U.S. Fish and Wildlife Service's
Biological Opinon
(Reference # 1-9-08-F-0108)
for the
Proposed Issuance
of a
Section 10(a)(1)(B) Incidental Take Permit
(TE-165744-0)
to the Broughton Land Company
for their
Native Fish Habitat Conservation Plan

August 18, 2008

Prepared by
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Fish and Wildlife Service
Spokane, Washington

1.0 Introduction

This document constitutes the U.S. Fish and Wildlife Service's (Service) Biological Opinion (BO) prepared pursuant to section 7 of the Endangered Species Act of 1973, as amended (ESA), on the effects of issuing an incidental take permit (ITP) to Broughton Land Company for the bull trout (*Salvelinus confluentus)*, pursuant to section 10(a)(1)(B) of the ESA. The BO will address bull trout and its designated critical habitat and is based on the Service's review of the Broughton Land Company Native Fish Habitat Conservation Plan (HCP) covering 38,000 acres in Columbia County, Washington. This opinion is based on information provided in the HCP and Environmental Assessment (EA), telephone conversations with Joe Hinson and Dale McGreer of Northwest Natural Resources Group LLC, the consultants for Broughton Land Company; and additional documents and literature regarding the bull trout. A complete administrative record of this consultation is on file in this office. Note that the National Marine Fisheries Service (NMFS) is expected to issue a separate ITP for their species associated with the HCP. BLC is seeking incidental take coverage for the bull trout (*Salvelinus confluentus*) associated with agriculture and forestry activities on their lands.

The Service's objective in the following BO is to determine whether the implementation of the HCP to "jeopardize the continued existence" of the bull trout and/or result in the "destruction or adverse modification" of its designated critical habitat. The standards for determining jeopardy are described in Section 7(a)(2) of the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 *et seq.*) and further defined in 50 C.F.R. 402.14. Although the standards for determining destruction and adverse modification of critical habitat are also described here, on August 6, 2004, the Ninth Circuit Court of Appeals rendered a decision in *Gifford Pinchot Task Force v. U.S. Fish and Wildlife Service*, No. 03-35279, finding that the Service's regulatory definition of "destruction or adverse modification" is contrary to law. As ordered in the Director's December 9, 2004, memorandum, this BO does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat (50 C.F.R. 402.02). Instead, this BO relies on the statutory provisions of the Act to complete the Project analysis with respect to critical habitat.

The Service has determined that the proposed actions will not affect any terrestrial listed species. Therefore, any such species will not be considered further in this opinion.

The Service finds that this project is likely to adversely affect the bull trout, resulting in take, and is likely to adversely affect designated critical habitat for the bull trout. The analyses of these effects are considered in the following BO.

1.1 Consultation History

From 1999 to 2007 the Service provided technical and policy assistance to BLC and its consultants in development of the HCP. During the development of the HCP, preliminary drafts were distributed to the Service and NMFS for comments. The Washington Department of Fish and Wildlife (WDFW) habitat biologist also attended several meetings and field trips, and reviewed an early version of the HCP.

BLC's consultant developed an early draft of an environmental assessment (EA) in 2006, and the Service and consultant revised that EA in 2007. NMFS and Service staff reviewed and commented on both the draft EA and HCP, and many of their comments were incorporated into the HCP and EA. The Service and NMFS published a Notice of Availability of the HCP in the Federal Register (73 (44):11870-11871) on March 5, 2008. A 30-day public comment period ended on April 4, 2008. The Service, NMFS, and BLC's consultants prepared a final HCP and EA, and the Service prepared a Finding of No Significant Impact.

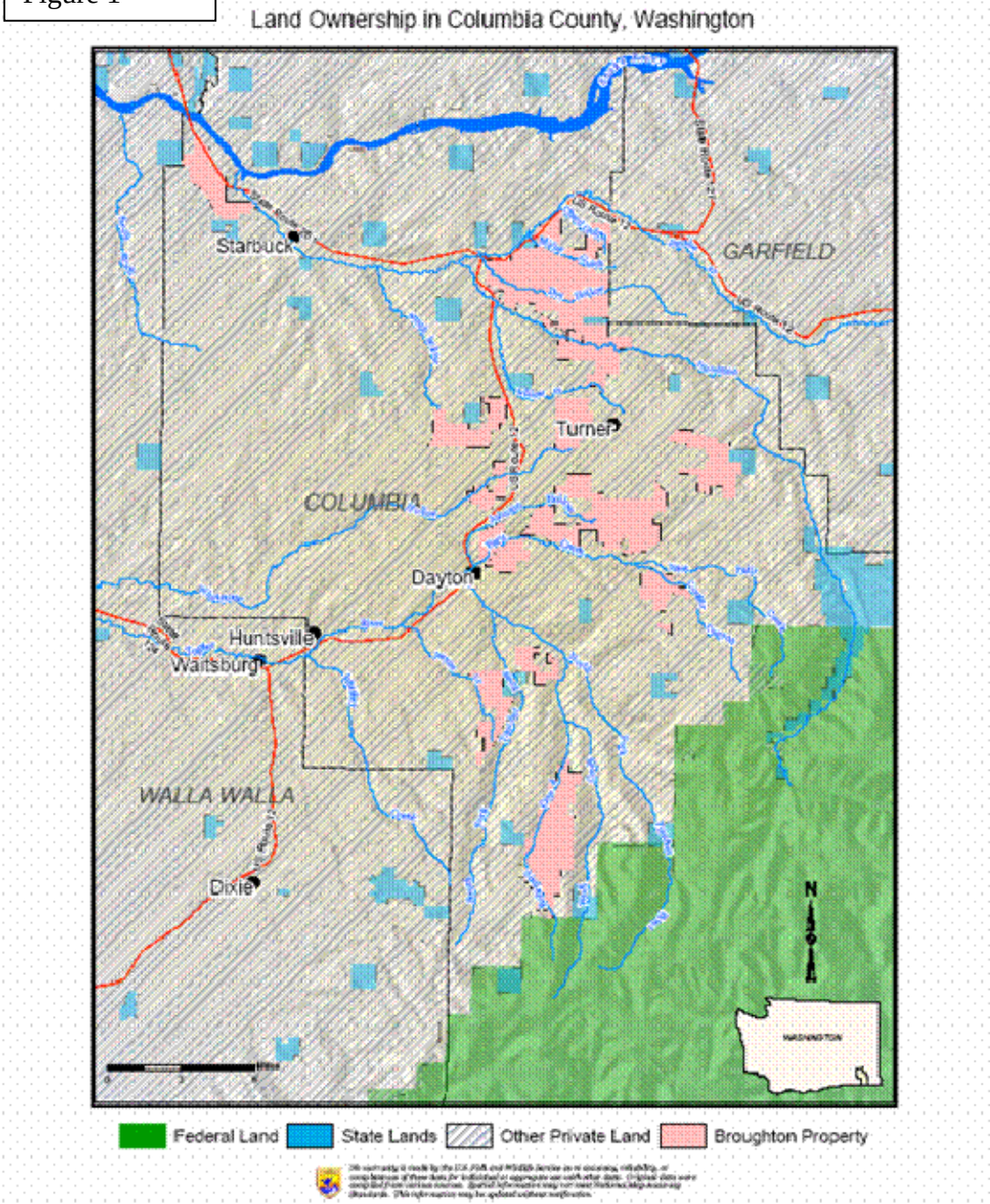
This BO is based on the final April 23, 2008 final HCP and EA, and several years of discussion and negotiations with BLC and its consultants. A complete administrative record of this HCP and BO is on file in the Service's Upper Columbia Fish and Wildlife Office in Spokane, Washington.

BIOLOGICAL OPINION

2.0 Description of the Proposed Action

Broughton Land Company (BLC), a privately held company, has applied for an ESA Section 10(a)(1)(B) permit (Section 10 permit) from the Service. The BLC owns and manages approximately 38,000 acres of range, agricultural, and forestland in Columbia County, Washington (Figure 1).

Figure 1


Land Ownership in Columbia County, Washington
Starbuck
GARFIELD
Turner
COLUMBIA
Dayton
Huntsville
Waitsburg
WALLA WALLA
Dixie
N
Federal Land
State Lands
Other Private Land
Broughton Property

The species sought for coverage through the HCP are listed in Table 1. The NMFS will evaluate permit issuance for the Chinook and steelhead. This BO will address the bull trout, *Salvelinus confluentus,* and its designated critical habitat.

Table 1. Native Fish Species to be Covered by the HCP

Species	Federal Status T=threatened
Oncorhynchus tshawytscha	
Snake River spring/summer Chinook salmon	T
Snake River fall Chinook salmon	T
Oncorhynchus mykiss	
Snake River Steelhead trout	T
Middle Columbia River Steelhead trout	T
Salvelinus confluentus	
Bull trout	T

2.1 Location

The BLC parcels covered by the HCP are in Columbia County in southeast Washington. The county is drained by the Tucannon and Touchet Rivers, which originate in forested areas of the Blue Mountains that lie in the southern part of the county. Topography of the county is characterized by long, gentle to moderately steep slopes intersected by steep canyons. Elevations range from 540 feet at the Tucannon River confluence with the Snake River to 6,400 feet at the head of the Tucannon in the Blue Mountains at Oregon Butte. The mouth of the Tucannon River is inundated by the reservoir formed by Lower Monumental Dam, located 20 miles downstream on the Snake River. The Touchet River originates as four major branches in the Blue Mountains upstream of Dayton, Washington, and joins the Walla Walla River approximately 25 miles downstream of Dayton.

2.1.1 Summary of BLC parcels

The BLC has two principal dryland pasture areas: the Pentecost Pasture located near the Snake River, and lands near and bordering Pataha Creek and the Tucannon River. These dryland areas are internally drained only by ephemeral gulches bordered by grasses, forbs, and in some areas, brush species. Narrow bottomland irrigated alfalfa and grass hay lands also occur along the Tucannon. Cattle have no access to intermittent or perennial streams in the Pentecost pasture, no access to Pataha Creek and only very limited access to parts of one of the four blocks of Broughton land bordering the Tucannon River (See subsection 3.4.3.3 of the HCP for further discussion of Tucannon grazing management). In its pre-settlement condition, Pataha Creek was likely bordered by dense brush and deciduous forest, but is currently only partially bordered by brush and dense grass/forbs (Pomeroy Conservation District 1997).

The company's forestlands are located in the Robinson Fork of the Touchet River. These lands are managed for an annual timber harvest, primarily employing partial-cut silvicultural systems, although this has been modified due to a large fire in 2006. The BLC's road system for management of these lands is nearly complete, with the exception of areas at the upper end of BLC's lands near and bordering National Forest lands. Areas to the east of the Robinson Fork near and bordering Confederated Tribes of the Umatilla Indian Reservation (CTUIR) lands would be accessed via existing ridge top roads or with helicopters. The BLC also typically grazes cattle in these forestlands for part of each year, generally beginning early in June and ending in November.

Agricultural lands are found in the moderate precipitation areas between the dry pastures and forestlands. The BLC's lands and most of the lands of Columbia County have been severely eroded from the time they were first tilled to the 1980s. It was a common practice to fallow farmland (grow no crop for one year) and till the soil many times to control weeds and prepare a seed bed for the next crop. BLC has implemented a cropping plan that minimizes soil erosion, as described in subsection 3.4.1.1 of the HCP. The BLC farms the suitable uplands, raising dryland wheat, peas, and barley. Irrigated bottomlands support grass or alfalfa. Small ephemeral draws in the upland farmed areas are maintained as grassed waterways to prevent channel and gully erosion. Larger channels, as they become intermittent and/or perennial, support perennial brush and tree stands, and are buffered from surrounding fields with those species. In many areas bordering several streams, current riparian vegetative condition within BLC land is recovering from degraded conditions that existed historically due to old farming and land management practices, many of which predate BLC ownership of these lands. Current vegetative condition and contributing management practices are described in detail for each stream in subsections 6.3.1 through 6.3.12 of the HCP/EA.

For a spatial display of BLC parcels, see figure 13 in the HCP/EA. Parcels are summarized in Table 2.

Table 2. Summary of BLC parcels.

BLC Parcel Name	Parcel Size	Main Activity	Drainage/ Watershed
Pentecost Pasture	2,717-acre contiguous block	dry pastureland	drains ~ equally into 1) Fields Gulch, a dry wash, which drains into the Snake River approximately 4.5 miles downstream from the nearest BLC property; and 2) unnamed ephemeral tributaries facing into the Snake River; separated from the Snake by at least 1,000 feet, and drained only by ephemeral draws that do not reach the river.
Pataha Creek	approximately 8,000 acres	predominantly used for grazing, with a minor acreage of dry croplands on ridges and north slopes in the southern part of the block	lands border 2 miles of the south bank of Pataha Creek starting about 1 mile upstream from its confluence with the Tucannon River;and other lands in intermittent tributaries of Pataha Creek: Dry Gulch, Miller Gulch, and Chard Gulch.

BLC Parcel Name	Parcel Size	Main Activity	Drainage/ Watershed
King/McGee	1,800-acre block of land	managed for dry croplands on the gentle terraces, with the steeper canyon slopes managed as grazing areas.	drains to the Tucannon via two intermittent tributaries approximately 23 miles upstream from its confluence with the Snake. Drained by ephemeral and intermittent tributaries of the Tucannon River and by an intermittent tributary at the extreme headwaters of Willow Creek.
Tucannon Blocks (4 blocks)	4,500 acres	grazing, with irrigated hay, alfalfa, and pasture in the river's floodplain	Adjacent to or near Tucannon River between 13 and 21 miles upstream of the Tucannon/Snake confluence. These lands border the river in four separate units identified as Tucannon Blocks 1 through 4.
Beard Block	1,568 acres	managed for dry croplands on rolling hills with some flat valley bottomlands near Whetstone Creek.	drained by ephemeral tributaries to Willow Creek (intermittent) and Whetstone Creek, and borders the north bank of Whetstone Creek for 1 mile. Whetstone Creek is seasonally intermittent in this area and for several miles downstream.

BLC Parcel Name	Parcel Size	Main Activity	Drainage/ Watershed
Romaine Block	1,792 acres	managed for dry croplands on gentle slopes, with one small area of brush and grass/forb rangeland on steeper slopes adjacent to intermittent tributary of Smith Hollow Creek. BLC lands drained by the single intermittent tributary of Willow Creek were retired from grazing uses years ago to control erosion and the steep slopes that border the tributary are not farmed.	drained by ephemeral and intermittent tributaries to Smith Hollow Creek (perennial), and one ephemeral tributary of Willow Creek (intermittent). Smith Hollow Creek drains into the Tucannon River approximately eight miles from the Snake River, about 8 miles downstream of BLC lands. Willow Creek is a dry wash.
Whetstone	916 acres	managed for dry croplands on rolling hills, with the flat valley bottomlands adjacent to Whetstone Creek managed in irrigated grass and alfalfa. Lands in the Whetstone block are not grazed.	borders both sides of Whetstone Creek for approximately 1 mile. Whetstone Creek remains seasonally intermittent in this area and for several miles downstream.
Patit Creek Blocks (4 Blocks)	7,032	Irrigated pasture, dryland farming, Lewis and Clark historic site	Four blocks of land along and near Patit Creek just upstream from Dayton, with some land in the Whetstone and Johnson Hollow watersheds. BLC land in both Johnson Hollow (a tributary of Patit) and Whetstone Creek are drained by ephemeral tributaries.

BLC Parcel Name	Parcel Size	Main Activity	Drainage/ Watershed
Cougar Canyon	1,250 acres	dry cropland, grassland and forestland	Cougar Canyon is an intermittent tributary to the South Fork (sometimes called the West Fork) of Patit Creek that joins Patit Creek ½ mile downstream of Patit Block #4.
Johnson Place	917 acres	dry cropland	Drained by two ephemeral headwater channels, one leading to the South Fork and one leading to the North Fork of the Touchet River. A portion of these lands also extend towards the Wolf Fork of the Touchet, but no stream channels lie in that area.
Payne Hollow	2,400 acres	dry cropland, although extensive areas of steeper slopes adjacent to the main-stem and tributaries of Payne Hollow are managed as conifer (ponderosa pine and Douglas-fir) forest and grassland areas, some of which are grazed seasonally.	along ephemeral and intermittent channels at the extreme headwaters of Payne Hollow, with minor acreage along an ephemeral headwater tributary of Whiskey Creek. Payne Hollow is an intermittently flowing tributary that joins the Touchet River 3 miles downstream of Dayton.

BLC Parcel Name	Parcel Size	Main Activity	Drainage/ Watershed
Robinson Fork	5,162 acres	forestland, grazing	tributary to and surrounding the Robinson Fork. BLC lands adjacent to the river begin 1.5 miles above Robinson Fork's confluence with the Wolf Fork that in turn flows into the North Fork Touchet River 2.5 miles further downstream.

2.2 Covered Activities

Covered activities in the HCP include forest management, grazing, and farming.

The following subsections are excerpts from the HCP section 3.3.3.

Forest Management

Forest management activities covered by the HCP [including Robinson Fork and portions of Payne Hollow and Cougar Canyon] include all aspects of mechanized timber harvesting, log transportation, road construction, maintenance and decommissioning, site preparation and slash abatement, tree planting, fertilization, silvicultural thinning, wildfire suppression, and stream restoration, as described below. During the plan period, BLC may apply insecticides, fungicides and herbicides (referred to jointly as "pesticides") in the HCP areas as needed to control vegetation and organisms that may suppress or inhibit tree growth. All pesticides will be applied in accordance with applicable regulations of the Environmental Protection Agency (EPA) and applicable laws of the State of Washington. The application of pesticides is not intended to be a covered activity under the HCP. However, incidental take statements issued as a result of Section 7 consultations between the Services [Service and/or NMFS] and the EPA may cover those activities in the future. Specific forest management activities to be covered under this plan are as follows:

- Timber harvest, including felling of timber, bucking of timber, and yarding of timber with ground, tower, or aerial logging systems;
- Transportation of logs from BLC lands via roads;
- Helicopter operations, including log transport, landing construction and the development of fueling points;
- Road construction, maintenance, and decommissioning, including clearing of rights of way for new roads, excavation of road cuts and fills, installation of culverts, surfacing of

roads, road surface and culvert maintenance, use and maintenance of existing fords, brush control along road corridors, seeding, maintenance and installation of erosion control measures, and temporary or permanent road closure;

- Site preparation and slash abatement, including preparation of harvested sites for planting by bulldozer blading or other means, and burning of slash in accordance with applicable Washington State law;
- Tree planting;
- Fertilization of certain timber stands up to two times between ages 15 and 40 with aerial application of approximately 440 pounds of nitrogenous pelletized fertilizer per acre in compliance with the Washington Forest Practices Rules WAC 222-38-030 (2001) that prohibit application of fertilizers to wetlands and streams;
- Silvicultural thinning of timber stands, including commercial thinning and pre-commercial thinning in stands younger than 30 years old; and
- Stream and riparian area enhancement projects designed to improve riparian and stream channel habitat in cooperation with local conservation districts, WDFW, Natural Resource Conservation Service (NRCS), and other qualified agencies.

Forest management expectations are also described in more detail in section 3.4.2.1 of the EA/HCP.

Grazing

BLC's grazing and livestock management operations are also included as part of this plan. BLC manages 18,273 acres of land for beef cattle production. BLC's current herd typically includes 800 cow/calf pairs, well below the lands carrying capacity. BLC also seasonally moved cattle from Pentecost Pasture and other areas to the forestlands of the Robinson Fork. However, because of the impacts of the fire in Robinson Fork and the need to re-establish trees, BLC has enrolled the riparian areas [see Fig. 3 in HCP/EA] in CREP [Conservation Reserve Enhancement Program] and will fence them to exclude all grazing for the term of the CREP contracts, although upland areas of Robinson Fork will be grazed once new trees in the burned area become established. The range and livestock management activities to be covered in this plan include:

- All normal grazing, pasture rotation, and herd dispersion practices;
- Fence, gate, and cattle guard construction and repair;
- Winter feeding operations and year-round placement of salt or other nutrients;
- Location, construction and repair of temporary or permanent watering devices;
- Construction and repair of temporary or permanent corrals and loading facilities;
- Construction, repair, and operation of temporary veterinary and medical treatment facilities;
- Location of such temporary housing as tents, trailers or small buildings designed for limited use by people who are assisting with livestock herding, calving or shipping;
- Collection and removal of animal wastes, including land application of manure under appropriate state regulations; and
- Disposal of dead animals.

Grazing management expectations are described in more detail in section 3.4.2.2 of the EA/HCP.

Farming

BLC farms 15,017 acres of land. Of this total, BLC has placed 2,100 acres of farm and grazing lands into Conservation Reserve Program (CRP) status. BLC also rents 1,963 acres of farmland to other operators. These lands are also included as activities covered by the HCP and would be subject to all of its requirements, with future rental agreements specifying practices for these lands that are consistent with the terms of the HCP. Lands which are rented to other operators will be monitored for HCP compliance as all other lands covered through this plan. The remaining 10,954 acres is farmed by BLC. Most of BLC's farming operation is dryland (not irrigated), with winter wheat, spring wheat, barley, peas, lentils, and other grains as the principle crops.

The farm practices to be included in the HCP plan are:

- Normal plowing tillage and cultivation;
- Planting, fertilizing, and land application of manure;
- Harvesting of crops and mowing;
- Burning of weeds, grass, and stubble;
- Fence construction and maintenance;
- Road construction and maintenance;
- Occasional or emergency use of existing fords (Patit Creek), generally with rubber-tired farm tractors;
- Construction and maintenance of pumping and water storage facilities;
- Normal irrigation practices as described for lands adjoining Patit Creek and the Tucannon River;
- Ditch construction, cleaning, and maintenance;
- Fallow treatment, which means establishment of a cover crop where the land is then not farmed for at least one growing season.

Farming expectations are described in more detail in section 3.4.2.3 of the EA/HCP.

2.3 Action Area

The BLC has 38,000 acres of land that are adjacent to or drain into the Snake River, Touchet River, and Tucannon River watersheds. Although BLC lands do not support known bull trout spawning areas, indirect effects from BLC covered activities may impact bull trout seasonal rearing, overwintering, foraging, and migration in the middle and lower portions of the watersheds. Thus, the Action Area for the analysis of effects to the bull trout includes the following watersheds where the BLC lands occur: 1) the Touchet River watershed, including the headwater streams and tributaries to the mouth, and 2) the Tucannon River watershed including the headwaters, mainstem, and tributaries down to the mouth. There are parcels of land that drain directly into the Snake River, but in those areas the drainages are intermittent vegetated draws, and the HCP activities likely have no or minimal impacts to bull trout in the Snake River. Where appropriate below, these Snake River draining parcels will be discussed in conjunction with the Tucannon River watershed.

2.4 Unforeseen Circumstances and No Surprises

In the HCP [section 3.6.2], "unforeseen" circumstances are those that are completely unpredictable (an earthquake or volcanic eruption or the outbreak of a disease completely lethal to one or more wildlife species) or a more normal situation that exceeds historic variability and which result in a substantial and adverse change to the status of a covered species. BLC considers a wildfire of about 2,000 acres and larger as an "unforeseen" event, since fires of this magnitude are rare on the BLC ownership. For the purposes of this HCP, "unforeseen" circumstances would include (but not be limited to):

- Natural catastrophic events such as fire, drought, severe wind or water erosion, floods, and landslides (also landslides associated with earthquakes) of a magnitude exceeding that expected to occur during the term of the permit.

- Invasion by exotic species not now found on BLC's lands or within the general area or habitat type or species-specific disease that threatens covered species.

Since, by definition, "unforeseen" circumstances cannot be predicted, it is impossible to identify all of them before they occur. Therefore, it is necessary to define them after the fact, and for that reason, this HCP includes a process for making that determination. In making the determination of what constitutes an "unforeseen" event, the Fish and Wildlife Service, in cooperation with other relevant agencies or interests shall consider such factors as:

- Percentage of the species range adversely affected by the HCP;
- Percentage of the range conserved by the HCP;
- Ecological significance of that portion of the range affected by the HCP;
- The level of knowledge about the affected species and the degree of specificity of the species' conservation program under the HCP and whether failure to adopt additional conservation measures would appreciably reduce the likelihood of survival and recovery of the affected species in the wild.

Prior to making a determination regarding the occurrence of any unforeseen circumstance, the Services [NMFS and Service] and BLC shall comply with the following procedures.

1) Notice to applicants and participants. Either BLC or the Services shall inform the other and all other relevant parties to this agreement upon the discovery of a possible "unforeseen circumstance." This notification shall include a detailed statement of the facts regarding the unforeseen circumstance involved and the anticipated impact on the covered species and its habitat, and any other information and data relevant to the situation. In addition, the notice shall include any proposed conservation measure(s) that the agencies or BLC believe would address the unforeseen circumstance, an estimate of the cost of implementing such conservation measure(s).

2) Response. BLC, in consultation with the Service, may choose to perform an expedited analysis of the covered species or its habitat affected by the alleged unforeseen circumstance and to modify or redirect existing conservation measures to mitigate the effects of the unforeseen

circumstance, within the scope of existing funded conservation actions. To the extent that these modified or redirected conservation measures do not affect conservation of other species, habitats, or key areas, this may be deemed an adequate response to the unforeseen circumstance. If the proposed modifications or redirected conservation actions could affect the conservation of other covered species or its habitat, the procedure outlined below will be followed.

3) Submission of information by others. BLC shall have a meaningful opportunity to submit information to the agencies within 60 days of the written notice. Upon the written request of BLC, the time for submission of said information may be extended by the agencies. Such a request would not be unreasonably denied.

4) Findings. The agencies shall have the burden of demonstrating that an unforeseen circumstance has occurred and that such unforeseen circumstance is having or is likely to have a significant adverse impact on the covered species or its habitat. The findings of the agencies must be clearly documented and be based upon the best scientific and commercial data available regarding the status and habitat requirements of the species. In addition, based on the results of an expedited analysis of the changed or unforeseen circumstance and the information provided by BLC, the agencies shall provide the justification and approval for any reallocation of funds or resources necessary to respond to the unforeseen circumstance within the existing commitments of BLC under the HCP.

Response to Unforeseen Circumstances

If, after the conclusion of the process outlined above, the agencies determine that an unforeseen circumstance has occurred, they may identify additional conservation measures to address such circumstance and which were not contemplated in the original HCP. BLC and the Services will discuss the extent to which those measures could be achieved by modification or redirections of the existing funded conservation measures. Any proposed additional conservation measures shall fit, to the maximum extent possible, within the terms of the HCP. Provided that BLC has fully complied with the terms of the HCP, the "no surprises" policy shall apply and the agencies would not require the commitment of additional land, water, or financial compensation or additional restrictions on the use of land, water, or other natural resources, even upon a finding of unforeseen circumstances, unless BLC consents.

