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1.0. ABSTRACT.

This Biological Assessment (BA) is submitted under authority of Section 7 of the Endangered Species Act of 1973. This BA evaluates the potential impacts of a proposed flood wall replacement by the Seattle District, US Army Corps of Engineers (Corps) in the city of St, Maries, Benewah County, Idaho under authority of Section 205 of the 1948 Flood Control Act as amended. The Corps proposed plan is to replace the aging and damaged timber floodwall that is integral to the flood control system with a sheet pile wall. This would provide high quality protection from the 200-year event with an additional 2 feet for uncertainty. The proposed floodwall would be constructed of driven sheet pile with a concrete cap within the footprint of the existing timber structure. The existing structure is 770 feet long. Bank protection for 350 feet on the river side of the upstream end of the floodwall is also required due to erosion of the slope. The US Fish and Wildlife Service identified gray wolf (Canis lupus), bald eagle (Haliaeetus leucocephalus), bull trout (Salvelinus confluentus), and Ute ladies'-tresses (Spiranthes diluvialis) as potential threatened or endangered species which may occur in the project vicinity. The Corps will use best management practices to minimize any potential impacts to these species during construction. In this BA, the Corps has determined that the effects of the flood wall replacement project may effect, but are not likely to adversely affect bald eagle, bull trout, and Ute ladies'-tresses and is not likely to jeopardize the continued existence of gray wolf.

2.0. INTRODUCTION.

The city of St. Maries is located on the left bank of the St. Joe River just below the confluence of the St. Joe and the St. Maries rivers in Benewah County in northern Idaho. The city of St. Maries is protected from flooding on the St. Joe River by an extensive earthen levee system and a wooden floodwall. The current city levee system can withstand the 200-year event with an extra two feet available for hydraulic and hydrologic uncertainty.

The deteriorating wooden floodwall portion of the existing flood control system at St. Maries does not currently provide adequate flood protection. The Corps plan is to construct a new floodwall to the same design elevation as the rest of the system. The left bank of the St. Joe River in the vicinity of St. Maries is built to a constant elevation of 2146’ (AVISTA) in order to provide continuous protection to the city. If built to the same elevation as the currently deteriorating floodwall and the rest of the levees, the reconstructed wall would provide St. Maries with the level of protection originally intended. With a top elevation of 2146' (AVISTA), it would afford protection from the 200-year event with an additional two feet available for hydrologic and hydraulic uncertainty. The top elevation will be 2146' to restore the protection provided by the original continuous system.

The Corps proposed plan is to replace the aging and damaged timber floodwall that is integral to the flood control system with a sheet pile wall. This would provide high quality protection from the 200-year event with an additional 2 feet for uncertainty. The proposed floodwall would be constructed of driven sheet pile with a concrete cap within the footprint of the existing timber structure. The existing structure is 770 feet long. Bank protection for 350 feet on the river side of the upstream end of the floodwall is also required due to erosion of the slope.

The environmental impact of the project would be minimal, as construction would consist primarily of replacing an existing structure. Construction would take place during low water, minimizing impacts to the river. Plantings would be placed on the river side of the floodwall where little or no vegetation currently exists. Measures would be taken to guard against fuel and oil spills during construction.

3.0. PROJECT SPECIFIC INFORMATION.

3.1. Project purpose/need

Recent Corps of Engineers inspection reports indicate that the wooden floodwall has exceeded its design life and that many of the timbers are damaged or rotted through, or missing altogether. In addition, the wall seeps during high water events. Land use in the flood hazard area is primarily industrial/commercial. The wooden floodwall is located on property owned by the Potlatch Corporation, which is Benewah County's largest employer. The mill at the project site employs 380 local residents. Five other businesses are located in the hazard area, as are 40 residential structures. Land use is anticipated to remain the same in the foreseeable future. The total value of improvements and contents in the threatened area has been estimated to be at least $53.0 million. In addition, Potlatch has $13.0 million worth of log, plywood, and lumber inventory stored in the flood hazard area. Flood damages sustained from a flood wall failure have been estimated at $15,374,000.

A visual inspection of the riverward bank along the length of the existing crib wall found that the bank is being eroded. On average, the erosion consists of a five foot high, near vertical cut. This erosion has reduced the riparian corridor between the existing crib wall and the river to a width of between five and fifteen feet. This riparian corridor should be protected and riprap will be placed along this cut bank to arrest the on-going erosion. If erosion is allowed to continue, it will threaten the floodwall.

3.1. PROJECT DESCRIPTION.

The existing timber crib wall will be demolished first, then utilities will be capped or relocated as needed. .Rip rap and bank protection environmental features will be placed next. Then the sheet pile will be driven using a vibratory hammer. The concrete cap will be placed on top of the driven sheet pile. Site preparation will include removal of some vegetation but will be minimal. Equipment used will include a land-based pile driver, a hydralic track mounted excavator, equivalent to a Komatsu 300 series, a bulldozer equivalent to a Caterpillar D-4, and dump trucks. The work corridor will be comprised of the area from the river bank to the road on the land side of the existing structure. Staging areas and equipment fueling areas are located at least 500 feet from the river on the existing parking area used by the Potlatch Corporation. Stockpile location for materials to be disposed of is located at an existing City park, approximately ¼ mile from the work area. No soil stabilization is required. The work area will be revegetated with native species. In addition, vegetation removed will be stockpiled and replanted if possible. The site will be left clean. The project will be completed during the low water period of August and September. The project is anticipated to be completed in approximately ten weeks.

3.2. PROJECT LOCATION.

The proposed project is located at the City of St. Maries, Idaho, in Benewah County (Northwest ¼ of section 22, Township 46 North, Range 2 West). St. Maries is located on the left bank of the St. Joe River just below the confluence of the St. Joe and St. Maries rivers in Northern, Idaho.

3.2.1. PROJECT MAPS. map 1

map2

map 3

map 4

3.3. ACTION AREA/PROJECT AREA.

The St. Joe River originates on the western side of the Bitteroot Mountain Range near the Idaho-Montana border. The St. Joe River drains an area of approximately 2,668 km^2 and flows in a westerly direction entering the southern end of Lake Coeur d' Alene near St. Maries, Idaho. Mean annual discharge discharge for the St. Joe River near Calder is 2,339 cfs (USGS 1994). The upper river flows over rocky substrates through deep mountain gorges with alternating rapids and deep pools. Stream width and pool depth average 10.1 m and 2.0 m respectively, in the headwaters of the St. Joe River (Rankel 1971). In contrast, the lower river flows slowly through land with gentle topography characterized by lowland meadows. Streams widths and mid-channel depths in the lower river average 80.0 and 9.0 m, respectively. The St. Maries River is the largest tributary to the St. Joe River. Other tributaries of significance include Cherry, Thomas, Street, Rochat, Bond, Falls, Trout, Hugus, Moose, Mica, and Big creeks.

