Wildlife Service Manual 614 FW 1-5 will be followed. Specifically, the Service is developing a programmatic consultation for all NRDAR activities within the Commonwealth of Virginia with the State Historic Preservation Office (SHPO) to ensure Section 106 compliance.

3.1.2 Virginia Erosion and Sedimentation Law

In Virginia, there are approximately 170 local erosion and sediment control programs. They work to prevent soil erosion, sedimentation, and runoff from land-disturbing activities. These

problems can damage public and private properties, waters, stream channels, and other natural resources. One-way DCR and local government employees fight erosion and sedimentation is by implementing the Virginia Erosion and Sediment (ESC) Law. Virginia was one of the first states to tackle the problem. The ESC law encourages land developers to consider soil erosion and sediment control a routine part of development. Local authorities must approve a project's erosion and sediment control plan before land can be cleared or excavated. Clearly, erosion and sediment control practices and principles are quality engineering and contracting practices that help owners protect their land and water resources. Some agricultural practices and engineering operations, along with other activities such as mining and silviculture, are exempt. Projects disturbing less than 10,000 square feet are usually exempt unless a local ordinance has lowered that limit. This information will be forward to restoration project proponents for consideration.

3.1.3 Solid and Hazardous Waste Management

Any soil or sediment that is suspected of contamination, or wastes that are generated, must be tested and disposed of in accordance with applicable federal, state, and local laws and regulations. This applies to soils that are disturbed by restoration endeavors contemplated in the RP/EA. The VDEQ does not suggest that additional soils be removed. The laws which might apply to contaminated soils encountered in RP/EA implementation include, but are not limited to, the Virginia Hazardous Waste Act (*Virginia Code* sections 10.1-1400 *et. Seq.*, the Virginia Hazardous Waste Management Regulations (9 VAC 20-60), and the Virginia Regulations for the Transport of Hazardous Materials (9 VAC 20-110). This information will be forward to restoration project proponents for consideration.

3.1.4 NEPA Compliance

An Environmental Action Statement and a Finding of No Significant Impact will be circulated for signature by the Authorized Official upon publication of the notice of availability of this RP/EA in the Federal Register. These documents will remain within the administrative record for this matter.

3.1.5 Endangered Species Act, Section 7 Consultation

Because it was determined that actions proposed within this RP/EA may affect Federally-listed species, an informal, intra-Service Endangered Species Act (ESA) Section 7 consultation was conducted. The consultation concluded that actions proposed by this RP/EA will “not likely adversely affect” protected species, and will “not likely destroy or adversely modify critical habitat.” The consultation will remain within the administrative record for this matter.

3.2 Environmental Consequences of the Preferred Alternative

The Preferred Alternative has been selected in accord with the language contained within the CD - "... restoration, replacement, or acquisition of endangered fish and mussels located in the Powell River and its watershed, or restoration, replacement or acquisition of their habitats or ecosystems which support them, or for restoration planning, implementation, oversight, and monitoring." This alternative will restore, rehabilitate, or replace similar resources that existed within the Powell River watershed prior to the injury, and will provide those resources with long-term protection were possible. The benefits of the proposed activities are in line with expected costs. The proposed actions use an integrated natural resource management approach intended to maximize restoration and minimize unforeseen losses to natural forces such as drought, floods, disease, or impacts from normal human uses. The net benefit realized would be the restoration and rehabilitation of several hundred to several thousand acres of riparian habitat, the reestablishment of the full potential of ecological services provided by aquatic fauna, and the general improvement of the Powell River ecosystem quality. The beneficiary of these actions will be the people of the Commonwealth of Virginia, the people of the State of Tennessee, and the people of the United States through the improvement of the cultural, aesthetic, ecological, economic, intrinsic, and scientific values of the Powell River.

The Preferred Alternative calls for in-kind restoration actions within the Powell River watershed. These actions include monitoring programs over the life of each individual action. Monitoring will evaluate the effectiveness of the prescribed actions and will be used by the Service to determine whether mid-course corrections are necessary to achieve the restoration objectives on a case by case basis.