If additional expenditures are required, the agencies may take the additional actions that might lead to the conservation or enhancement of a species that is being adversely affected by an unforeseen circumstance. The costs of these additional actions shall be borne by the relevant federal agency and may include the purchase or exchange of land in other areas to offset the loss of any habitat from within the area of this HCP. However, the agencies agree that, prior to undertaking or attempting to impose any action or conservation measure, it shall consider all practical alternatives to the proposed conservation measure.

"No Surprises" Policy

The No Surprises policy applies to this HCP so long as BLC has complied fully with all the terms of the HCP and its provisions are being implemented. Consistent with the Service and NMFS Habitat Conservation Consultation Handbook (1988), the No Surprises policy provides that except as otherwise required by law, no further mitigation for the effects of the proposed HCP upon the Covered Species may be required from BLC who has otherwise abided by the terms of the HCP, except in the event of unforeseen circumstances; provided that any such additional mitigation may not require additional land or water use restrictions or financial compensation from BLC without their written consent.

2.5 Changed Circumstances

"Changed" circumstances (section 3.6.2 of the HCP) include those which are predictable events for the landscapes included in the HCP. These include, for example, a wildfire that burns 500 acres**,** an event that is a hallmark of the timber and rangelands within the Broughton ownership. For the purposes of this HCP, such "changed" circumstances include (but are not limited to)

- Listing of a new species not covered by this HCP.
- Vandalism or other intentional, destructive, illegal human activities.
- Natural catastrophic events such as fire, drought, severe wind or water erosion, floods, and landslides (also landslides associated with earthquakes) of a magnitude expected to occur during the term of the permit. The magnitude of natural catastrophic events should be evaluated on the basis of historical records of the frequency and magnitude of such events. Events with a magnitude likely to occur during an average 30-year period would be considered changed circumstances. Events expected to occur less frequently than once during an average 30-year period would be unforeseen circumstances.
- Invasion by exotic species, habitat or species-specific disease, or any other circumstance that significantly threatens covered species or their habitats and that affects populations of covered species throughout a substantial portion of their distribution in the HCP area.
- Initiation of grazing, farming or logging in a portion of Broughton's ownership where those activities did not commonly take place when the HCP was being prepared,
- Land purchases, sales or exchanges, and
- New scientific knowledge, which, if applied, could further the purposes of this HCP.

Response to Changed Circumstances

It is quite likely that additional and/or different conservation measures not contained in the HCP would be suggested and be proven to be effective during the term of the HCP. It may also be possible that measures currently included in the original HCP may prove to be less effective than originally thought as a means to conserve either the species or their habitats. Therefore, BLC, with the cooperation of Service and NMFS, will utilize monitoring and "adaptive management" to gauge the effectiveness of existing conservation measures and to propose additional or alternative conservation measures as the need arises to deal with changed circumstances, in a manner consistent with the examples in Table 12 of the HCP (and repeated below as Table 3).

Changed circumstances and BLC responses would require consultation with Services and documentation.

Table 3. Predictable Changed Circumstances and Likely Responses		
Changed Situation	**As Evidenced By……**	**Likely Response**
Commodity prices favor grazing	Farm land converted to pasture	BLC would manage "new" grazing land according to the general grazing standards in the HCP, ie: implement riparian buffers equivalent to CREP on fish-bearing streams; provide upland watering sites, keep salt away from streams and wetlands, minimize sediments and nutrients into streams
Relatively small, lethal fire	Substantial timber mortality on perhaps 500 acres or less	BLC would salvage dead timber according to FPA rules and stabilize all sediment sources. BLC may replant area or may graze it. Measures would be implemented to protect or improve riparian areas.
CREP, CRP contracts not renewed	Formal notification from agencies	CREP lands would likely be maintained in the condition existing at that time and BLC would consult with the Services over any modifications. BLC would maintain CRP areas in accordance with HCP standards.
Riparian vegetation not meeting expectations	Poor growth or failed plantings	BLC would consult with appropriate agencies to determine cause and develop site specific responses that may include grazing exclosures or additional plantings.
There is a need to add covered species	Additional T&E listings or the likelihood thereof	BLC would consult with appropriate agencies to determine the nature and extent of changes needed to the HCP to cover the additional species.
New economic opportunities	The need for additional roads or ground disturbing activities	Any new roads or ground disturbing activities in excess of one-half acre, regardless of their purpose, would be constructed or maintained to the standards set forth in either the Forest Practice Act rules or local planning and zoning requirements.
Additional areas for timber harvest	Newly acquired land or maturing trees that were planted previously	All forest management activities would be conducted according to the relevant FPA rules, but in no case shall these practices be carried out in a manner that

		is less stringent than the FPA rules in place at the time this HCP is approved.
Additional areas for grazing or farming	Land acquisitions or changes in land use	Newly acquired lands or lands where the use is changed would be managed to the HCPs standards applicable for that land use.
Excessive cattle use of riparian areas	Poor riparian growth, sedimentation or the failure of current herding practices to prevent riparian use	BLC would take immediate steps to reduce cattle use including the herding, salting or upland water developments set forth in the HCP. Fencing may be required in extreme cases.
Floods damage riparian areas	Scoured streams, debris avalanches, debris dams, channel changes	BLC would consult with appropriate agencies to develop site specific responses, including active restoration and exclosures from grazing.
Above normal timber harvests	The need to salvage dead timber or high timber values	All forest management activities would be conducted according to the relevant FPA rules, but in no case shall these practices be carried out in a manner that is less stringent than the FPA rules in place at the time this HCP is approved.

2.6 Conservation Measures in the HCP

Forest management

The Washington Forest Practices Rules (WFPB 2001), and the South Fork Touchet River watershed analysis mass wasting prescriptions are the basis for this HCP's conservation measures on forest lands. In the event that the July, 2001, Forest Practices Rules or mass wasting prescriptions are modified, BLC would provide and implement equivalent or greater habitat protection. BLC's forestry activities in the Robinson Fork parcel include a road abandonment and relocation plan, riparian management based on the current Washington Forest Practice Rules, additional protections offered through implementation of a CREP buffer, and additional conservation measures that address grazing in the Robinson Fork parcel.

In the summer of 2006 the Columbia Complex wildfire swept through about 10,000 acres of BLC's holdings, including the Robinson Fork, other forest areas, plus some of the range and crop plantings. In Robinson Fork and other areas where stands of young trees had been established, much mature timber and virtually all reproduction was killed. Prior to the fire, BLC historically managed Robinson Fork through relatively frequent entries using the existing road system to selectively harvest mature timber along with trees that were at risk to insects or disease. The southern portion of the property, which represents about one-quarter of the commercial forestland within the drainage, has not had timber harvests since at least 40 years ago (Creative Resource Solutions "Newby Mountain Timber Valuation," 1999).

The HCP provides more detail on past timber harvest regimes, current stand conditions, and future expectations. BLC will complete the fire salvage harvest, with commitments on steeper slopes to contour fall whips and poles every 50 to 60 vertical feet and seed with grass to minimize erosion. Where available, live trees will be left as seed sources for regeneration. Other areas will be replanted with seedling stock. Unburned pockets of timber will continue to grow and represent timber that can be harvested, although volumes harvested will likely be far less than if the entire watershed contained timber with a distribution of age classes that would allow for a sustainable harvest equal to the annual growth. Until that distribution is reached (which may take 50 or more years), timber harvests within Robinson Fork after the salvage of fire-killed timber is complete will be infrequent and small.

BLC will reintroduce cattle grazing in the Robinson Fork parcel after the new trees have matured sufficiently (likely in 2008) continue to implement measures including a road management and abandonment plan, installation of CREP buffers on Robinson Fork, and grazing management in the parcel that will ensure maintenance of the riparian zone in the future.

Grazing

The company intends to continue raising beef cattle by managing its suitable grazing lands to support approximately 800 cow/calf pairs. This includes continuation of grazing in the Pentecost and Pataha pastures, on lands bordering Patit Creek, and in the Cougar Canyon block. Following the fire of 2006, BLC plans to forego grazing in the area until new trees are well-established.

Over the term of the HCP, there may be occasions when land uses within the Broughton ownership change and additional areas are used for grazing. This change in traditional land use could occur as the result of fires in the forested lands that allow the growth of additional forage or changes in commodity prices that either make grazing more attractive or certain types of farming less so. The potential for these shifts in land use is a foreseeable event and, therefore, further addressed in the discussion of "changed circumstances." However, if lands are opened to grazing which are not currently used for that purpose then BLC would manage those lands in a manner consistent with the general grazing practices outlined in this section.

In order to minimize the impacts to water quality, riparian conditions, and instream fish habitat, BLC will implement the following grazing and range management practices.

Fencing and water developments

BLC proposes to fence 1,500 feet along Patit Creek #4, install a watering system away from the stream, and to relocate the fence along Patit #1 to provide a wider riparian area. In addition, BLC has fenced the entire length of its lands bordering Pataha Creek (approximately 2,600 feet) to eliminate impacts of cattle and has drilled a well and installed three watering stations away from the Pataha riparian area.

Along the Tucannon River Block 4 as part of its CREP contract commitments for the area, BLC built two new watering devices in the uplands and away from fish-bearing streams. In addition cattle access to the river will be eliminated following construction of fences along the river 75 feet from the edge of the ordinary high water mark.

Table 4. Fencing and Water Development Projects

Location	Type of Device	Installation Date
Pataha	Fence/well/watering system	2001
Patit	Fence/ watering systems	2003
Tucannon	Pumps/tanks/watering system	2002

Figure 5 in the HCP illustrates the total number of various water developments on Broughton's lands designed to draw cattle away from streams.

Herd management

In the past, BLC grazed cattle in Robinson Fork and used both herd management practices and culling of habitual riparian grazers to assist in focusing the cattle on the higher elevation grass forage. However, since the fire, BLC committed to implement CREP buffers in Robinson Fork to eliminate all grazing in the riparian areas for the duration of the CREP contract, and will revisit cattle and riparian management at the end of the contract period.

In other grazed pastures, salt will be located at least 500 feet away from streams, seeps, and springs, if at all possible. Salt placement will be designed to draw cattle away from all flowing water sources and riparian areas and to encourage the use of alternative sources of water. How and where salt is placed would be decided on a case-by-case situation with these objectives in mind.

Rest and rotation of pasture lands

Broughton has four major blocks of dry grazing lands--the Pentecost pasture, the Pataha block, Tucannon #4 (south side of the Tucannon) and the forested lands in Robinson Fork. These lands are managed in a grazing rest/rotation system that provides approximately six months of rest (no grazing) within each 12-month period. This is accomplished by alternating the seasons of use. For example, lands that are grazed in the spring and summer of the first 12-month period are rested and then grazed in the fall and winter of the second year. Therefore, BLC's pastures would be managed to allow a minimum of 6 months of rest for every 6 months they are grazed. The "rest" period would include a growing season.

Farming

BLC's farming operations adjacent to fish-bearing streams are limited to nearly flat lands in the floodplains of the Tucannon River and Patit Creek. With the exception of some areas of Patit Creek, farm fields are currently separated from streams by riparian vegetation, and in most cases are fenced. BLC will maintain existing riparian areas and buffers adjacent to the Tucannon River and Patit Creek, and establish a wider, more effective buffer along Reach #1 and #4 of Patit Creek, as detailed in section 3.4.3 of the HCP. These buffers, coupled with certain upland management practices such as annual cropping and erosion control management practices, are intended to minimize and mitigate for potential effects upon stream processes that affect water quality and instream habitat-forming geomorphic processes, including stream shade/water temperature, erosion and sediment delivery, bank and channel stability, and large woody debris recruitment potential.

BLC uses a continuous crop system where a crop is grown on every acre every year. This dries the soil profile so that the infiltration rate of the soil is high. BLC has also implemented a minimum tillage and direct seed system that has increased the amount of organic material on the soil surface. BLC has reduced the number of times that the soil is tilled, which has improved soil structure for better water infiltration. This combination of annual cropping, minimum soil disturbance, and increased soil cover nearly eliminates overland flow and soil erosion. In addition, some areas near streams in these general dry croplands are used for irrigated alfalfa and grass hay, and some of the steeper areas too erodible for tillage are now used for seasonal grazing in some years. All of these practices would continue throughout the term of the HCP.

BLC utilizes grassed waterways in draws, low spots, and high water-table locations as a back-up for filtering sediment that could originate from fields during extreme weather circumstances, including non-irrigated lands that make up the majority of the company's farming operations. Necessary waterway width for these areas were determined years ago by the Farm Services Administration (FSA) as part of the Farm Bill, and is on file at the FSA office in Dayton. Widths of these grassed waterways meet the requirements of the Farm Bill Conservation Plan, and were determined to be necessary for prevention of gully/channel erosion through design consideration of soil characteristics, contributing watershed area, upslope land use and management practices, precipitation and climatic characteristics, upland slope, channel slope, and other factors. Widths of these waterways therefore typically vary from approximately 20 to 40 feet.

A number of areas and a significant amount of BLC's acres are enrolled in either the "Conservation Reserve Program" (CRP) or the "Conservation Reserve Enhancement Program" (CREP). Both are administered by the USDA Farm Service Agency, with technical support from the Natural Resource Conservation Service. CRP includes erodible farmlands that are planted to a perennial cover crop and "banked" for a 10-year period. The most significant effect of enrolling lands in CRP is to reduce sediment delivery. CRP lands are not farmed, so sediment delivery from them is minimal, as opposed to lands that are continuously tilled. While the cover crop may benefit some upland species, there is little direct benefit to aquatic or riparian species from CRP enrollment, other than reductions in sediment delivery. At the end of the 10-year CRP contract period, BLC may elect to either re-enroll these lands for another contract term or perhaps change their use and management. The need for such decisions is a foreseeable "changed circumstance."

The CREP, on the other hand, focuses on conservation practices in to restore riparian areas. In CREP areas, riparian areas are fenced and removed from both grazing and farming. This not only reduces direct delivery of sediment from these areas, but also allows the re-establishment of riparian vegetation (USDI 1998a; Beschta 1997; Keller et al. 1978). After the 15-year CREP contract period, the BLC commits to maintain those restored riparian buffers for the life of the HCP, with the exception of Robinson Fork. In Robinson Fork, after the CREP contract, the BLC would revisit whether riparian fences would be maintained and whether cattle may graze the area with intense herd management. BLCs goal would be to maintain or improve the restored riparian area.

Table 5 summarizes Broughton's current and possible CREP contracts. Figure 4 in the HCP shows the location of these lands.

Table 5. Broughton CREP Lands and Practices

Area	Status	Acreage	Renewal Year	Conservation Practices
Pataha Creek	CREP, 2001	39	2016	Fenced, trees planted, water developments
Tucannon #1	Considering CREP	17		Fenced, trees planted, water developments
Tucannon #2	CREP, 2006	30	2021	Fenced, trees planted, water developments
Tucannon #4	CREP, 2001	126	2016	Fenced, trees planted, water developments
Patit #1	CREP, 2006	30	2021	Fenced, trees planted, water developments
Patit, #3	CREP, 2003	19	2018	Fenced, trees planted, water developments
Robinson Fork	CREP, 2006	Approx. 400	2021	Fencing, grazing exclusions

All HCP conservation measures are summarized in Table 6, by individual area and by activity. While many of the conservation measures have already been implemented, due in part to the long length of time to develop the HCP, the BLC also commits to continuing the described measures for the life of the HCP. The conservation measures build on their existing forestry, farming, and grazing management.

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Table 6. Summary of BLC Conservation Measures

Conservation Measures By Individual Area…	**Conservation Practice**	**Target Implementation Date**	**Cost**	**Relationship to "Maximum Extent Practicable" Provision**
Pataha Creek	Enroll area between stream and Highway 12 in CREP; develop water source south of Hwy 12	Completed 2003		These measures eliminate all farming and ranching activities near Pataha Creek, are revegetating with trees and brush, much of which is planted. No additional measures needed.
Tucannon River	Replace pump screens to meet current fish criteria	Completed 2003	$28,000	These are the current standards required by NOAA Fish and State agencies to eliminate take associated with water intake pumping devices. If criteria change, adjust screens within one year of notice
Block 4	Enroll in CREP; build two water sources; construct fences and plant trees and shrubs	Completed 2002	$141,000	Enrollment in CREP ensures minimal to no take by eliminating virtually all farming and ranching activities near Patit Creek. No additional measures needed.
	If redds are found in cattle crossings consult with agencies to minimize impact			
Whetstone	Surface road	Completed 2003	$5,000	Minimizes sediment delivery by reducing erosion to approximately 2% of former quantity while continuing to allow BLC to use this important farm access road.

Conservation Measures By Individual Area…	**Conservation Practice**	**Target Implementation Date**	**Cost**	**Relationship to "Maximum Extent Practicable" Provision**
Patit Creek Block 1	Widen fenced riparian area; add rock to road in Sec. 20; remove old CCC dam. Enrolled in CREP in 2005	Fence completed 2005-2006, road completed 2003, CCC dam removed 2003	$32,000	See road comment above. The irrigated fields adjacent to Patit 1 are critical to BLC's operations and to other economic uses. Expansion of the riparian zone through upgrading and movement of the existing fence further eliminates grazing and haying impacts to the channel, riparian area and channel "bluffs," allowing these areas to revegetate and at accelerated rate, and providing aa high level of riparian area conservation benefit. This is maximum expansion of riparian area that can still allow the traditional use of the field.
Patit Creek Block 2	No additional measures needed.	Completed 1990s		This area of BLC land has been protected for several years (decades); there are no farming, grazing or other BLC land usages of this area.
Patit Creek Block 3	Enroll area in CREP. Fence entire block to south a minimum of 75 feet from the ordinary high water mark (OHWM) and eliminate grazing to north to allow expansion of riparian area; water developments. Donated approximately 4 acres for historical interpretive site	Completed 2003	$19,500	No additional measures needed. See Pataha comments regarding benefits of CREP.

Conservation Measures By Individual Area…	**Conservation Practice**	**Target Implementation Date**	**Cost**	**Relationship to "Maximum Extent Practicable" Provision**
Patit Creek Block 4	Realign farmed area to allow riparian area to expand; plant trees and shrubs as needed to encourage expansion; possibly enroll in CREP.	Unknown, but projected for 2012		This is maximum expansion of riparian area that can still allow the traditional use of the field. Riparian area would average more than 50 feet in width and farmed areas most proximate to stream are flat. Degree of stream temperature, LWD (large woody debris), and sediment buffering would high relative to 100% of potential.
Robinson Fork	Relocate and abandon stream bottom road and restrict use; comply with FPA rules as they exist at time of HCP approval through the term of the HCP.	Road relocation and upgrades complete 2007	$40,000	These are the measures that are economically possible, would protect the riparian area and maintain the traditional use of the Robinson Fork area.
	Enroll in CREP	2006		
	Cooperate in WDFW stream surveys or BLC will conduct informal surveys. If redds are found in Robinson Fork at fords consult with agencies to minimize impacts.	Ongoing		

Conservation Measures By Individual Area…	**Conservation Practice**	**Target Implementation Date**	**Cost**	**Relationship to "Maximum Extent Practicable" Provision**
	Conduct Fire Salvage: On steeper slopes BLC will contour fall whips and poles every 50 to 60 vertical feet and seed with grass to minimize erosion. Where available, live trees will be left as seed sources for regeneration. Other areas will be replanted with seedling stock.	Complete in 2007-2008		

Conservation Measures By Land Use and Covered Activity…	**Conservation Practice**	**Target Implementation Date**	**Cost**	**Relationship to "Maximum Extent Practicable" Provision**
Irrigation	Replace all screens with 3/32nd standard mess mesh	Completed 2003	As above	As above
	Enroll 6.4 cfs in water trust to reduce total irrigation use by over 50%	Completed 2003		This is a direct benefit to habitat effectiveness and availability within the Tucannon and is the maximum practicable for BLC to continue to use these lands for their traditional irrigated pasture and hay functions.
Grazing	Develop off-stream water sources fed by a new deep water Pataha well (no withdrawals from Pataha or Patit) in Pataha Creek, Patit #3	Completed 2001-2003	$83,000	These are the measures that are economically possible, would maintain the traditional use of the remaining pasture, and ensure full riparian function and conservation benefit.

Conservation Measures By Land Use and Covered Activity…	**Conservation Practice**	**Target Implementation Date**	**Cost**	**Relationship to "Maximum Extent Practicable" Provision**
	Enroll lands in Tucannon, Patit and Pataha Creeks in CREP and eliminate grazing within enrolled areas adjacent to streams along with qualifying portions of Robinson Fork		As above	No additional measures needed
	Maintain riparian conditions initially encouraged by CREP for life of HCP			
	Maintain grassed waterways for life of HCP			
	Construct new fences in Patit #3 and #1	Completed 2003, 2007	As above	No additional measures needed
	Attract cows away from streams by salt placement			Minimal additional cost
Farming	Surface roads in Whetstone and Patit Blocks	Completed, 2004	As above	No additional measures needed
	Remove old dam in Patit Creek	Completed 2003	$18,000	No additional measures needed
	Maintain grassed waterways for life of HCP			

Conservation Measures By Land Use and Covered Activity…	**Conservation Practice**	**Target Implementation Date**	**Cost**	**Relationship to "Maximum Extent Practicable" Provision**
	Maintain minimum till			
Forest Management	Abandon portions of the road in the riparian area of Robinson Fork. Remove two fish barrier culverts.	2005-2007 Culverts removed in 2004	As above	This allows the road to be used for administrative purposes but eliminates the preponderance of sediment delivery to the Robinson (from the entirety of BLC lands!), and enhances ability of the riparian area to provide LWD and shade as the road narrows from a heavy haul road to a "single track" condition.
	Comply with FPA rules in existence at time of HCP approval Enroll qualified portions of Robinson Fork in CREP to exclude grazing and facilitate the establishment of new trees.	Completed and will continue 2007		Minimal additional cost Excluding cattle and reforesting area will, over the long term, reduce sediment delivery.

2.7 Monitoring and Evaluation Measures.

As required for HCPs, monitoring measures will be implemented. Those measures are summarized in Table 7.

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Table 7. Summary of Monitoring Activities

Ownership Block	Management Action And/or Objective	Monitoring Objective	Measurement Frequency	Monitoring Measures and Reporting Procedure	Reporting Party
Pentecost	Continue to exclude cattle at all times from Field's Gulch by maintaining the effectiveness of the existing fence.	Verify the condition of the fence and its ability to separate the cattle from the stream (this stream is dry in all but severe thunderstorms.	Throughout the course of the year concurrent with normal management activities. Formally and thoroughly inspect twice per year, spring and fall.*	Memorandum report that verifies the fences effectiveness to be provided to the federal agencies annually[1]	BLC
Pataha Creek	Eliminate grazing on all BLC lands bordering Pataha Creek lying between the Creek and Highway 12 to allow development of a riparian area vegetated with brush, tree, and grass species capable of providing full riparian function.	Verify that streambanks and riparian area become revegetated and stabilized	Once per year*	Forward NRCS reports that verify compliance with the CREP program land use requirements. Establish 6 photo points at GPS-documented locations distributed along the length of Pataha Creek where vegetation is currently in poor condition and/or soil is exposed. Provide photo verification and narrative report annually.	NRCS and BLC

[1] A reporting memorandum will be prepared that reports the observer's name, agency, date of observation, and condition relative to the monitoring objective.

