ENVIRONMENTAL ASSESSMENT

Middle Wind River
Riparian Enhancement Project
T4N, R7E, Section 9
Gifford Pinchot National Forest, Mt. Adams District
Skamania County, Washington

CHAPTER I INTRODUCTION

A. DOCUMENT STRUCTURE

Underwood Conservation District has prepared this Environmental Assessment in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This Environmental Assessment discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. The document is organized into four parts:

- *Chapter I, Introduction:* The section includes information about the history of the project proposal, existing conditions, management direction, the purpose of and need for the project, and the proposal for achieving that purpose and need. This section also details the decision to be made, how Underwood Conservation District informed the public of the proposal, issues and needing consideration.
- *Chapter II, Project Alternatives:* This section provides a more detailed description of the proposed action as well as alternative methods, in this case, no action. This discussion also includes possible mitigation measures.
- *Chapter III, Environmental Consequences:* This section describes the environmental effects of implementing the proposed action and the No Action alternative. This analysis discusses the effects of the alternatives on the issues that were identified in Chapter II.
- *Chapter IV, Agencies and Persons Consulted:* This section provides a list of preparers and agencies consulted during the development of the environmental assessment.
- *References:* This list shows the articles, reports, and publications used to support this Analysis.
- *Appendices:* The appendices include maps and charts to support the analysis.

Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record located at Underwood Conservation District, 170 NW Lincoln St. White Salmon, WA.

B. THE PROPOSED PROJECT

The Underwood Conservation District (UCD) proposes to restore instream conditions and steelhead habitat on one reach of the Wind River, located immediately south of Beaver Campground. The project would consist of installing streambank log structures along an approximate 1-mile reach of the Wind River, north of Stabler. This project is federally funded through Title II of the Secure Rural Schools and Community Self-Determination Act (P.L. 106-393, 2000)

The project is designed to restore instream conditions, bank stability, and riparian habitat for the recovery of threatened Lower Columbia steelhead along the Wind River, north of Stabler, Washington

C. PROJECT AREA DESCRIPTION

The Project would take place within one reach of the Wind River, located about 2 miles north of Stabler, Washington, and immediately south of Beaver Campground. The project area is located in

T4N, R7E, Section 9, from approximately river mile 15.5 to 16.5. The project area involves both National Forest land and adjacent privately-owned lands. Refer to figures 1 and 2 in Appendix A for maps of project area.

Existing Conditions

Old growth riparian stands once dominated the project reach. Like much of the valley, mature stands were harvested from the 1920's to the mid 1950's. The current lack of mature riparian vegetation and associated root cohesion in the project area contributes to poor bank and channel stability. The lack of lateral channel stability reduces the project areas overall resiliency and ability to dissipate the negative effects of large scale disturbances such as the 1996 flood.

The treatment area currently consists of stream banks, gravel bars, various stages of riparian forest vegetation, invasive weeds (Scotch Broom), and side channels of the Wind River. The reach includes the main channel of the Wind River, and two side channels (designated "A" and "B"), which carry water during normal and high flows. The side channels carry very little water during summer low flows, but exhibit strong flows during the winter. In 1996, the Wind River cut through a meander during a winter storm. The meander channel is still active as a third side channel.

Access: Two roads run parallel to the Wind River in this vicinity. On the east side, the Wind River Highway lies about ¼ mile from the river. Two old access roads lead from the Highway to near the river edge in this area. On the west side, Szydlo and Soda Springs Roads roughly parallel the river. Unlike the eastern side, there are few old roads accessing the riverside.

Landowners: The proposed project area has two landowners. The northern and eastern portion of the project area lies on land recently acquired by the Gifford Pinchot National Forest. Prior to 2005, this property was in private ownership. The southern and western portion of the project area is privately owned. The present owners have agreed to participate cooperatively in this project. The boundary between the USFS and private property is not marked on the ground. Refer to Figure 2 in Appendix A for a map of the project area showing landownership lines.

More detail about the existing resource condition may be found in Chapter III, Project Alternatives, under the description of alternative 1 (no action).

D. MANAGEMENT DIRECTION

The project would be implemented under, and is consistent with, the direction of the *Gifford Pinchot Land and Resource Management Plan* (USDA Forest Service, 1990, 1998) for national forest lands, and by Federal and State laws and Skamania County ordinances appropriate to private lands.

The private property is zoned by Skamania County as Residential 2 (R-2), allowing for single family dwellings and other developments on parcels as small as 2 acres (Skamania County Zoning Ordinance). The area covered by this project, along the Wind River and adjacent side channels, fit a couple of the County's definitions of Critical Areas (streams, creeks and rivers, frequently flooded areas) and thus fall under and are governed by that Ordinance.

Northwest Forest Plan Allocations

The Forest Plan, as amended by the *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl and Standards and Guidelines for Late-Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl* (commonly referred to as the Northwest Forest Plan), will serve as direction for National Forest lands. The Northwest Forest Plan defined broad land management objectives within land allocations.

Late-Successional Reserves

The project is located within the Wind Late-Successional Reserve allocation. The Forest Service prepared an assessment of conditions and functions of each Late-Successional Reserve. In June 1997, The Gifford Pinchot National Forest published a Forestwide Late-Successional Reserve Assessment (LSRA). The LSRA, which covers each of the Forest's Late-Successional Reserves, provides an ecological framework within which projects will be designed in order to meet LSR objectives.

The LSRA identifies watershed restoration activities as an appropriate management activity for the LSR. The LSRA notes that restoration activities will have negligible effects on late-successional habitat, and, that watershed restoration is one of the four cornerstones of the ACS (pg. 5-38). Per the LSRA (pg. 5-39), in-stream stabilization and fish habitat restoration projects would "restore or enhance in-stream channel conditions". Projects would utilize large boulders and logs to stabilize banks and the channel. Stream bank stabilization should decrease the width-to-depth-ratio, provide greater channel stability and improve habitat for native fish stocks" (USDA Gifford Pinchot National Forest 1997).

Riparian Reserves

Riparian Reserves are defined as portions of watersheds where riparian-dependent resources receive primary emphasis and where special standards and guidelines apply.

Management Areas

Gifford Pinchot National Forest Plan defines Management Areas within these allocations that provide specific management direction for these lands.

The following Management Areas apply to National Forest lands in the planning area:

General Late Successional Reserves (LS) - Forest Plan (Amendment 11 pg. 5-31)

The project area is within the Wind Late Successional Reserve. The management objective for lands within this reserve is to protect and enhance conditions of late-successional and old growth forest ecosystems.

Scenic and Recreational Rivers (6L) - Forest Plan (Amendment 11 pg. 6-36)

The project area includes a portion of the Wind River and adjacent lands within 360' of it. The Wind River is both eligible and suitable for addition to the National Wild and Scenic Rivers System as a *Recreational* River It was nominated for consideration as a Recreational River in the Gifford Pinchot National Forest Plan (USDA Forest Service, 1990, Appendix E). The management objective for lands within ¼ mile of eligible rivers is to retain scenic or Recreational River characteristics pending possible addition to the Scenic Rivers System.
A map of management areas is provided in Appendix A, figure 4.

Aquatic Conservation Strategy

The Northwest Forest Plan identifies an Aquatic Conservation Strategy (ACS) as part of its comprehensive ecosystem management strategy. One component of the strategy requires watershed analysis. The Wind River Basin Watershed Analysis (Watershed Analysis) was completed in April 1996, and an update was completed in 2001 (Second Iteration Wind River Watershed Analysis).

The Wind River is a *Tier 1, Key Watershed*. Tier 1, Key Watersheds contribute directly to conservation of at-risk anadromous salmonids, bull trout, and resident fish species. Tier 1 Key Watersheds also have a high potential for restoration as part of a watershed restoration program (Northwest Forest Plan Record of Decision pg. B-18).

Riparian Reserves are another component of the ACS. Riparian Reserves include the body of water, inner gorges, all riparian vegetation, and the 100-year flood plain. The exact width of Riparian Reserves is defined as a multiple of a site-potential tree. The Riparian Reserves within this reach of the Wind River extend about 360 feet from the stream bank (360 feet equals two site potential tree heights, which is the criteria that provides the Riparian Reserves width). The entire project area is within the Riparian Reserve.

E. PURPOSE OF AND NEED FOR THE PROPOSED ACTION

Purpose and Need

The purpose of this project is to (1) restore instream conditions, bank stability, and riparian habitat for the recovery of threatened Lower Columbia steelhead along the Wind River, north of Stabler, Washington,. As well as promoting the recovery of steelhead, the actions of this project benefit water quality, reducing temperature and excessive sedimentation.

This project was initiated because severe bank erosion, meander cutoffs, and channel avulsions are taking place within the project area, which degrade steelhead habitat. There is a lack of mature riparian vegetation and associated root cohesion in the project area that contributes to the existing poor bank and channel stability. Lack of channel stability reduces the area's overall resiliency and ability to dissipate negative effects of large scale disturbances such as the 1996 flood. The existing conditions within the project area are contributing to loss of property, increased maximum water temperatures, increased sediment load and deposition within the river, and loss of primary pools and hiding cover for threatened Lower Columbia River steelhead (USDA Forest Service, T.E.A.M.s Enterprise 2005).

The Wind River Watershed Analysis (USDA Forest Service 2001) identified the reach of stream containing this project area (between river miles and 15-17 of the Wind River) for riparian and stream channel restoration. The Watershed Analysis and the Wind River Sub-Basin Plan (Lower Columbia River Fish Recovery Board 2004) identified the lack of pools, excessive width-to-depth ratios, shortage of large woody debris (LWD), channel instability and lack of mature riparian vegetation as limiting habitat factors for threatened steelhead.