The lower 48.2 km of the St. Joe River have been largely converted from a riverine to lacustrine system from the construction of the Post Falls Dam in 1906, and the resulting increased lake level elevation. As a result, water depth and velocity, as well as sediment transport capacity in this strech of river have been altered. A secondary and relatively minor impact evident in the St. Joe River drainage is the presence of a road along the length of river from St. Maries upstream approximately 167 km (Rankel 1971). Miles of streambank were likely denuded for road construction but little channel alteration has occurred. Lack of habitat is the major factor limiting fish populations in the lower St. Joe River downstream from St. Joe City, and in the St. Maries River downstream from Lotus Crossing (Apperson et al. 1988). Instream cover and spawning habitat are generally absent in these areas. Logging occurs within the St. Joe River and has likely resulted in the introduction of fine sediment into this system.

Water quality issues in lower reaches of the St. Joe River include bank erosion, nutrient enrichment from point and non-point sources, excessive growth of aquatic plants, and bacterial contamination. River bank erosion is a primary water quality issue in the lower St. Joe River.

Ellis (1940) investigated the St. Joe River during a biological survey of the area. Ellis (1940) stated that "a good bottom fauna typical of the local stream conditions was found at all stations on the St. Joe River." The physical habitat conditions along the St. Joe River have changed since the time of Ellis's survey, but have not resulted in a significant impairment to the general health of the aquatic resources found within the drainage.

Fisheries surveys have been conducted intermittently in the St. Joe River and its tributaries since the mid 1970s by the Idaho Department of Fish and Game (IDF&G). Electrofishing surveys conducted during 1986 indicated that mountain whitefish was the dominant game fish captured in the St. Joe River on all sampling dates; suckers dominated the total catch (Apperson et al. 1998). During the 1986 survey, suckers, squawfish, and mountain whitefish dominated the catch in the section from Huckleberry Campground downstream to Falls Creek (Horton and Mahan 1988). No cutthroat trout and only three rainbow trout caught during the August sampling, during which water temperatures exceeded 20^{o}C in both sections (Apperson et al. 1988). Cutthroat trout and rainbow trout were caught in both sections in October (Apperson et al. 1988).

Limited exploration was performed for the original wall construction in about 1939 or 1940. The method of exploration is undetermined and the soil property descriptions are very limited. Based on these borings and observations made during the driving of H-piles for the Advanced Measures project constructed in 1999 a preliminary description of the foundation conditions has been formulated. The earth fill within the crib wall appears to consist predominantly of fine-grained sands and silts. Soils from ground surface to about 4 to 6 feet below ground surface consist of soft to very soft sands, silty sands, and sandy silts with varying organic content. These soils overlie a deposit of loose sands and soft clays and sandy clays. Below these soft and loose soils the material starts to develop more strength as evidenced by the increasing driving resistance to the above referenced H-pile installations.

4.0. SPECIES SPECIFIC INFORMATION.

4.1. SPECIES THAT MAY OCCUR IN PROJECT AREA.

A species request list was sent to USFWS on July 19, 1999. A response was received on August 24, 1999, (FWS Reference 1-9-99-SP-406 File # 341.1000 found in Appendix B). Listed and proposed endangered and threatened species which may occur within the vicinity of project included:

Threatened
Bald eagle (*Haliaeetus leucocephalus*)
Bull trout (*Salvelinus confluentus)*
Ute ladies'-tresses (*Spiranthes diluvialis*)

Experimental Nonessential
Gray wolf (*Canis lupus*)

There was no designated critical habitat, proposed species, or candidate species indicated to be present near the project site.

4.2. STATUS OF SPECIES THAT MAY OCCUR IN PROJECT AREA.

4.2.1. GRAY WOLF.

Gray wolves occurring in Idaho south of I-90 are listed as nonessential experimental population, with special regulations defining their protection and management, as outlined in the final rules published in the Federal Register Vol. 59, No. 224-November 22, 1994. These regulations include special provision regarding "take" of gray wolves. For section 7 interagency coordination purposes, wolves designated as nonessential experimental that are not within units of the National Park System or National Wildlife Refuge System are treated as proposed species. As such, Federal agencies are only required to confer with the U.S Fish and Wildlife Service (the Service, USFWS) when they determine that an action they authorize, fund, or carry out "is likely to jeopardize the continued existence" of the species.

4.2.2. BALD EAGLE.

The bald eagle was listed as endangered throughout the conterminous U.S. in April, 1976, but threatened in the states of Washington, Idaho, Montana, and Minnesota. The USFWS has proposed to remove the bald eagle from the list of Endangered and Threatened Wildlife in the lower 48 states of the United States (Federal Register July 6th 1999 Volume 64, Number 128). This action has been proposed because the available data indicated that this species has recovered.

4.2.3. BULL TROUT.

In June 1995, the USFWS status review found listing bull trout as Threatened or Endangered was warranted under the Endangered Species Act. In the same finding, the USFWS precluded listing the bull trout due to higher priority listing actions. After a court ordered reconsideration of the earlier finding, the USFWS issued a proposed rule to list in 1997 and issued the final rule to list the Columbia River bull trout population segment as threatened in June of 1998.

4.2.4. UTE LADIES' TRESSES.

Ute ladies' tresses were listed as Threatened by the USFWS on January 17, 1992. Historical range covered Colorado, Idaho, Montana, Nebraska, Nevada, Utah, Washington, and Wyoming. Currently it can be found in Colorado, Idaho, Montana, Utah, Washington, and Wyoming.

4.3. SPECIES LIFE HISTORY.

Detailed descriptions of the life history of proposed, threatened, and endangered species that may occur within the project area were not considered necessary for this assessment. However, as a convenience for the reviewer, detailed life history profiles can be found in Appendix A of this document.

5.0. EFFECTS OF THE ACTION.

5.1. DATA SOURCES.

In addition to the list obtained from the USFWS, correspondence was conducted with the Idaho Department of Fish and Game, Couer D' Alene Tribe, US Environmental Protection Agency, Idaho Division of Environmental Quality, and Idaho Department of Lands to discuss possible impacts of the project. Also literature review was conducted to provide a synopsis of the existing information describing the aquatic resources of the St. Joe River Basin, Idaho. Another objective of this literature review was to identify important environmental factors and events that may have been impacted by this project.

5.2. GENERAL IMPACTS.

Effects of Bank Stabilization on Physical River Processes

The most important factors controlling river channel patterns are flow strength, bank erodibility, and sediment and debris supply (Beschta and Platts 1986; Benda 1990; Knighton and Nanson 1993). Deposition of sediment and debris controls the distribution of boulders in a channel and promotes the aggradation and degradation cycle associated with channel beds (Benda 1990). This cycle allows a river to adjust and recover its hydraulic geometries, which include channel width, bar relief, and the distribution of riffles and pools (Lisle 1982). The aggradation and degradation cycle is also responsible for maintaining a diverse mix of sediment types and sizes (Gordon et al. 1992), which is important because different species of aquatic organisms differ in their substrate preferences and requirements (Gordon et al. 1992). For example, chironomid midge larvae require mud into which they can burrow, whereas salmonids require a mix of gravel, sand, and cobble for optimum spawning substrate (Beschta and Platts 1986; Gordon et al. 1992). Thus, the distribution of sediment types and sizes along a stream can be a paramount factor affecting the persistence of fish and invertebrates (Gordon et al. 1992).