Ownership Block	Management Action And/or Objective	Monitoring Objective	Measurement Frequency	Monitoring Measures and Reporting Procedure	Reporting Party
	Develop and maintain a well and upland water source south of Highway 12	Verify that the well is installed and that the water source remains functional.	Once per year*	Memorandum report annually	NRCS and BLC
	Maintain grassed waterways in dryland-farmed areas adjacent to ephemeral draws to prevent erosion of headwater channels.	Multiple inspections annually. Compare FSA inventory to reinventories as FSA conducts them to verify that grassed waterways remain in place and control erosion effectively.	Annual reporting of any erosion and/or treatment.* FSA inspections periodically at approximately 10-year intervals	Acreage comparison with field-by-field comparisons if needed	BLC
Tucannon River	Screen all pumps to newest bull trout, steelhead and chinook standards to prevent take of fry. Inspect screens annually at the beginning of each irrigation season.	Verify installation of required screens. Verify that the screens have been inspected and maintained annually	Once per year	Memorandum report annually	BLC and WDFW
Block 1	Maintain existing riparian areas to prevent channel erosion, maintain shade, provide LWD recruitment, and filter sediment.	Verify that existing riparian areas remain intact and richly vegetated.	Annually in June*	Verify with two GPS-located photo point photos. Results reported annually.	BLC

Ownership Block	Management Action And/or Objective	Monitoring Objective	Measurement Frequency	Monitoring Measures and Reporting Procedure	Reporting Party
Block 2	Maintain existing fences and riparian areas to prevent channel erosion, maintain shade, provide LWD recruitment, and filter sediment.	Verify that existing fences remain effective at excluding cattle from the riparian area. Verify that riparian areas remain intact and richly vegetated.	Annually in June*	Verify with two GPS-located photo point photos. Results reported annually.	BLC
Block 3	Maintain existing fences and riparian areas to prevent channel erosion, maintain shade, provide LWD recruitment, and filter sediment.	Verify that existing fences remain effective at excluding cattle from the riparian area. Verify that riparian areas remain intact and richly vegetated.	Annually in June*	Verify with two GPS-located photo point photos. Results reported annually.	BLC
Block 4	Maintain riparian areas to prevent channel erosion, maintain shade, provide LWD recruitment, and filter sediment. Eliminate grazing with fences per CREP contract. Build two new watering devices in the uplands away from fish-bearing streams	Verify that riparian areas remain intact and richly vegetated.	Annually in June*	Forward NRCS reports that verify compliance with the CREP program land use requirements. Verify with two GPS-located photo point photos. Results reported annually.	BLC
King/ McGee	Maintain grassed waterways in dryland farmed areas adjacent to ephemeral draws	Verify that the waterways effectively prevent channel erosion . Document any unfavorable change	Annually in June	Verify with GPS-located photo point photos of two representative waterways. Results reported annually.	BLC

Ownership Block	Management Action And/or Objective	Monitoring Objective	Measurement Frequency	Monitoring Measures and Reporting Procedure	Reporting Party
Beard	Maintain grassed waterways in dryland farmed areas adjacent to ephemeral draws	Verify that the waterways effectively prevent channel erosion . Document any unfavorable change	Annually in June	Verify with GPS-located photo point photos of two representative waterways. Results reported annually.	BLC
Romaine	Maintain grassed waterways in dryland farmed areas adjacent to ephemeral draws	Verify that the waterways effectively prevent channel erosion. Document any unfavorable change	Annually in June	Verify with GPS-located photo point photos of two representative waterways. Results reported annually.	BLC
Whetstone	Maintain grassed waterways in dryland farmed areas adjacent to ephemeral draws	Verify that the waterways effectively prevent channel erosion. Document any unfavorable change	Annually in June	Verify with GPS-located photo point photos of two representative waterways. Results reported annually.	BLC
Patit Creek					
Block 1	Move existing fences further from riparian areas to exclude cattle, develop wider riparian area on both sides of the stream, and allow development of a richly vegetated riparian area. Add rock surfacing to BLC road along ephemeral tributary south of Patit in Sec. 20 to reduce prevent sediment delivery to Patit Creek.	Verify fence relocation. Verify with photos that the riparian area continues to develop a rich vegetation community and that escarpments regrade and become vegetated. Document any significant changes in road condition	Annually in June* As needed	Verify with two photo point locations representative of poor bank stability and/or poor vegetative condition with GPS location and bearing. Results reported annually.	BLC BLC

Ownership Block	Management Action And/or Objective	Monitoring Objective	Measurement Frequency	Monitoring Measures and Reporting Procedure	Reporting Party
Block 2	Maintain and allow continued maturation of dense riparian vegetation	Verify with photos that the riparian area continues to develop a rich vegetation community.	Annually in June*	Photo point two representative locations with GPS location and bearing and submit memorandum report with photos. Results reported annually.	BLC
Block 3	Fence 1,500 feet of Patit Creek to eliminate grazing from the riparian area and allow development of a richly vegetated riparian area. Install a watering system away from the stream	Verify fence construction. Verify with photos development of the vegetative community. Photopoint two areas that were less than fully vegetated to measure improvement	Annually in June*	Photo point two representative locations with GPS location and bearing and submit memorandum report with photos. Results reported annually.	BLC
Block 4	Establish wider riparian area and revegetate bare soils therein.	Allow development of well-vegetated riparian area and eliminate bare soil exposure and unstable banks near the stream and within the riparian area.	Annually in June*	Verify the increased width of riparian area and development of riparian vegetation. Photo point two representative riparian areas treated to provide greater width with GPS location and bearing. Submit memorandum report with photos. Results reported annually.	BLC

Ownership Block	Management Action And/or Objective	Monitoring Objective	Measurement Frequency	Monitoring Measures and Reporting Procedure	Reporting Party
Johnson Hollow	Maintain grassed waterways in dryland farmed areas adjacent to ephemeral draws	Verify that the waterways effectively prevent channel erosion. Document any unfavorable change	Annually in June	Memorandum report with GPS-located photo of two representative waterways. Results reported annually.	BLC
Payne Hollow	Maintain existing fences and riparian vegetation	Maintain existing riparian areas and functions. These areas were heavily burned. Photopoints will document recovery	Annually in June*	Photo point two representative locations with GPS location and bearing and submit memorandum report with photo. Results reported annually.	BLC
Robinson Fork					
	Develop and implement an approved road maintenance and abandonment plan for the watershed with emphasis on mitigating effects from the Bottom Road	This work has been completed	Annually in June to document changed conditions as a result of road modifications and CREP enrollment*	Memorandum report with plans and progress reports attached. Results reported annually.	BLC
	Comply with all Forest Practices Rules	Submit all forest practices inspection and enforcement reports.	Annually or as required	Submit BLC and WDNR reports to the federal agencies.	BLC

Ownership Block	Management Action And/or Objective	Monitoring Objective	Measurement Frequency	Monitoring Measures and Reporting Procedure	Reporting Party
	Relocate, abandon, maintain, and improve forest roads in full compliance with the 2001 WDNR Road Maintenance and Abandonment Plan to reduce sediment delivery and improve riparian conditions and functions.	Verify implementation of the Plan	Annually until Plan is fully implemented	Submit BLC and WDNR reports to the federal agencies within the annual monitoring report.	BLC
	Maintain full riparian function by complying with the Forest Practices Rules	Verify compliance including any harvest of trees within riparian management areas adjacent to the Robinson Fork.	Continuously if and when harvest occurs within riparian areas	Submit BLC and WDNR reports annually to the federal agencies that include mapped location and basal area of any trees removed from regulated riparian areas adjacent to the Robinson Fork.	BLC
	Eliminate grazing with fences per CREP contract.	Verify that riparian areas remain intact and richly vegetated.	Annually in June to document changes to riparian areas	Forward NRCS reports that verify compliance with CREP program land use requirements.	

*Indicates practices where annual photos will be the primary monitoring tool

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3.0 Status of the Bull Trout Rangewide

Bull Trout

Listing Status

The coterminous United States population of the bull trout (*Salvelinus confluentus*) was listed as threatened on November 1, 1999 (USDI, 1999a). The threatened bull trout occurs in the Klamath River Basin of south-central Oregon and in the Jarbidge River in Nevada, north to various coastal rivers of Washington to the Puget Sound and east throughout major rivers within the Columbia River Basin to the St. Mary-Belly River, east of the Continental Divide in northwestern Montana (Cavender 1978, Bond 1992, Brewin and Brewin 1997, Leary and Allendorf 1997).

Throughout its range, the bull trout is threatened by the combined effects of habitat degradation, fragmentation and alterations associated with: dewatering, road construction and maintenance, mining, and grazing; the blockage of migratory corridors by dams or other diversion structures; poor water quality; incidental angler harvest; entrainment (a process by which aquatic organisms are pulled through a diversion or other device) into diversion channels; and introduced non-native species (USDI 1999a).

The bull trout was initially listed as three separate Distinct Population Segments (DPS) (USDI 1998a, USDI 1999c). The preamble to the final listing rule for the United States coterminous population of the bull trout discusses the consolidation of these DPSs, plus two other population segments, into one listed taxon and the application of the jeopardy standard under section 7 of the ESA relative to this species (USDI 1999a, p. 58930):

> Although this rule consolidates the five bull trout DPSs into one listed taxon, based on conformance with the DPS policy for purposes of consultation under section 7 of the Act, we intend to retain recognition of each DPS in light of available scientific information relating to their uniqueness and significance. Under this approach, these DPSs will be treated as interim recovery units with respect to application of the jeopardy standard until an approved recovery plan is developed. Formal establishment of bull trout recovery units will occur during the recovery planning process.

Current Status and Conservation Needs

A summary of the current status and conservation needs of the bull trout within these units is provided below. A comprehensive discussion of these topics is found in the Service's draft recovery plan for the bull trout (Service 2002a, b, c; 2004).

The conservation needs of the bull trout are often generally expressed as the need to provide the four Cs: cold, clean, complex, and connected habitat. Cold stream temperatures, clean water quality that is relatively free of sediment and contaminants, complex channel characteristics (including abundant large wood and undercut banks), and large patches of such habitat that are well connected by unobstructed migratory pathways are all needed to promote conservation of bull trout at multiple scales ranging from the coterminus to local populations. The recovery planning process for the bull trout (Service 2002a, b, c; 2004) has also identified the following conservation needs for the bull trout: 1) maintain and restore multiple, interconnected populations in diverse habitats across the range of each interim recovery unit; 2) preserve the diversity of life-history strategies; 3) maintain genetic and phenotypic diversity across the range of each interim recovery unit; and 4) establish a positive population trend. Recently, it has also been recognized that bull trout populations need to be protected from catastrophic fires across the range of each interim recovery unit.

Central to the survival and recovery of the bull trout is the maintenance of viable core areas (Service 2002a, b, c; 2004b). A core area is defined as a geographic area occupied by one or more local bull trout populations that overlap in their use of rearing, foraging, migratory, and overwintering habitat, and in some cases in their use of spawning habitat (throughout this document when the terminology "foraging, migratory, and overwintering habitat" is referenced, it should be noted that a rearing habitat component is part of this terminology, but may not always be written out). Each of the interim recovery units listed above consists of one or more core areas. About 114 core areas are recognized across the United States range of the bull trout (Service 2002a, b, c; 2004).

As noted above, in recognition of available scientific information relating to their uniqueness and significance, five segments of the coterminous United States population of the bull trout are considered essential to the survival and recovery of this species and are identified as interim recovery units: 1) Jarbidge River; 2) Klamath River; 3) Columbia River; 4) Coastal-Puget Sound; and 5) St. Mary-Belly River. Each of these segments is necessary to maintain the bull trout's distribution, as well as its genetic and phenotypic diversity, all of which are important to ensure the species' resilience to changing environmental conditions.

<u>Jarbidge River</u>

This interim recovery unit currently contains a single core area with six local populations. Less than 500 resident and migratory adult bull trout, representing about 50 to 125 spawners, are estimated to occur within the core area. The current condition of the bull trout in this interim recovery unit is attributed to the effects of livestock grazing, roads, angler harvest, timber

harvest, and the introduction of non-native fishes (Service 2004a). The draft bull trout recovery plan (Service 2004a) identifies the following conservation needs for this unit: maintain the current distribution of the bull trout within the core area; maintain stable or increasing trends in abundance of both resident and migratory bull trout in the core area; restore and maintain suitable habitat conditions for all life history stages and forms; and conserve genetic diversity and increase natural opportunities for genetic exchange between resident and migratory forms of the bull trout. The draft recovery plan estimates 270 to 1,000 spawning fish per year are needed to provide for the persistence and viability of the core area and to support both resident and migratory adult bull trout (Service 2004a).

Klamath River

This interim recovery unit currently contains 3 core areas and 12 local populations. The current abundance, distribution, and range of the bull trout in the Klamath River Basin are greatly reduced from historical levels due to habitat loss and degradation caused by reduced water quality, timber harvest, livestock grazing, water diversions, roads, and the introduction of non-native fishes (Service 2002a). Bull trout populations in this unit face a high risk of extirpation. The draft bull trout recovery plan identifies the following conservation needs for this unit: maintain the current distribution of the bull trout and restore distribution in previously occupied areas; maintain stable or increasing trends in bull trout abundance; restore and maintain suitable habitat conditions for all life history stages and strategies; conserve genetic diversity and provide the opportunity for genetic exchange among appropriate core area populations. The draft recovery plan notes 8 to 15 new local populations and an increase in population size from about 3,250 adults currently to 8,250 adults are needed to provide for the persistence and viability of the 3 core areas (Service 2002a).

Columbia River

This interim recovery unit currently contains about 90 core areas and 500 local populations. About 62% of these core areas and local populations occur in central Idaho and northwestern Montana. The condition of the bull trout within these core areas varies from poor to good but generally all have been subject to the combined effects of habitat degradation, fragmentation and alterations associated with one or more of the following activities: dewatering; road construction and maintenance; mining; grazing; the blockage of migratory corridors by dams or other diversion structures; poor water quality; incidental angler harvest; entrainment into diversion channels; and introduced non-native species. The draft bull trout recovery plan (Service 2002a) identifies the following conservation needs for this unit: maintain or expand the current distribution of the bull trout within core areas; maintain stable or increasing trends in bull trout abundance; maintain/restore suitable habitat conditions for all bull trout life history stages and strategies; and conserve genetic diversity and provide opportunities for genetic exchange.

Coastal-Puget Sound

Bull trout in the Coastal-Puget Sound interim recovery unit exhibit anadromous, adfluvial, fluvial, and resident life history patterns. The anadromous life history form is unique to this unit.

This interim recovery unit currently contains 14 core areas and 67 local populations (Service 2002a). Bull trout are distributed throughout most of the large rivers and associated tributary systems within this unit. With limited exceptions, bull trout continue to be present in nearly all major watersheds where they likely occurred historically within this unit. Generally, bull trout distribution has contracted and abundance has declined especially in the southeastern part of the unit. The current condition of the bull trout in this interim recovery unit is attributed to the adverse effects of dams, forest management practices (e.g., timber harvest and associated road building activities), agricultural practices (e.g., diking, water control structures, draining of wetlands, channelization, and the removal of riparian vegetation), livestock grazing, roads, mining, urbanization, angler harvest, and the introduction of non-native species. The draft bull trout recovery plan (Service 2002a) identifies the following conservation needs for this unit: maintain or expand the current distribution of bull trout within existing core areas; increase bull trout abundance to about 16,500 adults across all core areas; and maintain or increase connectivity between local populations within each core area.

St. Mary-Belly River

This interim recovery unit currently contains 6 core areas and 9 local populations (Service 2002a). Currently, the bull trout is widely distributed in the St. Mary River drainage and occurs in nearly all of the waters that it inhabited historically. Bull trout are found only in a 1.2-mile reach of the North Fork Belly River within the United States. Redd count surveys of the North Fork Belly River documented an increase from 27 redds in 1995 to 119 redds in 1999. This increase was attributed primarily to protection from angler harvest (Service 2002). The current condition of the bull trout in this interim recovery unit is primarily attributed to the effects of dams, water diversions, roads, mining, and the introduction of non-native fishes (Service 2002a). The draft bull trout recovery plan (Service 2002a) identifies the following conservation needs for this unit: maintain the current distribution of the bull trout and restore distribution in previously occupied areas; maintain stable or increasing trends in bull trout abundance; restore and maintain suitable habitat conditions for all life history stages and forms; conserve genetic diversity and provide the opportunity for genetic exchange; and establish good working relations with Canadian interests because local bull trout populations in this unit are comprised mostly of migratory fish, whose habitat is mostly in Canada.

Bull Trout Life History

Bull trout exhibit both resident and migratory life history strategies. Both resident and migratory forms may be found together, and either form may produce offspring exhibiting either resident or migratory behavior (Rieman and McIntyre 1993). Resident bull trout complete their entire life cycle in the tributary (or nearby) streams in which they spawn and rear. The resident form tends to be smaller than the migratory form at maturity and also produces fewer eggs (Fraley and Shepard 1989, Goetz 1989). Migratory bull trout spawn in tributary streams where juvenile fish rear 1 to 4 years before migrating to either a lake (adfluvial form), river (fluvial form) (Fraley and Shepard 1989, Goetz 1989), or saltwater (anadromous) to rear as subadults or to live as adults (Cavender 1978, McPhail and Baxter 1996, WDFW et al. 1997). Bull trout normally reach sexual maturity in 4 to 7 years and may live longer than 12 years. They are iteroparous (they

spawn more than once in a lifetime), and both repeat- and alternate-year spawning has been reported, although repeat-spawning frequency and post-spawning mortality are not well documented (Leathe and Graham 1982, Fraley and Shepard 1989, Pratt 1992, Rieman and McIntyre 1996).

The iteroparous reproductive system of bull trout has important repercussions for the management of this species. Bull trout require 2-way passage up and downstream, not only for repeat spawning but also for foraging. Most fish ladders, however, were designed specifically for anadromous semelparous (fishes that spawn once and then die, and therefore require only one-way passage upstream) salmonids. Therefore even dams or other barriers with fish passage facilities may be a factor in isolating bull trout populations if they do not provide a downstream passage route.

Growth varies depending upon life-history strategy. Resident adults range from 6- to 12-inches total length, and migratory adults commonly reach 24-inches or more (Pratt 1985, Goetz 1989). The largest verified bull trout is a 32-pound specimen caught in Lake Pend Oreille, Idaho, in 1949 (Simpson and Wallace 1982).

Habitat Characteristics

Bull trout have more specific habitat requirements than most other salmonids (Rieman and McIntyre 1993). Habitat components that influence bull trout distribution and abundance include water temperature, cover, channel form and stability, valley form, spawning and rearing substrate, and migratory corridors (Fraley and Shepard 1989; Goetz 1989; Hoelscher and Bjornn 1989; Sedell and Everest 1991; Howell and Buchanan 1992; Pratt 1992; Rieman and McIntyre 1993, 1995; Rich 1996; Watson and Hillman 1997). Watson and Hillman (1997) concluded that watersheds must have specific physical characteristics to provide the habitat requirements necessary for bull trout to successfully spawn and rear and that these specific characteristics are not necessarily present throughout these watersheds. Because bull trout exhibit a patchy distribution, even in pristine habitats (Rieman and McIntyre 1993), fish should not be expected to simultaneously occupy all available habitats (Rieman et. al.1997a).

Migratory corridors link seasonal habitats for all bull trout life histories. The ability to migrate is important to the persistence of bull trout (Rieman and McIntyre 1993; Gilpin, in litt. 1997; Rieman et al. 1997a, b). Migrations facilitate gene flow among local populations when individuals from different local populations interbreed, or stray, to nonnatal streams. Local populations that are extirpated by catastrophic events may also become reestablished by bull trout migrants. However, it is important to note that the genetic structuring of bull trout indicates that there is limited gene flow among bull trout populations, which may encourage local adaptation within individual populations, and that reestablishment of extirpated populations may take a very long time (Spruell et al. 1999, Rieman and McIntyre 1993).

Cold water temperatures play an important role in determining bull trout habitat, as these fish are primarily found in colder streams (below 59 degrees Fahrenheit), and spawning habitats are

generally characterized by temperatures that drop below 48 degrees Fahrenheit in the fall (Fraley and Shepard 1989, Pratt 1992, Rieman and McIntyre 1993).

Thermal requirements for bull trout appear to differ at different life stages. Spawning areas are often associated with cold-water springs, groundwater infiltration, and the coldest streams in a given watershed (Pratt 1992, Rieman and McIntyre 1993, Baxter et al. 1999, Rieman et al. 1997). Optimum incubation temperatures for bull trout eggs range from 35 to 39 degrees Fahrenheit whereas optimum water temperatures for rearing range from about 46 to 50 degrees Fahrenheit (McPhail and Murray 1979, Goetz 1989, Buchanan and Gregory 1997). In Granite Creek, Idaho, Bonneau and Scarnecchia (1996) observed that juvenile bull trout selected the coldest water available in a plunge pool, 46 to 48 degrees Fahrenheit, within a temperature gradient of 46 to 60 degrees Fahrenheit. In a landscape study relating bull trout distribution to maximum water temperatures, Dunham et al. (2003) found that the probability of juvenile bull trout occurrence does not become high (i.e., greater than 0.75) until maximum temperatures decline to 52 to 54 degrees Fahrenheit.

Although bull trout are found primarily in cold streams, occasionally these fish are found in larger, warmer river systems throughout the Columbia River basin (Fraley and Shepard 1989; Rieman and McIntyre 1993, 1995; Buchanan and Gregory 1997; Rieman et al. 1997a). Factors that can influence bull trout ability to survive in warmer rivers include availability and proximity of cold water patches and food productivity (Myrick et al. 2002). In Nevada, adult bull trout have been collected at 63 degrees Fahrenheit in the West Fork of the Jarbidge River (S. Werdon, Service, pers. comm. 1998). In the Little Lost River, Idaho, bull trout have been collected in water having temperatures up to 68 degrees Fahrenheit; however, bull trout made up less than 50% of all salmonids when maximum summer water temperature exceeded 59 degrees Fahrenheit and less than 10% of all salmonids when temperature exceeded 63 degrees Fahrenheit (Gamett 1999). In the Little Lost River study, most sites that had high densities of bull trout were in an area where primary productivity increased in the streams following a fire (Gamett, U.S. Forest Service, pers. comm., 2002).

All life history stages of bull trout are associated with complex forms of cover, including large woody debris, undercut banks, boulders, and pools (Fraley and Shepard 1989, Goetz 1989, Hoelscher and Bjornn 1989, Sedell and Everest 1991, Pratt 1992, Thomas 1992, Rich 1996, Sexauer and James 1997, Watson and Hillman 1997). Maintaining bull trout habitat requires stability of stream channels and maintenance of natural flow patterns (Rieman and McIntyre 1993). Juvenile and adult bull trout frequently inhabit side channels, stream margins, and pools with suitable cover (Sexauer and James 1997). These areas are sensitive to activities that directly or indirectly affect stream channel stability and alter natural flow patterns. For example, altered stream flow in the fall may disrupt bull trout during the spawning period, and channel instability may decrease survival of eggs and young juveniles in the gravel from winter through spring (Fraley and Shepard 1989, Pratt 1992, Pratt and Huston 1993). Pratt (1992) indicated that increases in fine sediment reduce egg survival and emergence.

Bull trout typically spawn from August to November during periods of decreasing water temperatures. Preferred spawning habitat consists of low-gradient stream reaches with loose,

clean gravel (Fraley and Shepard 1989). Redds are often constructed in stream reaches fed by springs or near other sources of cold groundwater (Goetz 1989, Pratt 1992, Rieman and McIntyre 1996). Depending on water temperature, incubation is normally 100 to 145 days (Pratt 1992), and after hatching, juveniles remain in the substrate. Time from egg deposition to emergence of fry may surpass 200 days. Fry normally emerge from early April through May, depending on water temperatures and increasing stream flows (Pratt 1992, Ratliff and Howell 1992).

Migratory forms of the bull trout appear to develop when habitat conditions allow movement between spawning and rearing streams and larger rivers or lakes where foraging opportunities may be enhanced (Frissell 1993). For example, multiple life history forms (e.g., resident and fluvial) and multiple migration patterns have been noted in the Grande Ronde River (Baxter 2002). Parts of this river system have retained habitat conditions that allow free movement between spawning and rearing areas and the mainstem Snake River. Such multiple life history strategies help to maintain the stability and persistence of bull trout populations during environmental changes. Benefits to a migratory form of bull trout include greater growth in the more productive waters of larger streams and lakes, greater fecundity resulting in increased reproductive potential, and dispersing the population across space and time so that spawning streams may be recolonized should local populations suffer a catastrophic loss (Rieman and McIntyre 1993, MBTSG 1998, Frissell 1999). In the absence of the migratory bull trout life form, isolated populations cannot be replenished when disturbance makes local habitats temporarily unsuitable, the range of the species is diminished, and the potential for enhanced reproductive capabilities are lost (Rieman and McIntyre 1993).

Diet

Bull trout migration and life history strategies are closely related to their feeding and foraging strategies.Bull trout are opportunistic feeders, with food habits primarily a function of size and life-history strategy. Resident and juvenile migratory bull trout prey on terrestrial and aquatic insects, macrozooplankton, and small fish (Boag 1987, Goetz 1989, Donald and Alger 1993). Adult migratory bull trout feed on various fish species (Leathe and Graham 1982, Fraley and Shepard 1989, Brown 1994, Donald and Alger 1993). In coastal areas of western Washington, bull trout feed on Pacific herring (*Clupea pallasi*), Pacific sand lance (*Ammodytes hexapterus*), and surf smelt (*Hypomesus pretiosus*) in the ocean (WDFW et al. 1997).

A single optimal foraging strategy is not necessarily a consistent feature in the life of a fish, but this foraging strategy can change from one life stage to another. Resident and juvenile migratory bull trout prey on terrestrial and aquatic insects, macrozooplankton, mysids and small fish (Shepard et al. 1984; Boag 1987; Goetz 1989; Donald and Alger 1993). Bull trout that are 4.3-inches long or longer commonly have fish in their diet (Shepard et al. 1984), and bull trout of all sizes have been found to eat fish half their length (Beauchamp and Van Tassell 2001).

Migratory bull trout begin growing rapidly once they move to waters with abundant forage that includes fish (Shepard et al. 1984; Carl 1985). As these fish mature they become larger bodied predators and are able to travel greater distances (with greater energy expended) in search of prey species of larger size and in greater abundance (with greater energy acquired). In Lake

Billy Chinook in Oregon, as bull trout became increasingly piscivorous with increasing size, the prey species changed from mainly smaller bull trout and rainbow trout for bull trout less than 17.7 inches in length to mainly kokanee for larger sized bull trout (Beauchamp and Van Tassell 2001).

Migration allows bull trout to access optimal foraging areas and exploit a wider variety of prey resources. Bull trout likely move to or with a food source. For example, some bull trout in the Wenatchee basin were found to consume large numbers of earthworms during spring runoff in May at the mouth of the Little Wenatchee River where it enters Lake Wenatchee (Kelly Ringel and Delavergne 2006). In the Wenatchee River, radio-tagged bull trout moved downstream after spawning to the locations of spawning chinook and sockeye salmon and held for a few days to a few weeks, possibly to prey on dislodged eggs, before establishing an overwintering area downstream or in Lake Wenatchee (Kelly Ringel and Delavergne 2006).

3.1 Consulted-On Effects

Projects subject to Section 7 consultation under the Act have occurred throughout the range of bull trout. Singly or in aggregate, these projects could affect the species' status. In order to assess the effects of previous actions/projects on bull trout, we incorporate by reference the Service's Biological Opinion for the Rock Creek Mine in Montana prepared by our Region 6 office (USFWS 2006). In the Status of the Species section of that BO, the Service reviewed 137 BOs produced by the Service from the time of listing in June 1998 until August 2003. The Service analyzed 24 different activity types (e.g., grazing, road maintenance, habitat restoration, timber sales, hydropower, etc.). Twenty BOs involved multiple projects, including restorative actions for bull trout.

The geographic scale of projects analyzed in these BOs varied from individual actions (e.g., construction of a bridge or pipeline) within one basin, to multiple-project actions, occurring across several basins. Some large-scale projects affected more than one DPS. In summary, 124 BOs (91%) applied to activities affecting bull trout in the Columbia River population, 12 BOs (9%) applied to activities affecting bull trout in the Coastal-Puget Sound population, 7 BOs (5%) applied to activities affecting bull trout in the Klamath River population, and 1 BO (less than 1%) applied to activities affecting the Jarbidge and St. Mary Belly populations.

Our aggregate analysis of BOs was also stepped-down from the DPS to the core-area scale (USFWS 2006). For example, the Rock Creek Mine Biological Opinion included an evaluation of the Clark Fork River basin from the time of listing until August 2003. Of 37 actions that occurred in this river basin during this period, the majority (35) involved habitat disturbance with unquantifiable effects, 16 actions were ongoing, and 21 actions had been completed and effects were no longer occurring. Similarly, the number of actions, type of actions, and a brief description of the action was provided for each river basin where bull trout may have been adversely affected (USFWS 2006).

For each action, the causes of adverse effects were identified as were the anticipated consequences for spawning streams and/or migratory corridors, if possible (in most cases, these

consequences were known). Actions whose effects were "unquantifiable" numbered 55 in migratory corridors and 55 in spawning streams. The Service also attempted to define the duration of anticipated effects (e.g., "short-term effects" varied from hours to several months). Projects likely to result in long-term benefits also were identified.