In 2005 Underwood Conservation District (UCD) developed objectives for this project, with the help of USFS Fish Biologists.

Objectives

- Reduce the low-flow width-to-depth ratio to <12
- Reduce the bankfull width-to-depth ratio to <35
- Increase the floodplain large woody debris to >16 pieces per acre larger than 12 inches in diameter and >70 feet long.
- Increase instream large woody debris (LWD) to >120 pieces per mile >12 inches in diameter and >70 feet in length.
- Reduce bank erosion to 20%.
- Reconnect and/or maintain side channels.

Proposed Action

This project is located between river miles 15 and 17 along the middle Wind River of Skamania County, Wash., North of Carson and Stabler and just south of Beaver Campground.

A series of large wood structures have been proposed for construction to 1) restore lateral channel stability to allow natural regeneration and prevent premature recruitment of riparian vegetation from subsequent flood events for the long- term (>30 years); 2) in the short term (<5 years) reduce near

bank shear stress and bank erosion to reduce coarse and fine sediment input to the Wind River; 3) reduce bankfull and low flow width-to-depth ratios to reduce the surface area of the stream exposed to solar input and incrementally reduce water temperature; 4) increase primary pools and hiding cover for juvenile and adult threatened Lower Columbia River steelhead; and 5) prevent further loss of property.

A series of debris jams (5 total) will be placed in side channels throughout this reach to reduce the slope and moderate the peak flow discharge. The purpose of the debris jams is to keep these side channels connected to the flood plain and usable for high flows, without allowing them to take on so much flow that the main stem becomes even more shallow and warm.

Approximately 23 "Formidable, Multi-Faceted Jams" (FMFs) are proposed along the river banks of the main stem of the Wind River. These FMFs are designed to be constructed of large rootwads, logs, and rock. These will help reduce bank erosion and sediment delivery into the river, create stable banks for long-term vegetation establishment, as well as rehabilitate fish habitat by creating pools and cover. UCD's engineer has finished preliminary designs for these structures, incorporating the designs used by the USFS. Logs for the project would be furnished by the Gifford Pinchot National Forest, and would be removed as part of a thinning project in the Trout Creek watershed.

F. DECISION TO BE MADE

Based on this environmental assessment, the Forest Supervisor will make the decision to either:

1. Select an action alternative for the Middle Wind River Restoration Project,
2. Defer action at this time, or
3. Determine if there is the potential for significant effects associated with the selected alternative and direct that an environmental impact statement (EIS) be prepared.

G. ISSUES

Scoping Summary

Scoping is a process used early in the planning effort to determine issues concerning the proposed action. Comments are solicited from the public, employees of the Forest Service, and other public agencies. Once identified, the issue becomes the basis for formulating alternatives and determining the impacts to study during environmental analysis.

As a part of the public scoping process, a public meeting was held in conjunction with the Wind River Watershed Council in April 2006. A summary of the proposed project, including the Purpose and Need, and Proposed Action, was mailed to interested parties on the Mt. Adams Ranger District mailing list. The proposal was published in the Gifford Pinchot National Forest quarterly Schedule of Proposed Actions beginning in Summer 2006. Finally, landowners were briefed on the project proposal. Internal scoping was conducted through a series of meetings and through consultation with the interdisciplinary team and regulatory agencies. During public scoping we identified "Effects on Hatchery Fish" and "Downstream Effects" as issues. These and other issues are summarized below.

Issues for this project were divided into the following three categories:

Significant Issues - Issues used to formulate and evaluate the alternatives. They involve potential effects which may result from the proposed action, even after application of standards and guidelines and mitigation measures.

Other Issues - Topics of concern which are addressed by existing standards and guidelines, policies, laws or minor modification of the project design. The resolution of these issues do not vary between alternatives.

Issues dropped from further consideration - Concerns raised during scoping which are beyond the scope of the project or for which there are simple solutions such as the placement of informational and/or regulatory signs.

The following section describes the issues. The order in which the issues are presented is not intended to reflect their order in importance.

Significant Issues

No Significant Issues were identified.

Other Issues

1. **Threatened and Endangered Species, and Survey and Manage Species**. Lower Columbia River (LCR) steelhead and Chinook are the only listed species that exist in the immediate project area. However the Wind River drains into the Columbia River which contains the following listed species: Snake River (SR), Upper Columbia River (UCR), Middle Columbia River (MCR) and LCR steelhead; SR (spring, summer and fall), UCR (spring) and LCR Chinook salmon; Columbia River (CR) chum salmon; LCR coho salmon; and bull trout. LCR coho salmon exist below Shipherd Falls and occupy approximately the lower three river miles of the Wind River. SR, UCR and MCR steelhead, and SR (spring, summer, and fall) and UCR (spring) Chinook salmon may occupy the mouth of the Wind River or the right bank side of the Columbia River at (RM 154-152) during their migration to the Pacific Ocean; all these species are within the action area. Project activities are likely to cause some localized in-stream disturbance that may have an impact on LCR steelhead and Chinook within the immediate project area. Refer to Chapter III discussion and Mitigation Measures 2, 3, 4, and 6.

   This project is located within the range and habitat of a number of wildlife species including the gray wolf, peregrine falcon, bald eagle, harlequin duck, and northern spotted owl. The project is likely to cause some localized in-stream disturbance. Noise disturbance may have an impact on wildlife; the effect could extend out away from the river into the adjacent area. Construction may temporally disturb or displace obligate aquatic organisms. Potential effects to wildlife species of concern are discussed in Chapter III.

   There are no known vascular plants of concern or threatened, endangered, or sensitive plants that may be at risk by the proposed project. One Survey and Manage snail, the *Puget Oregonian* does exist within the project area. Project design criteria would protect this snail. Potential impacts to botanical resources are discussed in Chapter III.

   2. Water Quality Impacts from Project Implementation. In-stream use of mechanized equipment generates sediment. Excessive sediment is a problem because it inhibits the ability of fish to see, breathe, and feed, as well as violate state water quality standards. In order to keep the sediment from directly impacting adult and juvenile steelhead, project design criteria were developed or incorporated through consultation with regulatory agencies. These are described in detail in Chapter II. In summary, the project design would place restrictions on location of excavation, require timely rehabilitation/re-vegetation of disturbed sites, and rehabilitation of access roads and skid trails. A spill containment plan would be developed to prevent any petroleum leaks from reaching the stream. Water quality, as it relates to project implementation, will be discussed further in Chapter III.

   3. The effects of the project on the Wind River's suitability for listing as a Scenic River. Does the project conform to the Wild and Scenic River Act as determined by the sec. 7 analysis. The Wind River was nominated to be evaluated as a Scenic River via Appendix E of the Gifford Pinchot Land and Resource Management Plan (USDA Forest Service, Gifford

Pinchot National Forest, 1990). In that document, the Outstandingly Remarkable Values (ORVs) noted for the Wind River were (1) The Fishery, and (2) the Scenic and Geologic qualities of segment 2 (the Wind River canyon downstream from the project area). Regarding the fishery, Appendix E notes, "The Wind River is an important Anadromous fish stream. The State of Washington is managing the Wind River as a Wild Steelhead River. The fishery is considered outstanding." This project is focused on improving the Wind River for this fishery.

4. Potential Downstream Effects to Private Property. The project area includes, and is located upstream of, private lands. Adding in-stream structures such as logs and rocks has the potential to modify the direction and velocity of water movement. Presently during periods of high flow, many pieces of large wood move down stream through the system: this is part of the natural process. There is concern that material used in the proposed in-stream structures could break loose and move down stream where they could add to or create jams. The logjams could cause the river to change its course and cause damage to private or public property.

5. Noxious Weeds. Transport of heavy equipment to be used for ground disturbing activities has the potential to bring noxious weeds into the project area. Several plant species, recognized as Noxious by Skamania County Noxious Weed Department and USFS botanist, Andrea Ruchty, are present. Noxious weeds cause problems by outcompeting and displacing native vegetation, likewise reducing native habitat for birds, fish and wildlife. Prevention measures such as requiring machinery to be cleaned, and prompt re-vegetation of disturbed ground would be required. See Project Design Criteria.

Issues dropped from further consideration

1. **Cultural Resources.** The riparian areas of the Middle Wind River have potential for containing cultural resources. Surveys in 2006 did not indicate the presence of any cultural resources in the proposed project area.

2. **Hatchery Salmon.** The Carson National Fish Hatchery has noted that the project may provide resting habitat for adult hatchery Chinook Salmon returning to the hatchery and smolts headed downstream. This is a beneficial effect. The benefits are secondary to the objective of the project.

3. **Consistency with the LSRA**. The LSRA identifies watershed restoration activities as an appropriate management activity for the LSR. This project would have negligible effects on late-successional habitat because late successional forest stands are not involved. No harvest of trees is planned in the project area, and in-stream channel conditions would be restored.

CHAPTER II
PROJECT ALTERNATIVES

No significant issues were generated from public or internal scoping, therefore this environmental assessment evaluates only two alternatives: no action and the proposed action. The current proposal reflects UCD's efforts to meet the goals and objectives for habitat improvement, implement the recommendations of the Wind River Watershed Analysis, and reverse adverse affects. Based on the issues and project objectives, no other alternatives were warranted.

A. ALTERNATIVE 1 - NO ACTION

The no action alternative would maintain the current conditions in the targeted reach of the Wind River. The restoration project for Middle Wind River would not be implemented. No stream banks or gravel bars would be stabilized, and about one-third of the river bank in this reach would remain unstable.