Bank stabilization structures and flow diversion structures alter a river’s natural adjustment processes resulting in changes in channel morphology (Beschta and Platts 1986). For example, revetted banks (banks stabilized with riprap) on the lower Mississippi River shortened the river length 229 km, and levees reduced the floodplain by 90% (Baker et al. 1988a). Levees and dikes along the Vistula River, Poland, reduced the number of islands and braided reaches, decreased the channel width by 50%, and deepened the riverbed by 1.3 m (Backiel and Penczak 1989). The Piave River in Italy also became less braided and its channel width decreased after flow deflection structures were installed (Surian 1999). Bank revetments along the Rhine River caused the riverbed to deepen by up to 7 m and reduced the number of backwaters, braids, and side channels (Dister et al. 1990). Channelized and riprapped sections of Little Prickly Pear Creek north of Helena, Montana, were uniformly shallow and homogeneous, whereas unaltered sections varied in depth and alternated between pools and riffles (Elser 1968). Thus, bank stabilization structures not only alter the banks they are designed to protect, but by redirecting a river’s energy, change the morphology and physical structure of a river. These changes, in turn, would be expected to change the quantity and quality of fish habitats.

When a river is not allowed to move its channel laterally, unnatural regimens of sediment flow occur that lead to decreased amounts of important habitats where fish can find food, cover, or spawning substrates (White 1991). Channel migration provides a river with large woody debris (Murphy and Koski 1989), which is a critical habitat requirement in most trout streams. Input of large woody debris to a river stabilizes the channel, traps sediment and debris that modifies channel shape by redirecting currents, and provides shelter for fish (Gordon et al. 1992). Abundances and biomasses of trout in reaches of 13 Montana streams altered by channel relocation, riprapping, clearing, and diking to preclude natural meandering were only 29% and 11%, respectively, of those in unaltered reaches (Peters and Alvord 1964). Channel migration can also provide required spawning substrates. For example, erosive channel widening on the South Fork Kern River, California, resulted in significantly more spawning habitat and higher densities of redds and age-0 golden trout (*Oncorhynchus aguabonita*) than in stable narrow reaches (Knapp et al. 1998). Because bank stabilization structures restrain a river's natural lateral channel migration, they allow less large woody debris input, substrate deposition, and side-channel formation, and thereby lead to decreased habitat quality for fish. These changes in turn, would be expected to limit abundance and production of fish.

Positive Effects of Riprap on Fish

Positive or neutral effects on fish resulting from bank stabilization with riprap have been observed in warmwater systems, primarily the Mississippi River. Revetted banks along the lower Mississippi River in Mississippi supported the highest percentage, by weight, of fish species considered to have a sporting or commercial value compared to natural banks (Pennington et al. 1983a; Pennington et al. 1983b). Fish abundances (mostly freshwater drum *Aplodinotus grunniens*, flathead catfish *Pylodictis olivaris*, common carp *Cyprinus carpio*, and blue catfish *Ictalurus furcatus*) in the Mississippi River near Eudora, Arkansas, were similar along old revetments, new revetments, and natural banks, which suggested that fish inhabiting natural riverbanks recovered rapidly after bank perturbation caused by the placement of riprap (Pennington et al. 1985). Abundances and aggregate weights of all species combined were greater at revetted banks than natural banks of Pool 24 of the Mississippi River in Missouri, and fish diversities at both bank types were equal (Farabee 1986). Revetted banks of the Willamette River, Orgeon, supported higher densities of small warmwater fish than unaltered banks, which were inhabited by low densities of large fish (Hjort et al. 1984).

Positive or neutral effects of riprap have also been observed in coldwater systems. Abundance of 6 to 12 inch brown trout increased 35% and abundance of 12-inch and larger brown trout increased 86% after 0.7 miles of riprap were installed on Willow Creek, Wisconsin (Hunt 1988). Also in Wisconsin, Millville Creek was stabilized with riprap to mitigate effects of bank degradation caused by cattle grazing and row crop farming in the riparian zone (Avery 1995). Mean densities of brown trout increased from 65 fish/mile to 102 fish/mile after the bank stabilization (but the author considered this increase in density insufficient justification for the $26,800/mile cost of the riprap). Seven years after 2,150 feet of riprap and 111 habitat improvement devices (deflectors, plunges, overhangs, channel blocks, ramps, logs) were installed on Beaver Creek, Wyoming, to mitigate habitat degradation stemming from cattle grazing, abundances of brook trout (*Salvelinus fontinalis*) 6 inches and longer had increased 1,814% and abundances of brook trout less than 6 inches had increased 1,462% (Binns 1994). Abundances of yearling steelhead (*O. mykiss*) and cutthroat trout increased shortly after banks along large streams in central western Washington were riprapped (Knudsen and Dilley 1987). Fish species diversity (but not abundance) was greater along riprapped banks than along natural banks of the Sacramento River, California (Michny 1988). Large riprap (rock >30 cm in diameter) supported higher juvenile chinook salmon (*O. tshawytscha*) and steelhead trout densities than natural cobble-boulder banks on the Thompson River in British Columbia in both summer and winter (Lister et al. 1995). The overall densities of yearling and older salmonids in 15 western Washington rivers were unaffected or increased at riprapped banks (Peters et al. 1998) and sub-yearling rainbow trout (*O. mykiss*) in the Skagit River, Washington, were more abundant in riprap compared to the mean reach abundance (Beamer and Henderson 1998).

Negative Effects of Riprap on Fish

Few studies conducted in warmwater systems indicated negative effects of riprap on fish. Riprapped banks of the Willamette River, Oregon, were poor habitat for larvae of warmwater fish compared to natural banks (Li et al. 1984) and species diversity along revetted banks was lower than at the unaltered banks (Hjort et al. 1984). Riprap also provides habitat favoring introduced exotic species. Riprapped banks on the St. Clair River, Michigan, had higher densities of round gobies (*Neogobius melanostomus*), tubenose gobies (*Proterorhinus marmoratus*), and zebra mussels (*Dreissena polymorpha*) than natural sand and macrophyte-dominated substrate (Jude and DeBoe 1996).

Assessments of riprap in coldwater systems inhabited by salmonids tended to show deleterious effects. Brown and rainbow trout were significantly more abundant in unaltered sections than in channelized and riprapped sections of Little Prickly Pear Creek north of Helena, Montana, and non-salmonid fishes were almost completely absent in the altered reaches (Elser 1968). Biomasses of juvenile coho salmon (*O. kisutch*), juvenile steelhead, and cutthroat trout decreased shortly after long lengths of bank were stabilized along small streams in central western Washington (Knudsen and Dilley 1987); in larger streams, only slight reductions in numbers of juvenile coho salmon and young-of-the-year cutthroat trout occurred. Densities of rainbow trout in the Big Wood River, Idaho, were highest in areas with diverse channel features and in the presence of woody cover (17.4 trout/100 m^2), whereas riprapped banks held almost as few fish (2.1 trout/100 m^2) as habitats lacking any cover (1.2 trout/100 m^2) (Thurow 1988). Sub-yearling cutthroat trout, coho salmon, and chinook salmon densities were lower at riprapped banks than natural banks on the Skagit River (Beamer and Henderson 1998) and 15 other rivers in western Washington (Peters et al. 1998). Relative abundances of juvenile chinook salmon along riprapped banks of the Sacramento River, California, were 25% of those along natural banks (Michny 1987; U.S. Fish and Wildlife Service 1992).