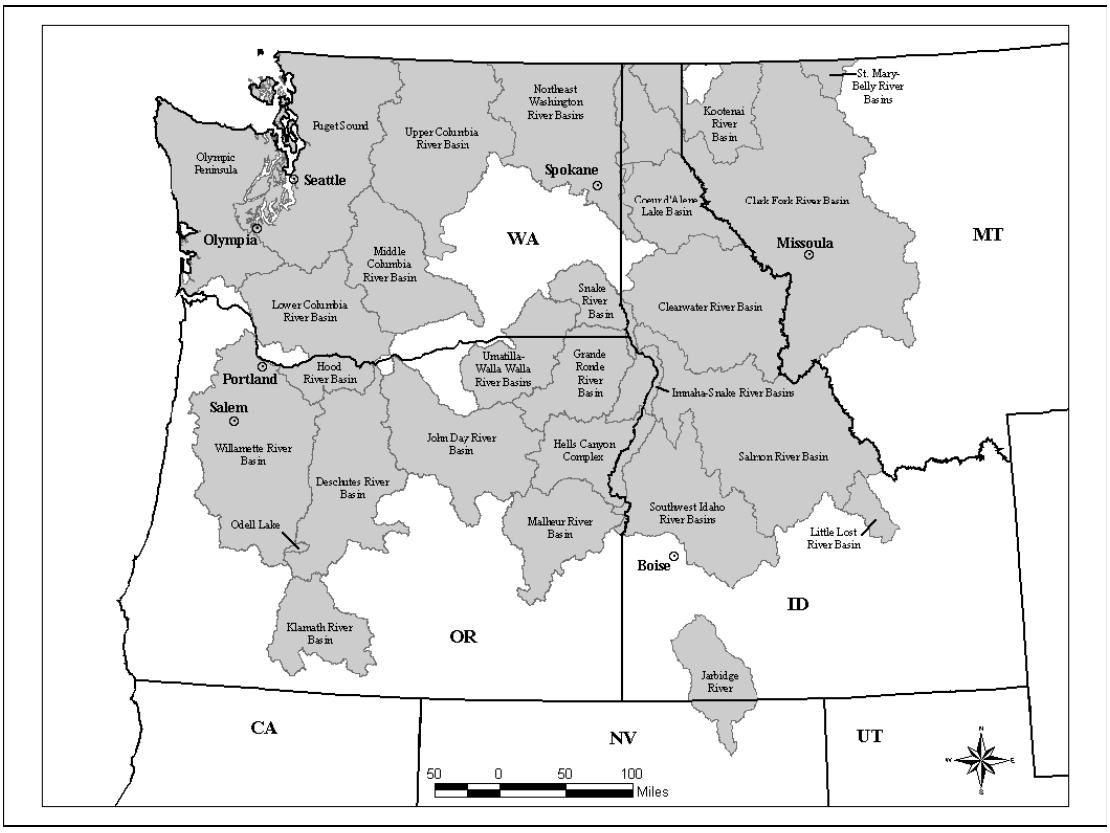
At the time of preparation of the Rock Creek Mine Biological Opinion, all other BOs within the range of bull trout reached a "no-jeopardy" determination. After reviewing previous BOs, the Service concluded that the continued long-term survival and existence of the bull trout had not been appreciably reduced range-wide (USFWS 2006). The Service's assessment of BOs from the time of listing until August 2003 (137 BOs), confirmed that no actions that had undergone Section 7 consultation during this period, considered either singly or cumulatively, would appreciably reduce the likelihood of survival and recovery of the bull trout or result in the loss of any (sub) populations (USFWS 2006).

Between August 2003 and July 2006, the Service issued 198 additional BOs that included analyses of effects on bull trout (Brewer, D., USFWS, 2006, pers. comm.). These BOs also reached "no-jeopardy" determinations, and the Service concluded that the continued long-term survival and existence of the species had not been appreciably reduced range-wide due to these actions (USFWS 2006). All BOs issued after July 2006 also reached "no-jeopardy" determinations.

4.0 Status of the Bull Trout in the Umatilla-Walla Walla Management Unit

The BLC HCP includes parcels in two different bull trout management units (referred to in the draft recovery plan chapters as recovery units): the Umatilla-Walla Walla, and the Snake River (see figure 2). In an effort to minimize confusion, we have grouped status discussions, and corresponding baseline and effects discussions for the bull trout by management units in the following chapters. We follow-up the bull trout discussions with chapters on designated critical habitat for the bull trout in each management unit, including status, baseline, and effects.

Figure 2 (from Service 2002a)

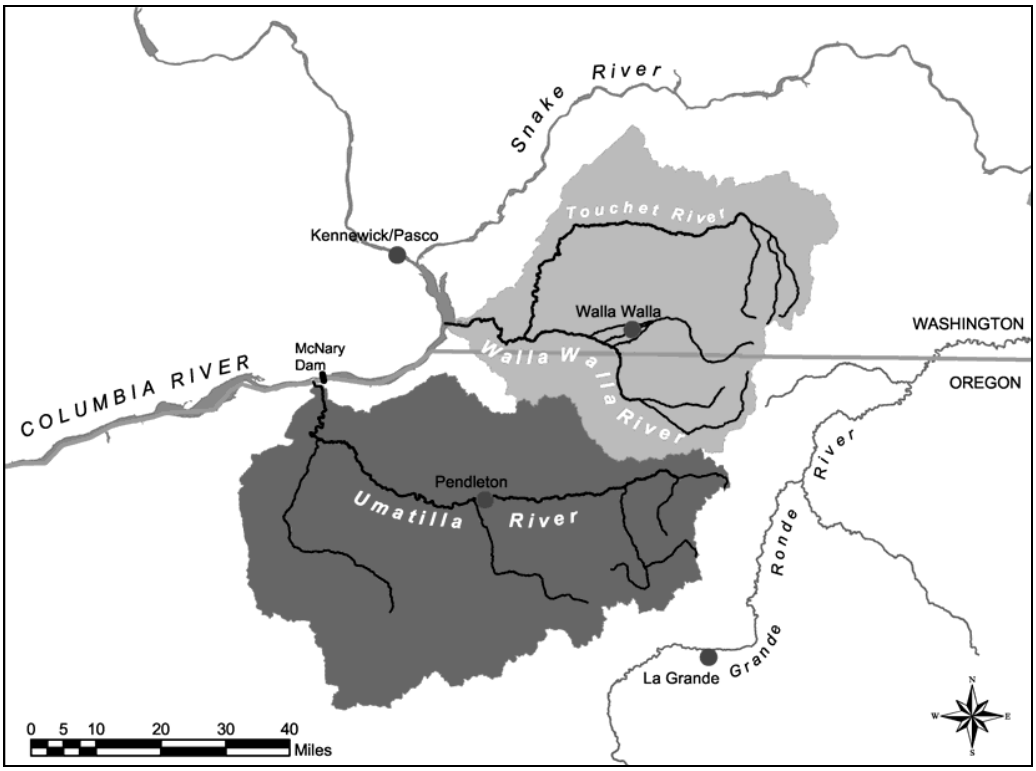


The following discussion is based on information presented in the draft bull trout recovery plan (Service 2002a, b; Service 2004b).

The Umatilla-Walla Walla River management unit includes the entire Umatilla and Walla Walla River basins upstream from their confluence with the Columbia River (see figure 3). It encompasses over 4,200 square miles of habitat in southeastern Washington and northeastern Oregon. The Umatilla River basin has one bull trout core area (Umatilla River core Area) and the Walla Walla River basin has two core areas (Walla Walla River and Touchet River core areas) (Service 2004b). Core areas contain bull trout populations with the demographic characteristics needed to ensure their persistence. A local population is a group of bull trout that spawn within a particular stream or portion of a stream system. A local population is considered to be the smallest group of fish that is known to represent an interacting reproductive unit. Connectivity is expected between local populations within a core area in the Umatilla- Walla Walla River management unit, but not between core areas (Service 2004b). A total of 7 local populations are distributed in the upper reaches of these core areas.

In the Umatilla River basin, bull trout are currently found primarily upstream of the City of Pendleton, Oregon. The Umatilla River core area supports two local populations: one in Meacham Creek and one in the North and South forks of the Umatilla River.

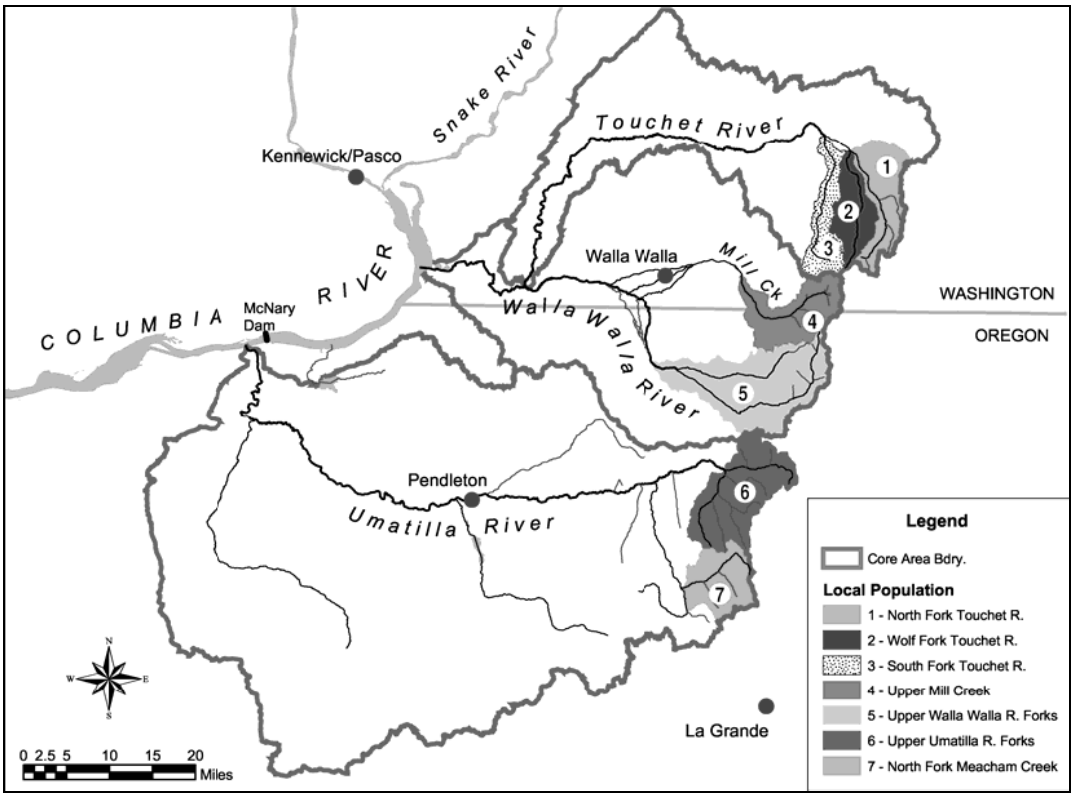
Figure 3 (from Service 2004b)



The Walla Walla River core area supports two local populations: one in upper Mill Creek and one spanning the North and South Forks of the Walla Walla River. In the Walla Walla River basin (see figure 4), bull trout have long been documented in the Walla Walla River upstream of the Oregon/Washington state line, and in Mill Creek upstream of the City of Walla Walla, Washington (Mendel et al. 2001). Recent research data shows migratory bull trout in the Walla Walla River moving downstream of the Oregon/Washington state line, and in Mill Creek moving within and below the City of Walla Walla (B. Tice, Corps, pers. comm., 2007; D. Gallion, Service, pers. comm., 2007) and a few bull trout have been documented at the mouth of the Walla Walla River and likely into the Columbia River (Anglin pers. comm. 2008).

The Touchet River core area supports three local populations (see figure 4): one in the North Fork Touchet River, one in the Wolf Fork Touchet River, and one in the South Fork Touchet River (Service 2004b, Mendel et al. 2003a). In each core area, bull trout exhibit both fluvial and resident life history patterns. In the middle portions of the Touchet River bull trout are regularly found in the Touchet River upstream of the town of Waitsburg, Washington (River Mile 43) (Mendel et al. 2001). Recent information shows bull trout moving downstream of Dayton (which is still upstream of Waitsburg) in the fall, winter, and spring (Mendel pers. comm., 2008), and although these bull trout were pit-tagged, it is too soon to tell how far downstream they move.

Figure 4 (from Service 2004b)



Land and water management activities that depress bull trout populations and degrade habitat in the Walla Walla Umatilla Management Unit include the operation and maintenance of dams and other diversion structures which modify streamflows and restrict fish passage, forest management, livestock grazing, agriculture, urbanization, and flood control management. Historic, and to a lesser extent current, timber harvest activities, riparian road and railroad construction and use and associated toxic spills, livestock water developments, and fish stocking programs have also been implicated in the decline of the bull trout. Impassable dams and diversion structures isolate and fragment bull trout local populations. Forestry and most other land use activities can impact bull trout through decreased recruitment of large woody debris, increased water temperatures from reduced shading, increased sedimentation, the lack of pools, and habitat connectivity.

Migratory bull trout life history forms appear to develop when habitat conditions allow movement between spawning and rearing streams and larger rivers or lakes where foraging opportunities may be enhanced (Frissell 1993). Historically, the mainstem Walla Walla River and Columbia River were likely used as migration corridors, foraging areas, and overwintering habitat by fluvial bull trout that originated in tributary streams throughout the basins. Presently, portions of the mainstem Walla Walla River are used by bull trout, and recent information documents bull trout moving past the mouth into the Columbia River (D. Anglin, Service, pers. comm., January 28, 2008).

Although currently fragmented by the presence of dams, the mainstem Columbia and Walla Walla Rivers provide habitat that potentially helps to maintain interactions between populations of bull trout in the tributaries, and provides for foraging and overwintering opportunities. Migratory corridors such as these allow individuals access to unoccupied but suitable habitats, foraging areas, and refuges from disturbances (Saunders et al. 1991). In the absence of the migratory bull trout life form, isolated populations cannot be replenished when disturbance makes local habitats temporarily unsuitable, the range of the species is diminished, and the potential for enhanced reproductive capabilities are lost (Rieman and McIntyre 1993).

Recovery criteria have been established for each management unit to assess whether recovery actions result in the recovery of bull trout in the unit. The criteria include quantitative measures of bull trout distribution and population characteristics in each core area within the recovery unit.

Recovery criteria for the Umatilla-Walla Walla Management unit are as follows:
1. Bull trout are distributed among seven or more local populations, including the following:
    Umatilla River Core Area
        North Fork Meacham Creek local population
        Upper Umatilla River local population
    Walla Walla River Core Area
        Upper Mill Creek local population
        Upper Walla Walla River local population
    Touchet River Core Area
        South Fork Touchet River local population
        Wolf Fork Touchet River local population
        North Fork Touchet River local population

2. Achieve and maintain bull trout numbers within the following annual abundance ranges in each core area:
    Umatilla River Core Area 500 to 1,000 spawning adults
    Walla Walla River Core Area 1,500 to 3,000 spawning adults
    Touchet River Core Area 500 to 1,000 spawning adults

3. Bull trout populations in each core area exhibit a stable or increasing trend in abundance for at least two generations (i.e., 10-14 years) at or above the abundance levels identified in criteria #2. The intent of this criterion is to increase bull trout populations in those core areas presently below their recovered abundance levels, and to maintain stable bull trout populations in core areas that have reached recovery levels. Achievement of this criteria will be based on a minimum of at least 10 years of monitoring data.

4. The fluvial component of each local population is maintained and specific barriers to bull trout movement are sufficiently addressed to: 1) allow fluvial fish to effectively move between spawning and wintering areas, and 2) ensure that fish movement can occur, at least seasonally, between local populations within each core area in the management unit. Establish the conditions necessary for up- and down-stream fish passage to ensure the persistence of fluvial

life stages and genetic interchange between local populations within each core area. In the Umatilla River Core Area, this means implementing actions to address thermal and low-flow barriers in the Umatilla River and Meacham Creek and passage barriers at Feed Canal and Three Mile Dam. In the Walla Walla Core Area this means providing suitable habitat conditions on the Walla Walla River from Nursery Bridge downstream to the Mill Creek confluence, ensuring the ladders and slots at Nursery Bridge and Burlingame Diversion Dam will successfully pass bull trout, and screening diversions that impact bull trout. On Mill Creek, there must be effective up- and down-stream passage at the Bennington Diversion Dam, and either Yellowhawk Creek or lower Mill Creek must be restored to provide a functional, two-way movement corridor between Mill Creek and the Walla Walla River. In the Touchet River Core Area, barriers to be addressed include improving passage at the Dayton Steelhead Acclimation Pond intake diversion, and screening diversions that impact bull trout.

General recovery measures that private landowners may contribute to include: maintain or improve water quality by reducing sediment inputs; appropriately screen irrigation pumps, increase instream flows, restore stream channel and riparian functions, and identify upland conditions negatively affecting bull trout habitats and implement tasks to restore appropriate functions. Specific recovery measures for the Touchet River watershed are described in table 9 under Effects of the Action on Bull Trout.

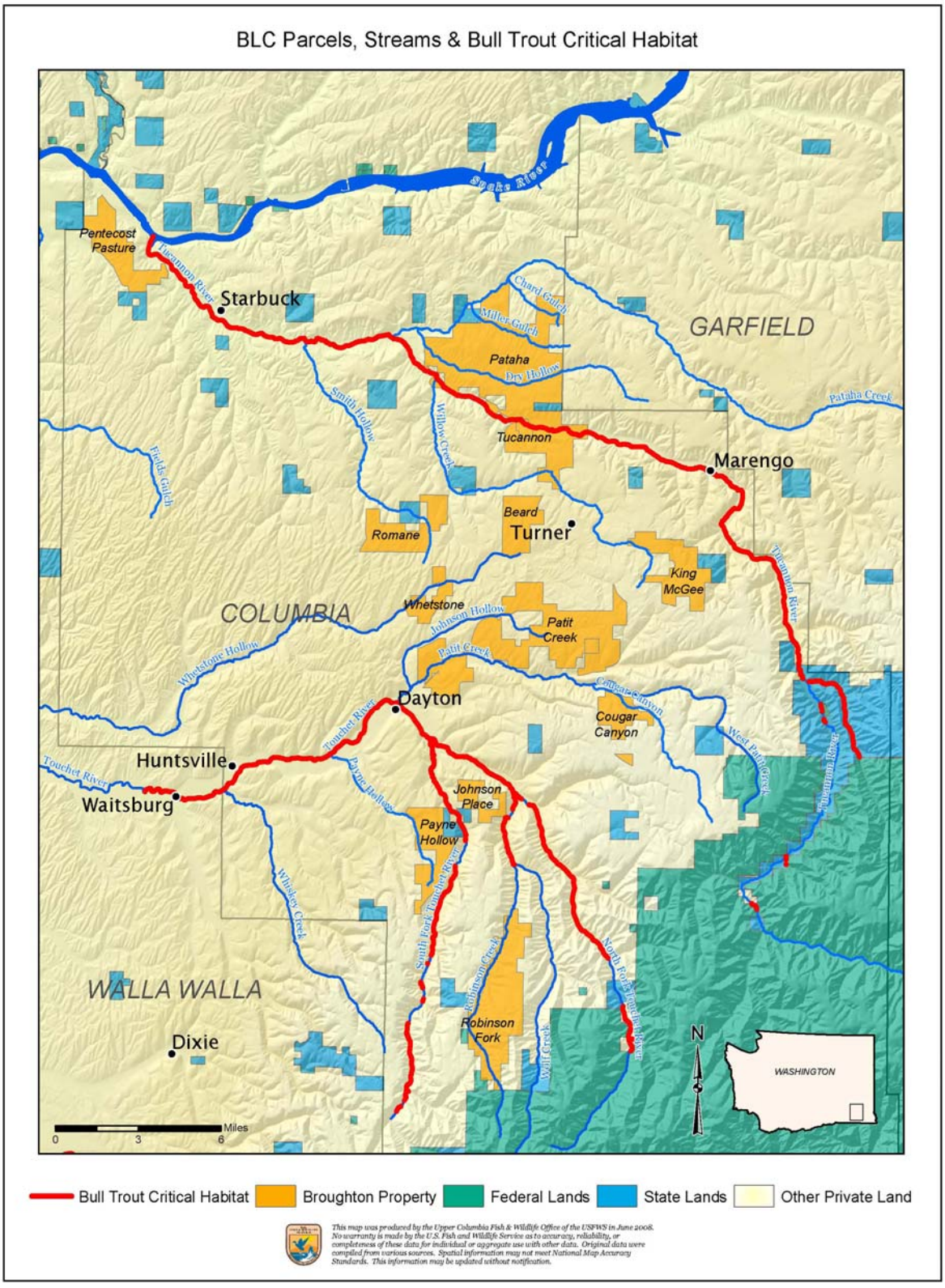
4.1 Environmental Baseline-General

Regulations implementing the ESA (50 CFR 402.02) define the environmental baseline as the past and ongoing impacts of all Federal, State, or private actions and other human activities leading to the current status of a species, its habitat, and ecosystem within the action area. Also included in the environmental baseline are the anticipated impacts of all proposed Federal projects in the action area that have undergone section 7 consultation, and the impacts of state and private actions which are contemporaneous with the consultation in progress. The environmental baseline further represents a snapshot in time of the current condition of habitat and local populations, and provides the context for the analysis of potential effects of the proposed action on the species.

The preceding definition of environmental baseline applies to the following bull trout discussions, and also to the later environmental baseline discussion for designated critical habitat for the bull trout.

Figure 5 displays BLC parcels with streams, rivers, and critical habitat.

Figure 5.


BLC Parcels, Streams & Bull Trout Critical Habitat
Snake River
Pentecost Pasture
Tucannon River
Starbuck
Chard Gulch
Miller Gulch
GARFIELD
Pataha
Dry Hollow
Pataha Creek
Smith Hollow
Willow Creek
Tucannon
Marengo
Fields Gulch
Beard
Romane
Turner
King McGee
Tucannon River
COLUMBIA
Whetstone
Johnson Hollow
Patit Creek
Whetstone Hollow
Patit Creek
Dayton
Cougar Canyon
Touchet River
Huntsville
Touchet River
Waitsburg
Payne Hollow
Johnson Place
Payne Hollow
Whiskey Creek
South Fork Tumalum River
Robinson Creek
North Fork Touchet River
WALLA WALLA
Dixie
Robinson Fork
Wolf Creek
N
WASHINGTON
Miles
0
3
6
Bull Trout Critical Habitat
Broughton Property
Federal Lands
State Lands
Other Private Land
This map was produced by the Upper Columbia Fish & Wildlife Office of the USFWS in June 2008. No warranty is made by the U.S. Fish and Wildlife Service as to accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. Spatial information may not meet National Map Accuracy Standards. This information may be updated without notification.

4.2 Enviromental Baseline Bull Trout-Touchet River Watershed

The Touchet River originates in a network of deeply incised streams on the northwestern slopes of the Blue Mountains and from seasonal streams draining the Palouse hillsides to the north. Fish habitat in the basin has been degraded by urban and agricultural development, grazing, tilling, logging, recreational activities and flood control. Table 8 displays a list of BLC parcels, bull trout use, and critical habitat in the Touchet River watershed.

Table 8. Touchet River Watershed Parcels, Conditions, and Bull Trout use.

BLC parcel name Size	Current Activity	Stream type/ name	Down-stream major watershed	Riparian Conditions	Bull trout use of areas	Relevant draft Bull Trout Recovery Chapter	Bull trout critical habitat designated?
Whetstone Block 916 acres	Dry farming	Seasonally intermittent portion of Whetstone Creek	Tributary to Touchet River.	Grassed waterways	None on parcels	Umatilla-Walla Walla	Not on parcels. Touchet River designated above mouth of Touchet.
Patit Creek Block 1 7,032 acres (all blocks)	Irrigated pasture	On Patit Creek and uplands	Tributary to Touchet River	Stable inner floodplain bounded by sometimes vertical and unstable banks. Riparian shrubs developing in areas.	None on parcels, likely migratory BT in Touchet River	Umatilla-Walla Walla	Not on parcels. Touchet River is designated above and below mouth of Patit Creek.
Patit Creek Block 2	Irrigated pasture	On Patit Creek and uplands	Tributary to Touchet River	Stable, well developed.	None on parcels, likely migratory BT in Touchet River	Umatilla-Walla Walla	Not on parcels. Touchet River is designated above and below mouth of Patit Creek.
Patit Creek Block 3	Irrigated pasture	On Patit Creek and uplands	Tributary to Touchet River	Variable conditions.	None on parcels, likely migratory	Umatilla-Walla Walla	Not on parcels. Touchet River is designated above and

BLC parcel name **Size**	**Current Activity**	**Stream type/ name**	**Down-stream major watershed**	**Riparian Conditions**	**Bull trout use of areas**	**Relevant draft Bull Trout Recovery Chapter**	**Bull trout critical habitat designated?**
					BT in Touchet River		below mouth of Patit Creek.
Patit Creek Block 4	Dry farming	On Patit Creek and uplands	Tributary to Touchet River	Shrubs, grass, and small trees	None on parcels, likely migratory BT in Touchet River	Umatilla-Walla Walla	Not on parcels. Touchet River is designated above and below mouth of Patit Creek.
Cougar Canyon 1250 acres	Dry farming/ conserv-ation areas	On and tributary to intermittent Cougar Canyon	Tributary to South Fork of Patit Creek	Stable with brush and small trees	None on parcels	Umatilla-Walla Walla	Not on parcels, or on Patit Creek. Touchet River is designated above and below mouth of Patit Creek.
Johnson Place 917 acres	Dry farming/ grazing	Ephemeral draws,	Tributary to the South Fork Touchet and the North Fork Touchet River	Grassed waterways	None on parcels	Umatilla-Walla Walla	Not on parcel. South Fork Touchet and North Fork Touchet River are designated.
Payne Hollow 2,400 acres	Dry farming/ grazing	Ephemeral and intermittent tributaries of Payne Hollow	Tributary to Touchet River	Grassed waterways	None on parcels	Umatilla-Walla Walla	Not on parcel. Touchet River is designated above and below mouth.

BLC parcel name **Size**	**Current Activity**	**Stream type/ name**	**Down-stream major watershed**	**Riparian Conditions**	**Bull trout use of areas**	**Relevant draft Bull Trout Recovery Chapter**	**Bull trout critical habitat designated?**
Robinson Fork 5,162 acres	Timber/ seasonal grazing	Robinson Fork	Tributary to Wolf Fork, then North Fork Touchet River	Loss of riparian vegetation in areas, road in stream bottom, scoured areas from 96 flood.	Migratory BT use possible, but rare on parcel. Spawning on Wolf Fork and North Fork Touchet upstream of Robinson Fork	Umatilla-Walla Walla	Not on Parcel. Wolf Fork and North Fork Touchet River designated below parcel.

A Framework to Assist in Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Bull Trout Subpopulation Watershed Scale (also referred to as the Bull Trout Matrix) (Service 1999) was used to organize the baseline discussions for the bull trout. The document provides a matrix of indicators and pathways for comparing bull trout habitat and population parameters. Key parameters in the matrix include: subpopulation characteristics (now referred to as core areas or local populations); water quality, habitat access, habitat elements, channel condition and dynamics, flow and hydrology, watershed conditions, and integration of species and habitat conditions.

The following discussions compare baseline conditions for the Bull Trout Matrix indicators and pathways for the Touchet River watershed, part of the Umatilla-Walla Walla River interim management unit.

4.2.1 Touchet River Subpopulation Characteristics:
(Subpopulation Size, Growth and Survival, Life History Diversity and Isolation, Persistence and Genetic Integrity)

The Touchet River Core Area supports three local populations: one in the North Fork Touchet River, one in the Wolf Fork Touchet River, and one in the South Fork Touchet River (Service 2004b). Bull trout also use the upper Touchet River above the town of Waitsburg, Washington (River Mile 43) (Service 2004b).