B. ALTERNATIVE 2 – PROJECT IMPLEMENTATION

This action would rehabilitate sites along approximately 1 river mile on the mainstem Wind River. The proposed restoration activities within each reach include:

1. Restoring bank and channel stability by securing log structures to stream banks and/or gravel bars
2. Reducing the width to depth ratio in order to improve steelhead habitat
3. Reducing sedimentation to levels that don't adversely affect the fish
4. Increase the amount of large woody debris in the streams and increase the pools per mile in order to improve steelhead habitat

The following section provides more specific detail on the proposed action. General locations of proposed actions are depicted on the maps located in Appendix A, Figure 4.. More detailed maps and conceptual drawings of *typical* structures are located in Appendix D.. Actual structures would be designed to meet local conditions and needs.

Description of Proposed Restoration Activities

The proposed project consists of placing approximately 23 log structures along the banks of the Wind River, and along two important side channels within the proposed project area. Trees for the project will come from the Gifford Pinchot National Forest's upper Trout thinning project, and would be hauled from that area to the Middle Wind project site. The proposed structures, which are shown on the map following this section, would be designed to (1) provide fish habitat (shelter, resting), (2) deflect the river's flow from the adjacent bank; and (3) use some of the river's energy on-site, in order to not transfer that energy downstream;.

Structures 1, 2, A1, A2, A3, 6a and 6b would help to protect and enhance side channel A. This channel is important as an active channel during high flows, helping store and move some of the river's floodwaters, and providing fish high water refuge habitat. The structures would add habitat diversity to the side channels, which have little large wood in them. The structures would also serve to capture some of the stream's energy during floods and high flows, lessening the chance that the Wind River would change its course, making the side channel the main stream.

Structures B1 and B2 would help to protect and enhance side channel B in a similar manner.

Structures A1, A2, 3a, 3b, 5, 6a, 6b, 7, 7a, 9a, 9b, 9c, 10a, 10b, and 10c will help to minimize erosion on adjacent banks, and help to keep the mainstem channel narrow and deep during summer, thus keeping the river cooler. These structures would also provide fish habitat for resting, shade, and cover. Structures would be designed to add in-stream roughness (logs), which would help to decrease bank erosion, yet use the stream's energy in place, and not transfer it downstream to other sites. See Appendix A for map of proposed worksites.

All structures would help to stabilize the location of the main river channel and side channels, while still keeping the river in connection with its floodplain. This would enable managers to invest in other riparian improvements, such as conifer plantings and weed removal, lessening the chance that those investments would be lost in the next flood.

The project includes the following actions:

- Access points would be designated on the ground for heavy machinery (log skidders and an excavator) to enter the project area. The log skidder would stay on pre-designated skid trails, and the excavator would work in-stream and on gravel bars. Per Project Design Criterion 2, in-stream activity would be restricted to the period of low flow.

- Log structures will be constructed on approximately 23 sites within the stream reach. A typical structure would consist of several *anchor trees*, the tops of which would be buried or driven into the ground at an angle to the stream. If root wads are attached, they would be exposed and face the water. Other trees would be "woven" through these anchors, and smaller woody debris and green slash would be jackstrawed on top of these woven trees. In some cases, trees would be secured to the anchors by cable. These revetments are typically placed on the downstream end of the bend so the flow helps keep them in place and initiate sediment deposition.

  The typical log structure on gravel bars would consist of several logs buried into the ground

to serve as pilings. Enough trees would be placed in and around the pilings in order to protect small trees and help store fine and coarse sediment.

- Trees would be planted, such as Douglas-fir, western redcedar, grand fir, and hardwood species where appropriate.

- Skid roads on public land would be decompacted and revegetated as necessary.

Table 1. Alternatives and Summary of Effects

Effect	***Alternative 1 – No Action***	***Alternative 2 – Proposed Action***
Bank erosion, sedimentation	Continued bank erosion and fine sediment delivery, reduced steelhead egg survival	Long term reduction in bank erosion/fine sediment production; 8,000 square feet of eroding bank treated to decrease coarse and fine sediment into the Wind River; increased steelhead egg survival
Water temperature	Incremental increase in water temperature (approximately 2 degrees) within and below the project area (25-30 years from present	Long-term incremental decrease in water temperature within and below the project area
Turbidity	Increased turbidity during peak flow periods	Long-term decrease in turbidity during peak flow periods
Large woody debris (LWD)	Reduced LWD, hiding cover and poor pool quality and quantity	Long-term increase in large woody debris both in-stream and floodplain
Riparian vegetation	Reduced riparian recovery	Long-term increase in effective riparian vegetation / accelerated riparian recovery (<20 years)
Suitability of the Wind River as a Recreation River	Remains suitable; free-flowing condition maintained	Remains suitable; free-flowing condition maintained. Steelhead population enhanced
Terrestrial wildlife	No effects	May impact Puget Oregonian, a sensitive species. Not likely to lead to a trend toward federal listing
Potential downstream effects	LWD will both pass through the river system, and be retained by trees and gravel bars	LWD will pass through the system, and be retained by trees and gravel bars. Low potential exists for structures to mobilize and move downstream
Noxious weeds	Noxious weeds continue to exist and may continue to spread due to vehicle traffic and other disturbances.	Potential for further spread into disturbed areas
Cultural resources	No effects anticipated	No effects anticipated

PROJECT DESIGN CRITERIA

The following design criteria are an integral part of Alternative 2; they are prescribed to avoid or correct adverse impacts to hydrologic function, water, fish, wildlife and vegetation.
When appropriate, these criteria will be incorporated into the project contract. Unless otherwise noted, the contract administrator is responsible for seeing that the prescribed actions are accomplished.

1. Equipment Used

Equipment used for streambank stabilization would typically consist of a mix of the following: tracked excavators, tracked or rubber-tire log skidder or bulldozer with winch, log trucks, dump trucks, and trucks with equipment trailers.

2. In-water Work Windows

Forest Service personnel will collaborate with the State of Washington Department of Fish and Wildlife for timing of in-water work periods for the relevant ESA-listed fish. In-water work will be proposed for July 1 through September 30 of a calendar year, except where the potential for greater damage to water quality and fish habitat exists. Work outside this window shall not occur without specific justification and measures implemented to protect summer steelhead. To the extent practicable, instream work shall occur using equipment stationed on the banks. In addition, project activities will typically cease during wet periods, regardless of typical season, when there is potential to generate and deliver excessive sediment to the Wind River. In addition, work on private lands will not occur during the month of September, per landowner constraint.

3. Pollution and Erosion Control Plan (PECP) and Supporting Measures

A Pollution and Erosion Control Plan (PECP) will be developed for this project. The PECP will include methods and measures that minimize erosion and sedimentation associated with the project. The PECP elements will be in place prior to and at all times during the appropriate project phases. The following conservation measures will assist in the creation of a PECP:

A. Follow State Water Quality Guidelines - All project actions will follow applicable provisions of the Clean Water Act. A short-term exemption will be required from Washington Department of Ecology to exceed State water quality standards for turbidity. State standards require that Turbidity shall not exceed 5 Nephelometric turbidity units (NTU) over background levels when the background is 50 NTU or less, or a 10 percent increase in turbidity when the background turbidity is more than 50 NTU (WAC 173-201A).

B. Spill Prevention Control and Containment Plan (SPCCP) - The contractor will be required to have a written SPCCP, which describes measures to prevent or reduce impacts from potential spills (fuel, hydraulic fluid, etc). The SPCCP shall contain a description of the hazardous materials that will be used, including inventory, storage, handling, and monitoring.

C. Minimize Site Preparation Related Impacts - Site preparation will be completed in the following manner:

i. The contractor shall have a written erosion and sedimentation prevention and containment plan for the project and shall have all necessary personnel, supplies, and equipment available to implement the plan promptly and effectively.

ii. Boundaries will be flagged to delineate clearing limits associated with site access, and to minimize overall disturbance and disturbance to critical vegetation in staging and stockpile areas.

iii. Staging areas will be established along existing roadways or the Beaver Campground area for heavy equipment storage, vehicle storage, fueling, servicing, and other equipment usage needs. Staging areas will be located beyond the 100-year-flood-prone area in a location and manner that will preclude erosion into or contamination of the stream or floodplain.

iv. Clearing and grubbing activities will be minimized, if required for preparation of staging or stockpile areas. When staging areas are established, large wood, trees, riparian and other vegetation, sand, and topsoil will be stockpiled for use in site restoration.

v. Hauling of trees for the project will require advance permission, to ensure that conditions are dry enough to prevent road damage.

D. Minimize Heavy Equipment Fuel/Oil Leakage - Methods to minimize fuel/oil leakage from construction equipment into the stream channel and floodplain include the following:

i. The contractor shall have a written spill prevention and containment plan for the project and shall have all necessary personnel, supplies, and equipment available to ensure that the plan is promptly and effectively implemented.

ii. All equipment used for instream work shall be cleaned and leaks repaired prior to arriving at the project. External oil and grease, along with dirt and mud shall be removed. All equipment shall be inspected before unloading at site. Thereafter, equipment shall be inspected daily for leaks or accumulations of grease, and any identified problems shall be fixed before equipment enters streams or areas that drain directly to streams or wetlands.

iii. Equipment used for instream or riparian work shall be fueled and serviced in an established staging area (at least 150 feet away from the Wind River or other water bodies). When not in use, vehicles will be stored in the staging area.

iv. Two oil absorbing floating booms appropriate for the size of the stream shall be available onsite during all phases of construction whenever surface water is present. Booms shall be placed in a location that facilitates an immediate response to potential petroleum leakage.

4. Site Restoration

A revegetation plan will be prepared by Underwood Conservation District. All disturbed areas shall be rehabilitated and stabilized by seeding and planting with native vegetation. Revegetation would be monitored and maintained for at least three years to ensure a minimum of 80 percent survival throughout revegetated areas. If survival falls below 80 percent, additional revegetation would be planted until the threshold for survival is met.