Enhancements to Riprap that Benefit Fish

Various enhancements can be incorporated into riprapped banks to benefit fish including off-bankline revetments, larger rock size, fish groins, filling interstices with gravel, rearing benches, and indented revetments (Shields et al. 1995). Some of these show great promise, but have not been extensively deployed yet (Shields et al. 1995).
Placing boulders of 1.0 m to 1.5 m in diameter along the toe of the bank (intersection of bank and bottom of the stream channel) on the Coldwater River, British Columbia, appeared to increase rearing densities of all salmonids except sub-yearling steelhead trout by providing cover from high water velocities (Lister et al. 1995). Traditional riprap revetments along the Sacramento River, California, enhanced with low ridges of riprap called “fish groins” running perpendicular to the channel from the toe of the bank to the top of the bank were used by juvenile salmonids more than unimproved riprap, but not as much as natural banks (U.S. Fish and Wildlife Service 1992). A gradually sloping (1V:5H) gravel bench parallel to the channel, called a rearing bench, placed at an

elevation where it was inundated at moderate flows provided shallow habitat for juvenile salmonids by simulating hydraulic conditions associated with natural gravel bars (Michny 1987); fish abundances therein were intermediate between those at natural and unimproved riprapped banks. Incorporation of notches or gaps in revetted banks facilitates formation of littoral bays, which enhance fish abundances in altered reaches (Kallemeyn and Novotny 1977).

The size of material used in constructing riprap affects microhabitat selection by salmonids because substrate size is an important criterion determining habitat suitability as described previously (Bustard and Narver 1975; Rimmer et al. 1984; Greenberg et al. 1996). On the Skagit River, Washington, small rock (i.e., rubble from 64 to 256 mm in diameter) riprap adversely affected all species (coho salmon, chinook salmon, chum salmon *O. keta*, and rainbow trout) of fish compared to boulder riprap (Beamer and Henderson 1998). A Mississippi River bank riprapped with 60-cm diameter rock had a fish biomass catch-per-unit-effort more than twice as great as a similar bank riprapped with rock 30 to 60 cm in diameter (Farabee 1986). Banks of the Thompson and Coldwater Rivers, British Columbia, riprapped with material of mean diameter greater than 30 cm supported higher chinook salmon, coho salmon, and steelhead trout densities during summer and winter than banks riprapped with material of mean diameter less than 30 cm (Lister et al. 1995). Filling the interstices of riprap with gravel can also enhance habitat value of riprap for juvenile salmonids (Michny 1987; U.S. Fish and Wildlife Service 1992).

The type of material used in bank stabilization may also affect fish density. Revetted banks that incorporate woody vegetation provide more cover for fish and have a more natural appearance than rock riprap (Hunter 1991; McClure 1991; Shields 1991). Furthermore, revetted banks on the Sacramento River, California, that incorporated woody vegetation suffered less damage from high flow velocities than unvegetated banks of the same age and similar curvature (Shields 1991).

Because riprap provides many interstitial spaces and high amounts of surface area, aquatic invertebrates flourish therein. Riprap in streams often becomes a location for sediment and debris deposition (Shields 1991), which enhances habitat for benthic invertebrates by providing additional food and cover (Burress et al. 1982; Mathis et al. 1982), except when the deposited sediments consist of sand (Sanders et al. 1986). Channelized reaches of the Missouri River in South Dakota had higher diversities, but lower densities, of invertebrates than natural reaches (Wolf et al. 1972). Invertebrate drift was greater along riprapped, channelized banks of the Missouri River in Iowa than along natural banks (Kallemeyn and Novotny 1977) and current-swept rocks in dikes and revetments supported more diversity and a higher density of macroinvertebrates than did natural stream substrates along the Missouri River in North Dakota (Burress et al. 1982). Similarly, higher total numbers of invertebrates were collected from revetted banks than natural banks along the Willamette River, Oregon (Hjort et al. 1984). On the other hand, artificial substrates placed in an unchannelized stretch with natural banks on the Missouri River near Vermillon, South Dakota, had 70% greater standing crops of invertebrates than at riprapped banks near Sioux City, Iowa (Nord and Schmulbach 1973). Abundant aquatic invertebrates in riprap may serve as a superior food source for fish, but no studies have been conducted that directly show that higher abundances of aquatic invertebrates in riprap benefit fish.

The studies described above addressing the effects of bank stabilization with riprap on river biota provide ambiguous results when considered in aggregate. Some case studies showed higher diversities and abundances of fish and invertebrates along riprapped banks than natural banks. Other studies indicated decreases in abundances and diversities of fish along riprapped banks compared to natural banks. In some studies, benefits were accrued by some species while others were deleteriously affected.

Some of the studies showing positive effects of riprap on fish (i.e., Binns 1994 and Avery 1995) were before-and-after studies conducted in streams suffering previous bank degradation from cattle grazing or other agriculture-related effects. Pre-existing conditions in these cases were already degraded and were no longer natural. Therefore, the ostensible positive effects of riprap in these cases may be viewed more realistically as partial mitigation of more severe past damage.

The beneficial effects of riprap in large, warmwater rivers such as the Mississippi may perhaps be viewed similarly. Historically, such rivers were congested with woody-debris snags, which because they were often the only hard substrates available (most substrates in these rivers consist of sand and gravel), were important sources of cover for fish and attachment sites for benthic invertebrates (Allan 1995). For example, in the Saltilla River, Georgia, woody debris represented only 4% of the total habitat surface available, but supported 60% of the total invertebrate biomass (Benke et al. 1985). Four of the 8 species of fish collected in this study obtained at least 60% of their prey biomass from woody debris, and all of the fish species used woody debris to some extent as cover (Benke et al. 1985). Removal of snags during the 19^{th} and 20^{th} centuries from large rivers to facilitate navigation (Funk and Robinson 1974) has severly diminished availability of hard substrates, leaving only shifting sand substrates. When riprap is introduced into these hard-substrate-limited systems, it is quickly colonized by invertebrates and used as cover by fish (Dardeau et al. 1995). Again, the pre-existing conditions used to compare riprapped banks to were already somewhat degraded and no longer provided a valid comparison. Studies conducted in coldwater systems tended to show negative effects of riprap on salmonids. In these systems, results may have differed from those in warmwater systems because hard substrate was likely not a limiting factor, considering that many freestone trout streams are characterized by a diverse range of substrate sizes, often including boulders. In addition, the absence of undercut banks along revetments may have been detrimental to salmonids.

Differing effects of riprap in different studies may also have been an artifact of when those studies were conducted and which life stages or species were focused on. Because microhabitat requirements change diurnally, seasonally, ontogenically, and as a function of prevailing weather and flow conditions, temporal and procedural differences in sampling protocols may have introducted confounding factors and led researchers to different conclusions.