The Touchet River core area is isolated from the other Walla Walla River bull trout core area and local populations, and is vulnerable to catastrophic events due to the isolation and the limited known spawning distribution within the subbasin (Service 2002b). Because this core area does not have and is unlikely to achieve 10 local populations (3 currently exist), the core area is at

moderate risk of extinction from stochastic events. The loss of one local population in this core area may threaten its long-term viability and recovery. Current abundance and distribution of bull trout in the core area are considered lower than historic levels. Historic land uses affecting bull trout habitat in the Walla Walla River basin include forest management, livestock grazing, irrigated agriculture, urbanization and flood control management. Liberal harvest regulations and fish stocking programs have also been implicated in the decline of bull trout.

Historically, bull trout were thought to be widely distributed in the Touchet River watershed. However, tributary streams that enter the Touchet River downstream of the town of Waitsburg are not currently considered capable of supporting bull trout. Factors which have elevated the water temperatures, such as damaged riparian vegetation, increased sedimentation and decreased water flows, have also decreased the range of this cold water species (Mendel et al. 2003).

The entire Touchet River from its confluence with the Walla Walla River upstream to the South Fork Touchet River (River Mile 45) is potential forage, overwintering and adult migratory habitat. BLC activities and parcels are adjent to, or drain into forage, migration, and overwintering habitat. Most observations of bull trout in the mainstem Touchet River have been above River Mile 52 (just downsteam of the town of Dayton). The WDFW has captured and enumerated bull trout at the adult steelhead trap in Dayton each spring for the past several years while trapping steelhead. Adult bull trout have been captured in the fish trap at Dayton: 18 in 1999 and 28 in 2000 (USDI 2006). However, more recent data gathered in a new structure at Dayton show 75 bull trout moving downstream of Dayton between November 2007 and May 2008, with results beyond May not yet available (Mendel, WDFW, pers. comm. May 20, 2008). These bull trout have been pit-tagged, and may provide additional migration and distribution information. There have been few winter surveys in the Touchet River below Dayton, but fluvial bull trout are presumed to overwinter in the mainstem (Service 2002). The spatial and temporal distribution of bull trout in the Touchet River during winter and spring is currently unknown (Mendel et al. 2003).

WDFW has summarized the bull trout redd surveys in the Touchet River watershed (Mendel et al 2006; Mendel pers.comm. 2007). In 2006, WDFW counted 37 redds in the upper Wolf Fork; in 2007, with a more limited survey effort due to active logging in two survey sections, the WDFW counted 38 redds. Since WDFW standardized the survey methods for Wolf Fork in 1998, redd counts have ranged from 37 (2006) to 101 (2003), with a possible declining trend since 2005. The North Fork Touchet River surveys resulted in 15 redds in 2005, 9 redds in 2006, and 20 redds in 2007. Redd surveys in the North Fork have varied from a low of 11 (1995) to a high of 47 (2000). The WDFW remains concerned about redd count numbers since 2001, with 6 straight years of counts below 30, and 2006 had the lowest count since 1995. The third Touchet River tributary which WDFW surveyed in 2005 was the Burnt Fork, a tributary to the South Fork Touchet River, and found two redds. Since 2000, the redd counts in Burnt Fork ranged from zero (2003 and 2004) to 16 (2001). Surveys were not conducted in the Burnt Fork in 2006 or 2007 due to fire restrictions and limited staff.

The draft bull trout recovery plan (Service 2002) made an assumption that each bull trout redd represents 2.5 spawning adults (Fraley and Shepard 1989). Using the information referenced in

the paragraph above, the Service came up with the following rough abundance calculations in the draft recovery plan (Service 2004b). The redd count average (76) from 1998 to 2005 in the Wolf Fork River equates to a population estimate of 190 spawning adults. The redd count average (32) over 10 years (1996 to 2005) from the North Fork Touchet River equates to a population estimate of 80 spawning adults. The redd count average (4) from 2000-2005in the Burnt Fork (South Fork Touchet River) equates to a population estimate of 10 spawning adults. Thus, while there are three local populations in the Touchet River Watershed, the average redd counts may correlate to a total of 280 spawning adults. The trends in each of those local populations may be declining in recent years.

Several Broughton parcels are drained by Touchet River tributaries, including Patit Creek, Whiskey Creek, Payne Hollow Creek, and the Robinson Fork. Local residents have indicated that bull trout were once present in the Robinson Fork (WDNR 1998). However, during four surveys conducted in the watershed during the past 20 years, only one bull trout has been reported; this one observation occurred during a WDFW inventory of the Robinson Fork during their 2000 survey; none were detected in 1999 (Mendel et al 2000). During the 1997 WDNR watershed assessment, numerous bull trout were found in the Wolf Fork, a single bull trout was found in the South Fork, and none were found in the Robinson Fork (WDNR 1998). Michaelis (1972) also found bull trout in the Wolf Fork, but not in the Robinson Fork.

There is no record of bull trout occurrence in the Patit Creek watershed. High sustained water temperatures and extreme low flow conditions make it unlikely that bull trout could occupy Patit Creek under current conditions, and the draft recovery plan chapter does not expect bull trout to occur in Patit Creek (Service 2004b).

4.2.2 Touchet River Water Quality:
(Temperature, Sediment, Chem. Contam./Nutrients)

Water temperatures in the streams throughout Columbia County are elevated above naturally occurring levels because of channel conditions and loss of shade resulting from historic agricultural and grazing practices, riparian harvest, road construction, and other uses and development. The water quality conditions, including elevated temperatures, in streams on BLC's lands are similar to those in the rest of the county.

The federal Clean Water Act requires the Washington Department of Ecology (Ecology) to identify water bodies that fail to meet water quality standards, and describe those on a 303(d) List. Ecology then works with local interests to to prepare cleanup plans (also known as TMDLs) to reduce such pollution. In 1998, segments of the Touchet River were listed on the 303(d) list for fecal coliform. The change from rural to urban areas, especially near the city of Walla Walla, has contributed to elevated pH levels, excessive levels of fecal coliform bacteria, and high concentrations of pesticides and nutrients (James et al. 2001). Naturally low summer stream flows, magnified by withdrawals for irrigation and the degradation of riparian zones, have resulted in maximum water temperatures, often exceeding 75°F for extended periods (generally June through September) (Kuttel 2001). These temperatures are considered high for salmonids and are suspected to cause thermal barriers in the lower Touchet and the lower Walla Walla

River (Mendel et al. 1999). One likely thermal barrier was identified in the lower Walla Walla River from the Touchet River confluence and downstream. Portions of other tributaries are on on Ecology's 303(d) list for temperature: the North Fork (dissolved oxygen and temperature), the Wolf Fork (temperature on the mainstem), and Robinson Fork (temperature). Robinson Fork flows into the Wolf Fork, which then flows into the North Fork Touchet (Krupka USFWS, pers. comm. 2008; WWWPU and WWBWC, 2004a). These degraded water quality conditions in and below the Touchet River and in its tributaries indicate the need for riparian buffers to act as nutrient buffers, and to provide shade to moderate temperatures.

Patit Creek, even in its lower miles, periodically goes dry in some short reaches, while other reaches remain flowing year-round. It is likely that flow moves subsurface in these areas. Because of extremely low summer flows, low elevation and associated hot summer air temperatures, and a continued high degree of solar exposure in some areas, stream temperatures undoubtedly exceed the Washington state water quality standard of 63.5°F (Ecology 2006) for a 7-day maximum throughout Patit Creek below the North/West fork confluence, and likely beyond (HCP/EA). The WDFW observed a temperature of 82°F in late July 1998 upstream from BLC lands prior to the time the stream in this area went dry (Mendel et al 1999). While Patit Creek is not currently on the 303d list, it is a category 2 watershed of concern for temperature and other water quality factors (Ecology 2008).

Some stream reaches within BLC's lands, including along Patit Creek, are not well protected and vegetated, and channel and bank erosion and stream shade and water temperature are problems. Historic forest management practices have also increased erosion and sediment delivery above natural rates. However, recent estimates of the average rate for all sources of erosion in the forest are 0.4 tons/acre/year, with delivery of 0.03 tons/acre/year (Pomeroy Conservation District 1997). Although these rates are low in comparison to those reported for range and croplands, significant effects of forestland erosion have been reported (Columbia County Conservation District 1997; Reckendorf & Associates 2000). Existing Forest Practice Rules, including mandatory prescriptions from a WDNR watershed analysis (1998), limit timer harvest on unstable slopes in the Robinson Fork parcel.

In Robinson Fork, past road, grazing, and timber management practices, exacerbated by the 1996 flood, have resulted in low near-term large woody debris (LWD) recruitment potential (WDNR 1998). Summer stream temperatures exceeded the Washington state water quality standard at that time of 64.4°F in the lower six to eight miles of the Robinson Fork due to insufficient riparian shade. A temperature of 77°F was observed in the summer of 1999 near the lower end of BLC's lands, and 65°F 6.3 miles further upstream in Section 2, T39N, R8W, near the center of BLC's lands (Mendel et al 2000). Canopy density was assessed in 1997 and ranged from a low of 23 percent in the 2 miles above the Wolf Fork to 72 percent near RM 6, where canopy density was predicted to be adequate to meet the standards (WDNR 1998), which is consistent with WDFW observations (Mendel et al 2000). However, Mendel et al (1999) report "Generally, reaches of the Touchet River above Dayton maintained cool temperatures, in a range favorable to most salmonids, throughout the summer." Riparian and erosion conditions may also have been changed as a result of the Columbia Complex Fires in 2006.

Roads, fords, and stream crossings can have direct and indirect effects on bull trout. Sedimentation and stream channel changes are the primary negative effects of roads on streams (Furniss et al. 1991; Edwards and Burns 1986, Weaver and Fraley 1991, and Shepard et al 1984 (all as referenced in Service 2002). Roads can increase water yield and peak flows in forest areas, and poorly constructed or maintained roads can trigger large debris flows (Troendle and King 1987; Cacek 1989; as referenced in Service 2002). While water quality impacts such as sedimentation may impact bull trout habitat on or downstream of BLC parcels, riparian buffers help to minimize these effects. Conservation measures implemented in the HCP (including using the Robinson Fork bottom road and five fords for administration, but not for timber harvest or log haul activities) minimize the potential effects from the roads.

4.2.3 Touchet River Habitat Access:
(Physical Barriers)

The draft recovery plan chapter (Service 2004b) lists barriers in the Touchet River watershed including a passage barrier at Hofer Dam near the mouth of the Touchet River that occurs downstream of any BLC parcels. This barrier was fixed in 2006. The draft chapter also describes an expectation to improve passage at the Dayton Steelhead Acclimation Pond intake diversion, and to screen diversions that may impact bull trout. BLC's irrigation diversions have fish screens which meet NMFS fish screen criteria. The WDFW maintains a list of likely fish passage barriers in the Walla Walla and Touchet River watersheds (Glen Mendel, WDFW, pers. comm., October 31, 2007). Some of these partial or complete barriers have been addressed. There are no complete barriers downstream of BLC lands in the Touchet Watershed, although there is a complete barrier associated with a pond on a side-tributary to Robinson Fork (not on BLC lands). Some Robinson Fork fords, including those on BLC lands, may act as partial barriers depending on flows and stream conditions.

There was one physical barrier on Patit Creek that was removed in 2003 by BLC, but we do not expect bull trout to use that area. There are no other known physical barriers on BLC lands in Patit Creek. There may be downstream temperature effects that may result in thermal barriers in some seasons.

4.2.4 Touchet Habitat Elements:
(Substrate Embeddedness, Large Woody Debris, Pool Frequency and Quality, Large Pools, Off-channel Habitat, Refugia)

Most of the Walla Walla River watershed includes streams supporting gravel with heavy siltation (embeddedness greater than 30%). Many streams in the Walla Walla basin are intensively managed for irrigation water flows by eliminating peak flows that would normally act to break up substrate paving (Kuttel 2001). Gravels and cobbles in these "controlled" streams are highly cemented by fine sediment. Agriculture, livestock ranching, and timber harvest are some of the other contributing factors that create high sedimentation throughout the watershed.

Fish habitat problems were described in the South Fork Touchet River watershed analysis (WDNR 1998) and are applicable to areas of the Robinson Fork downstream from and within

BLC ownership. These problems include low frequency of pools and hiding cover due to lack of large woody debris and pool filling by gravels and cobbles, scour and burying of redds during peak flows due to the unstable channel, high levels of fine sediment in spawning gravels, and warm stream temperatures. The concern for redds and spawning gravel is more relevant to steelhead, that spawn further downstream, but the watershed analysis was useful to minimize sediment through implementation of mandatory timber harvest prescriptions to maintain stability in steep or erodable areas. These prescriptions have been, and will continue to be, implemented by BLC. The North Fork Touchet also has high sediment yields, due in part to valley bottom roads on the National Forest lands. These impacts vary by reach, and indicate that the watershed is functioning at risk (Bull Trout Matrix; Krupka USFWS, pers.comm. 2008; WWWPU and WWBWC , 2004a)

Patit Creek substrate was observed to be cobble dominated on BLC parcels, with low levels of deposited fine sediments (HCP/EA). Exposure of bedrock also occurs. Patit Creek's instream large woody debris and near-term LWD recruitment potential are low (Mendel et al 1999).

4.2.5 Touchet Channel Cond. & Dynamics:
(Wetted Width/Max.Depth Ratio, Streambank Condition, Floodplain Connectivity)

Columbia County has experienced a series of floods that have repeatedly scoured streambeds, stream banks, and riparian vegetation. Severe floods damaged the Touchet River systems in 1964-65, 1968-69, and again in 1996-97. The Columbia County Conservation District (1997) reported that riparian and channel conditions improved following the 1964 flood, but had not fully recovered when the 1996-97 floods caused further decline. Floods resulted in streams becoming wider, less stable, the frequency of large pools with large woody debris decreased, and the frequency of unvegetated stream banks increased. These problems occurred in many locations (Columbia County Conservation District 1997), including in the headwater forks of the Touchet River, and in Robinson Fork where BLC owns land (Reckendorf & Associates 2000).

Some stream channels have been degraded through loss of riparian vegetation, coupled with accelerated runoff. These problems have been reported for the Touchet River (Michaelis 1972; USACE 1997), the North, South, Robinson, and Wolf Forks of the Touchet upstream of Dayton (Reckendorf and Associates 2000; WDNR 1998), and South Fork Patit Creek (Reckendorf and Associates 2000). Stream channelization and straightening, drainage of wetlands, and conversion of grasslands, shrub communities, and forests to croplands resulted in severe channel downcutting, widening, channel instability, and further loss of native riparian communities. Almost the entire North Fork Touchet River is paralleled by roads or jeep trails, especially in the lower portion of the river. This undoubtedly impacts streambank condition and sediment yield to a high degree, and may contribute to increased peak flows by channelization. About 30% of the Wolf Fork channel is confined, which contributes to poor floodplain connectivity and alteration of flows (Krupka, USFWS, pers. comm. 2008; WWWPU and WWBWC, 2004a).

The South Fork Touchet River watershed analysis (WDNR 1998) indicated that problems include low frequency of pools due to lack of LWD and pool filling by gravels and cobbles. Past road, grazing, and timber management practices, exacerbated by the 1996 flood, have resulted in

low near-term LWD recruitment potential (WDNR 1998). The watershed analysis also resulted in additional timber harvest prescriptions to maintain stability in steep or erodable areas. These prescriptions have been, and will continue to be, implemented by BLC. Stream channels in the Robinson Fork have been impacted by the 1996 flood, and also by grazing, streamside roads, and poorly located forest landings and skid trails.

Patit Creek has been subject to the same storms that created the floods and damage experienced by the larger stream and river channels in Columbia County. However, the lower reaches of Patit Creek did not experience the degree of channel degradation during the 1996 floods that remain evident in the Touchet River and the Robinson Fork. Although the 1996 floods may not have added to the degradation, Reckendorf and Associates (2000) report that South Patit Creek has experienced downcutting, sometimes to bedrock, widening, and extensive stream bank erosion. The mainstem Patit Creek downstream near BLC's lands has historically experienced these same effects. Due to historic effects and recent farming and grazing, Blocks 1 through 4 of Patit Creek on BLC's land have been affected by channel downcutting and widening, rare pools in the stream, and varying degrees of stable and unstable banks. The channel remains vulnerable to these effects in some areas, while in others, current management and the condition of the riparian area render the channel more resistant to erosion processes.

Today, many streams have re-established riparian communities on terraces within the incised channel. In other cases, riparian vegetative development continues to be retarded by farming to the stream edge and riparian grazing. Roads located adjacent to streams also adversely affect stream shade and contribute sediment-laden runoff to streams in some areas. Patit Creek #4 has an incised channel and historically downcut deeply into the valley floor and is sinuous within a newly established inner terrace floodplain. This inner terrace is generally bordered by an escarpment (generally 3 to 10 feet in height) formed when the stream downcut many years ago. In several areas, the escarpment remains unstable and barren, while in others it is richly vegetated with brush species. Currently the stream has reestablished a narrow (3.4-foot average width) active channel within an inner riparian terrace (27-foot average total width) that is generally heavily vegetated with reed canary grass, or brush with grass understory.

Cougar Canyon, a tributary to West Patit Creek, supports a well-developed riparian area and pines on the side slopes. Cougar Canyon burned in the 2006 fires; the riparian areas did not burn hot but upland tree plantings were killed. Other Patit Creek intermittent and ephemeral tributary channels have evidence of downcutting, erosion, and gullying, although they have stabilized due to recovered vegetation.

Intermittent tributaries to the Touchet River, such as Whetstone Creek, are supported by grassed waterways on BLC lands. Some of the ephemeral side streams in Payne Hollow burned in the 2006 fire, although grass cover in the burned areas likely recovered quickly.

4.2.6 Touchet Flow/Hydrology:
(Change in Peak/Base Flows, Drainage Network Increase)

The Touchet River near the mouth can be dewatered or receive very low flows in dry years from irrigation diversions. Past management and roads are believed the primary factors in influencing the hydrology of the North Fork Touchet. With a valley-bottom road, the overall drainage network has also been expanded. The terminus of this road is the Ski Bluewood alpine ski area, which likely also alters the hydrology, especially the parking lot. However, the magnitude of these impacts is moderate, suggesting only a moderate risk rating for the baseline condition (Krupka, USFWS, pers. comm. 2008; WWWPU and WWBWC, 2004a).

The Robinson Fork is one of the four major headwater forks (North, South, Wolf, and Robinson) of the Touchet River. Each fork drains predominantly forested lands, with range and/or croplands at the lower elevations. The Robinson Fork is a 15.6 mi^2 tributary to the Wolf Fork that in turn joins the North Fork upstream of Dayton. BLC lands begin at Robinson Fork RM 2.4.

During peak flows, water yield and low flow regimes of the Robinson Fork are not measurably different from conditions found under the hypothetical fully forested (natural/unmanaged) condition (WDNR 1998). The DNR watershed analysis (1998) did not expect that BLC's timber harvest contributed to changes in peak/base flows. The fire of 2006 may have changed the situation somewhat, and BLC expects that large storms or rain on snow events may well happen and could cause short-term, "pulse" impacts which are unpreventable. This may be somewhat ameliorated by growth of grass and forbs since the fire.

The volume and speed of runoff in much of the farmland and pastureland in Columbia County is increased above naturally occurring conditions as a result of historical land use practices (HCP/EA). BLC assumes that its unusual method of annual cropping of wheat in a no-till system allow better absorption of water, and decreases soil erosion from overland flows.

4.2.7 Touchet Watershed Conditions:
(Road Density & Location, Disturbance History, Riparian Conservation Areas, Disturbance Regime)

Riparian vegetation has been extensively degraded in Columbia County and in many areas that are now in BLC ownership by the historically common practice of farming to the stream bank. Major impacts on riparian vegetation also result from overgrazing, agricultural clearing and herbicides, forest harvest, road construction, flood damage and flood control (HCP/EA).

The Blue Mountains are in an area of high fire frequency, although the size of the 2006 fire was very large. BLC notes in the HCP that fires of this nature are normal in these ecosystems, although the intervals between them might exceed 100 years. Inevitably, stand replacing fires create opportunities for sediment delivery to streams, usually through "pulse" events, such as summer thunderstorms or heavy winter rains. Forbs and grasses have recolonized the Robinson

Fork site and in the winter immediately following the fire, little additional sediment was noted in the stream (Hinson, Dayton meeting July 2007, pers. comm). However, large storms or rain on snow events may well happen and could cause short-term, "pulse" impacts which are unpreventable.

Overall, the North Fork Touchet watershed is in fair condition andit continues to support a moderate number of salmonids. This watershed has the highest proportion of Forest Service lands of the 3 Touchet River local populations, and appears to have benefited from the generally higher standard of riparian protection. The road density in the North Fork is 2.85 miles/mile^2 with 250 stream crossings. The road density in the South Fork Touchet is 3.8 miles/mile^2 with 142 stream crossings, and only 37 percent of the riparian zone is considered functional. Thus, the South Fork Touchet is at higher risk than the North Fork Touchet. The Wolf Fork watershed has over 3 miles/mile^2 road density, and 84 stream crossings. Riparian areas are degraded, yet still in fair condition (Krupka, USFWS, pers. comm.. 2008; WWWPU and WWBWC , 2004a.).

Riparian areas in the Robinson Fork have been impacted by the 1996 flood, and also by grazing, streamside roads, and poorly located forest landings and skid trails. To begin to restore the riparian areas over the past several years, BLC intensified its cattle herding and abandoned the "Bottom Road" for logging use in compliance with their road management and abandonment plan. BLC continues to use the bottom road for administrative use to look for cattle or check fences. Logging within riparian areas is addressed under the Forest Practices Rules. The prescriptions are complex and site-specific, but in general terms, no timber can be harvested within 75 feet of the waterways. BLC lands also include headwater areas to Robinson Fork. Much of Robinson Fork burned in 2006. Much of the headwaters supported mature timber prior to the fire. Fire salvage harvest began in 2006, and is expected to be finished in 2008. In 2007 BLC implemented CREP buffers in Robinson Fork to speed restoration of the riparian area. Cattle will be fenced out of the buffer during the CREP contract period.

Patit Creek is tributary to the Touchet River at Dayton. Patit Creek and its lower tributaries drain gentle rolling Palouse slopes for several miles upstream from Dayton, although a broad floodplain occurs in the lower miles of the drainage, bounded by steep escarpment breaklands. In the Patit Creek blocks, riparian areas are variable. At Patit Creek block #1, the channel has downcut and widened; some degree of bank erosion continues. A fence borders Patit Creek on both sides; bed and incised channel are well vegetated. After enrolling the area in CREP, BLC extended the fence width. Block #2 has riparian vegetation that is well developed with stable stream banks and beds. The stream is heavily shaded in areas. Patit Creek Block #3 has some areas with limited bank stability. The south side of the creek includes BLC ownership, and was fenced in 2003 after enrolling in CREP. The north side of the creek is not grazed. Adjacent land is pasture irrigated from wells. In Patit Creek Block #4, a county road parallels the stream on its north side, but is generally well separated from the creek by a richly developed shrub and small deciduous tree riparian zone. BLC grows dryland wheat and peas on flat terraces above the incised channel. In some areas farming occurs to the edge of the channel bank; BLC has modified plowing distance from the creek to allow increased riparian area.

Patit Creek block #4 has an incised channel and historically downcut deeply into the valley floor and is sinuous within a newly established inner terrace floodplain. This inner terrace is generally bordered by an escarpment (generally 3 to 10 feet in height) formed when the stream downcut many years ago. In several areas, the escarpment remains unstable and barren, while in others it is richly vegetated with brush species. Currently the stream has reestablished a narrow (3.4-foot average width) active channel within an inner riparian terrace (27-foot average total width) that is generally heavily vegetated with reed canary grass, or brush with grass understory. As displayed in Table 7 and Figure 11 of the HCP, the current riparian area bordering Patit Block #4, and including both the incised terrace and the upper escarpment averages 39-feet in width to the north, and 52-feet in width to the south.

Intermittent and ephemeral tributaries to Patit Creek on BLC lands typically have fully to partially developed shrub and deciduous tree riparian communities, and are often separated from dry croplands by CRP, grazed grasslands, or trees planted by BLC. In particular, trees and grasses are planted by BLC on very steep lands. In one location, an unsurfaced road in highly erodable silty soils parallels an ephemeral channel. The road is used by farm equipment, and occasionally was subject to severe rutting and erosion during heavy seasonal rains. This road was resurfaced by BLC in 2003. Some of the ephemeral side streams in the Patit watershed burned in the 2006 fire. Grass cover in the burned areas was expected to recover quickly.

Cougar Canyon is a tributary to West Patit Creek, and the riparian area is well developed with side slopes that supported pines; it burned in the 2006 fires, but the riparian area did not burn hot. Cougar Canyon originates in steep canyon and forestlands in the lower slopes of the Blue Mountains. Dry croplands are the predominant land use in the watershed, occurring mainly on the rolling hills. Range and conservation reserve areas occupy the breaklands, and irrigated pasture occurs in the lower reaches of the watershed on the broad floodplain. BLC owns extensive lands in the lower part of the watershed and along Cougar Canyon, a mid-watershed tributary to South Patit Creek. Steeper slopes along the canyon were converted from dry crop and grazing lands to conservation grass and planted trees several years ago.

Intermittent tributaries, such as Whetstone Creek are supported by grass waterways on BLC lands. Some of the ephemeral side streams in Payne Hollow burned in the 2006 fire, but again the grass cover was expected to recover quickly.

4.2.8. Touchet Integration of Species and Habitat Conditions

The Touchet River watershed has benefited somewhat from the National Forest lands in the upper watershed, and its riparian protections in spawning areas. The middle and lower portions of the watershed are mostly private. Past and present factors affecting the species within the action area include forest management, livestock grazing, irrigated agriculture, urbanization and flood control management. In the Walla Walla Basin, the 1997 Washington Salmonid Stock Inventory identified habitat degradation from forest management practices, agricultural activities, livestock grazing, and development, and interactions between introduced steelhead and brown trout as factors affecting bull trout production in the Touchet drainage (WDFW 1998b). The South Fork Touchet River Watershed Analysis (Washington Department of Natural

Resources (WDNR) 1998) identified lack of pool habitat for resting, staging and rearing, a lack of large woody debris, and a destabilized main channel as the major limiting factors affecting all life stages of fish in the watershed and attributed them to forest management and human development (WDFW 1998a, Buchanan et al. 1997). Generally, bull trout in the Touchet River core area appear to be declining in recent years, and have low numbers of spawners.

While BLC can affect bull trout forage, migration and overwintering habitats, all known spawning habitats occur upstream and/or on different tributaries than BLC parcels. No bull trout spawning or rearing habitat in the Touchet River watershed occurs on BLC lands.