Methods to minimize sedimentation through site restoration include the following:

a. Upon project completion, project-related waste will be removed. Rehabilitation of all disturbed areas will occur in a manner that results in similar or better than pre-work conditions through spreading of stockpiled materials, seeding, and/or planting with native seed mixes or plants. If native stock is not available, soil-stabilizing vegetation (seed or plants) will be used that does not lead to propagation of exotic species.

b. Access roads within the work, staging, and stockpile areas will be closed and obliterated when work is complete.

dc Conifers will not be felled in the riparian areas for restoration purposes. Riparian conifers will only be felled for safety. If necessary for safety, trees will be felled toward the stream and left in place or placed in the stream channel or floodplain.

d. Necessary site-restoration activities such as mulching will occur within five days of the last construction phase.

Conservation Measure from Fisheries Biological Evaluation.

5. Protect *Puget Oregonian*

In order to ensure protection of the *Puget Oregonian*, a Survey and Manage Mollusk species, felling, skidding, structure construction, and other ground disturbing activity would not occur within

25 feet of large (>12 inches dbh) Bigleaf Maple trees. Disturbance to large woody debris and leaf litter near these trees would also be minimized. Recommended from Wildlife Biological Evaluation.

6. Minimize Soil Disturbance

In order to minimize new surface disturbance, as well as comply with wishes of landowners, Sites 3a, 3b, 5, B1, B2, 7, 8, 10a, 10b, and 10c will be accessed by machinery from the east bank of the river instead of from Soda Springs or Szydlo Rds.

7. Minimize Spread of Noxious Weeds by Cleaning Equipment

To prevent the introduction of noxious weeds into the project area, all heavy equipment, or other off- road equipment used in the project is to be cleaned to remove soil, seeds, vegetative matter or other debris that could contain seeds. Cleaning should be done before entering National Forest Lands, and when equipment moves from or between project sites or areas known to be infested into other areas, infested or otherwise. Cleaning of the equipment may include pressure washing. An inspection will be required to ensure that equipment is clean before work can begin.

8. Minimize Spread of Noxious Weeds by Using Clean Mulch

Use weed-free straw and mulch for all projects, conducted or authorized by the Forest Service, on National Forest System Lands. If State certified straw and/or mulch is not available, individual Forests should require sources certified to be weed free using the North American Weed Free Forage Program standards or a similar certification process. Mulch species shall preferably be from native seed sources or annual rye or cereal grain fields

9. Minimize Spread of Noxious Weeds by Using Clean Gravel and Fill

Inspect active gravel, fill, sand stockpiles, quarry sites, and borrow material for invasive plants before use and transport. Treat or require treatment of infested sources before any use of pit material. Use only gravel, fill, sand, and rock that is judged to be weed free by District or Forest weed specialists.

10. Use Native Plant Materials

Native plant materials are the first choice in revegetation for restoration and rehabilitation where timely natural regeneration of the native plant community is not likely to occur. Non-native, non-invasive plant species may be used in any of the following situations: 1) when needed in emergency conditions to protect basic resource values (e.g., soil stability, water quality and to help prevent the establishment of invasive species), 2) as an interim, non-persistent measure designed to aid in the re-establishment of native plants, 3) if native plant materials are not available, or 4) in permanently altered plant communities. Under no circumstances will non-native invasive plant species be used for revegetation. Contact the District Botanist for appropriate seeding and site preparation prescription. When seed is used it should be either certified noxious weed free or from Forest Service native seed supplies.

11. Continue Preventing Spread of Noxious Weeds

Continue with efforts already underway to cut scotch broom before it sets seed on an annual basis to prohibit its reproduction and weaken its fitness. Monitor the size and distribution of infestations across the project area to assess changes in infestation levels annually. Map infestations on copies of aerial photographs or GIS ortho photographs annually for comparison and tracking of the species. Adjust efforts and methods as needed. .

12. Document Noxious Weed Removal Activities for Forest

Tansy ragwort present on site should be pulled where encountered in the area. Control treatments for both scotch broom and tansy ragwort on national forest lands need to be recorded on the "Invasive Plant Site Treatment Form" and submitted annually to the District Botanist for Forest and Region-wide tracking of noxious weeds. See Appendix B for "Invasive Plant Site Treatment Form."

CHAPTER III
ENVIRONMENTAL CONSEQUENCES

This chapter discusses the environmental consequences on each issue of implementing each alternative. It provides the scientific and analytic basis for evaluating the alternatives. Refer to project resource specialist's reports located in the analysis file for additional documentation and specific information. Supporting technical and background information for specific consequences in the Middle Wind project area are located in the analysis file for this EA, located at Underwood Conservation District, 170 NW Lincoln St. White Salmon, Washington.

A. ISSUE 1. THE EFFECTS OF THE PROJECT ON THREATENED AND ENDANGERED SPECIES, AND SURVEY & MANAGE SPECIES

1. Fisheries Effects

Geographical Extent of Salmonid Habitat

The Wind River enters the Bonneville pool of the Columbia River at RM 154. When Bonneville Dam was constructed, the reservoir it created inundated the alluvial fan at the mouth of the Wind River, flooding 1.1 river miles in 1938. At RM 2, there are a series of stair-step waterfalls collectively known as Shipherd Falls totaling 45 feet in height. Historically, summer steelhead were the only anadromous fish species that could negotiate the falls. Winter steelhead, spring chinook, fall chinook, coho, and chum salmon were relegated to the mouth and lower three river miles. In 1951, a fish ladder was installed to allow passage of salmon. Today, wild summer and winter-run steelhead and hatchery spring chinook occur above the falls and fish ladder occupying approximately 120 river miles of mainstem and tributary habitat. A native run of fall chinook and a small run of coho thought to be composed primarily of strays, and a small population of sea-run cutthroat currently occupy the reach below the falls.

Status of Listed, Proposed, Endangered, Threatened, & Sensitive Fish Species

This assessment evaluates the following listed species: Snake River (SR), Upper Columbia River (UCR), Middle Columbia River (MCR) and Lower Columbia River (LCR) steelhead; SR (spring, summer and fall), UCR (spring) and LCR Chinook salmon; Columbia River (CR) chum salmon; LCR coho salmon; and bull trout. LCR steelhead are the only listed species that exist in the immediate project area. LCR chinook and coho salmon exist below Shipherd Falls and occupy approximately the lower three river miles of the Wind River. SR, UCR and MCR steelhead, and SR (spring, summer, and fall) and UCR (spring) Chinook salmon may occupy the mouth of the Wind River or the right bank side of the Columbia River at (RM 154-152) during their migration to the Pacific Ocean; all these species are within the cumulative effect analysis area. Historically, chum salmon and bull trout may have occupied this lower reach of the Wind River, but they have not been documented in recent history. The introduced spring chinook salmon produced at the Carson National Fish Hatchery are not a listed species.

Direct/Indirect Effects on Hydrology and Aquatic Resources

Table 2. Summary of Effects for the Middle Wind River Riparian Enhancement Project, Gifford Pinchot National Forest, Skamania County Washington (USFS, T.E.A.M.s Enterprise, 2006).

Summary of Direct/Indirect Effects on Aquatic Resources

Alternative	*Summary of Effects* Short Term (0-10 years) / Long Term (>10 years)
1 –No Action	Indirect Effects 8,000 square feet of eroding bank will continue to increase coarse and fine sediment into the Wind River (for approximately 25-30 years from present) Incremental increase in water temperature (approximately 2 degrees) within and below the project area (25-30 years from present Increased turbidity during peak flow periods (25-30 years from present) Increased fine sediment deposition and reduced steelhead egg survival (25-30 years from present) Riparian recovery impeded by approximately 25-30 years Reduced LWD, hiding cover and poor pool quality and quantity (for approximately 30-50 years from present)

2 – Proposed Action	Direct Effects • Long term reduction in bank erosion/fine sediment production; 8,000 square feet of eroding bank treated to decrease coarse and fine sediment into the Wind River (immediately after implementation for >10 years) • Long-term restoration of LWD, hiding cover and poor pool quality and quantity to historic range (immediately after implementation for >10 years) • Short-term (one month during construction) loss of potential habitat to fish within the project vicinity • Short-term (one month during construction) displacement of fish due to turbidity, human/machinery presence, activity, noise, and water quality Indirect Effects • Long-term decrease in turbidity during peak flow periods (immediately after implementation for >10 years) • Long-term decrease in fine sediment deposition and increased steelhead egg survival (immediately after implementation for >10 years) • Long-term increase in effective riparian vegetation / accelerated riparian recovery (<20 years) Long-term incremental decrease in water temperature within and below the project area . • Long-term improvement in connectivity between upstream and downstream habitat and watersheds during low flow periods; reduced low flow width-to-depth ratios will allow unimpeded migration of both juvenile and adult steelhead (for >10 years after implementation) • Long-term increase in large woody debris both in-stream and floodplain(for >10 years after implementation) • Long-term increase in hiding cover for both juvenile and adult steelhead • Long-term retention of nutrients • Long-term increase in pool quality and quantity • Long-term reduction in bank erosion/embeddedness/sediment deposition • Long-term increase in the quantity, quality and diversity of habitat for anadromous and migratory forms of fish and aquatic dependent wildlife.

Alternative 1 – No Action

The no action alternative would be viewed as a continuation of the existing condition. Severe bank erosion would continue in the short and long term to contribute coarse and fine sediment into the project and action areas. Water temperature maximums would also continue to be increased by the lack of stream shade and high stream channel width to depth ratios. Riparian area recovery and floodplain function would continue to be impeded by channel instability. The project area will continue to lack LWD and hiding cover for threatened steelhead. In his fisheries biological evaluation of the area (USFS T.E.A.M.s Enterprise, 2006), Bair estimated that the Middle Wind River has relatively moderate turbidities and moderate percentages of fine materials, and is "functioning at risk". This state would continue, and possibly worsen, with no action.