3.2.1 Environmental Consequences of Riparian Habitat Protection and Enhancement

Riparian habitat protection and enhancement activities may include, but not be limited to the implementation of best management practices, stream bank stabilization, riparian buffer planting, and permanent riparian protection options such as the development of conservation easements and outright acquisition. These actions either replace lost resources or provide additional natural resources and natural resource services by providing protection and enhancement for riparian areas within the upper Powell River watershed. Such activities will provide the potential for restoration, rehabilitation, enhancement, production, or creation of the functions of sustainable vegetated riparian buffers. Further, selected lands may contain desirable natural resources possessing the potential for protection, buffering, or otherwise supporting the ecological development, maturation, function, or sustainability of desirable habitats within the surrounding watershed. These actions facilitate the buffering of environmental impacts associated with urban, agricultural, resource extraction practices, and suburban development within the watershed.

The consequence of riparian habitat protection and enhancement is the restoration and preservation (in perpetuity where possible) of riparian areas, a rapidly vanishing and valuable natural resource of Lee County, Virginia. The ecological services provided by such lands (e.g., wildlife habitat, intrinsic values, flood water control, erosion control, esthetic values, eco-tourism values) will also bestow protection based on the length of individual land protection agreements. Another consequence of this action is that any lands potentially protected by conservation easements will no longer be available for commercial, residential, or economic development (potentially elevating the market value of other properties in the area).

The expected cost of riparian habitat protection and enhancement is believed to be commensurate with current real estate market values, availability of willing land owners/partners, parcel size, development potential and availability. Consideration of parcel-specific costs compared to the benefits that may be realized through the establishment of conservation easements and riparian buffer enhancements will be made on a parcel-specific basis as properties and willing landowners become available. Riparian restoration actions are not expected to create the potential for causing additional injury to the natural resources within the watershed. In addition, these actions are not expected to have any adverse impact on human health and safety. It is the intent of the Service to maximize the benefits in relation to the cost of restoring riparian areas within the watershed. The necessity and magnitude of restoration activities and costs required to achieve management objectives will be determined on a site-specific basis.

Habitat restoration actions will be implemented through grant agreements or cooperative agreements for selected projects. An intended consequence of these actions is to facilitate buffering the impacts (e.g., increased amounts of impervious cover, road run-off, and toxicant deposition; reduced groundwater recharge; loss of wildlife habitat) within the watershed. Further consequences of this action are the preservation, protection, and maintenance of surface water quality, and cooperation between the Service and local communities to preserve and conserve the natural resources of the Powell River watershed. Restoration of properties and acquisition of conservation easements is consistent with Federal and State policies and laws promoting the conservation and protection of fish and wildlife resources.

3.2.2 Environmental Consequences of Propagation and Augmentation of Freshwater Mussel and Rare Fish Populations

The environmental consequences of propagating freshwater mussel and fish in order to restore populations are decidedly positive. Augmentation activities provide several benefits in addition to reestablishing extirpated populations. Propagation and release of mussels and fish help to: 1) increase the re-colonization rates of species into suitable habitat, 2) increase the likelihood of recruitment into currently occupied habitat, 3) increase the chance of species' continued existence in currently occupied river reaches, and 4) stabilize declining populations of non-listed species which in turn may preclude the need for future Federal or State listing actions.

The environmental consequences of restoring imperiled species has long been recognized in legal forums. The Federal Endangered Species Act (ESA) reflects the concern of Congress at the rate of extinction of species in the modern era. In *Tennessee Valley Authority v. Hill*, 437 U.S. 153, 178-79 (1978), the Supreme Court recognized in interpreting the ESA that one of Congress' primary concerns with respect to extinction of species was "about the unknown uses that endangered species might have and about the unforeseeable place such creatures may have in the chain of life on this planet." More recently, the Fourth Circuit echoed these concerns about the failure to preserve endangered species: "Extinction, after all, is irreversible. If a species becomes extinct, we are left to speculate forever on what we might have learned or what we may have realized. If we conserve the species, it will be available for the study and benefit of future generations." *Gibbs v. Babbitt*, 214 F.3d 483, 496 (4th Cir. 2000). These assertions by congress and the courts indicate that the magnitude of potential future positive environmental consequences may be unknowable.