Recovery criteria for the Umatilla-Walla Walla management unit were listed in section 4.0, and Touchet River-specific expectations and baseline conditions (in italics) are as follows:

1. Bull trout are distributed among the following populations in the Touchet River Core Area: South Fork Touchet River local population; Wolf Fork Touchet River local population; and North Fork Touchet River local population.
Bull trout are currently distributed in three local populations: the South Fork Touchet River (specifically within Burnt Fork), the North Fork Touchet, and the Wolf Fork Touchet River. (Mendel et al. 2006).

2. Achieve and maintain certain bull trout numbers with the Touchet River core area expected to support 500 to 1,000 spawning adults.
Numbers of bull trout in the Touchet River core area are lower than draft recovery criteria expectations. As described previously in section 4.3., recent average redd counts are estimated to correlate to a total of 280 spawning adults.

3. Bull trout populations in each core area exhibit a stable or increasing trend in abundance for at least two generations (i.e., 10-14 years) at or above the abundance levels identified in criteria #2.

As described in section 4.3.1, the trends in each of those local populations may be declining in recent years.

4. The fluvial component of each local population is maintained and specific barriers to bull trout movement are sufficiently addressed to: 1) allow fluvial fish to effectively move between spawning and wintering areas, and 2) ensure that fish movement can occur, at least seasonally, between local populations within each core area in the management unit. Establish the conditions necessary for up- and down-stream fish passage to ensure the persistence of fluvial life stages and genetic interchange between local populations within each core area.

There continues to be barriers in certain locations in the Touchet River watershed. One physical barrier on Patit Creek on BLC lands was removed in 2003, although this area is probably not used by bull trout. One Touchet River high priority barrier, the Dayton Dam associated with a steelhead acclimation pond, has been addressed with completion expected in 2008. The Touchet River also has likely barriers associated with 12 stream fords on a private road on the Wolf Fork (Mendel, WDFW, pers. comm. October 31, 2007; Mendel, WDFW, pers. comm. June 17, 2008).

The Dayton Dam and Wolf Fork fords do not occur on BLC lands. The fords on the Robinson Fork parcel may act as partial barriers during certain flows, but Robinson Fork is not between spawning/wintering areas, and is not a connection between local populations.

4.3 Effects of the Action Bull Trout- Touchet River Watershed

The draft bull trout recovery plan (Service 2004b) includes several recovery measures that can be addressed by a private landowner. Specific recovery measures and BLC contributions in the HCP are described in Table 9.

Table 9. Relevant* Recovery Measures (Service 2004b) and HCP Measures.
* "Relevant" includes those measures relevant to the Touchet River watershed, and which are reasonable for a private landowner such as BLC to implement.

Relevant Recovery Measures Walla Walla/Umatilla Management Unit	**BLC HCP measures** For more detail see Table 6
1. Protect, restore, and maintain suitable habitat conditions for bull trout. Reduce sediment inputs into Mill Creek, **the Touchet River**, and the South Fork Walla Walla River.	-Whetstone: surface road to minimize sediment delivery: done 2003. -Patit Creek Block #1:Widen fenced riparian area: done 2005-2006; Add rock to road in Sec. 20: done 2003; Enrolled in CREP in 2005. -Patit Creek Block #3: Enroll area in CREP in 2003. Fence south a minimum of 75 feet from the ordinary high water mark; eliminate grazing to north to increase riparian area. Remove grazing on historic site, water developments. 2003. -Patit Creek Block #4: Buffer top of incised channel by average 50 feet. -Robinson Fork: Relocate and abandon stream bottom road for logging and restrict use; Comply with FPA rules; 2007. Enroll in CREP. During fire salvage contour fall whips and poles every 50 to 60 vertical feet and seed with grass to minimize erosion. Leave live trees as seed sources and/or replant.
2. Identify barriers or sites of entrainment for bull trout and implement tasks to provide passage and eliminate entrainment. Inventory screen needs in the Walla Walla Basin in Washington. List priorities for action and implement screen projects. Use the voluntary WDFW Cooperative Compliance Review Program to identify and properly screen diversions.	-Patit Creek Block #1:CCC dam removed 2003. -Patit Creek-replaced irrigation screen with 3/32nd standard mess mesh in 2003.

Relevant Recovery Measures Walla Walla/Umatilla Management Unit	**BLC HCP measures** For more detail see Table 6
3. Pursue opportunities to increase instream flows in areas occupied by bull trout.	Not necessary in Patit Creek for bull trout. Not relevant to Robinson Fork because BLC has no diversions there.
4. Unitwide, protect and, where needed, revegetate riparian zones in areas used by bull trout. Reduce grazing impacts. Use current proven technology, (e.g.fencing, changes in timing and use of riparian pastures, off-site watering and salting, etc.), to reduce grazing impacts.	-Attract cows away from streams by salt placement and supplemental feed location. -Patit Creek Block #1:Widen fenced riparian area (30 acres); Enrolled in CREP in 2006. -Patit Creek Block #3: Enrolled area in CREP in 2003; 19 ac. Fencing and elimination of grazing to increase riparian area. Remove grazing on historic site. Implement off-stream water developments. -Maintain riparian conditions initially encouraged by CREP for life of HCP, with exception of Robinson Fork. -Robinson Fork enrolled in CREP in 2006; ~400 ac., will fence to exclude livestock. After CREP contract, revisit cattle management to maintain riparian buffer.
5. Identify upland conditions negatively affecting bull trout habitats and implement tasks to restore appropriate functions.	-Maintain grassed waterways for life of HCP. - Maintain minimum till farming methods.

4.3.1 Effects Touchet Subpopulation Characteristics:
(Subpopulation Size, Growth and Survival, Life History Diversity and Isolation, Persistence and Genetic Integrity)

While the BLC HCP is likely to result in improved aquatic functions, there will be minimal direct effects on subpopulation characteristics because BLC parcels occur in the middle portions of the watershed, and/or outside of the main bull trout spawning and rearing areas. There may be improvements to general habitat quality, which could improve forage migration and overwintering habitats within and below the mouth of Robinson Fork in the Wolf Fork, North Fork, and the mainstem Touchet.

It is possible that migratory bull trout could be injured, killed, or harassed through motor vehicle use of Robinson Fork fords, although this is likely to be a rare event based on known bull trout distribution, and because the fords will only be used for administrative use, not for log-haul. Administrative use would include checking the CREP fences, and checking cattle approximately 7 times per month between May and October (about 50 trips/year), usually with ATVs (Dan McKinley, BLC, pers. comm., July 29, 2008). Smaller and lighter ATVs will have less impact than full-size vehicles. Not all checks would require use of all five fords. Bull trout spawning and rearing is unlikely in Robinson Fork, therefore redds are unlikely to be harmed. Foraging or migratory adults or subadult bull trout are likely to be able to move away from vehicles. Only

one bull trout has ever been documented during surveys of Robinson Fork (Mendel et al 2000); therefore the Service assumes conservatively that one bull trout could be injured or killed annually from the use of fords in the Robinson Fork parcel.

All items listed in Table 9 minimize effects to subpopulation characteristics, especially for foraging, migratory, and overwintering bull trout. Spawning and rearing habitats for bull trout will not be affected. Generally, implementation of the HCP minimizes sediment entry into streams, and improves riparian areas. The riparian areas will mature over time to increase shade, minimize water temperatures, increase structural diversity in the streams, decrease sediment and nutrient entry into streams, increase channel stability, and increase cover for bull trout and its prey base.

4.3.2 Effects Touchet Water Quality:
(Temperature, Sediment, Chem. Contam./Nutrients)

BLC lands include about 7.1 miles on the mainstem Robinson Fork. Detrimental impacts from timber management can include the removal of LWD, and the reduction in riparian vegetation which results in water temperature increases, accelerated erosion, and de-stabilization of stream channels. Healthy riparian areas contribute to the amount of LWD in streams, to channel dynamics, to nutrient loads and, therefore, to community structure, and to lower water temperature; these factors can have far-reaching effects both upstream and downstream (Bolton and Shellberg 2001). Loss of these functions is typically associated with reduced productivity of fish populations. BLC's forest management practices would remain subject to the Forest Practice Rules, and the basic protections to riparian zones and road and harvest controls would remain in place. The Forest Practices Rules (WFPB 2001) currently in effect regulate harvest and road management practices within riparian zones. BLC would follow these regulations and in the event that these July, 2001 regulations are modified, BLC would provide and implement equivalent or greater habitat protection to the current requirements. Prescriptions developed under DNR's watershed analysis (1998) would also remain in place until re-evaluated; these prescriptions include limits on roads and skid trails to minimize the potential for sedimentation and landslides. Thus, due to these forest regulations and prescriptions, water quality impacts will be minimized. Any adverse effects or injury or harm to bull trout from the Forest Practice Rules has already been addressed in the Forest Practices HCP with the WDNR.

In addition to forestry activities, BLC grazes cattle on their forest lands in Robinson Fork. Poorly managed livestock grazing can impact riparian habitats and water quality. Stream bank trampling and reduction in riparian vegetation due to grazing can lead to channel widening, downcutting, and decreased stream bank stability. There is also the potential for greater sediment delivery to streams, along with increased bacterial and nutrient loads from animal wastes. Finally, there is the potential for grazing to retard the re-growth of broad-leaved vegetation in the Robinson Fork riparian area, where much of the streamside cover was destroyed during the 1996-1997 floods. Improved cattle management practices, including removing cattle from Robinson Fork until 2008, and implementing CREP buffers proposed by will improve the riparian vegetation and channel banks, and help ameliorate the effects of the 2006 fire. After the CREP contract expires within Robinson Fork, BLC agrees to manage cattle

to ensure that the riparian habitat is maintained, and will coordinate with the Service and NMFS at that time. BLC commitments in the forest lands will result in improved riparian habitat conditions. Improved riparian habitat results in more shading and decreased stream temperatures.

During the fire salvage harvest, which is expected to continue through 2008, BLC will contour-fall whips and poles every 50 to 60 vertical feet on steeper slopes and seed with grass to minimize erosion. Live trees will be left where available as seed sources for regeneration. Other areas will be replanted with seedling stock. Pulses of sediment may still occur and can have a negative impact on water quality, but these measures will help ameliorate those effects.

In the farming and range area uplands BLC will continue to manage farmland and pasture land riparian areas in the current condition, including maintaining grassed waterways for the life of the HCP and maintaining CRP fields and other erosion control expectations under the Farm Bill, as long as the programs continue. If the CRP contracts are not renewed, BLC still commits to implementing their HCP standards, including: maintaining minimum till methods; maintaining vegetation and potentially seasonal grazing in areas too erodible for tillage; maintaining grassed waterways in draws, low spots, and high water-table locations as a back-up for filtering sediment; and maintaining riparian buffers, including CREP buffers in farmed and grazed parcels after the 15-year contract period for the life of the HCP. Thus, many of the upland small tributaries, intermittent streams, and ephemeral draws would be maintained in their current vegetated condition. This continues to minimize impacts such as sediment input to the riparian areas on fish-bearing streams.

Migratory bull trout can be injured or killed due to water quality effects caused by farming or livestock grazing contribution of sediment or nutrients into tributary streams or occupied bull trout streams, or through continued high temperatures from lack of riparian shading. Riparian buffers have been or will be implemented, but not all reach out to a site-potential-tree height distance, or about 100 feet, which would be more likely to eliminate the risk of bull trout incidental take by maintaining properly functioning riparian habitats (WDFW Priority Habitat and Species Riparian Habitat Management Recommendations, and the State of Washington Wild Salmonid Policy). Riparian buffers provide sediment filtration, large woody debris recruitment, pollutant filtration, erosion control, shading for temperature control, wildlife habitat, and density and diversity of benthic invertebrates and macroinvertebrates.

BLC lands include approximately 2.2 miles of the mainstem Patit Creek. Along part of that ownership, Patit Creek block #4, the Service recognizes that the current riparian buffer averages approximately 39- feet; and with implementation of the HCP the buffer will improve, but will still average about 50-feet on either side of the creek, with some locations as narrow as 10 feet on the top escarpement. The HCP/EA (pages 57-64) explains how these buffers will still allow restoration of aquatic functions in that stretch of Patit Creek. In summary, due to the highly incised channel, the inner terrace acts as a vegetated riparian buffer. To further support that inner buffer, BLC proposes to establish a no-farm buffer between its fields and the upper escarpments that would be a minimum of 10-feet wide, and to provide a total riparian buffer width that would average over 50-feet wide on each side of the stream. Ponderosa pine and/or

other suitable tree species would be planted within suitable areas of the buffer. Slopes farmed adjacent to these riparian areas are flat to very nearly flat, thus minimizing the potential for erosion. The HCP consultant determined through an assessement of subwatershed size and likely flood frequency and size that the aquatic functions of a flood plain would usually be entirely provided within the incised channel. The area on top of the escarpement provides some functions, such as stability and shading, but would not provide habitat for water-loving riparian plants. Patit Creek also is not likely to support bull trout, but it does drain into the middle reaches of the Touchet River, which does support seasonal migratory bull trout use.

Improperly managed livestock grazing can degrade bull trout habitat by removing riparian vegetation, which destabilizes streambanks, widens stream channels, promotes incised channels, lowers water tables, reduces pool frequency, increases soil erosion, and alters water quality (Howell and Buchanan 1992, Mullan *et al.* 1992, Overton *et al.* 1993). These effects can reduce overhead cover, increase summer water temperatures, and increase sediment in spawning and rearing habitats. From Table 9, items 1, 4, and 5 minimize effects to water quality. Riparian habitat assists in preventing nutrient and sediment entry into streams. A more mature riparian area results in increased shading and lowered stream temperatures. Buffers established under CREP and prevention of grazing or farming in those buffers in and adjacent to farmlands (such as on Patit Creek) will gradually improve the riparian habitats. BLC will maintain these or similar riparian buffers for the life of the HCP (25 years) rather than just the life of the CREP contract (usually 15 years.) Improved riparian habitat would result in improved stream channel and bank stability and morphology, stream shade would increase in Patit Creek, and water temperature regimes would be improved.

In summary, the riparian buffers and upland management proposed by BLC would result in a gradual improvement of water quality, although it is built upon a degraded baseline. BLC only controls small portions of the watershed, and other negative water quality contributions would likely continue from other sources.

4.3.3 Effects Touchet Habitat Access:
(Physical Barriers)

BLC has already removed a barrier on their lands in Patit Creek, and ensured their irrigation screen on Patit Creek meets NMFS screen criteria, although this area is unlikely to be used by bull trout. Under some flows and stream conditions, the fords on Robinson Fork may act as partial barriers, but this should have a minor effect on bull trout because Robinson Fork is not expected to be used as a spawning area, and overwintering or migration is possible, but not expected (Service, 2004). While fords can have negative impacts to bull trout habitat through compaction of stream gravels, they generally allow a more natural stream function than a bridge and bridge approaches. In areas of light vehicle use, fords are appropriate. The Service is not aware of any other potential bull trout migration barriers on BLC lands. Other barriers in the watershed will continue in the current condition.

4.3.4 Effects Touchet Habitat Elements:
(Substrate Embeddedness, Large Woody Debris, Pool Frequency and Quality, Large Pools, Off-channel Habitat, Refugia)

As described in section 4.3.2, detrimental impacts from timber management can include the removal of LWD, and the reduction in riparian vegetation which results in water temperature increases, accelerated erosion, and de-stabilization of stream channels. The HCP will implement the measures described in Table 9, item 5. Riparian buffers resulting from HCP implementation should decrease substrate embeddedness, and improve other habitat elements including LWD. Following Forest Practice Rules, required prescriptions, and implementing CREP buffers or similar management for the life of the HCP should allow improvement of habitat elements in the Robinson Fork. The benefit to bull trout, however, will be small, because Robinson Fork is not expected to be used as a spawning or rearing area or migration corridor (Service, 2004), although it could be used for foraging and overwintering.

Similarly, in BLC farmed and grazed lands on Patit Creek and its tributaries, riparian habitat will improve with resultant improvement in habitat elements, but Patit Creek is not a key area for bull trout (Service, 2004).

4.3.5 Effects Touchet Channel Cond. & Dynamics:
(Wetted Width/Max.Depth Ratio, Streambank Condition, Floodplain Connectivity)

In Robinson Fork, there should be little change to floodplain connectivity due to the steep narrow valley. BLC's forest management practices under the HCP (following Forest Practices Rules and mandatory prescriptions (WFPB 2001, WDNR 1998)), and the Road Management and Abandonment Plan, include limits on roads and skid trails to minimize the potential for sedimentation and landslides. In addition, improved cattle management practices, including removing cattle from Robinson Fork until 2008 and implementing ~ 400 acres of CREP buffers will improve the riparian vegetation and stabilize channel banks, to ameliorate the effects of the 2006 fire. After the CREP contract expires within Robinson Fork, BLC agrees to manage cattle to ensure that riparian habitat is maintained, and will coordinate with the Service and NMFS at that time. During fire salvage harvest, BLC will also implement measures to minimize sediment movement into the Robinson Fork. BLC commitments in the forest lands, including riparian buffers and implementation of their road management and abandonment plan, will result in improved riparian habitat conditions, thereby stabilizing the stream bank, and allowing development of a natural wetted width/maximum depth ratio. While harm or injury of bull trout is possible due to sediment into Robinson Fork, it is unlikely since bull trout are not documented and are likely rare in the creek. Adverse effects and harm or injury from timber harvest activities would already have been addressed in the Forest Practices HCP.

In the farming and range upland areas BLC would also continue to manage farmland and pasture land riparian areas in the current condition, including maintaining grassed waterways and CRP fields and other erosion control expectations under the Farm Bill, as long as the programs continue. If the CRP contracts are not renewed, BLC still commits to implementing their HCP standards, as described above in section 4.3.2. This continues to minimize impacts such as

sediment input to the riparian areas on fish-bearing streams. HCP conservation measures for lands and streams within farming and grazing lands would be implemented and riparian conditions would improve. Improved riparian habitat would result in improved stream channel and bank stability and morphology in Patit Creek along BLC parcels. Buffers established under CREP (49 acres on Patit Creek) and prevention of grazing in those buffers in and adjacent to farmlands would be maintained for the life of the HCP. Longer duration of growth of riparian areas results in larger vegetation which contributes root structure to stabilize banks, and increases the potential for large woody debris contributions to the stream, further stabilizing stream morphology and allowing development of pools.

Flooding is expected to occur again in the future in both the forested and farming and grazing lands. Maintaining diverse structures and a natural stream channel condition can dampen the energy of floods, and allow faster recovery of habitats after a flood. As displayed in Table 7 and Figure 11 of the HCP, the current riparian area bordering Patit Block #4, and including both the incised terrace and the upper escarpment averages 39-feet in width to the north, and 52-feet in width to the south. To stabilize the escarpments and reestablish riparian brush and tree species on exposed surfaces and on the upper terrace surfaces, BLC proposes to establish a no-farm buffer between its fields and these escarpments that would be a minimum of 10 feet wide, and to provide a total riparian buffer width that would average over 50-feet wide on each side of the stream. The watershed area contributory to Patit #4 is 12 square miles. Discharge for the 100-year flood calculated using USGS regional flood frequency procedures is 1,320 cfs. Hydraulic capacity of the channel in this reach is 1,400 cfs. Thus, the consultant determined that the aquatic functions of a flood plain would usually be entirely provided within the incised channel. The area on top of the escarpement provides some functions, such as stability and shading, but would not provide habitat for water-loving riparian plants.

4.3.6 Effects Touchet Flow/Hydrology:
(Change in Peak/Base Flows, Drainage Network Increase)

Low flows can inhibit bull trout foraging and spawning migrations, or downstream migrations after spawning. There will only be minimal effects to Touchet Watershed flow and hydrology as a result of the HCP. There will be no change to the flow on Patit Creek, including the small screened diversion, or the vegetable plant waste-water pasture irrigation. Patit Creek is not considered as a key area for bull trout (Service 2004b). Robinson Fork activities do not include water withdrawals. Due to improved riparian habitats and stream stability, when peak flows do occur less aquatic damage and scouring should occur. Roads and drainage networks will remain the same as the baseline condition, with the exception of about 1 mile of upslope road being built outside of the Robinson Fork riparian area.

4.3.7 Effects Touchet Watershed Conditions:
(Road Density & Location, Disturbance History, Riparian Conservation Areas, Disturbance Regime)

Bull trout are less likely to use streams for spawning and rearing in areas with high road density, and are typically absent at mean road densities above 1.1 kilometer per square kilometer (1.7

miles per square mile) (Quigley and Arbelbide 1997). BLC will follow the Forest Practice Rules (WFPB 2001), and mandatory prescriptions (WDNR 1988). While the BLC will be building about one mile of upslope road, the "Bottom Road" in Robinson Fork will only receive administrative use as expected in the Road Maintenance and Abandonment Plan. Thus road densities have been improved over historic conditions in the Robinson Fork parcel, but in the future increased slightly with approximately 1 additional road mile of upslope road, outside of riparian habitats. In addition, improved cattle management practices, including removing cattle from Robinson Fork until 2008 and implementing CREP buffers proposed by BLC would improve the riparian vegetation and channel banks, and help ameliorate the effects of the 2006 fire. After the CREP contract expires within Robinson Fork, BLC agrees to manage cattle to ensure that riparian habitat is maintained, and will coordinate with the Service and NMFS at that time.

In the farming and range areas, BLC would also continue to manage farmland and pasture land riparian areas in the current condition, including maintaining grassed waterways and CRP fields and other erosion control expectations under the Farm Bill, as long as the programs continue. In the absence of CRP, BLC will follow HCP standards, which still will minimize impacts such as sediment input to the riparian areas on fish-bearing streams.

At Patit Block #4, BLC proposes to establish a no-farm buffer between its fields and these escarpments that would be a minimum of 10 feet wide, and to provide a total riparian buffer width that would average over 50-feet wide on each side of the stream, to stabilize the escarpments and reestablish riparian brush and tree species on exposed surfaces and on the upper terrace surfaces. Ponderosa pine and/or other suitable tree species would be planted within suitable areas of the buffer. This width of riparian area, once densely vegetated, would provide for stream shade, woody debris recruitment, bank stability, and erosion control. Slopes farmed adjacent to these riparian areas are flat to very nearly flat, and coupled with excellent erosion control provided by minimum till conservation practices, provide good sediment and nutrient filtering. Full riparian function for all of these attributes is the goal and is expected to be achieved as brush and tree species establish.

Disturbance regimes, such as fire, storms, or floods will still occur. Larger more mature riparian areas (~449 acres, see Table 9, item 4) will help to minimize the impacts of these events through maintaining vegetated buffers, instream diversity, and bank stability.

4.3.8 Effects Touchet Integration of Species and Habitat Conditions

BLC commitments in the forest lands will result in improved riparian habitat conditions for possible bull trout in the Robinson Fork. Robinson Fork may be used for foraging and overwintering, but does not provide a key migration corridor for bull trout.

The HCP conservation measures for lands and streams within farming and grazing lands would be implemented, riparian conditions would improve stream channel and bank stability and morphology, stream shade would increase in Patit Creek, and water temperature regimes would be improved. Buffers established under CREP in and adjacent to farmlands would be maintained

for the life of the HCP. Patit Creek is not expected to be used by bull trout, but it does flow into bull trout forage, migration, and overwintering habitat in the Touchet River.

The recovery criteria relevant to the Touchet River watershed were addressed in section 4.2.8. The implementation of the BLC HCP, while it improves aquatic habitat, will have little or no impact on local population distribution, population numbers, or population trends. Bull trout forage, migration, and overwintering habitat may be improved through resultant cleaner and cooler water from more mature riparian habitats upstream, although the effects to the core area will be small since the BLC parcels are not in key bull trout use areas. Overwintering or migratory bull trout could be impacted by continued degraded conditions elsewhere in the watershed, but BLC lands have little impact on spawning or rearing habitats for the bull trout. Downstream effects, such as water quality, temperature, and sediment are minimized by HCP measures, especially through continued implementation of riparian buffers on BLC lands.

4.4 Concurrent Effects

The Service completed consultation on May 16, 2006, on an incidental take permit to the state of Washington for the Forest Practices Habitat Conservation Plan. This project will result in concurrent effects.

4.5 Cumulative Effects Bull Trout- Touchet River Watershed

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

Forest Management

Much of the Forest Management in the Touchet River watershed occurs on National Forest Lands, and thus would be considered under future section 7 consultations with the Forest Service. Forest management on state or private lands also occurs in the Touchet River watershed, and is likely to continue. Impacts to bull trout from state and private forestry activities have already been considered by the Service under the Forest Practices HCP.

Residential and Urban Development

Residential and urban development affects bull trout through increases in nutrient loading from septic systems and chemical applications, alterations to channel morphology, and effects from road construction. The draft recovery plan (Service 2004b) explains that there are no large cities in the Touchet River watershed, but there is significant residential development along the Touchet River near the communities of Waitsburg and Dayton. The Touchet River channel through Waitsburg and Dayton was diked for flood control in the 1950's and 1960's (ACOE 1997). Some of the residential or recreational development in the upper forks of the Touchet River is located in narrow canyons, where it constricts the stream channel and/or impinges on riparian habitat. Nutrient inputs to the Touchet River from sewage treatment plants have been

reduced through the upgrading of facilities in the communities of Waitsburg and Dayton, but may still occur.

Livestock Grazing

Ranching and grazing is likely to continue on private land in the Touchet River watershed. In some cases the potential impacts to streams and aquatic systems are minimized through good stewardship and implementation of riparian buffers, and in other cases the ranching and grazing have negative effects on aquatic systems, through erosion and unstable banks.

Agriculture/Irrigation

Agricultural practices, including seeding and tilling result in increased course sediment loads in the Touchet River watershed. Upgraded soil conservation practices and increasing no-till farming methods decrease, but do not eliminate sediment impacts. Some landowners are working with conservation districts to implement CREP buffers along streams.

Irrigation removes water from the rivers and streams and results in elevated water temperatures, particularly in lower portions of the watershed. Bull trout do not thrive in areas with long term elevated temperatures. Near the mouth, portions of the Touchet River are seasonally dewatered, or have very low flows, particularly in dry years (Service 2004b). Water will likely continue to be diverted within the Touchet River watershed, increasing temperatures and impacting bull trout migration. Improper irrigation screens also can impact bull trout, and it is unknown whether all diversion screens meet State or Federal screen criteria; although the WDFW and Ecology continue to implement programs to address this concern.

Transportation Infrastructure

Use and maintenance of State, county, and private roads will continue in the watershed. Bull trout are less likely to use streams for spawning and rearing in areas with high road density, and are typically absent at mean road densities above 1.1 kilometer per square kilometer (1.7 miles per square mile) (Quigley and Arbelbide 1997). Poorly designed roads can contribute to sediment input in streams, or road ditches can trap and then transport sediment from upslope activities. Road maintenance, especially after flood damage, can exacerbate sediment problems.