Alternative 2 – Proposed Action

The Middle Wind River Riparian Enhancement Project will treat approximately 2,000 feet of bank with approximately 23 LWD structures along one river mile of the Wind River. The objectives of these structures are to stabilize streambanks, protect and accelerate the recovery of riparian vegetation, reduce pool quantity and quality, provide hiding cover for fish and retain nutrients and organics. These structures would be composed of multiple trees ranging from 3 to 20 per structure. The structures would be composed of green, sound conifers greater than 12 inches in diameter at the butt end and more than 60 feet in length, some with rootwads attached. In addition, five floodplain LWD structures will be constructed in and around two side channels. The objectives of these structures are to maintain the integrity and increase complexity of off channel habitat and prevent evulsions during over-bank flood events.

Throughout this section refer to Table 2, Effects of the Actions on Matrix Indicators, documenting environmental baseline and effects of the proposed action(s) on relevant indicators. Table 2 is located on page 22.

Water Temperature

Alternative 1: Based on UCD and USFS continuous stream temperature data, significant warming can occur in this area of the Wind River. In 2003, the Wind River exceeded the state water quality standard of 18 degrees Celsius on 9 different days at station WR-5a, located at the Pacific Crest Trail Bridge, approximately 3.5 miles downstream from the project area. 18 degrees is considered as "not properly functioning" for salmonids by the National Marine Fisheries Service (USFS T.E.A.M.s Enterprise, 2006). On those same days, a monitoring station located north of Beaver Campground (WR-5b), approximately 1.5 miles upstream of the proposed project area, recorded temperatures about 3.5 degrees cooler.

NMFS considers water temperatures between 14 and 18 degrees centigrade as "at risk." WR-5a exceeded the 14 degree threshold on 261 days from 2002 through 2006, with about half of those days (131) being over 16 degrees. WR-5b exceeded 14 degrees 56 times, with the highest being 14.57 deg.

Under the no action alternative maximum water temperatures would continue to be negatively affected by poor channel stability, stream width to depth ratios and riparian conditions in the long term (greater than 25 years). The combined effects of the no action alternative on temperature are classified as "**degrade**".

Water temperatures within the project area have exceeded 18 degrees Celsius which can be stressful to salmonids. Therefore, any increase however incremental could negatively affect steelhead and Chinook growth and survival (USFS T.E.A.M.s Enterprise, 2006).

Alternative 2: Maximum water temperatures would incrementally decrease as a result of stabilizing streambanks, reducing width-to-depth ratios, protecting riparian vegetation and increasing stream shade in the long term. The combined effects of the project actions on temperature are classified as "**restore.**"

Water temperature decreases would reduce salmonid stress in summer months and would be expected to indirectly increase steelhead and Chinook growth and survival if Alternative 2 is implemented (USFS T.E.A.M.s Enterprise, 2006).

Sediment and Turbidity

Alternative 1: Under the no action alternative, the recovery of stream channel morphology and pre-disturbance characteristics would be the result of natural processes. In the short and long-term turbidity and sediment in steelhead and Chinook spawning gravels are expected to increase within the immediate project area as a result of continued bank erosion. The project area sediment combined with other sources within the watershed would continue to contribute to the degradation of critical habitat in the lower Wind River and confluence of the Columbia River. Therefore, the indirect short/long-term effects of the no action alternative on sediment and turbidity are expected to continue to move the baseline condition towards a **degraded** condition (USFS T.E.A.M.s Enterprise, 2006).

Alternative 2: Project construction under this Alternative would likely cause some short-term increases in sedimentation and turbidity to the Wind River, exceeding Washington State turbidity standards. Heavy equipment crossing the stream and operating on the banks during structure excavation and placement will generate turbidity pulses in the immediate vicinity of the disturbance. Monitoring of the 1997 Hatchery Reach Restoration project on the Wind River (a project similar to the Middle Wind River Project), showed that turbidity levels in direct vicinity of heavy equipment may exceed 200 times the upstream turbidity level. This elevated turbidity dissipates rapidly as the suspended sediment settles out of the water column down stream. Monitoring data also indicated that turbidity pulses typically subsided in less than one hour and typically were not detectable one mile down stream (Hatchery Reach Water Quality Monitoring, 1997).

The negative short-term effects to steelhead and Chinook and their critical habitats would result from the short-term increase in turbidity and sedimentation during the construction phase. As previously discussed, the levels of fine sediment and turbidity increases within project area are expected to be short in duration and below stressful or lethal levels. The increases in suspended sediments anywhere in the project or action area are expected to be below levels that are documented to have a negative effect on salmonid rearing habitat (Newcombe and Jensen 1996). Adverse effects to fish would be short-term and would occur during construction. The impact to the overall populations is expected to be very small and limited to fish within and potentially one mile downstream of the project reach. The in-stream implementation phases of this project would occur post fry and smolt emigration.

LWD structures installed into the banks are expected to dramatically increase bank stability and reduce sediment inputs after installation. Monitoring of 1996 restoration efforts in Layout Creek demonstrated that in-stream log structures increased bank stability from 60 percent stable to 80 percent stable and reduced the annual sediment load in treated areas from 330 cubic yards to less than 30 within four years.

Direct mortality of aquatic macro invertebrates within the project area is expected. This impact would be brief (12 hours) after disturbance and will be limited to the restored reaches and approximately 1 mile downstream. Based on research by Novotny and Faler (1982), re-colonization of aquatic invertebrates from upriver reaches could occur rapidly due to species dispersal from in river drift. Gersich and Brusven (1981) estimated that full aquatic insect colonization of rock substrates within disturbed areas would take 47 days.

Short-term turbidity and sediment in spawning gravels are expected to increase within the immediate project area; therefore, the short-term direct and indirect effects of the project actions on sediment and turbidity are expected to move the baseline condition towards a "**degrade**" rating for the short term (approximately one month during construction).

However, rehabilitation of the eroding banks will provide long-term benefits to ESA-listed species and the aquatic environ by reducing fine sediment input for the long term. Therefore, the long-term direct and indirect effects of the project are considered "**restore**"

The project actions are not expected to increase sediment or turbidity more than one mile downstream of the project area. Therefore negative impacts to threatened or endangered fish species occupying the lower Wind River or Columbia River confluence are not expected (USFS T.E.A.M.s Enterprise, 2006).

Large Woody Debris

Alternative 1: Large woody debris (LWD) along this reach of the Wind River exists as both individual logs and in logjams. In summer, 2006, the mainstem Wind River contained about 26 pieces of wood (greater than 12 inches diameter and greater than 70 feet long), per acre, within the bankfull zone. On the floodplain, above the bankfull zone, the same size wood averaged .27 pieces per acre. The side channels contained even fewer large and long pieces of wood. See the monitoring report from summer 2006 for more information in Appendix C.

The project area in the short term would continue to contain poor LWD levels as an indirect result of poor riparian conditions and would move baseline conditions toward **"degrade"**. In the long term (>30 years) as riparian conditions improve within the project area and in the upper watershed, LWD levels are expected to move conditions toward a restored state.

The lack of large woody debris (LWD) within the project area will continue to inhibit juvenile salmonid rearing habitat, suitable spawning sites, and habitat diversity. Under this alternative, large woody debris would potentially decrease. This is because contributions of LWD from both the planning area and upstream are minor, and because high flows would continue to flush existing LWD from the project area. It is unknown how long it would take for LWD accumulations to reach historic levels (~120 pieces per river mile). The lack of in-stream LWD would continue to directly negatively affect riparian, channel and fish habitat conditions for the long term (>30 years). This would impede the recovery of suitable Chinook and steelhead habitat and continue to limit their production within the project area (USFS T.E.A.M.s Enterprise, 2006).

Alternative 2: The placement of LWD complexes used to stabilize streambanks, or placed on floodplains will in the short term directly increase the amount of wood within the project area to the range of natural variability which will intern increase hiding cover, reduce width to depth ratios, increase pool quality and quantity and retain nutrients. Therefore, the effect of this alternative on this indicator are classified as "**restore**"

The addition of LWD would dramatically increase channel complexity, protect riparian conifers, increase pool quality and retain nutrients. Benefits to adult and juvenile salmonids from the addition of LWD include the addition of cover, increased pool depths and retention of carcasses and other organics. Salmon carcasses may contribute anywhere between 20-30% of the nitrogen and phosphorus into a particular system (Bilby, 1996). The marine-derived nutrients associated with salmon carcass decomposition are now known to play a major role in the productivity of aquatic and riparian systems associated with anadromous fish watersheds in the Pacific Northwest (Cedarholm 2000). The addition of LWD and the increased retention of these nutrients would indirectly affect all ecosystem aspects, ranging from stream micro-organisms and benthic macroinvertebrates, to top level predators such as eagles and bear.

Implementation of this alternative would in the short and long-term indirectly benefit both juvenile and adult salmonids by creating large lateral pools for rearing and resting during migrations and over-wintering. Monitoring in the "Mining Reach" of the Wind River (6 miles upstream of the proposed project area) documented increases in bank full pool volume within a half mile reach by up to 520% (USDA Forest Service 2000).

In the long term, salmonids would also benefit from restored and self-maintained levels of channel complexity. LWD would also provide roughness elements that would help regulate bed load movement of the stream channel and fine sediment deposition on the flood plain through time. Log complexes would also assist in the regulation of water velocity and volume within side channels (USFS T.E.A.M.s Enterprise, 2006).

Pool Frequency, Character and Quality

Alternative 1: Pool quality within the project reach was estimated to be "good" in the 2001 Wind River Watershed Analysis. Therefore the effect of the no action alternative on this indicator is classified as "**maintain**".