Finally, it is important to recognize that riprap comes in various forms, sizes, and configurations, and can be made up of a variety of materials, which can influence its suitability as invertebrate and fish habitat. The physical descriptions of riprap in many of the studies were often incomplete or vague, thus making it difficult to recognize important distinctions (e.g., size of rock, incorporation of LWD) that may have helped reduce the uncertainty of our conclusions.

Effects of Turbidity

Best management practices will be used to minimize turbidity releases into St. Joe River. However, during rainy weather there could be a release of sediment into the river. The potential affects of the increased turbidity are discussed below.

Turbidity effects on fish: Most published information on the effects of sediment in streams relates to fish. Four major categories of this relationship are (1) the direct effects of suspended sediment and turbidity, (2) sediment trapped in salmonid redds and its influence on reproductive success, (3) effects on warmwater fish reproduction, and (4) effects of deposited sediment of fish habitat.

Suspended sediment produces little or no direct mortality on adult fish at levels observed in natural, relatively unpolluted streams. Intensive investigation of direct mortality due to suspended sediment was not undertaken until recently. In an extensive review, Lloyd (1987) quoted a number of unpublished reports that included results as either fatal or lowered survival; most of these included suspended sediment concentrations from 500 to 6,000 mg/L. Sigler et al. (1984) reported some mortality of very young coho salmon and steelhead trout fry at about 500 to 1,500 mg/L. In laboratory experiments, however, McLeary et al. (1984) reported survival of Artic grayling underyearlings which had been subjected to prolonged exposure to mining silt in concentrations of 1,000 mg/L. Also, McLeay et al. (1983) reported survival of similar fish acclimated to warm waters in stream cages and subjected to short exposures of concentrations up to 250,000 mg/L.

Much more information is available on sublethal effects or suspended sediment. Most of these reports were based on laboratory experiments, wherein specific effects were observed critically and often quantified. Effects tested in (1) avoidance and distribution, (2) reduced feeding and growth, (3) respiratory impairment, (4) reduced tolerance to disease and toxicants, and (5) physiological stress (review by Lloyd 1987).

Perhaps the most important sublethal effect of suspended sediment is the behavioral avoidance of turbid or silty water, resulting in long reaches or entire streams devoid of fish. Thus, the effect of avoidance may be the total preclusion of resident fish and juvenile anadromous salmonids. This factor destroys a stream as a productive fishery just as surely as if the population were killed. Many published reports have documented such effects.

Avoidance of water muddied from mining silt by spawning adult salmon was observed by Sumner and Smith (1940) in a California river. Avoidance by adult chinook salmon of a spawning stream that contained volcanic ash was reported by Whitman et al. (1982). In work on the Fraser River, British Columbia, Servizi and Martens (1992) observed avoidance by young coho salmon of high suspended sediment derived from gold-mining spoils; they pointed out that coho salmon may move laterally to the sides of a river to avoid high turbidity.

Much research on avoidance of silty water has been conducted in laboratory and field experiments. Juvenile coho salmon (Bisson and Bilby 1982) and young Arctic grayling (Scannell 1988) avoided high concentration of suspended sediment (as measured by turbidity in NTU). Coho salmon avoided turbidity greater than 70 NTU, and Artic grayling avoided turbidity greater than 20 NTU. Sigler et al. (1984) also observed that juvenile coho salmon and steelhead trout avoided turbid water in laboratory experiments. McLeay et al. (1984, 1987) observed Artic grayling that moved in a downstream direction in laboratory streams when subjected to mining silt. Berg and Northcote (1985) observed that juvenile coho salmon exposed to short-term pulses of suspended sediment dispersed from established territories.

In experimental stream channels related to long-term studies on coho salmon in the Clearwater River, Washington, Cederholm and Reid (1987) subjected juvenile coho salmon to three levels of suspended sediment concentrations: clear water (0 mg/L); medium suspended sediment (1,000 - 4,000 mg/L); and high suspended sediment (4,000-12,000 mg/L). They observed that the fish preferred clear and medium conditions, suggesting that juvenile fish preferentially avoid high suspended sediment condition in silty streams. Furthermore, they observed evidence of stress in the fish - an increased rate of opercular movement and "coughing"; sediment accumulations on gill filaments; and declines in prey capture success - at the high suspended sediment concentrations.

In a different approach involving competition between species, Gradall and Swenson (1982) concluded that red-clay turbidity favored the creek chub over brook trout in sympatric populations in small streams. The creek chub preferred the cover provided by suspended sediment turbidity, whereas brook trout preferred clearer water.

One of the major sublethal effects of high suspended sediment is the loss of visual capability, leading to reduced feeding and depressed growth rate. Several researchers have reported decreased feeding and growth by fish in turbid conditions resulting from suspended sediment. For example, Cleary (1956) and Larimore (1975) noted that turbidity in smallmouth bass streams caused very young fry to be displaced downstream due to the loss of visual orientation. The bass left areas where they fed on the microcrustaceans so important to early fry stages.

Most research on feeding and growth, however, has been experimental. McLeay et al. (1984, 1987) reported impaired feed ability by Arctic grayling exposed to placer mining silt: Reynolds et al. (1989) reported similar results for Arctic grayling in cage experiments in Alaska streams. Redding et al. (1987) observed little or no feeding by juvenile coho salmon and steelhead trout exposed to suspended sediment in Oregon laboratory experiments, and Berg and Northcote (1985) reported reduced feeding by juvenile coho salmon on drift (brine shrimp) in laboratory tests. In most cases, vision impairment due to suspended sediment turbidity was determined to be the factor that reduced the ability of the fish to capture prey (Sykora et al. 1972; Berg 1982).

Despite early speculation about gill damage by suspended sediment (Cordone and Kelley 1961; Herbert and Merkens 1961), few reports indicated gill damage and impairment of respiratory function as a source of mortality (McLeay et al. 1987; Redding et al. 1987; Reynolds et al. 1989). Whereas high suspended sediment concentrations may not be immediately fatal, thickening of the gill epithelium may cause some loss of respiratory function (Bell 1973)

Berg and Northcote (1985) reported increased gill-flaring in high turbidities due to suspended sediment; this was viewed as an attempt by fish to cleanse their gill surfaces of suspended sediment particles. Similarly, Servizi and Martens (1992) recorded an eightfold increase in "cough" frequency over controls at suspended sediment concentrations of 230 mg/L. It seems likely that fish have evolved behavioral or physiological adaptations to temporary high concentrations of suspended sediment in order to survive short-term conditions caused by natural spates and floods. Chronic high suspended sediment concentrations that are initiated by anthropogenic sources, however, may not be tolerated.

Studying the effect of Mount St. Helens volcanic ash on chinook and sockeye salmon smolts, Newcomb and Flagg (1983) reported total mortality at very high ash levels (25% ash by volume) but no mortality at less than 5% ash. Based on the appearance of the gills, they suggested that impaired oxygen exchange was the primary cause of death, but they concluded that most airborne ashfalls would not cause acute mortality.