3.2.3 Environmental Consequences of Community Educational Outreach

Since the projects of the Preferred Alternative are primarily designed to improve and protect degraded habitats and improve fish and mussel populations, the cumulative environmental consequences of these actions will be beneficial. The environmental consequences will likely not be limited to specific project locations. Indirect and direct beneficial impacts will occur for some distance downstream of selected projects. It is therefore crucial to the overall success of restoration actions that residents of the watershed be apprized of ongoing restoration actions, as well as the scope, goals, and reasons for those actions. The natural resources at issue are managed in trust for the continuing benefit of the public. The net benefits of this action include the enhancement of the public's general natural resource knowledge, the development of educational tools designed to promote public protection and conservation of natural resources, and the installation of a sense of civic responsibility for those resources. Therefore, the environmental consequences of providing educational outreach to the public must also be considered to be decidedly positive. It should be noted that these benefits are indirect, as opposed to the benefits of other restoration activities considered in Section 3.0. Although a certain amount of community educational outreach is anticipated to provide a meaningful benefit through encouragement of public actions to assist endangered species and riparian protection, this aspect of the Preferred Alternative does not qualify as direct restoration. Community educational outreach is appropriate under the review criteria as an adjunct activity that improves the value of the core endangered species restoration and habitat protection activities.

In summary, in order to achieve the above stated objectives, the Service proposes the following actions contained within the proposed restoration alternative:

1. enhancement and protection of riparian areas, in perpetuity were feasible;

2. augmentation of imperiled fish and mussel populations of the Powell River watershed;
and
3. implementation of a local public educational outreach plan.

A further action contained in the proposed preferred alternative promotes restoration and protection of natural resources by cost-sharing with local municipalities or other interested organizations through grant agreements or cooperative agreements for selected projects. The Service will provide funding, consistent with applicable laws and regulations, to local projects that satisfy criteria of the CD and that acquire, restore, rehabilitate, or enhance rare species populations within the Powell River watershed. This action will assist in replacing the ecological services lost to the spill. This action will also facilitate buffering the impacts of normal human activities within the watershed, will preserve, protect, and maintain the quality of surface waters entering the Powell River, and will promote cooperation between the Service and local communities to mutually preserve and conserve the resources of the Powell River watershed.

The Service believes that the aforementioned actions contained within the proposed preferred alternative represent cost-effective, practical, and beneficial means by which to restore or replace the natural resources injured and the services they provided. All specific work plans, including any additional NEPA analysis developed for implementation of specific actions will be made available for public review upon request.

4.0 MONITORING AND CORRECTIVE ACTION PLAN

A monitoring and corrective action plan will be an integral part of specific restoration actions contained within the preferred alternative. The specific restoration actions presented in this RP/EA will be biologically monitored (plant survival in restored/enhanced habitats and faunal responses) and maintained (replacement of unsuccessful plants, erosion control, cleaning/repair of water structures, temporary fencing for deer control, trail repairs, curtail succession, etc.) when necessary. Evaluation techniques, time tables, and allocation of funding for the monitoring and corrective action portion of any action may be considered to be site- and action-specific. Selected restoration projects may include specific monitoring and corrective action components and will be publically available as developed. Project

5.0 COMMENTS RECEIVED ON THE DRAFT RESTORATION PLAN

The Service received 20 comment letters from interested public entities including private citizens, a non-governmental organization, and County and State agencies. Specific comments are addressed below. Other editorial and organizational comments provided from various

sources have already been incorporated into the text of this document.

Comment 1: A comment letter was received from the VDEQ, Office of Environmental Impact Review (OEIR). The OEIR requested that all potentially affected agencies within the Commonwealth of Virginia provide feedback on the draft RP/EA to OEIR so that a coordinated response could be provided to the Service. Agencies that joined the review include: the Departments of Environmental Quality; Agriculture and Consumer Services; Conservation and Recreation; Historic Resources; and Game and Inland Fisheries. Agency feedback to OEIR ranged from no comment to general support with two key regulatory and coordination needs identified; compliance with Section 106 of the National Historic Preservation Act of 1966, and compliance with Virginia Commonwealth Erosion and Sediment Control Law and Stormwater Management Law. An additional comment from VADEQ's Waste Division further suggested that soils not be removed and that pollution prevention principles be carried out.