Under this alternative, no improvement to pool quantity or quality is anticipated and therefore will have no affect on production of both adult and juvenile Chinook and steelhead (USFS T.E.A.M.s Enterprise, 2006).

Alternative 2: The LWD structures are designed to scour pools and decrease width-to-depth ratios. Additional pools will be created by these structures and existing pools will be *enhanced*; therefore, the direct and indirect effects of Alternative 2 on this indicator is classified as both "**maintain**" and "**restore**".

The increase in primary pools will directly and indirectly benefit all species and life stages of fish by providing low water velocity resting habitat and bubble curtains and depth that provide hiding cover from predators. In addition, the increase in pool habitat will indirectly increase foraging efficiency for juvenile and resident life stages of fish (USFS T.E.A.M.s Enterprise, 2006).

Width-to-Depth Ratios

Alternative 1: This reach of the Wind River tends to be relatively wide and shallow. In summer, 2006, width-to-depth ratios were measured. At that time, the low flow and bankfull width-to-depth ratios both averaged 58:1, indicating an extremely wide and shallow stream. See the monitoring report from summer 2006 for more information in Appendix C.

Low flow and bankfull width to depth ratios within the project area will continue to be indirectly negatively affected by poor channel stability for the long-term. Therefore the no action alternative will indirectly "**degrade**" width to depth ratios in the short and long term (USFS T.E.A.M.s Enterprise, 2006).

Alternative 2: Large wood structures and increased bank stability would provide a more defined stream channel with greater lateral resistance, which will indirectly decrease width-to-depth ratios in the short term. Analysis of previous restoration efforts suggests that width-to-depth ratios may be reduced by one-third or more in the year following structure installation (USDA Forest Service 2000). This immediate enhancement of channel morphology would foster recovery of riparian vegetation and improvement of stable riffle and pool development. Reduction of width-to-depth ratio and increased stream shade in the long term will also incrementally decrease water temperature and therefore will maintain or reduce water temperature. Consequently, the indirect effects of Alternative 2 on this indicator are classified as "**restore**" (USFS T.E.A.M.s Enterprise, 2006).

Streambank Condition

Alternative 1: In several areas, banks of the Wind River are actively eroding, especially during high flows. Monitoring during summer, 2006, revealed that 37% of the Wind River Banks were actively eroding. The two side channels are more stable, with 18% and 8% bank erosion in Side Channels A and B respectively. See the monitoring report from summer 2006 for more information in Appendix C.

Poor streambank conditions will continue to be indirectly affected by poor riparian conditions and low levels of LWD under the no action alternative for the short and long-term. Therefore the no action alternative will continue to move the baseline toward "**degrade**" rating (USFS T.E.A.M.s Enterprise, 2006).

Impacts to fish would be as described in the sediment and turbidity section of this report.

Alternative 2: As previously discussed in the Sediment and Turbidity section of this assessment, bank stability is expected to be dramatically increased and therefore, the short term direct effects of Alternative 2 on this indicator are classified as "**restore**" (USFS T.E.A.M.s Enterprise, 2006).

Benefits to fish would be as described in the LWD, Sediment, and Turbidity sections of this assessment.

Off-channel Habitat and Floodplain Connectivity

Alternative 1: Off-channel habitat conditions will continue to be indirectly negatively affected by poor riparian and floodplain LWD levels. The lack of mature vegetation and roughness created by LWD on the floodplains within the project area makes them vulnerable to channel avulsions. Channel avulsions mean that streams abandon their existing channel and pioneer a new channel or cut through an existing smaller side channel. Channel avulsions are natural occurrences however when they occur in areas that lack adequate vegetation or roughness they can cause severe erosion and long-term channel instability. Therefore the indirect effects of the no action alternative on off-channel habitat would be **"degrade"** (USFS T.E.A.M.s Enterprise, 2006).

Alternative 2: One of the objectives of this project is to increase floodplain stability and increase LWD levels within side channels and on floodplains, which will reduce the risk of adverse affects of channel avulsions and will indirectly accelerate the recovery of riparian vegetation in the long term. In addition floodplain connectivity will be rehabilitated by reconnecting and stabilizing two side channels. Therefore the direct and indirect effects of Alternative 2 on this indicator are classified as "**restore**" (USFS T.E.A.M.s Enterprise, 2006).

The increase in off channel rearing habitat will benefit Chinook and steelhead directly and indirectly from the increase in off channel habitat.

Riparian Reserves

Alternative 1: Riparian recovery will continue to be indirectly impeded by poor streambank and floodplain instability under the no action alternative. Therefore Alternative 1 will continue to **"degrade"** riparian condition in the short term.

The indirect negative effects stemming from poor riparian conditions will indirectly limit salmonid productivity within the project reach for the next thirty years or more (USFS T.E.A.M.s Enterprise, 2006).

Alternative 2: There will be three temporary access routes, two of which will be pioneered through riparian areas. No large trees will be cut and only small hardwoods and shrubs will be removed to provide access. These disturbances will be minor and short term, and are expected to revegetate in one year. The exposed soil will be heavily mulched after the project is completed. This area will be planted the following spring (March-April) with a variety of native grasses, rooted woody shrubs, and coniferous and hardwood trees. Overland flow from storm events may erode minor amounts of exposed soil into the stream channel in the short term (October–April following restoration). The planted grasses and shrubs are expected to prevent further erosion the year following restoration. In the long term (over 60 years), riparian conifers will occupy the historic channel margin and provide stream shade through the rehabilitated project area. Consequently, the short- and long-

term effects of Alternative 2 on this indicator are classified as "**degrade**" and **restore**" respectively.

Short term indirect effects to salmonids would occur from ground disturbance resulting in increased turbidity during material transport as discussed in the turbidity section of this report. In the long term (>30 years), stabilization of the floodplain and accelerated recovery of riparian areas would indirectly benefit salmonids by providing stream shade, bank stability and a source of LWD (USFS T.E.A.M.s Enterprise, 2006).

Effects of the Actions on Matrix Indicators

Table 2. Checklist for documenting environmental baseline and effects of the proposed action(s) on relevant indicators.

DIAGNOSTICS/ PATHWAYS:	**CURRENT CONDITIONS AND ENVIRONMENTAL BASELINE** **Baseline Conditions are based on the Wind River Watershed Analysis (2001)**			**EFFECTS OF THE ACTION(S)**			
INDICATORS	**Functioning Appropriately**	**Functioning At Risk**	**Not Properly Functioning**	**Restore[1]**	**Maintain[2]**	**Degrade[3]**	**Compliance with ACS**
Water Quality: Temperature			X	Alt 2		Alt 1	√
Sediment and Turbidity		X		Alt 2 Long Term		Alt 1 & 2 Short Term Alt 1 Long Term	√
Habitat Elements: Large Woody Debris			X	Alt 2		Alt 1	√
Pool Frequency and Quality	X			Alt 2	Alt 1&2		√
Off-channel Habitat and Floodplain Connectivity			X	Alt 2	Alt 1&2		√
Streambank Condition			X	Alt 2		Alt 1	√
Riparian Reserves		X		Alt 2 Long Term		Alt 1&2 Short Term Alt 1 Long Term	√

Location: Hood/Wind River Subbasin Watershed Name: Wind River
ACS (Aquatic Conservation Strategy, Northwest Forest Plan, USDA Forest Service 1994)
Unless otherwise indicated, effects are both long and short-term.

Cumulative Effects – Hydrology and Aquatic Resources

Cumulative effects are described as the impacts on the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions, regardless of what agency or person undertakes the action. The following provides a list of past, ongoing and foreseeable projects within the Wind River and that could cumulatively have an impact on hydrology and aquatic resources.

Past Projects/Activities, Type of Action, and Location:
Past FS timber sales, Logging, Watershed Wide
Private/State/County, Logging, Middle and Lower Wind River Watersheds
Wind River Mine, Mining, Upper Wind River Watershed
Columbia River Gorge National Scenic Area establishment, Recreation, Lower Wind R.
Archaeological excavation, Research, Watershed Wide
Forest road construction Road, Construction, Watershed Wide
Forest road maintenance, Road Maintenance, Watershed Wide
Noxious Weed abatement programs, Weed Control, Watershed Wide
Middle Wind Restoration, Channel Rehabilitation, Middle Wind River
Mining Reach stream and riparian rehabilitation, Riparian and Channel Rehabilitation, Upper Wind River
Dry Creek stream and riparian rehabilitation, Riparian and Channel Rehabilitation, Dry Creek Sub-watershed
Forest road decommissioning, Upslope Rehabilitation, Watershed Wide
Landslide rehabilitation, Upslope Rehabilitation, Watershed Wide
Wind River Nursery, Agricultural, Trout Creek Sub-watershed
Private land development, building construction, septic installation, well-drilling, road construction, Lower and Middle Wind River

Ongoing Projects/Activities, Type of Action and Location:
Dry Timber Sale (2005-2006), Logging, Dry Creek Sub-watershed
Wind River Mine, Mining, Upper Wind River Watershed
Archaeological excavation, Research, Watershed Wide
Forest road maintenance, Road Maintenance, Watershed Wide
Noxious Weed abatement programs, Weed Control, Watershed Wide
Private land development, building construction, septic installation, well-drilling, road construction, Lower and Middle Wind River

Foreseeable Projects
Private/State logging, Logging, Middle and Lower Wind River Watersheds
Tumble Timber Sale, Logging, Falls Creek and Upper Wind River Watersheds
Wind River Mine, Mining, Upper Wind River Watershed
Archaeological excavation, Research, Watershed Wide
Wind River Highway Realignment, Road Construction, Upper Wind River Watershed
Forest Road Construction Road, Construction, Dry and Falls Creek Sub-watersheds
Forest Road maintenance, Road Maintenance, Watershed Wide
Milfoil abatement project by Skamania County, Weed Control, Lower Wind River/Confluence with Columbia River
Noxious Weed abatement programs, Weed Control, Watershed Wide
Mouse Creek culvert replacements, Fish Passage, Panther Creek Sub-watershed
Private land development, building construction, septic installation, well-drilling, road construction, Lower and Middle Wind River

Alternative 1:

The detrimental effects from no action would be more correctly termed as indirect effects of the lack of recovery from past degrading actions rather than cumulative effects from no action. The proposed project area is a portion of approximately seven miles of the Wind River's channel that have been highly disturbed by historic logging and road building activities. By not improving channel conditions in this alternative, the project area continues to act cumulatively with the other disturbed channel reaches in maintaining degraded channel conditions and degraded stream and riparian habitat for fish and wildlife. These disturbed channel segments are all within the Middle Wind River sub-watershed and likely provided the system's highest quality fisheries and riparian habitat before anthropogenic disturbance. Anecdotal historic reports from early settlers mention abundant runs of summer steelhead in this section of the Wind River.