The severe effect of sediment upon developing embryos and sac fry in redds has been intensively investigated. A major problem in many circumstances is that the source of oxygen reaching the redd is in the downwelling water of the stream itself. Suspended sediment carried by stream water enters the redd where velocities are slowed in the interstitial spaces and sediment particles settle. Consequent effects include the coating of eggs and embryos and the filling of interstitial spaces in the redd gravel so completely that the flow of water containing oxygen through the redd is impeded or stopped. The salmonid redd thus functions as an effective "sediment trap," and the entry of oxygen required for embryo survival and development is prevented.

A second major problem occurs when sedimentation on the streambed or in upper strata of the redd produces a consolidated armor layer through which emerging sac fry cannot penetrate. Even though embryo development and hatching may be successful within the redd, such entombment of fry attempting to emerge from the redd can result in reproductive failure.

Studies of either direct mortality or sublethal effects of suspended sediment on warmwater fish species are relatively few in the literature. The work of Wallen (1951) remains the most instructive about suspended sediment effects in warmwater fishes, although not all of the fishes he studied were stream inhabitants. The clogging of gills, and thus respiratory impairment, and induction of disease and parasites have been suggested as effects of suspended sediment (Trautman 1933; Pautske 1938, Wallen 1951).

Despite the observation of seemingly viable fish communities in sometime extremely turbid and silty conditions, some warmwater species have disappeared over the long term (Larimore and Smith 1963; Smith 1971; Trautman 1981). Muncy et al. (1979), in their extensive review on suspended sediment and warmwater fish, concluded that great variation exists among these species in tolerance to suspended sediment, and that the loss of some species from an otherwise apparently viable fish community eventually may have severe disruptive effects on the system as a whole.

The effect of sediment upon reproductive success of warmwater fishes is not well known. Early reports of declines or losses in warmwater populations were broadly correlated with sedimented streams (Trautman 1933, Aitkin 1936, Larimore and Smith 1963, Smith 1971). Sometimes reproductive failures were inferred, but no explicit experimental study has been reported for freshwater stream species. Muncy et al (1979) noted that most publications on warmwater fish reproduction were from north-central agricultural regions. Little had been published from western or southern areas.

Reproductive behavior of warmwater fish species is more complex and less understood than for salmonid species. Historically, observations of gross correlations between fish species distribution and heavy sedimentation in streams strongly suggested cause and effect but only circumstantial evidence is available.

The effect of deposited sediment, most often sand, on fish-rearing habitat has been studied within two major subject areas: mortality to fry by elimination of interstitial space in riffles of gravel and cobbles, and loss of juvenile-rearing and adult habitat by filling of pools. Salmonid fry, particulary, often require the protection of streambed "roughness" conditions for winter survival. Severe reductions in year-class strength occur when a cohort of salmonid fry faces stream riffles heavily embedded by sediment deposits. Presumably, fry of warmwater species require similar habitat for survival of early life stages, but little research has been accomplished on sediment relationships for these fishes.

Although not as extensively documented, the effect of deposited sediment on juvenile rearing habitat in pools has been similarly convincing. When heavy deposits eliminate pool habitat, reduced growth and loss of populations result.

Turbidity/Sediment effects on primary producers: The principal effect of suspended sediment upon primary producers is through turbidity, which reduces light penetration through the water, thus reducing photosynthesis The ecological effects of sustained, reduced photosynthesis upon higher trophic levels (i.e, invertebrates and fish) is generally unknown. Virtually no experimental research has addressed the effects of sediment-reduced primary production on herbivorous invertebrates.

Turbidity/Sediment effects on invertebrates: More is known about the effects of suspended sediment on macroinvertebrates. The most common direct effect observed in experiments with fine sediments has been a pronounced increase in downstream drifting. Such increased drift has been attributed primarily to a decrease in light with consequent drift responses similar to behavioral drift in a diel periodicity. Extraordinary drift under prolonged high levels of suspended sediment may deplete benthic invertebrate populations.

Severe damage to benthic invertebrate populations can be caused by heavy sediment deposits. The affected organisms consist mainly of the insect orders Ephemeroptera, Plecoptera, and Trichoptera, (EPT), which generally are the forms most readily available to foraging fish. Virtually no research has been conducted on the effect of sediment on the meiofauna of streambeds, despite increasing appreciation of the ecological importance of these small organisms to fisheries.

Any effect of sediment input to St. Joe River is likely to be of minor consequence since the biological effect of episodic inputs has been found generally to be temporary. Rapid recovery often results from invertebrate drift from upstream reaches. In an Ohio stream, sediments from eroding deposits of glacial lacustrine silt, although natural, simulated episodic events. The glacial silt periodically reduced benthic macrosinvertebrates up to 5 km downstream from the site (DeWalt and Olive 1988). However, after one of the glacial silt deposits was completely eroded, sediment input ceased, the stream deposits cleared, and drift from upstream quickly restored benthic populations. In British Columbia, temporary siltation from a pipeline crossing reduced local benthos populations by up to 74% but benthos recovery was rapid after construction stopped (Tsui and McCart 1981).

5.3. PROJECT IMPACT TO LISTED SPECIES.

5.3.1. GRAY WOLVES.

5.3.1.1. Level of use of the project area.

The gray wolf is a resident of northern Idaho. Populations of wolves in the Western United States are in areas with the highest concentration of deer and elk. They have colonized parts of Montana, and have been periodically documented in Washington, Idaho, and Wyoming. Documentation of the presence of wolves has increased in Idaho since the 1970's, although no breeding or pack activity has been confirmed. Gray wolves have little tolerance for humans and human activity.

5.3.1.2. Effect of the project on primary food stocks, prey species, and foraging areas.

Negative impacts affecting the ungulate prey base is detrimental to wolves. The wolf is a predator on ungulates and thus is influenced by their numbers (Mech 1970, Peterson et al. 1984). Wolf numbers decline with inadequate prey, or if prey is not vulnerable due to good habitat and/or weather (Peterson et al. 1984). Ungulate calving and fawning grounds and wintering areas are particularly important for wolves. Ungulate use of the project is unlikely, as it is not a known calving, fawning, or wintering area for elk or deer.

5.3.1.3. Impacts from project construction.

The project will not result in a net loss or degradation of key gray wolf prey species or their habitats. The project will not result in the construction of any new roads or encourage new roads in gray wolf habitat. Project activities will not occur in the vicinity of a known den or a rendezvous site.

5.3.2. BALD EAGLES

5.3.2.1. Level of use of the project area.

Correspondence with the Idaho Department of Fish and Game indicated that there are no bald eagle nests or roosting sites located near the project site. However, St. Joe River basin is a known area for wintering bald eagles and it is highly likely that they may pass through the project area during foraging or migration.

5.3.2.2. Effect of the project on primary food stocks, prey species, and foraging areas.

Bald eagle food habits are extremely varied. Small prey are taken when abundant. However, larger fish, water birds, and small mammals are also taken as live prey. During winter, carrion such as carcasses discarded by trappers, winter-kill deer, and spawned-out salmon also attract eagles.