Restoration efforts

The Walla Walla Conservation District and the Columbia County Conservation District have implemented riparian and instream habitat enhancements, fish screens, and ladders for improved fish passage. They have used various funding sources to implement these projects, and it is likely that similar projects will continue.

Fishing & Recreation Impacts

As the human population in Columbia County continues to grow, residential growth and demand for dispersed and developed recreation is likely to occur. This trend is likely to result in increasing habitat degradation from housing and road construction, levee building, bank armoring, and campsite development on private lands. These activities tend to remove riparian vegetation (which reduces stream shade, increases stream temperature and reduces the opportunity for large woody debris recruitment), disconnect rivers from their floodplains,

interrupt groundwater-surface water interactions, and reduce off-channel rearing habitat. Each subsequent action by itself may have only a small incremental effect, but taken together they may have a substantive effect that will further degrade the watershed's environmental baseline and undermine the improvements in habitat conditions necessary for listed species to survive and recover. Watershed assessments and other education programs may reduce these adverse effects by continuing to raise public awareness about the potentially detrimental effects of residential development and recreation on salmonid habitats and by presenting ways in which a growing human population and healthy fish populations can co-exist.

Poaching and hooking mortality are a threat to bull trout in the Touchet River watershed. The WDFW continues to consider fishing management changes to protect bull trout, especially in spawning areas (Service 2004b).

Global Climate Change

Climate change, and the related warming of global climate, has been well documented in the scientific literature (Bates et al 2008; ISAB 2007; WWF 2003). Climate change has the potential to profoundly alter the aquatic habitat through both direct and indirect effects (Bisson et al. in press). Direct effects are evident in alterations of water yield, peak flows, and stream temperature. Indirect effects, such as increased vulnerability to catastrophic wildfires, occur as climate change alters the structure and distribution of forest and aquatic systems. In the Pacific Northwest, most models project warmer air temperatures and increases in winter precipitation and decreases in summer precipitation. The research indicates that temperatures in many areas will continue to increase due to the effects of global climate change. According to model predictions, average temperatures in Washington State are likely to increase between 1.7 °C and 2.9 °C (3.1 °F and 5.3 °F) by 2040 (Casola et al. 2005). Warmer temperatures will lead to more precipitation falling as rain rather than snow. As the snow pack diminishes, stream flow timing will change and peak flows will likely increase. Higher ambient air temperatures will likely cause water temperatures to rise (ISAB 2007).

Bull trout rely on cold water throughout their various life stages and increasing air temperatures likely will cause a reduction in the availability of suitable cold water habitat. Climate change is already affecting the frequency and magnitude of fires, especially in the warmer, drier regions of the west, and the fires may act on an altered forest community in the future. (Bisson et al. *in press*). In several studies related to the effect of large fires on bull trout populations, bull trout appear to have adapted to past fire disturbances through mechanisms such as dispersal and plasticity. However, as stated earlier, the future may well be different than the past and extreme fire events may have a dramatic effect on bull trout and other aquatic species, especially in the context of continued habitat loss, simplification and fragmentation of aquatic systems, and the introduction and expansion of exotic species (Bisson et al. *in press*).

Impacts on hydrology associated with climate change will cause shifts in timing, magnitude, and distribution of peak flows that are also likely to be most pronounced in high elevation stream basins (Battin et al. 2007) that currently provide cold water for spawning and incubation. Although lower elevation rivers are not expected to experience as severe an impact from

alterations in stream hydrology, they are generally not cold enough for bull trout spawning, incubation, and juvenile rearing.

There is still a great deal of uncertainty associated with predictions of timing, location, and magnitude of climate change. It is also likely that the intensity of effects will vary by region (ISAB 2007). However, the long term water quality monitoring data and several studies have revealed that climate change does have the potential to impact ecosystems throughout the state of Washington (ISAB 2007, Battin et al. 2007; Rieman et al. 2007). There is little doubt that climate change is and will be an important factor affecting bull trout distribution. As distribution contracts, patch size decreases and connectivity is truncated; populations that are currently connected may become thermally isolated, which could accelerate the rate of local extinction beyond that resulting from changes in stream temperature alone (Rieman et al. 2007). The FWS believes that it is vital to maintain or restore stream temperatures as close to natural conditions as possible if bull trout and other cold-water dependent species are to persist.

5.0 Status of the Bull Trout within the Snake River Management Unit

The recovery goals for the Snake River management unit are: maintain current distributions of bull trout and restore distributions in previously occupied areas within the Snake River watershed in Washington; maintain stable or increasing trends in adult bull trout abundance; restore and maintain suitable habitat conditions for all life history stages and forms; and conserve genetic diversity and provide opportunity for genetic exchange (Service 2002c).

There are two core areas in the Snake River management unit (see figure 6): Tucannon River and Asotin Creek (Service 2002c). These core areas are separated by the mainstem hydroelectric facilities at Little Goose and Lower Granite Dams. Tucannon River bull trout have been documented as using the Snake River, but mainstem use by Asotin Creek bull trout is unclear. While genetic analyses have not been initiated to provide conclusive evidence, the physical distance that separates these streams makes interbreeding unlikely between these populations. Additional genetic information is needed to verify the separation of bull trout within the core areas of the Snake River Washington management unit. Spawning areas in the Tucannon River watershed are known to include (see figure 7): upper Tucannon River, Bear Creek, Sheep Creek, Cold Creek, Panjab Creek, Meadow Creek, Little Turkey Creek, and Turkey Creek. Based on juvenile distribution, spawning may also occur in Cummings Creek (USFS 1992c as referenced in Service 2002c). In the Asotin Creek Core Area, spawning is known to occur in North Fork Asotin Creek, and Cougar Creek.

Figure 6 (from Service 2002c).

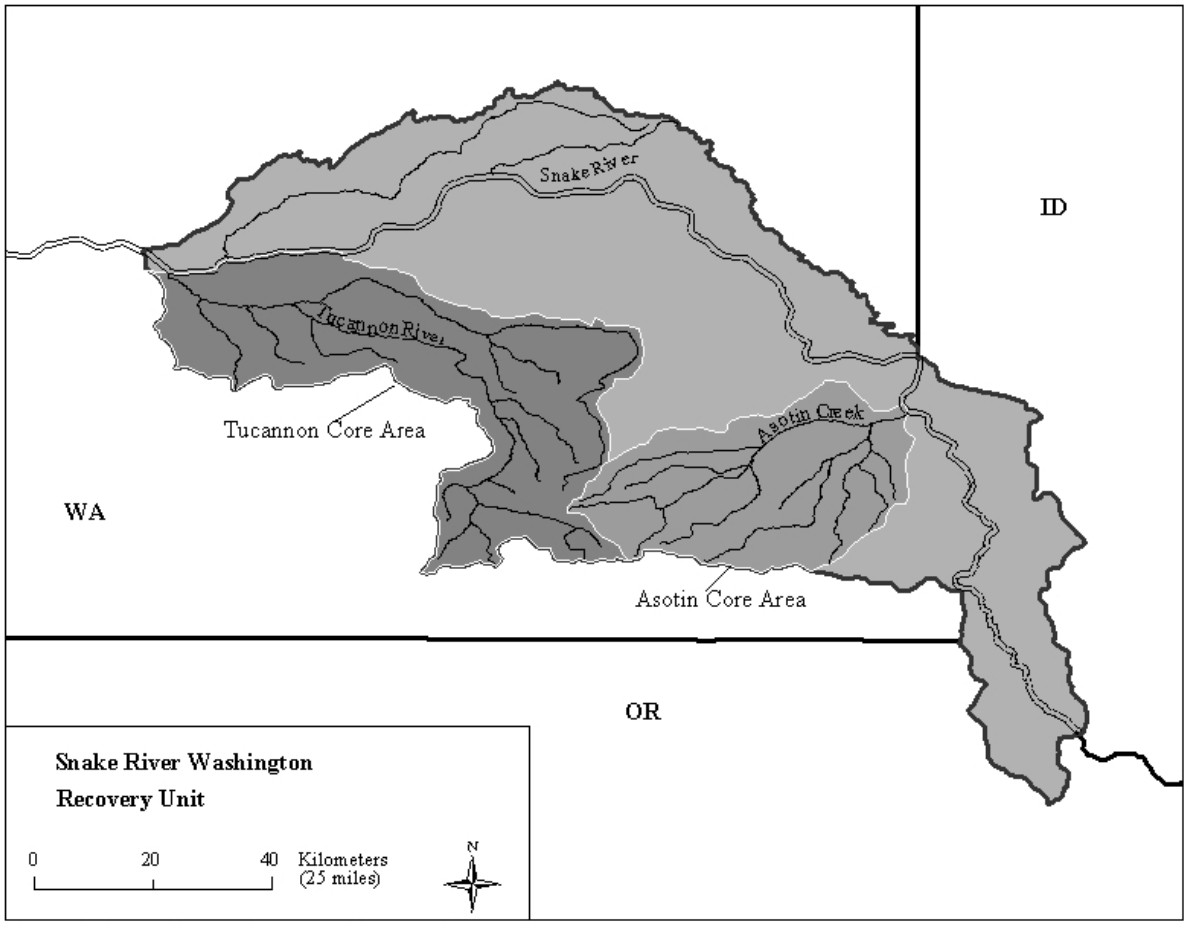


Figure 2. Snake River Washington Recovery Unit.

Figure 7 (from Service 2002c)

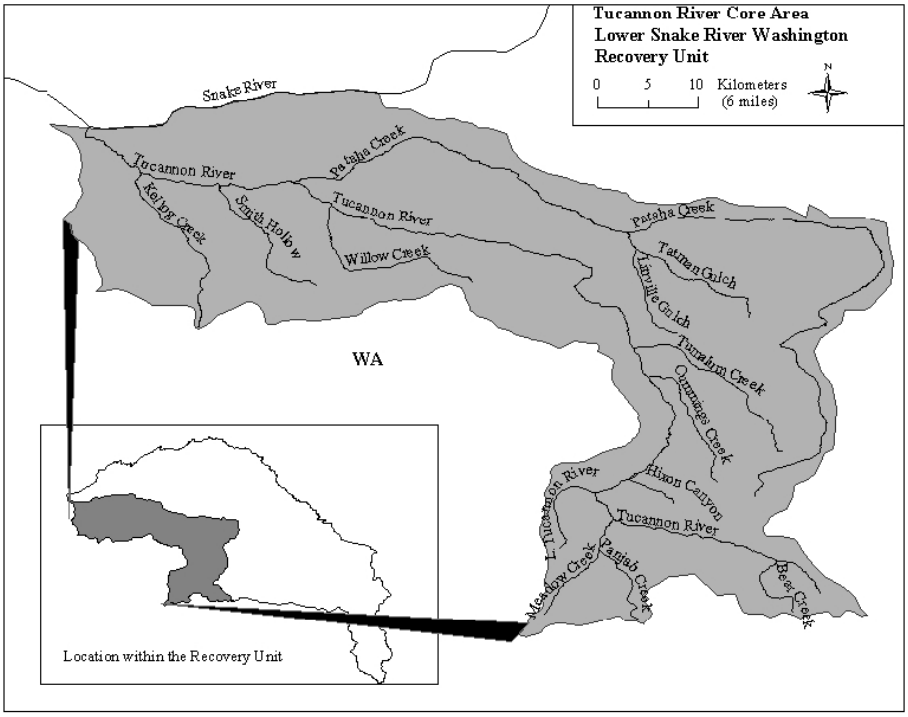


Figure 3. Tucannon River Core Area for Bull Trout within the Snake River Washington Recovery Unit.

Both resident and migratory forms of bull trout occur in the Tucannon River basin (Martin et al. 1992; WDFW 1997 as referenced in Service 2002c). It is likely that migratory Tucannon River bull trout use the mainstem Snake River (Kleist, in lit. 1993; Underwood et al. 1995; WDFW 1997, Glen Mendel, WDFW, pers. comm., 2002, all as referenced in Service 2002c). Asotin Creek also may support large migratory bull trout that use the Snake River (Groat, pers. comm.. 2002c). Adult bull trout have been noted passing Lower Monumental Dam, Little Goose Dams, and Ice Harbor Dams on the mainstem Snake River (Kleist in litt 1993; Baxter in litt., 2002 all as referenced in Service 2002c); while juvenile bull trout have been captured at Lower Granite Dam (D. Groat, Forest Service, pers. comm.. 2002 as referenced in Service 2002c).

While the Snake River dams may impact movement of bull trout that migrate into the Snake River, historic and current dams in the Tucannon River are likely to have had greater impact on migratory bull trout. One dam, the Starbuck dam on the Tucannon River (River Mile 5.5) was built in 1907 and likely impaired fish passage (Service 2002c), including fluvial bull trout. In 1992, the WDFW built a new fish ladder at Starbuck dam, which is operated in October through December for fall Chinook. A notch was cut in the center of the structure to allow water to cascade in spring and summer, thereby allowing upstream passage of adult anadromous fish, but

to block the passage of non-game fish. Adult bull trout are believed to be able to pass, but juvenile or subadult passage is unclear. Asotin creek also had impacts from dams and irrigation, but is not addressed in detail here since the action area for this HCP does not include the Asotin Creek watershed.

Bull trout spawn and rear in isolated portions of stream drainages in both core areas of the Snake River Washington management unit. In addition to man-made barriers, destruction of riparian zones, leading to high water temperatures, is the most significant factor acting to reduce fish movement and habitat use in the middle to lower reaches of the Tucannon River and Asotin Creek.

The recovery criteria for the Snake River Washington management unit include the following quantitative measurements of bull trout distribution and population characteristics:

1. Distribution criteria will be met when the total number of stable local populations has increased to 10 in the Tucannon River Core Area and to 7 in the Asotin Creek Core Area. These local populations must occur in separate streams with broad distribution throughout the core area.

2. Trend criteria will be met when the overall bull trout population in each core area of the Snake River Washington Management unit is stable or increasing over a period of at least 10 years, as determined through contemporary and accepted analyses of abundance trend data.

3. Abundance criteria will be met when the Tucannon River Core Area supports an average of 1,000 spawners annually and when the Asotin Creek Core Area supports an average of 700 spawners annually.

4. Connectivity criteria will be met when migratory forms are present in all local populations and when intact migratory corridors among all local populations in both core areas provide opportunity for genetic exchange and diversity.

General recovery measures that private landowners may contribute to include: maintain or improve water quality; and identify upland conditions negatively affecting bull trout habitats and implement tasks to restore appropriate functions. Specific recovery measures for the Tucannon River watershed are described in Table 11 under Effects of the Action on Bull Trout.

5.1 Environmental Baseline Bull Trout- Tucannon River Watershed

Below, we discuss bull trout distribution and habitat characteristics in relation to the Tucannon River Core area. The Asotin Creek Core area is outside of the action area, and not further addressed here.

5.1 Tucannon River Watershed

Within the Tucannon River watershed, the primary existing threats to bull trout include (Service 2002c): 1) lack of large, deep pools with LWD; 2) lack of adequate shade and over-hanging vegetation; 3) lack of off-channel rearing habitat; 4) heavy siltation during storm runoff; 5) general lack of connectivity to the floodplain; and 6) high temperatures. Bull trout require water temperatures below 59^{o}F with an optimum for rearing about 46-48^{o}F. Tucannon River water temperatures in the summer are well above these limits, and are not noticeably cooler until about Cummings Creek, at River Mile 35 (Columbia County Conservation District, 2001, as referenced in Service 2002c). Frequently, the Tucannon River contains high amounts of suspended sediments. This usually occurs during spring runoff and during periods of heavy, long duration rains in late spring and intense thunderstorms in early summer.

Table 10 displays a list of BLC parcels, bull trout use, and critical habitat in the Tucannon River watershed.

Figure 5 in section 4.2 displays a map of parcels, streams, and critical habitat.

Table 10. Tucannon River Watershed Parcels and Bull Trout use.

BLC parcel name **Size**	**Current Activity**	**Stream type/ name**	**Down-stream major watershed**	**Riparian Conditions**	**Bull trout use of areas**	**Relevant draft Bull Trout Recovery Chapter**	**Bull trout critical habitat designated?**
Pentecost Pasture 2,717 acres	Winter Spring grazing	dis-connected ephemeral or dry draws to Snake River/ Field's Gulch, and unnamed draws	Snake River	Dry brush types	None on parcels; Snake River unknown; possible BT migration	Snake River	Not on Snake River.
Pataha Creek Pasture 8,000 acres	Grazing	Incised deep channel/ Pataha Creek	Flows into Tucannon River	Developing trees and shrubs	None on Pataha Creek, migratory on Tucannon	Snake River	Not on Pataha Creek. Tucannon River designated below Forest Service, to mouth.

BLC parcel name **Size**	**Current Activity**	**Stream type/ name**	**Down-stream major watershed**	**Riparian Conditions**	**Bull trout use of areas**	**Relevant draft Bull Trout Recovery Chapter**	**Bull trout critical habitat designated?**
Tucannon River Block 1 4,500 acres (all blocks)	Irrigated pasture	Large fish-bearing stream/ Tucannon River	Flows into Snake River	Deciduous forest or grass/forb. Forested in most areas; scoured and channelized in some.	Spawning upstream of ownership; migratory near parcels	Snake River	Tucannon River designated below Forest Service, to mouth.
Tucannon River Block 2	Irrigated alfalfa	Large fish-bearing stream/ Tucannon River and uplands	Snake River	Dense grass.	Spawning upstream of ownership; migratory near parcels	Snake River	Tucannon River designated below Forest Service, to mouth.
Tucannon River Block 3	Irrigated alfalfa	Large fish-bearing stream/ Tucannon River	Snake River	Fenced deciduous forest. Stream channel stabilized by large boulders.	Spawning upstream of ownership; migratory near parcels	Snake River	Tucannon River designated below Forest Service, to mouth.
Tucannon River Block 4	Irrigated pasture	Large fish-bearing stream/ Tucannon River and uplands	Snake River	Fenced, deciduous forest.	Spawning upstream of ownership; migratory near parcels	Snake River	Tucannon River designated below Forest Service, to mouth.
King/ McGee 1,800 acres	Dry farming/ grazing	Ephemeral and intermittent tributaries to Willow Creek and Tucannon River	Tucannon River	Grassed waterway	None on parcels	Snake River	Tucannon River designated below Forest Service, to mouth.

BLC parcel name **Size**	**Current Activity**	**Stream type/ name**	**Down-stream major watershed**	**Riparian Conditions**	**Bull trout use of areas**	**Relevant draft Bull Trout Recovery Chapter**	**Bull trout critical habitat designated?**
Beard Block 1,568 acres	Dry farming	Ephemeral and intermittent tribs to Willow Creek and Whetstone Creek	Tucannon River	Grassed waterway	None on parcels	Snake River	Not on parcels. Tucannon River designated below Forest Service, to mouth.
Romaine Block 1,792 acres	Dry farming	Ephemeral and intermittent tributaries to Smith Hollow Creek and Willow Creek	Intermittent and perennial tributaries to Tucannon River	Dense brush in canyon	None on parcels	Snake River	Not on parcels. Tucannon River designated below Forest Service, to mouth.

As above in the Touchet River bull trout discussions, we use the Bull Trout Matrix (Service 1999) to organize our discussions in the following bull trout environmental baseline and effects sections.

5.1.1 Tucannon Subpopulation Characteristics:
(Subpopulation Size, Growth and Survival, Life History Diversity and Isolation, Persistence and Genetic Integrity)

Bull trout are known to spawn in the upper Tucannon River (above River Mile 34) (Martin et al 1992; Underwood et al 1995) and its tributaries (Cummings, Panjab, Sheep, and Bear Creeks) (Service 2002c), and migrate through the lower reaches. This stock of wild bull trout likely has both resident and fluvial life histories. Bull trout from the Tucannon migrate into the Snake River, but little is known about the status of bull trout in the Snake River.

Cummings Creek is the most downstream of the upper Tucannon tributaries known to have bull trout. Both fluvial and resident forms were observed during U.S. Forest Service (USFS) surveys in 1991. Bull trout have been documented in Panjab, Sheep, and Bear Creeks during USFS surveys in 1992, 1994, and 1995. The USFS has documented spawning in Panjab Creek and juveniles in Sheep Creek. Observation of adults indicate that both fluvial and resident life history forms exist in Panjab and Bear Creeks (Columbia County Conservation District 2001, as referenced in Service 2002c). Fluvial subpopulations are relatively rare in the Columbia River basin and are important to conserve.

Adult and sub-adult bull trout move downstream through the main stem Tucannon River, including the area bordered by BLC lands, and move upstream to colder headwater areas in the spring. BLC has approximately 4.2 miles of the Tucannon River along its parcels. Spawning areas are above BLC lands. Mendel (WDFW pers.comm July 22, 2008) reviewed several years of bull trout data on the Tucannon River. He determined that of the 47 radio tagged fish with successful over-winter tracking data available, 13 (28%) stayed above the Tucannon Fish Hatchery. Sixteen (34%) remained between the Tucannon Fish Hatchery (higher in the watershed) and Marengo, and 17 (37%) migrated below Marengo (about 5 miles above BLC Tucannon parcels. Mendel also summarized that six different individuals (3 in 2006; 2 in 2005; 1 in 2004) were documented as migrating into the Snake River (past BLC parcels). During 2002 to 2006, the number of unique bull trout handled (as evidenced by PIT tags) varied from 97 to 253 (Mendel, WDFW, pers. comm., July 22, 2008) with the average being 160 individuals. Using a single year as an example, in 2005, 165 bull trout were captured and PIT tagged at the Tucannon Fish Hatchery weir in the spring between March 21 and July 21, 2005 (Faler et al, 2006). In 2005 during the fall, the researchers captured and radio tagged 18 bull trout. Nine of the radio-tagged bull trout congregated near the Tucannon Fish Hatchery and Wooten Wildlife Area, and seven (~39%) migrated to the lower river near Starbuck (past BLC parcels) by November of 2005.

Thus, as described above, at least 6 individual adult bull trout have been documented as leaving the Tucannon River spawning areas and migrating into the Snake River; approximately 37% of radio tagged bull trout have moved below Marengo (still upstream of Broughton parcels, but in the middle reaches of the Tucannon River); and in 2005, approximately 39% of radio-tagged bull trout moved below Starbuck (thereby moving past the BLC Tucannon parcels). About 160 bull trout are handled at the Tucannon Fish Hatchery per year on average, with a high of 253. The Service is cautious because the information is based on a sample of a population and we do not know the total population of bull trout in the Tucannon River; much of the data is for larger migratory fish that are big enough to handle a radio tag; there is no information on subadult bull trout movements; and there is always sampling error. However, this is the best available information to determine numbers of bull trout migrating through the stretch of the Tucannon River affected by activities on BLC's parcels. The Service assumes between 7 and 99 (39% of 253) adult bull trout migrate past BLC's parcels on the Tucannon River.

Recent redd surveys show low numbers of spawners in the Tucannon River watershed. In 2007 the upper Tucannon had 13 redds; Bear Creek had 4; Meadow Creek 5, and Panjab Creek 1, for a toatal of 17 (Mendel et al 2008). No surveys were conducted in 2006 due to a fire. The 2005 redd counts in the Tucannon River watershed totaled 134 redds. The highest redd counts since 1990 was185 total redds in 2004. The total redds in 2007 in the upper Tucannon and Bear Creek were the lowest since 1990, and the Punjab and Meadow Creek 2007 results were the lowest since 2000.

Pataha Creek is a tributary to the Tucannon River. BLC owns land near or tributary to Pataha Creek, although only in the lowest 4 miles of the stream. Pataha Creek only has ~0.8 miles of frontage along BLC lands. The Service could find no recent record of bull trout in the Pataha

Creek watershed. Del Groat (Umatilla Nation Forest, 2000, pers. comm., as referenced in HCP), Umatilla National Forest District Fisheries Biologist, reports that a bull trout was observed in the headwaters of the Pataha Creek watershed in about 1970, but none have been detected since. Downstream of Pomeroy, in Garfield County, stream substrate is sediment laden, and high water temperatures are sustained for extended periods, making it highly unlikely that bull trout would occupy these areas (HCP/EA). According to the Columbia County Conservation District (1997), no salmonid fish were found in the first 10.7 miles of Pataha Creek in 1994, likely due to high temperatures. A 1998 WDFW survey (Mendel 1999) also found no salmonid or other fish or amphibian species addressed by the BLC HCP downstream of Pomeroy (Mendel 1999).

5.1.2 Tucannon Water Quality:
(Temperature, Sediment, Chem. Contam./Nutrients)

Tucannon River water temperatures in the summer are well above bull trout limits, and are not noticeably cooler until about Cummings Creek, at River Mile 35 (Columbia County Conservation District 2001). Elevated water temperatures likely limit bull trout distribution in some areas of the Tucannon River from July through October (Service 2002c). Juvenile rearing and adult migration in lower stream reaches is prevented during this period. Other water quality parameters within lower reaches of the Tucannon River watershed are within Washington State standards most of the time and probably do not hinder expansion of local populations.

Riparian vegetation has been extensively degraded in Columbia County and in many areas that are now in BLC ownership by the historically common practice of farming to the stream bank. Major impacts on riparian vegetation also result from overgrazing, agricultural clearing and herbicides, forest harvest, road construction, flood damage and flood control. Loss of riparian vegetation is a major contributor to increased water temperature and sedimentation throughout the Tucannon River watershed, although naturally occurring warm air temperatures, and artesian-thermal springs along the Tucannon also contribute to high temperatures in the river (HCP/EA).

The federal Clean Water Act requires Ecology to identify water bodies that fail to meet water quality standards, and place these on a 303(d) List. Portions of Pataha Creek and the Tucannon River are on the 303(d) list for temperature, fecal coliform, and/or pH. Portions of the Tucannon River are also listed for temperature, fecal coliform, and in one location for pH. These degraded water quality conditions indicate the need for riparian buffers to act as nutrient buffers, and to provide shade to moderate temperatures.

Grazing has occurred in the Blue Mountains and the Tucannon Watershed since the 1800's. Grazed rangeland used for livestock production currently includes 36 percent of the Tucannon River watershed (Gephart and Nordheim 2001 as referenced in Service 2002c). In the Pataha Creek watershed, livestock grazing is a major land use with rangeland covering about 45,114 acres of land. The majority of grazed range is on the valley slopes above the river valley bottom (Service 2002c). In 1996, the conditions of 69 percent of grazed lands in the watershed were rated from poor to fair, with associated soil loss from rill and sheet erosion estimated at 135,300 tons per year (Pomeroy Conservation District 1998 as referenced in Service 2002c). In 1991 the

estimated annual sediment yield to the Snake River from grazed rangelands along the Tucannon was about 15 percent of the total sediment load carried by the river that year (TRMWP 1997 as referenced in Service 2002c).