Alternative 1 would result in a long-term continuation of declining water quality, fish habitat and fish populations. Past timber harvest and associated road building represent the primary management activities that contribute to cumulative effects and degradation of aquatic habitat and the fishery resources in the Wind River. Subsequent wildfires and flooding have also compounded the negative effects and have slowed the rate of recovery of the watershed, stream network, aquatic habitat and fisheries. Restoration efforts up-stream of the project area (1992 to present), similar in scope and nature to what is proposed in Alternative 2, are designed to accelerate the recovery of riparian areas and aquatic habitat. Monitoring of those projects indicates that erosion rates have decreased and are expected to have incrementally benefited channel processes and recovery of aquatic habitat within the project area.

Future timber harvest, road construction and maintenance within the watershed will result in incremental increases in fine sediment which could be delivered to fish bearing waters through the road ditch network. However sediment produced from timber harvest are not expected to accumulate to measurable levels, above background, because of riparian protection measures incorporated into all harvest unit designs on both public and private land. Sediment introduced into the system during road construction activities would incrementally affect width to depth ratios, pool depth and spawning gravel (USFS T.E.A.M.s Enterprise, 2006).

Alternative 2:
Fine sediment would be introduced into the Wind River during the construction phase of Alternative 2. However seasonal high flows in the fall, following project implementation and are not expected to be measurable when added to the contributions from ongoing erosion stemming from past and ongoing timber sales or road construction activities. There would be no measurable effect on downstream habitat attributes below the project or forest boundary. The completion of the future timber harvest activities, road construction and culvert replacements would cause short term flushes of sediment during the first stream flow events however sediment produced from Alternative 2 project actions would not cumulate to measurable levels, above background, because of riparian protection measures and project design criteria incorporated into all projects. Increased turbidity generated during construction activities could displace fish temporarily. Fine sediment deposited within the project area by Alternative 2 is expected to be undetectable within spawning areas before steelhead arrive in the spring (USFS T.E.A.M.s Enterprise, 2006).
Alternative 2, combined with similar habitat-improvement actions within the Wind River, over time will cumulatively improve fish habitat conditions at the 5th field watershed level.

Threatened and Endangered Species

Affected LISTED Fish Species and Critical Habitat

Columbia River chum salmon were listed as threatened under the ESA on March 25, 1999 (50 C.F.R. 223 and 224). Lower Columbia River chinook salmon were listed as threatened on March 24, 1999 (50 C.F.R. 223 and 224). Lower Columbia River steelhead were listed as threatened on March 19, 1998 (50 C.F.R. 223 and 224). Lower Columbia River coho salmon were listed as threatened on June 28, 2005 (70 F.R. 37160). The NMFS designated critical habitat for LCR steelhead on February 16, 2000 (65 FR 7764) and applied protective regulations under section 4(d) of the ESA on July 10, 2000 (65 FR 42422).

Critical habitat applies to SR sockeye, SR spring and fall races of Chinook, SR steelhead, UCR chinook and steelhead, MCR steelhead, LCR Chinook, LCR steelhead and CR chum ESUs (70 FR 52630). The Wind River watershed was designated as critical habitat for both LCR chinook and steelhead on August 12, 2005. Action agencies are required to consult on proposed actions and need to reinitiate consultations on ongoing federal actions that "may affect" designated critical habitat (USFS T.E.A.M.s Enterprise, 2006).

Determinations

The Middle Wind River Riparian Enhancement Project is consistent with the July 26, 2004 NOAA Fisheries Programmatic BO (Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for USDA Forest Service Programmatic Activities, Gifford Pinchot National Forest and the Columbia River Gorge National Scenic Area, Washington). Per Term and Condition 1.b. of the NOAA Fisheries Programmatic BO, this project consistency form has been sent to the NOAA Fisheries Level 1 team representative in order to ensure consistency with the project descriptions and design criteria in the Forest Service programmatic Biological Assessment/Biological Opinion.

Table 2 of the Programmatic Activities, Gifford Pinchot National Forest (GPNF) Columbia River Gorge National Scenic Area, (CRGNSA), Washington, Biological Opinion July 26, 2004 states that:

> **"Nearly any action in which the wetted stream channel is entered when listed species are present or turbidity is transmitted to such areas or areas suitable for spawning, where disturbed soil is likely transmitted to water bodies, and which would disturb substantial amounts of woody vegetation or substantially affect any other riparian functions" would be determined as LAA.**

Therefore the following determinations have been made:

Likely to Adversely Affect determination for: LCR steelhead and LCR Chinook.

Not Likely to Adversely Affect determinations for: LCR coho, SR spring, summer or fall chinook, UCR chinook, SR, UCR or MCR steelhead, SR sockeye, CR chum and bull trout.

The Middle Wind River Riparian Enhancement Project will rehabilitate approximately one mile of the Wind River. The project is designed to provide long-term benefits to the project area and downstream reaches within the action area by decreasing bank erosion and sedimentation, increasing LWD, the quality and quantity of pools, hiding cover and nutrient retention. This project will also reconnect and stabilize two side channels and rehabilitate the floodplain by increasing roughness with LWD and planting native grasses, shrubs, and trees. In the long term, as vegetation becomes established, this project will incrementally contribute to the decrease in maximum water temperature of the Wind River.

During the construction phase of the project, fine sediment and turbidity will be increased within the project area, which could directly, indirectly, and cumulatively impact fish and aquatic habitat. The levels of fine sediment and turbidity increases are expected to be localized or closely associated

with bank revetments and designated stream crossings. Deposition of fines or embeddedness is expected to be undetectable relative to background conditions. The incremental increase in turbidity is expected to be short term (less than one hour per event) and is not expected to reach stressful levels for fish.

Sediment and turbidity generated by this project is not expected to reach the lower Wind River or Bonneville pool of the Columbia River; the project is 15 miles upstream. Therefore, it is determined that this project will **not likely adversely affect** SR spring, summer or fall chinook, UCR spring chinook, SR, UCR, or MCR steelhead, SR sockeye, LCR coho, CR chum or bull trout. Juvenile and adult salmon and steelhead from these stocks may occupy the lower Wind River mouth (RM 0) and the Columbia River (RM 154-152).

This project will also not likely adversely affect designated critical habitat for: SR sockeye, SR, UCR, MCR, CR chum, and MCR, and steelhead in the Columbia or lower Wind River. The turbidity and fine sediment generated within the project area may produce a short-term negative effect on PCE of critical habitat for LCR steelhead and Chinook. However, this disturbance is not likely to result in take. The duration and magnitude of increased turbidity and fine deposition is not expected to reach levels that would directly, indirectly, or cumulatively increase mortality of listed fish within the project area (USFS T.E.A.M.s Enterprise, 2006).

Essential Fish Habitat

Magnuson Stevens Fishery Conservation & Management Act

The Sustainable Fisheries Act of 1996 (Public Law 104-267) amended the Magnuson Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) to require federal agencies to consult with NMFS on activities that may adversely affect "essential fish habitat" (EFH). Essential fish habitat is defined in the Act as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." Essential fish habitat includes all freshwater streams accessible to anadromous fish, marine waters, and intertidal habitats. Within the action area, this would include the Wind River from RM 18 to the mouth of the Wind River RM 0 and the Columbia River RM 154-152.

Effects Determination for Essential Fish Habitat (EFH) – Middle Wind River Riparian Enhancement Project

The Wind River basin and the Columbia River are designated as essential fish habitat for Chinook and coho salmon. Chinook and coho salmon EFH in the lower Wind River (RM 3 – 0) and Columbia River (RM 154-152) are not expected to be impacted by fine sediment produced by the project; the project is expected to generate minimal amounts of sediment during structure construction and is located 15 miles upstream of EFH and therefore **would not adversely affect** EFH in the short or long term and consultation will not be required.

2. Terrestrial Wildlife Effects

A biological evaluation has been prepared for this project to determine the effects of the project on federally-listed species, and their critical habitats, and to determine the need for consultation or conferencing with the U.S. Fish and Wildlife Service. This examination also includes analysis of and impacts to the Region 6 Sensitive species and wildlife species and Management Indicator Species described by the Forest Plan. The biological evaluation examines the potential effects on 32 threatened, endangered, proposed or sensitive species with potential to occur in the project area. One species listed as sensitive by the USFS was documented to occur in the project area, the Puget Oregonian (*Cryptomastix devia)*, a terrestrial snail. See table 1 in the Wildlife Biological Evaluation for more detail.

Effects to Federally listed wildlife species – No effect to Federally listed species or their critical habitat. This project may impact but is not likely to lead to a trend toward federal listing of Puget Oregonian (*Cryptomastix devia)*, listed on the Region 6 Regional Forester's Sensitive Species list (USDA Forest Service, Gifford Pinchot NF, 2006a.).