Migrant eagles begin to appear on traditional wintering grounds during late October. Peak numbers occur during January and February. The primary motivations during winter are feeding and conserving energy. Bald eagles congregate near sources of food, generally river, lakes, and the marine shoreline. When not actively feeding or searching for food, they will appear to "loaf" in favorite perch trees.

Best management practices will be used to avoid impact to various fish species that may serve as food for bald eagles. Migrating waterfowl may avoid the area of construction due to noise. Regardless, impacts to bald eagle food or prey would be minimal as a result of this project.

5.3.2.3. Impacts from project construction.

One of the two major threats to the bald eagle at present and for the foreseeable future is destruction and degradation of its habitat. This occurs through direct cutting of trees for shoreline development, human disturbance associated with recreational use of shorelines and waterways, and contamination of waterways from point and non-point sources of pollution. The project will not introduce any contamination or pollution into the project area.

The project will be built during late summer/early fall when wintering bald eagles will not be present. Therefore, direct impacts from construction are very unlikely.

5.3.3. BULL TROUT.

5.3.3.1. Level of use of the project area.

The St. Joe River drainage is considered to consist of one population of bull trout. A small number of bull trout use the river as a migratory corridor.

5.3.3.2. Effect of the project on primary food stocks, prey species, and foraging areas.

Bull trout are opportunistic feeders with food habits primarily a function of size and life-history strategy. Resident and juvenile migratory bull trout prey on terrestrial and aquatic insects, macro-zooplankton and small fish (Boag 1987; Goetz 1989; Donald and Alger 1993).

Adult migratory bull trout are primarily piscivorous, known to feed on various fish species (Fraley and Shepard 1989; Donald and Alger 1993). Bull trout evolved with, and in some areas, co-occur with native cutthroat trout (*Oncorhynchus clarki* ssp.), resident (redband) and migratory rainbow trout (*O. mykiss*), chinook salmon (*O. tshawytscha*), sockeye salmon (*O. nerka*), mountain whitefish (*Prosopium williamsoni*), various sculpin (*Cottus spp.),* sucker (Catastomidae) and minnow species (*Cyprinidae spp.)* (Rieman and McIntyre 1993).

Best management construction techniques will reduce impacts to aquatic resources. No impact on bull trout food stocks, prey species or foraging areas will likely occur.

5.3.3.3. Impacts from project construction.

Although preferred water temperature varies by life history stage, consistently cold water is required at all critical life history stages for bull trout. Increases in stream temperatures can cause direct mortality, displacement by avoidance (Bonneau and Scarnechia 1996), or increased competition with species more tolerant of warm temperatures (Rieman and McIntyre 1993, Craig and Wissmar 1993). This project will not increase the water temperature. There will be a minimal loss of established riparian vegetation. Sedimentation can also increase water temperature of streams (i.e., by filling pools and reducing channel depth, increasing riffle area and channel width, which results in increased solar insulation [MBTSB 1998]). However, an increase in sedimentation will not occur.

Cover is an important component of habitat complexity that is used by bull trout at all life history stages. Cover can include woody debris, overhanging vegetation, undercut banks, cobble and boulder substrate, water depth and turbulence, and aquatic vegetation (Graham et al. 1981, Pratt 1984, Hoelscher and Bjornn 1989, Goetz 1991, Pratt 1992, Murphy 1995). Minimal cover will be lost as a result of this project. The incorporation of large woody debris will provide a slight increase in instream habitat.

This project will not likely affect the upstream or downstream movement of bull trout, nor will it fragment bull trout habitat, reduce habitat patch size or isolate remaining subpopulations. Appropriate conservation measures will be employed to avoid direct effects to adult bull trout during construction.

Bull trout show affinity for stream bottoms and a preference for deep pools of cold water streams, lakes, and reservoirs (Goetz 1989). Because of this strong association with the stream bottom throughout their life history they can be adversely affected by activities that directly or indirectly change substrate composition and stability. The Corps will isolate the work area from the open water to prevent sediment delivery and turbidity in the river. Therefore, no significant accumulations of sediment is anticipated.

The project is not within or above known or suspected bull trout spawning habitat. Most scientific literature suggests that the project area is unlikely to be used by bull trout for spawning, incubation, and juvenile rearing life history stages. Bull trout are among the most cold water adapted fish and require very cold water for incubation, juvenile rearing, and to initiate spawning. Juvenile rearing and spawning typically occur in the smaller tributaries and headwater streams that may be upstream of anadromous salmonids (Underwood et al. 1995, Reiman et al. 1997). There are no known areas of groundwater upwelling or influence in the project area that would be suitable for redd construction.

The project will not facilitate the introduction of non-native species, such as brook trout or brown trout, that may compete, hybridized with, or prey on bull trout. Also, the project will not significantly disrupt behavior patterns of migrating bull trout.

5.3.4. UTES LADIES'TRESSES.

5.3.4.1. Distribution of Ute ladies' tresses in project vicinity.

Ute ladies' is known to inhabit wetland and riparian areas, including spring habitats, and mesic to wet meadows and flood plains. In Washington, it has been found at 1,500 feet in elevation. In other parts of its range it is found up to about 6,000 feet, below the lower margin of montane forests, generally in moist areas in open shrub or grassland, or in the transitional zone. There has been no known occurrence of Ute ladies' tresses in the vicinity of the project.

5.3.4.2. Disturbance (trampling, uprooting, collecting, etc.) of individual plants and loss of habitat.

This project will not cause a disturbance or loss of habitat to Ute ladies' tresses.

5.3.4.4. Changes in hydrology where Ute ladies' tresses are found.

This species may be adversely affected by modifications of its habitat associated with livestock grazing, vegetation removal, excavation, construction, stream channelization, and other actions that alter hydrology. This project is not believed to cause any changes in hydrology to Ute ladies' tresses because the project consisted of simply reinforcing of an existing levee.

6.0. INTERDEPENDENT AND INTERRELATED EFFECTS.

Interdependent and interrelated actions are actions that have no independent utility apart from the primary action. Both the interdependent and interrelated activities are assessed by applying the "but for" test, which asks whether any action and its associated impacts would occur "but for" the action. The Corps has determined that there are no interdependent and interrelated effects as a result of this project.

7.0. CUMULATIVE EFFECTS.

Cumulative effects include the effects of future state, Tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological assessment. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Development is likely to continue to occur in the area. Construction of commercial and residential housing is ongoing and likely to increase in the future. Commercial development and construction of residential subdivisions will occur in surrounding areas limiting the amount of interior forest.

8.0. CONSERVATION MEASURES.

Corps personnel will build the project in a manner that will avoid and minimize potential negative effects to fish and habitat. They will use the following best management practices during construction:

1. Riparian and wetland areas will be avoided as staging or refueling areas.
2. Equipment will be stored, serviced, and fueled away from aquatic habitats or other sensitive areas.
3. The project will used clean material to minimize the release of fines into the aquatic environment.
4. Existing roadways or travel paths will be used for access to project sites.
5. Excavation and transport equipment machinery will be limited in capacity, but sufficiently sized to complete required activities.
6. All garbage will be removed from the project site and disposed of properly; undisturbed vegetated buffer zones will be retained along the project to the greatest extent possible to reduce sedimentation rates, channel instability, and aquatic habitat impacts.
7. riprap will be limited to the extent absolutely needed and the use of bio-engineered techniques employed where possible.
8. The Corps will stockpile native riparian vegetation removed during construction and replant it in the riparian corridor after construction of engineered features.
9. Will isolate the work area from the open water to prevent sediment delivery and turbidity in the river.