Service Response: The Service is appreciative of the level of effort that went into the OEIR joint project review. The two primary regulatory compliance concerns are generally addressed within the body of this document. Specifically, the Service is in the process of developing a programmatic consultation for all NRDAR activities within Virginia with the State Historic Preservation Office (SHPO) in Richmond, Virginia. Language pertaining to this consultation has been included in this document. The Service has also consulted with the Virginia Department of Conservation and Recreation's Upper Tennessee and Big Sandy Watersheds Office on compliance issues associated with Erosion and Sediment Control Law and Stormwater Management Law. General language pertaining to this compliance has also been included in this document. These regulatory needs pertain only to the Riparian Enhancement/Protection component of the Preferred Alternative. Therefore, compliance with these regulations will be distinct requirements for entities submitting riparian restoration project proposals as appropriate. However, the Service, as the lead Federal Agency, will retain the ultimate responsibility for said compliance.

Comment 2: Lone Mountain Processing, Inc. provided a letter that contains six main comments: (1) support for the Preferred Alternative (versus the No Action Alternative); (2) support for conservation easements, bank stabilization and water quality enhancement in areas upstream from mussel beds; (3) opposition to expenditure of restoration funds outside of the Powell River Watershed; (4) consideration of increased monitoring and accountability for propagation, education, and administrative activities; (5) restoration funds should be used as "seed" money for long-term projects and that long-term programs should be given higher priority than short-term projects; and (6) enhancement of oversight activities.

Service Response: The Service concurs with the first three comments and has incorporated them into this document. In response to comment (4), detailed monitoring and accountability

requirements are integral components of each specific cooperative agreement being developed for restoration implementation; mussel propagation, fish propagation, and educational outreach. Detailed goals, accounting, and reporting requirements will be documented in these agreements. However, the specifics of these agreements will not be included in this document as they are extensive and below the broad scope of this RP/EA. In response to comment (5), it is difficult to justify the expenditure of restoration funds as “seed” money in a generic way in order to provide general support for a given program. Restoration funds must be used to directly restore, replace, or acquire equivalent natural resources. The restoration, replacement, or acquisition must be quantifiable in order for the restoration activity to remain within the realm of acceptable restoration as dictated by the DOI and Service regulations and policies. The Service concurs with the notion that long-term gains are more desirable than short-term gains. Project selection criteria outlined in Appendix A are in line with this comment. Finally, suggestions for enhancement of project oversight have been incorporated into this document.

Comment 3: The Nature Conservancy (TNC) provided a comment letter that is generally supportive and specifically advocates for the Preferred Alternative, the importance of riparian restoration and protection and permanent conservation easements, and the necessity of rare species propagation. TNC advocates for the riparian buffer widths of 100 meters on each side of the stream, but the largest buffer practicable should be considered.

Service Response: The Service concurs with the comments and has included appropriate language within the document and/or will incorporate specific recommendations with ancillary cooperative agreements and the RFP.

Comment 4: The Virginia Department of Mines, Minerals and Energy (DMME) submitted a letter that included a copy of criteria used by the DMME in considering abandoned mine land (AML) reclamation projects. DMME also recommends that the Service consider partnerships and leveraging as a way to improve and extend riparian restoration actions. DMME also advocates the use of conservation easements where applicable. DMME suggested that Service consider previously accomplished contractor assessment work in restoration planning.

Service Response: The Service will consider appropriate AML reclamation criteria during the RFP and believes that significant overlap exists between the two documents. The Service concurs that increased partnering and fund leveraging could improve the quality and likelihood of success of riparian restoration projects and will advocate these approaches within the RFP. Please note that leveraging is an important criterion within Appendix A. Finally, the Service is aware of and has considered previous assessment work within the Powell River in making the determination that all releases of rare species propagated under this plan will take place in lower portions of the Powell River near the Tennessee border. These are areas where we see recruitment of the rare fish and mussels at issue.

Comment 5: A comment letter was received from a private citizen who suggested that the river needs to be stocked with small mouth bass, drum, channel catfish, and walleye.

Service Response: The Service shares the concerns of the public in the belief that sport fish should be restored within the Powell River. However, the Service cannot restore sport fish in this instance for two reasons. The Consent Decree requires activities to be primarily directed toward the restoration and enhancement of threatened and endangered fish and mussel species within the Powell River Watershed. Additionally, water quality in the headwater areas of the Powell River is degraded to the point that the success of potential fish stocking efforts would be questionable. It is important to note that the restoration activities outlined in this plan will benefit all aquatic life within the watershed through the improvement and protection of habitat.