Alternative 1, no action:

Direct/Indirect and Cumulative Effects

Alternative 1 will not affect threatened, endangered, and sensitive wildlife species. One identified species, the *Puget Oregonian*, will continue to exist on the site.

Alternative 2, proposed action:

Direct/Indirect Effects

Alternative 2 has the potential to adversely affect the Puget Oregonian, since it is associated with bigleaf maple (*Acer macrophyllum*) trees which may be damaged or disturbed in operations. This potential will be minimized by implementing the Project Design Criteria for keeping activity at least 25 feet away from larger (>12 inches in diameter) bigleaf maple. With this criteria, Alternative 2 may impact, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the populations or species (USDA Forest Service, Gifford Pinchot NF, 2006a).

Alternative 2 will have no adverse effects on other listed species, on Management Indicator Species (MIS) or migratory birds (USDA Forest Serivce, Gifford Pinchot NF, 2006a).

Cumulative Effects

Cumulative Effects – Other potential effects to Puget Oregonian populations along the Wind River include annual hazard tree removal at Beaver Campground, and possible timber harvest on private land south of the project area. However, with the recommended mitigation to protect large big-leaf maple trees, the cumulative effects of this project would be negligible since the population at the project site would be maintained (USDA Forest Service, Gifford Pinchot NF, 2006a).

3. Plant Species and Habitat Effects

Effects to Threatened, Endangered, Proposed, and Sensitive plant species – No Federally listed Threatened, Endangered, or Proposed species present. There will be no effect to species listed on the Region 6 Regional Forester's Sensitive Plant list (Scott and Ruchty 2006). The determination of no effect means there were none found during project surveys and suitable habitats were either lacking or of marginal quality. According to the Botany Review, Alternative 2 may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species (USDA Forest Service, Gifford Pinchot NF, 2006b).

B. ISSUE 2. WATER QUALITY IMPACTS

Water quality impacts from the proposed project could include short-term increase in turbidity, due to disturbance during equipment operations, and pollution impacts from machinery operating in or near streamcourses. Since effects to water quality also affect fish, the effects of both alternatives on water quality were discussed under Issue 1, Effects of the Project on Threatened and endangered species, and survey & Manage species. Refer to that section for a detailed discussion of water quality effects.

Alternative 1 No Action:
Direct/Indirect Effects
Alternative 1 would result in no project implementation-related impacts on water quality, since no machinery would be operating in the project area.

Cumulative Effects
No Effect, aside from continuation of existing conditions. Refer to Hydrology and Aquatic Resources Section.

Alternative 2, Proposed Action:
Direct/Indirect Effects
Alternative 2 would result in short-term increases in sedimentation and turbidity during excavation work and other mechanized equipment activity. Elevated turbidity levels should return to normal once instream activity is complete. For the short term, turbidity and sediment conditions will contribute to a degraded condition. Chemical pollution, from equipment leaks (petroleum products, hydraulic fluid), are possible during construction activities. Short-term impacts will be minimized by mitigation measures 1 – 7.
Long-term improvements to water quality will result from reduced stream temperatures.
Other water quality effects are covered under Issue 1, Effects of the Project on Threatened and endangered species, and survey & Manage species, and in the Fisheries Biological Opinion report (USDA Forest Service, T.E.A.M.s Enterprise, 2006).

Cumulative Effects
Water quality should see long-term improvements in the form of reduced water temperatures. This action, combined with similar projects in Trout Creek, the Mining Reach of the Wind River, and other projects should cumulatively improve the water temperature regime at the 5th field watershed level. Refer to water quality discussions under Issue 1 for more information.

C. ISSUE 3, THE EFFECTS OF THE PROJECT ON THE WIND RIVER'S SUITABILITY FOR LISTING AS A RECREATIONAL RIVER.

Section 7 of the Wild and Scenic Rivers Act requires that for a proposed water resources project, the administering agency determine the "direct and adverse effect on the values for which such river was established." This determination is referred to as a *Section 7 analysis*. The Wind River has been nominated, via the Gifford Pinchot Land and Resource Management Plan (USDA Forest Service, Gifford Pinchot National Forest, 1990, Appendix E) as eligible for inclusion in the National Wild and Scenic Rivers System as a *Recreational River* pending a suitability study. A Section 7 analysis was completed to ensure that the proposed project would not alter the Wind River's suitability for inclusion. It is located in the project's analysis file, and is available upon request.

The Wild and Scenic Rivers Act of 1968 states "…that certain selected rivers of the Nation which, with their immediate environments, possess *outstandingly remarkable* scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in *free-flowing condition*, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations." The "outstandingly remarkable value" of the Wind River is it's anadromous fishery - primarily wild steelhead.

Free Flowing Condition

Alternative 1, Existing Condition
Indirect/Direct and Cumulative Effects

No action, there would be no effect to the free flowing character of the river. This alternative would not affect the Wind River's suitability for listing as a Scenic River in the National Wild and Scenic River System.

Alternative 2, Proposed action
Indirect/Direct and Cumulative Effects

Implementation of the project will not alter the free flowing characteristics of the river. Instream structures will not block flow, but provide channel and bank stability. During high flow events, the wood structures would protect recovering riparian vegetation on the flood plains, protect stream banks and side channels from erosion. The increase in stream channel, bank and flood plain stability will accelerate the recovery of natural processes and overall recovery of the system. Refer to the Section 7 Analysis in the Project Analysis File.

D. ISSUE 4. POTENTIAL DOWN STREAM EFFECTS

Alternative 1, No Action:
Indirect/Direct and Cumulative Effects

Movement of in-stream large woody debris is a natural process that is typically associated with episodic flood events. Under historic conditions (pre - 1930's) it is believed that extremely large volumes of wood accumulated and were naturally transported through the system. Regional guidelines based on historic LWD levels have established a management standard of 80 pieces of LWD / mile. The Watershed Analysis showed that an "undisturbed", low gradient, unconstrained channel would be expected to retain 75-180 pieces of LWD per mile (NMFS (PACFISH) 1995). . The average rate of LWD in all "C" channels ("disturbed" and "undisturbed") is somewhat lower and well below standards due to a reduction in the source of LWD in the Wind River system.

Floating wood may pass entirely through the Wind River system, but, it is more likely that wood will become temporarily fixed in the system. There are two likely scenarios how wood will stabilize.

1. Wood may become perched on the margins of the stream on gravel bars or on flood plains above the high-water mark. Typically wood is retained when it makes contact with the channel bottom or is captured by large standing trees. Structures such as bridges constructed in the flood prone area may act like trees in retaining wood.

2. Floating wood commonly collects on the outside bend of a channel meander. Hydraulic forces tend to hold wood against the channel bank. Logs positioned at a channel bend tend to reduce the erosive force and stabilize lower stream banks.

Alternative 2, Proposed Action:
Indirect/Direct and Cumulative Effects
Under the action alternative there is a potential for in-stream structures to mobilize and move downstream. The risk, however is low. This is because the structures are located at the channel margin and all pieces of wood would be anchored as follows: Logs keyed into the stream bank would be held in place by surrounding soil and rock and or would be anchored to large rocks using heavy gauge steel cable when suitable log lengths are unavailable.

A 1996 survey of the Wind River structures showed that 83 percent of the Wind River structures meeting these criteria remained relatively unmoved (USDA Forest Service 1996). Monitoring in 1997 and 1998 has shown that to date, no structures have been destroyed or flushed downstream. The potential for adverse effects to private and/or federally owned lands downstream of the project area is considered low (USDA Forest Service 1999).

E. ISSUE 5. NOXIOUS WEEDS

Alternative 1, no action:

Noxious weed species, namely Scotchbroom and Tansy ragwort, are common and abundant in some places in the project area, especially on the gravel bars and adjacent open terraces. The heaviest infestation of Scotchbroom occurs a 1-2 acre open terrace along the channel on the west bank of the river in the southern portion of the project (Scott and Ruchty 2006). The effect of these species is to outcompete and displace native vegetation, likewise reducing habitat for native birds, wildlife and fish. These weed species would continue to exist and spread on the project site if the project was not implemented.

Alternative 2, Proposed Action:

Direct/Indirect and Cumulative Effects

Under this alternative there is the potential for further spread of scotch broom and tansy ragwort in the project area (Scott and Ruchty 2006). In order to prevent exacerbating the situation, Project Design Criterion 7 would require all equipment to be cleaned prior to entry to the site. Project Design Criteria 8 and 9 would require the use of clean mulch, gravel and fill to prevent spread of weed seeds. Project Design Criterion 10 would require native plant revegetation in order prevent re-establishment of noxious weeds. A Revegetation Plan has been drafted to provide for the replanting of each project construction site and decking/staging area. Project Design Criteria 11 and 12 would require disturbed sites to be mapped, monitored for noxious weeds and documented. If the monitors find any weeds, they would treat the site (typically by pulling the weeds). Refer to the Botany report located in the analysis file for more information. Despite the potential for immediate spread of scotch broom and tansy ragwort, due to ground disturbance from equipment and construction, the cumulative effects of the project will provide for long-term control, monitoring, and prevention of noxious weeds in the project area.

Other Legally-Required Disclosures

Economic and Social Effects
Neither of the alternatives would affect minority or low-income populations. There are no economic or social impacts associated with this proposal.

Prime Farmland, Rangeland, Wetlands and Flood Plains

There is no affect to prime farmland or rangeland with either alternative. While there are wetlands and flood plains in proximity and down river of the project area and riparian zones that comprise the project area, there would be no change in their size or ecological function.

CHAPTER IV
CONSULTATION WITH OTHERS

List of Preparers and Outside Consultants

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