9.0. DETERMINATION OF EFFECTS.

Table 2. Determination Summary Table

Species	Listing Status	Effect Determination
Gray wolf	Listed Endangered	Not likely to jeopardize
Bald eagle	Listed Threatened	Not likely to adversely affect
Bull trout	Listed Threatened	Not likely to adversely affect
Ute ladies'-tresses	Listed Threatened	Not likely to adversely affect

9.1. GRAY WOLF

The project will not result in a net loss or degradation of key gray wolf prey species or their habitats. Ungulate use of the project is unlikely, as it is not a known calving, fawning, or wintering area for elk or deer. The project will not result in the construction of any new roads or encourage new roads in gray wolf habitat. Project activities will not occur in the vicinity of a den or a rendezvous site. Thus, the Corps believes the project **is not likely to jeopardize the continued existence** the gray wolf.

9.2. BALD EAGLE.

Based on the analysis of effects the Corps has determined that this project **may affect, but not likely to adversely affect bald eagle.** The level of use of the area by bald eagles is minimal. The project will not have an effect on the eagle's primary food stocks and foraging area in the area influenced by the project. The project will not cause bald eagles to avoid or abandon the area, nor will it remove any current or potential habitat.

9.3. BULL TROUT.

A draft document provided by the USFWS, Olympia titled "A Framework to Assist in Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Bull Trout Subpopulation Watershed Scale February 1998" was used in making a determination of effect for bull trout. The document provided a dichotomous key for making ESA determination of effects. The following questions and answers are detailed within this document.

Question 1. Are there any proposed/listed fish species and/or proposed/designated critical habitat in the watershed or downstream from the watershed?

NO……………………………………………………………No effect
YES (or Unknown) …………………………………………...Go to 2

As previously discussed in this document, both the USFWS and IDFG indicated that bull trout may occur in project vicinity. Therefore, the answer to question one would be "yes".

Question 2. Will the proposed action(s) have any effect whatsoever on the species; designated or proposed critical habitat; seasonally or permanently occupied habitat; or unoccupied habitat necessary for the species' survival?

NO……………………………………………………………No effect
YES……………………………………………………………Go to 2

This is a tougher question to answer. Initially the answer that would come to mind would be "no." However, the USFWS definition of "any effect whatsoever" includes small effects, effects that are unlikely to occur, and beneficial effects. A "no effect" determination is only appropriate if the proposed action will literally have no effect whatsoever on the species and/or critical habitat, not a small effect, an effect that is unlikely to occur, or a beneficial effect. Since the project occurs in the floodplain there exists a chance, even though remote, that there could be a small effect on bull trout. Therefore, the answer to question two is "yes".

Question 3. Does the proposed action(s) have potential to: result in "take" of any proposed/fish species?

NO……………………………………………………………Go to 4
YES……………………………………………………………Likely to adversely effect

The Endangered Species Act (Section 3) defines take as "to harass, harm, pursue, hunt, shoot, wound, trap, capture, collect or attempt to engage in any such conduct". The USFWS (USFWS, 1994) further defines "harm" as "significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering", and "harass" as "actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to breeding, feeding, or sheltering". As described in the "project description" section, this project is unlikely to cause harm or harassment as defined by the USFWS. Therefore, the answer to question three is "no".

Question 4. Does the proposed action(s) have potential to or cause an adverse effect to any proposed/listed fish species habitat, such as: adverse effects to critical habitat constituent elements or segments; impairing the suitability of seasonally or permanently occupied habitat; or impairing or degrading unoccupied habitat necessary for survival of the species locally?

NO ………………………………………………………Not likely to adversely effect
YES……………Likely to adversely affect (including adverse effects to critical habitat)

In order to help answer this question an evaluation of project was done using a relevant indicators matrix. The matrix listed several "relevant indicators" to simplify arriving at an effects determination. The matrix used is from the USFWS "A Framework to Assist in Making Endangered Species Act Determination of Effect for Individual or Grouped Actions at the Bull Trout Subpopulation Watershed Scale draft 1998."

Table 3. Checklist for documenting environmental baseline and effects of the completed action on relevant indicators.

Pathways:	**ENVIRONMENTAL BASELINE**			**EFFECTS OF THE ACTION**		
Indicators	Properly Functioning	At Risk	Not Prop. Functioning	Restore	Maintain	Degrade
Subpopulation Characteristics Subpopulation size			x		x	
Growth and Survival			x		x	
Life History Diversity and Isolation			x		x	
Persistence and Genetic Integrity	Unknown				x	
Water Quality: Temperature	x				x	
Sediment		x			x	
Chem. Contam./Nut		x			x	
Habitat Access: Physical Barriers			x		x	
Habitat Elements: Substrate		x			x	
Large Woody Debris	x				x	
Pool Frequency		x			x	
Pool Quality		x			x	
Off-channel Habitat			x		x	
Refugia	x				x	
Channel Cond/Dyn.: Width/Depth Ratio	x				x	
Streambank Cond.		x			x	
Floodplain Connectivity			x		x	
Flow/hydrology: Peak/Base Flows		x			x	
Drainage Network Increase		x			x	
Watershed: Road Dens. & Loc.		x			x	
Disturbance History		x			x	

Riparian Reserves	x				x	
Disturbance Regime		x			x	
Integration of Species and Habitat Conditions			x		x	

Further evaluation of the project reveals that the project will not destroy or alter bull trout habitat by dredging, diversion, in-stream vehicle operation or rock removal, or other activities that result in the destruction or significant degradation of cover, channel stability, substrate composition, temperature, and migratory corridors used by bull trout for foraging, cover, migration, and spawning.

The project will not significantly disrupt behavior patterns of migrating or spawning bull trout. Nor will the project facilitate the introduction of non-native species, such as brook trout or brown trout, that may compete, hybridize with, or prey on bull trout.

The project will not discharge or release toxic chemicals, silt, or other pollutants into waters supporting bull trout that result in death or injury of the species. The project also will not destroy or alter riparian habitat that results in a significant degradation of cover, channel stability, substrate composition, temperature, and migratory corridors used by bull trout for foraging, cover, migration, and spawning.

Based on the preceding information the answer to question four would be "no". Therefore the determination would be **not likely to adversely affect**.

9.4. UTE LADIES' TRESSES.

Ute ladies' tresses have not been found in the general vicinity of the project as they are generally found at relatively low elevations in mesic or wet meadows along permanent streams, and about springs and major desert lakes. These sites are commonly subject to intermittent and unpredictable innundation, and the plants often emerge form shallow water. Therefore, based on the unlikely prospect of the Ute ladies tresses occurring in the project area and the fact the project only reinforced simply replaces an existing floodwall, the Corps has determined that the project **may affect, but not likely to adversely affect** the Ute ladies'-tresses.

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