Comment 6: A comment letter was received by the Service from the Lenowisco Planning District Commission after closure of the formal comment period. In short, the letter states that the commission is “not in support of the project” and believes “other alternatives to the proposed plan of action should be reviewed.” No other information or discussion was provided.

Service Response: The Service notes the commission’s position, but is unable to offer a substantive response without additional information.

Comment 7: A comment letter was received by the Service from the Lee County Board of Supervisors that discussed two main points; the belief that restoration activities should begin in and around the town of St. Charles and move downstream, and that restoration projects that consider removal of man-made debris from stream reaches should be allowed. Positive aspects of these activities are provided.

Service Response: The Service agrees with the board in that water quality improvement should begin in the headwaters and also shares the board’s commitment to the restoration and conservation of natural resources within Lee County. While the Service further understands the rationale behind the board’s desire to focus restoration within the vicinity of the town of St. Charles, restoration projects must be evaluated within the broader context of the watershed. Initially, restoration projects must be screened on their own merit in terms of meeting project criteria set forth herein. The consent decree that documents the settlement between the responsible party and Federal government requires that restoration funds are expended to the maximum benefit of natural resources *within the Powell River watershed*. Projects that meet and/or exceed criteria will be further considered in relation to one another in terms of overall cost-effectiveness. Projects that provide the greatest restoration effectiveness (and other variables) per unit cost must be given priority. Because of limited funding, targeting any specific geographic area for primary consideration of restoration projects could truncate the consideration of those projects in other parts of the watershed that exhibit equal and greater restoration

effectiveness. There are undoubtedly several riparian areas within the vicinity of St. Charles with high restoration potential. The Service is available to assist Lee County in the identification of these sites and in the preparation of viable proposal(s). Finally, the removal of man-made debris from streams will not be precluded from consideration. However, this RP/EA indicates that sedimentation and non-point source runoff are among the prime contributors to water quality degradation within the watershed. These contributors are well documented within the scientific literature. While man-made debris and illegal dumps within the riparian areas are objectionable and inappropriate, the impacts of these activities on Federally-protected aquatic species have not been documented. In summary, a project proposal that considers only debris removal will likely rank lower than one that also considers erosion control, riparian buffer enhancement, or bank stabilization as the primary emphasis.

Comments 8 through 20: Thirteen copies of a proposal drafted by the Virginia Mining Association, Inc. (VMA), were signed by different Lee County residents and forwarded to the Service under separate cover. The proposal calls for certain amounts of restoration funds to be generally expended on riparian restoration projects, to be specifically expended in the vicinity of the town of St. Charles, and to be generically provided to the Lenowisco Planning District Commission for use as a financing tool.

Service Response: The Service shares VMA's commitment to restoration and protection of riparian areas within the Powell River watershed. However, it is premature to be submitting proposals for funding consideration. Some time after a notice of availability of this RP/EA has been published in the Federal Register, a RFP with specific instructions, requirements, and deadlines will be made publically available. Please note that, by Service regulation and policy, restoration funds cannot be allocated to projects that lack a clear and quantifiable restoration nexus.

6.0 COMMONWEALTH CONCURRENCE

The natural resources injured by the LMPI coal slurry spill are subject to overlapping trusteeship of both the United States and the Commonwealth of Virginia. Therefore, while the natural resource damage settlement was obtained by the United States, the Service will seek Commonwealth concurrence as a co-trustee for the final RP/EA.

7.0 LIST OF AGENCIES, ORGANIZATIONS, AND PARTIES CONSULTED FOR INFORMATION

Northeast Regional Office, Hadley, MA, U. S. Fish & Wildlife Service

Virginia Field Office, U. S. Fish and Wildlife Service
Southwestern Virginia Field Office, U. S. Fish and Wildlife Service
Ashville Field Office, U.S. Fish and Wildlife Service
Tennessee Field Office, U.S. Fish and Wildlife Service
Black Diamond Resource Conservation & Development, Inc.
Tennessee Valley Authority
Lonesome Pine Soil and Water Conservation District
U.S. Army Corp of Engineers, Clinch Valley Office
Virginia Department of Game and Inland Fisheries
The Nature Conservancy, Clinch Valley Program
Daniel Boone Soil and Water Conservation District
Virginia Department of Mines, Minerals, and Energy
Friends of the Clinch and Powell Rivers
Hands Across The Mountain
Lee County, Virginia
Wise County, Virginia
Virginia Department of Conservation and Recreation
Lone Mountain Coal Processing, Inc.
Office of the Solicitor, Department of the Interior
Virginia Department of Environmental Quality
Virginia Mining Association, Inc.

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APPENDIX A

PRELIMINARY POWELL RIVER RESTORATION PROJECT SCREENING CRITERIA

Required Criteria	General Description	YES	NO
Long-Term Protection	The project/site provides perpetual habitat protection and/or enhancement of water quality within the Powell River watershed.		
Location	Physical location of potential restoration project is within the Virginia portion of the Powell River watershed.		
Site Suitability	Available sites are those that may not contain substantial structures or pavement.		
Availability of other funding for this project	Projects wholly eligible or appropriate for funding from other sources will not be considered. Projects proponents are encouraged to seek appropriate leverage funds from third parties to enhance the quality and likelihood of project success.		
Restoration of the site will provide direct, functional benefits to injured natural resources	Site restoration project will include restoration activities that preserve and/or enhance designated critical habitat, threatened and endangered fish and mussels, and their supporting ecosystem.		
Partner Commitment	The project partner(s) is/are committed and capable of successful completion of the proposed restoration project.		
Oversight	The project includes oversight components designed document the objective and successful attainment of project goals, overall fiscal responsibility, and cost-effectiveness of the project.		

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Preferred Ranking Criteria	Description	H (3)	M (2)	L (1)	Final Ranking
	HIGH IMPORTANCE (X3)				
Long Term Protection	The project/site provides perpetual habitat protection within the Powell River watershed.				
Cost-Effectiveness	Site attributes impacting cost compared to the expected benefit realized by the documented success of the proposed project.				
Functional Benefits	Site restoration project activities will provide benefits to trust resources and their supporting ecosystem.				
Leverage Potential	Ability that these restoration funds would leverage other resources, excluding federal match.				
Novel Project Ideas	Novel project ideas that exhibit a high likelihood of success and are exportable to other watersheds.				
	MEDIUM IMPORTANCE (X2)				
Point source or non-point source control	Source control is sufficient if an environmental audit or similar report demonstrates that the site has limited potential for re-contamination.				
Ownership and Management	Availability of the site for potential restoration. Willingness to provide access.				
Land Use Compatibility	The nature and condition of existing surrounding land use and future concerns such as zoning, comprehensive or project-specific planning.				
Regulatory	Does the proposed project require additional regulatory review (beyond categorically excluded actions considered in the RP/EA)?				

Preliminary Explanation of Criteria Implementation

The previous table was presented to document a proposed approach for the screening and selection of restoration projects solicited during a series of future public notices requesting riparian restoration project proposals (RFP) for Service consideration. RFP notices will be published widely within the action area so that all interested partners with viable restoration projects will have the opportunity to submit a well supported funding request.

The required criteria will be used to determine whether or not a proposed riparian restoration project attains a minimum level of temporal protection, is spatially appropriate, is suitable and available, and adequately addresses natural resource and oversight concerns. Preferred criteria will then be used to rank suitable riparian restoration projects and actions based upon that specific project's merit and ability to meet or exceed listed criteria.

To establish project priorities, it is possible to use a weighting and scoring system in which the first step is to assign a numerical weight to each restoration project criterion. Each criterion receives a numerical weight of 1 to 3 with a 3 for high importance, a 2 for medium importance, and a 1 for low importance. The next step reflects how well a specific restoration project ranks for each criterion, with a 3 being a high match, 2 a medium or okay match and 1 a maybe or poor match. Then, each site score is multiplied by the weighting factor of the criterion and added for all criteria in order to obtain an aggregate project score. Based on these scores, the projects can be divided into groups of high priority, medium priority, and low priority.

This project screening process is dynamic. Changing conditions and new information may result in a project(s) receiving a higher or lower priorities in the future.