The draft recovery plan chapter (Service 2002c) explained that agricultural practices on naturally erodible soil types, along with tilling and seeding immediately adjacent to and in the floodplain of the Tucannon River, have resulted in greatly increased coarse sediment loads and increased substrate embeddedness along the lower 20 miles of the river. The river's width-to-depth ratio has increased in the lower watershed. Along tilled areas of the streambanks, riparian vegetation has been removed. Farming practices used from the early 1900's to 1970 produced high erosion rates, sediment transport to streams, and overall degradation of habitat and water quality.

Most of the cropland in the Tucannon River watershed is classified as "highly erodible land" (ACMWP 1995; TRMWP 1997; Stovall 2001, all as referenced in Service 2002). Farmers have implemented conservation practices such as direct seeding, strip cropping, and terracing to reduce erosion rates and sediment transport to streams. Despite these efforts, sediment delivery to streams from upland sources is still a significant concern in protecting salmonid habitat (TRMWP 1997; Gephart and Nordheim 2001; Stovall 2001; Kuttle 2002; as referenced in Service 2002c). Frequently, the Tucannon River contains high amounts of suspended sediments, especially during spring runoff and during periods of heavy, long duration rains in late spring and intense thunderstorms in early summer.

Rates of erosion and sediment delivery to streams from dry crop areas in parts of Columbia County can be extreme. Pataha Creek is the largest tributary to the Tucannon River, with a mainstem stream length of more than 98 kilometers (60 miles). Pataha Creek is deeply incised. Erosion of cropland soil is exacerbated by the fact that nearly all livestock operators move cattle to cropland following harvest of fields to forage on leftover crop vegetation (Pomeroy Conservation District 1998 as referenced in Service 2002c). Cropland was identified as the major contributor of the more than 187 million kilograms (205,200 tons) of sediment lost each year through runoff in the mid 1980's. The Pataha Creek sediment load was identified as the primary cause of accelerated braiding in the lower reaches of the Tucannon River below the mouth of Pataha Creek. Although extensive installation of conservation measures between 1986 and 1992 has reduced these rates substantially in much of the county, they remain high in some areas (Pomeroy Conservation District 1997 as referenced in Service 2002c).

In the Pataha Creek watershed, there are 212 miles of dirt, gravel, and paved County roads, and an additional 149 miles of roads on the Umatilla National Forest. Many of the roads in this watershed run parallel to Pataha Creek and cross over many smaller tributaries. The road network in Pataha Creek watershed is largely a non-engineered system that is more than a century old. The draft recovery plan (Service 2002c) explains that roads can negatively impact water quality. Roads increase sediment delivery, drainage ditches quickly fill with sediment, and some roads were built on excessively steep grades in the watershed and therefore deliver sediment during runoff and rainstorms. Many of these roads have steep, unprotected cut-and-embankment slopes that have moderate to severe tendencies to erode. Specific road maintenance activities that may have impacted historical populations of bull trout in Pataha Creek, and may

impact any establishment of bull trout in this watershed, include undersized culverts incapable of handling high sediment loads, installation of flood control channel structures and riprap, ditch and roadway cleaning without sediment removal, grading of aggregate and unsurfaced roads, vegetation control, herbicide and dust-control chemicals, and winter road sanding. Road conditions along Pataha Creek not only affect stream conditions locally, but also impact channel conditions in the mainstem of the Tucannon River at its confluence with Pataha Creek. Although some of the sediment delivered to Pataha Creek comes from poorly constructed and poorly maintained roads, it is important to note that much of the increased sediment delivered by the road system originates from upland land use activities.

Some stream reaches within BLC's lands, including along Pataha are not well protected and vegetated, and channel and bank erosion and stream shade/water temperature are problems. Stream temperatures commonly exceed 80°F throughout mid-summer in the lower miles of the river downstream of Pataha Creek (River Mile 31) (Mendel et al 1993) due to low elevation and the effect of naturally warm air temperatures, naturally occurring thermal-artesian springs, and loss of riparian vegetation, and likely exceed the Washington state water quality standard of 63.5 °F for a 7-day maximum (ECOLOGY 2006). Stream temperatures and general water quality improve once the stream reaches forestland several miles upstream of Pomeroy (Pomeroy Conservation District 1997).

Pataha Creek has only sporadic areas of riparian shade, and was too warm for juvenile salmonid rearing (Columbia County Conservation District 1997). High nutrient levels likely associated with livestock uses adjacent and in the stream, and warm water, contributed to low levels of dissolved oxygen. Several water diversions, some of which were not adequately screened, may have contributed to low stream flow. The channel evidenced much bank erosion from livestock and high flows, and the bed had cut down to bedrock in most of this section's length, with depositions of silt and some pockets of gravel. These problems resulted from stream channelization, valley drainage, and conversion from native shrub and forest to grasslands, followed by rapid stream downcutting dating to the early 1900s (HCP/EA).

5.1.3 Tucannon River Habitat Access:
(Physical Barriers)

Within the Tucannon River watershed, several important streams that support bull trout spawning and rearing have impassable natural barriers that substantially reduce the stream area available to fish. Most of these barriers are sizable waterfalls that may eliminate opportunities to bring additional stream area into production, and they occur on Sheep Creek, Bear Creek, and Cold Creek (Service 2002c). All three streams support spawning bull trout below these barriers. All three spawning streams are above any BLC lands.

In addition to man-made barriers, destruction of riparian zones leading to high water temperatures, is likely the most significant factor acting to reduce fish movement and habitat use in the middle to lower reaches of the Tucannon River (Service 2002c). Elevated water temperatures act as thermal barriers and limit bull trout distribution in some areas from July

through October, impairing or preventing juvenile rearing and adult migration in lower stream reaches during this period.

5.1.4 Tucannon Habitat Elements:
(Substrate Embeddedness, Large Woody Debris, Pool Frequency and Quality, Large Pools, Off-channel Habitat, Refugia)

Riparian and channel conditions in Columbia County improved following the 1964 flood, but had not fully recovered when the 1996-97 floods caused further decline (Columbia County Conservation District 1997). The Tucannon River became wider, less stable, frequency of large pools with large woody debris decreased, and frequency of unvegetated stream banks increased. Similar problems occurred in Pataha Creek (Pomeroy Conservation District 1997).

5.1.5 Tucannon Channel Cond. & Dynamics:
(Wetted Width/Max.Depth Ratio, Streambank Condition, Floodplain Connectivity)

In both the Tucannon River and Pataha Creek, a series of floods (1964-65, 1968-69, and again in 1996-97) have repeatedly scoured streambeds, stream banks, and riparian vegetation, resulting in a wider channel that is less stable, frequency of large pools with large woody debris has decreased, and frequency of unvegetated stream banks has increased (Columbia County Conservation District 1997, Pomeroy Conservation District 1997).

Tributaries of the Tucannon River draining Broughton land include Pataha Creek, Willow Creek, Whetstone Creek, Smith Hollow Creek, and Cougar Canyon Creek. As a result of the loss of riparian vegetation, and in some cases in combination with accelerated runoff, stream channels in some areas have become degraded. Stream channelization and straightening, drainage of wetlands, and conversion of grasslands, shrub communities, and forests to croplands resulted in severe channel downcutting, widening, channel instability, and further loss of native riparian communities.

In Pataha Creek, from the Town of Dodge at River Mile 10 down to the stream's confluence with the Tucannon River, the channel is extensively incised as a result of ditching along farm fields and subsequent erosion. The stream has downcut through more than 20 to 25 feet of silt and clay to expose raw bedrock in many locations from the City of Pomeroy to the mouth of the creek. Today, riparian communities have re-established on flood terraces within many portions of the incised channels. In other cases, riparian vegetative development continues to be retarded by farming to the stream edge and riparian grazing.

Section 6.2.3, and Appendix 1 of the HCP provide details on channel conditions in the Tucannon River parcels. Generally, parcels on the mainstem Tucannon River (Blocks 1 through 4) vary from eroded, unstable stream banks in block 1 with rock and log revetments, to stable and well-vegetated areas in the other blocks. Willow Creek, a tributary to the Tucannon River is incised, though stabilized by vegetation. Ephemeral tributaries to Willow Creek vary from rock rubble, to well vegetated and stable, to severely down-cut to bedrock. Tributary intermittent streams on BLC lands occur within steep canyon grass and grazed areas. The vegetated condition helps

stabilize these canyons and draws. Some intermittent and ephemeral draws drain into the Tucannon River, or the Snake River, and are generally vegetated with grasses and forbs.

Section 6.2.2, and Appendix 1 of the HCP provide details on channel conditions in the Pataha Creek parcels. Within BLC ownership, Pataha Creek has a deep incised channel through BLC lands. Trees and shrubs were planted under CREP, with the goal to stabilize the floodplain and banks. Intermittant draws, such as Dry Gulch and Miller Gulch drain into Pataha Creek. Miller Gulch is incised to meet the lowered elevation of Pataha Creek. BLC maintains grass cover in steep draws to stabilize the draws.

5.1.6 Tucannon Flow/Hydrology:
(Change in Peak/Base Flows, Drainage Network Increase)

The Tucannon River enters the Snake River at RM 62.2. The total watershed area is 498 mi^2. Mean discharge is 174 cfs, with a mean annual peak flow of 310 cfs, generally occurring in April or May, and a mean low flow of 61.5 cfs, usually occurring in August or September. The volume and speed of runoff in much of the farmland and pastureland in Columbia County is increased above naturally occurring conditions as a result of historical land use practices (HCP/EA). Upstream of the BLC irrigated parcels on the Tucannon River, the Tucannon @ Marengo gage lists a daily mean low flow of 50.1 cfs, 50.9 cfs, and 58 cfs for the water years of 2005, 2006, and 2007, respectively (Ecology website 2008). Downstream of the BLC irrigated parcels at the Tucannon near Starbuck gage, the USGS lists low flows of 35, 46, and 45 cfs for the waters years of 2005, 2006, and 2007 respectively (USGS National Water Information System Web Interface, 2008).

Elevated water temperatures in the lower Tucannon River are believed to be caused, in part, by reduced water volume from withdrawals for irrigation (Service 2002c). Water removed from the Tucannon River during peak crop irrigation reduces stream flow and impacts stream temperatures and bull trout migration. Impacts could be particularly severe during spring and fall migration periods in dry years with low snow pack runoff. As of 1995, Ecology had issued 68 surface water rights for the Tucannon River (Covert et al. 1995 as referenced in Service 2002c) for a total diversion of 1.7 cubic meters per second (60 cubic feet per second) to irrigate 464 hectares (1,147 acres) (TRMWP 1997 as referenced in Service 2002c). Since 1995, all other surface water right applications to Ecology have been denied.

BLC irrigates farmland from the Tucannon River and Patit Creek. At the Tucannon River irrigated parcel, BLC has implemented irrigation efficiency measures and protected the saved water instream. Beginning in 2004, BLC protected 6.4 cfs of the saved water instream as “trust water”, out of an 11.15 cfs water right. This water is currently protected through January 1, 2019.

Pataha Creek is the single largest tributary of the Tucannon River, entering the Tucannon at RM 31, and with a mainstem stream length of more than 60 miles. The total watershed area is 185 mi^2. While Pataha Creek is not gaged, and its mean annual flow has not been calculated, flow

measurements ranged between 5 cubic feet per second in September 1998 to 27 cubic feet per second in March 1999(HCP/EA). BLC does not divert water from Pataha Creek.

5.1.7 Tucannon Watershed Conditions:
(Road Density & Location, Disturbance History, Riparian Conservation Areas, Disturbance Regime)

Columbia County and the Tucannon River and Pataha Creek watersheds have experienced a series of floods that have repeatedly scoured streambeds, stream banks, and riparian vegetation. Severe floods damaged the Tucannon River systems in the 1960's and 1990's, and riparian and channel conditions were degraded by becoming wider and less stable, with the frequency of large pools with large woody debris decreased, and frequency of unvegetated stream banks increased (Columbia County Conservation District 1997, Pomeroy Conservation District 1997).

Timber harvest and roads have impacted bull trout habitat in the Tucannon River watershed. Nearly 89 percent (48,611 acres)of all forested lands in the Tucannon River watershed are within the Umatilla Nationa Forest Boundary. An additional 4,948 acres of forest lands in the watershed are owned by DNR, while the WDFW owns 13,037 acres of mostly forest land outside the Umatilla National Forest. Much of the watershed impact from forest harvest activities are from past practices, and all of the forest harvest impact is upstream of BLC parcels in the Tucannon River watershed.

The U.S. Forest Service reported that the Tucannon River watershed, excluding Pataha Creek, has 244 kilometers (152 miles) of road on National Forest lands (USFS 1998a). The Tucannon River Watershed Biological Assessment of Ongoing Activities for Consultation on Bull Trout (USFS 1998a) describes road density and road location on forest lands as "Functioning at Risk." There are roads with riparian areas within occupied bull trout habitat on U.S. Forest Service lands in the upper watershed. As of 1994, the overall road density on forest lands in the Tucannon River watershed was slightly less than 1.2 kilometers per square kilometer (2.0 miles per square mile) (Service 2002c).

Section 6.2.3 of the HCP/EA provides detail on riparian conditions on BLC parcels adjacent to the Tucannon River and its tributaries. The riparian conditions are variable, and include broad forested riparian zones from 60-100 feet wide, and other locations with unstable stream banks. One location, near the mouth of Willow Creek, has had efforts to stabilize the channel with rock and log revetments. The riparian areas are bordered by grass and alfalfa fields, and in one area cattle are grazed on the lands to the south of the river during the winter, but BLC implements feed and water stations on the high slopes to keep cattle out of the steep slopes and riparian area of the Tucannon River. CREP buffers and fencing installed by BLC in 2002 now prevent cattle access to the riparian zone. During the CREP contract, cattle would only be allowed access during emergencies.

Willow Creek, where it occurs on a BLC parcel, has a vegetated incised channel and supports minimal shrubs and trees. Other tributary intermittent streams on BLC lands typically support a well-vegetated riparian area bordered by relatively steep canyon grass/grazed areas, with dryland

wheat and peas on gentle slopes above. There are several ephemeral draws that drain the Pentecost Pasture, and they have no surface water connection with the Tucannon River. These draws are generally vegetated with grasses and forbs. Other ephemeral draws drain into the Snake River. These draws are vegetated, they may be grazed, and they are separated from the river by at least ½ mile, a state highway, and a railroad.

The draft recovery plan chapter (Service 2002c) explains that within the Pataha Creek watershed, there are 341 kilometers (212 miles) of dirt, gravel, and paved County roads. An additional 240 kilometers of roads (149 miles) in the watershed are on the Umatilla National Forest. Many of the roads in this watershed run parallel to Pataha Creek and cross over many smaller tributaries. The road network in Pataha Creek watershed is largely a non-engineered system that is more than a century old.

Conditions on Pataha Creek Parcels are described in the HCP/EA in section 6.2.2. Within BLC ownership, Pataha Creek has a deep incised channel through BLC lands. BLC has eliminated grazing and farming from the lands that occur between Highway 12 and Pataha Creek. Trees and shrubs were planted under CREP, and the riparian vegetation is recovering. Intermittant draws, such as Dry Gulch and Miller Gulch, drain into Pataha Creek. Miller Gulch is incised to meet the lowered elevation of Pataha Creek. Grazing is managed in the Pataha block to maintain grass cover in steep draws, preventing erosion.

5.1.8 Tucannon Integration of Species and Habitat Conditions

The recovery criteria (Service 2002c) for the Snake River Washington management unit include the following quantitative measurements of bull trout distribution and population characteristics, with responses in italics for the baseline conditions.

1. Distribution criteria will be met when the total number of stable local populations has increased to 10 in the Tucannon River Core Area and to 7 in the Asotin Creek Core Area. These local populations must occur in separate streams with broad distribution throughout the core area.

   For the Tucannon River Core Area, there are currently eight known local Populations (Service 2002c): Upper Tucannon, Bear Creek, Sheep Creek, Cold Creek, Panjab Creek, Turkey Creek, Meadow Creek, and Little Turkey Creek.

   For the Asotin Creek Core Area, there are two known local populations (Service 2002c): Asotin Creek and Cougar Creek.

2. Trend criteria will be met when the overall bull trout population in each core area of the Snake River Washington management unit is stable or increasing over a period of at least 10 years, as determined through contemporary and accepted analyses of abundance trend data.

Bull trout populations in the Asotin Creek Core Area exhibit a depressed and probably declining population trend (Service 2002c). As evidenced by recent redd counts, the Tucannon River Core Area exhibits a variable, and likely declining population trend.

3. Abundance criteria will be met when the Tucannon River Core Area supports an average of 1,000 spawners annually and when the Asotin Creek Core Area supports an average of 700 spawners annually.

   Adult abundance in the Tucannon River Core Area was estimated (based on redd counts) at 600 to 700 adult spawners per year in the eight known local populations (Service 2002c). The 2007 redd counts (17) would result in adult spawners of substantially lower number.

   Adult abundance in the Asotin Creek Core Area was estimated at less than 300 individuals in two known local populations, based on the results of bull trout surveys (Service 2002c).

4. Connectivity criteria will be met when migratory forms are present in all local populations and when intact migratory corridors among all local populations in both core areas provide opportunity for genetic exchange and diversity.

   Migratory bull trout may persist in some local populations in the Tucannon River Core Area (Service 2002c). Migratory forms in the Asotin Creek Core Area are believed to be absent or extremely limited in both local populations.

As described above, the Tucannon River watershed is not currently meeting recovery expectations. BLC parcels are downstream of expected Tucannon River local population spawning areas. Nonetheless, BLC lands can support connectivity for foraging, migratory, or overwintering bull trout in the Tucannon River and support access to the Snake River. Ongoing management on BLC lands already minimize some effects to the bull trout and its habitat and water quality, including their ongoing grazing management, upland agriculture methods, implementation of CREP buffers, and protection of some irrigation water in trust in the Tucannon River.

5.2 Effects of the Action Bull Trout -Tucannon River Watershed

The draft bull trout recovery plan (Service 2002c) includes several recovery measures that can be addressed by a private landowner. Specific recovery measures for the Tucannon River watershed and BLC contributions in the HCP are described in Table 11. Additional detail on the HCP measures is provided in Table 6.

Table 11. Relevant* Recovery Measures (Service 2002c) and BLC HCP Measures.

* "Relevant" includes those measures relevant to the Tucannon watershed, and which are reasonable for a private landowner such as BLC to implement.

Relevant Recovery Measures Snake River Washington Management Unit	**BLC HCP measures**
1. Maintain or improve water quality. Review and act on recommendations generated from sediment monitoring and abatement plans. In the Tucannon River watershed, review and coordinate sediment abatement actions in response to sediment monitoring in Pataha Creek and the mainstem Tucannon River. Promote agricultural practices such as no-till seeding to reduce sediment delivery to streams identified for bull trout recovery.	- Maintain minimum till (a.k.a: "no-till"). - Maintain grassed waterways for life of HCP. - Pataha Creek: enroll area between stream and Highway 12 in CREP (done 2001); 39 ac. - Maintain riparian conditions initially encouraged by CREP for life of HCP. - Tucannon River: Enroll in CREP (done 2001 and 2006), 195 ac.; construct fences and plant trees and shrubs. - Maintain buffers in Tucannon Block 1, 17 ac.
2. Identify factors contributing to elevated stream temperatures. Implement water temperature monitoring on State and Federal lands. Identify and correct reasons for temperature exceedences in bull trout migratory and rearing habitat in the Tucannon River.	- Enroll in CREP (see above). - Maintain riparian conditions initially encouraged by CREP for life of HCP.
3. Conduct a complete inventory of surface water diversions. Inventory all surface water diversions in the Tucannon River. Evaluate compliance with State, U.S. Fish and Wildlife Service, and the National Marine Fisheries Service screening criteria. Screen all diversions to meet State and Federal requirements.	- Tucannon River: Replace pump screens to meet current fish criteria (done 2003). - Enroll 6.4 cfs in water trust to reduce total irrigation use by over 50 percent of water right.
4. Stabilize streambeds and banks: Develop additional private landowner cooperation to restore streambanks, stream function, and floodplain connectivity on private grazing and agricultural lands along stream corridors.	- Maintain riparian conditions initially encouraged by CREP for life of HCP. - Tucannon River: Enroll in CREP; Build two water sources; construct fences and plant trees and shrubs. - Pataha Creek: Enroll in CREP; develop water source south of Hwy 12 (done 2003).
5. Identify and restore riparian vegetation in priority streams. Identify sites and revegetate to restore shade and canopy, riparian cover, and native vegetation to improve or maintain bull trout habitat.	- Maintain riparian conditions initially encouraged by CREP for life of HCP. - If redds are found in crossings consult with agencies to minimize impact.

Relevant Recovery Measures Snake River Washington Management Unit	**BLC HCP measures**
6. Reduce fine sediment inputs from agricultural land. Identify sources and work with landowners and agriculture agencies to reduce fine sediment inputs to the Tucannon River and its largest tributary, Pataha Creek.	- Maintain minimum till. - Maintain grassed waterways for life of HCP. - Maintain riparian conditions initially encouraged by CREP for life of HCP.
7. Reduce stream temperatures by enhancing riparian area. Reduce summer stream temperatures by restoring riparian forest buffers in both core areas. In the Tucannon River Core Area, restore riparian vegetation or areas to help reduce summer temperatures on the mainstem Tucannon River from Marengo downstream, especially in the Wooten Wildlife Area, and in Pataha Creek from Columbia Center downstream to the confluence with the Tucannon River.	- Maintain riparian conditions initially encouraged by CREP for life of HCP.
8. Reduce impacts of livestock on streams and riparian areas. To reduce impacts from livestock, work with landowners, managers, and agriculture agencies to fence around streams and riparian areas in both core areas. Develop off-site livestock watering facilities.	- Attract cows away from streams by salt placement and supplemental feed locations. - Develop off-stream water sources fed by a new deep water Pataha well in Pataha Creek (done 2001-2003).
9. Identify upland conditions negatively affecting bull trout habitats and implement tasks to restore appropriate functions. Assess effects of upland activities and current upland conditions on stream and riparian function. In the Asotin Creek watershed, identify adverse impacts to the stream system from tumbleweed dams and upland soil erosion that contributes to excess fines deposited in the streambed. In the Tucannon River watershed, identify measures to control upland soil erosion from rangeland. Implement corrective measures in both core areas.	- Maintain minimum till. - Maintain grassed waterways for life of HCP.

Relevant Recovery Measures Snake River Washington Management Unit	BLC HCP measures
10. Assess current and historical effects of upland management on occupied bull trout streams. Evaluate effects of upland management, particularly timber management, and agriculture and grazing practices in the Asotin Creek and Tucannon River Core Areas. Assess changes to the stream hydrographs, for example, timing and magnitude of both base and peak flows, and sediment sources that reach streams from upland sites. Use information to improve upland activities to increase base stream flows.	- Replace all screens with 3/32nd standard mesh. - Enroll 6.4 cfs in water trust in Tucannon River to reduce total irrigation use by over 50 percent.

Below, we discuss effects for each Bull Trout Matrix topic.

5.2.1 Effects Tucannon Subpopulation Characteristics:
(Subpopulation Size, Growth and Survival, Life History Diversity and Isolation, Persistence and Genetic Integrity)

While the BLC HCP is likely to result in improved aquatic functions, there will be minimal direct effects on subpopulation characteristics because BLC parcels occur in the middle portions of the watershed and affect bull trout foraging, migration, and overwintering habitats. Bull trout spawning areas occur above BLC parcels. Implementation of the BLC HCP is likely to improve aquatic functions and water quality in potential migratory or overwintering habitats in the Tucannon River. Continued implementation of existing riparian buffers and upslope farming measures, and continuation of the trust water right should improve water quality in the Tucannon River.

As described in section 4.3.1, roads, fords, and stream crossings can have direct and indirect effects on bull trout, through sedimentation, stream channel changes, water yield and peak flows changes, and resultant debris flows. While water quality impacts such as sedimentation may impact bull trout and its habitat on or downstream of BLC parcels, riparian buffers implemented or maintained in the HCP help to minimize these effects. It is possible that migratory bull trout could be injured, killed, or harassed through motor vehicle or cattle use of fords on the Tucannon River, but the risk is minimized through BLC's implementation of CREP buffers, and their commitment to cross cattle through the fords only during emergencies, such as fire or severe winter weather. The BLC estimates that emergencies in the Tucannon requiring fording would be once per year at most, and that administrative use of the fords would be 3 times a year (McKinley, BLC, pers. comm. July 29, 2008). Bull trout do not spawn or rear on the middle stretches of the Tucannon river, therefore redds are unlikely to be harmed, and migratory adults or subadults would usually be able to move away from fording cattle or vehicles. As described in section 5.1.1 and based on various bull trout tagging studies in the Tucannon River (Mendel, WDFW, pers. comm. July 22, 2008; Faler et al. 2006), the Service determined that between 7

and 99 adult bull trout may migrate past BLC's parcels on the Tucannon River. Because the mitigation measures implemented or maintained through the HCP minimize effects to the bull trout, making the risk of injury, death, or harassment lower, the Service assumes the lower number of 7 bull trout could be impacted each year.

All items listed in Table 11 minimize effects to subpopulation characteristics, especially for migratory and overwintering bull trout. Bull trout move upstream April through June. Outmigrants generally leave the upper headwater spawning areas in late September, and overwinter throughout the Tucannon River, with two tagged bull trout noted to use the Snake River reservoir (thus moving past BLC parcels) (Faler, Mendel, and Fulton, 2006). Spawning and rearing areas for bull trout will not be affected, other than through migration corridors, and the Service has no information on potential passage or migration barriers on BLC lands. Generally, implementation of the HCP minimizes sediment entry into streams, and improves riparian areas. The riparian areas will then increase shade to minimize water temperature, increase structural diversity in the streams, decrease sediment and nutrient entry into streams, increase channel stability and increase cover for bull trout and its prey base.

5.2.2 Effects Tucannon Water Quality:
(Temperature, Sediment, Chem. Contam./Nutrients)

As described in section 4.3.2, poorly managed livestock grazing can impact riparian habitats and water quality. BLC has approximately 4.2 miles of shoreline along the Tucannon River, and approximately 0.8 miles along Pataha Creek. Migratory bull trout can be injured or killed due to water quality effects caused by farming or livestock grazing contribution of sediment or nutrients into tributary streams or occupied bull trout streams, or through continued high temperatures from lack of riparian shading. Riparian buffers have been or will be implemented, but not all reach out to a site-potential-tree height distance, or about 100 feet, which would be more likely to eliminate the risk of incidental take by maintaining properly functioning riparian habitats (WDFW Priority Habitat and Species Riparian Habitat Management Recommendations, and the State of Washington Wild Salmonid Policy). Riparian buffers provide sediment filtration, large woody debris recruitment, pollutant filtration, erosion control, shading for temperature control, wildlife habitat, density and diversity of benthic invertebrates and macroinvertebrates. The buffer is 75 feet in places along the Tucannon River. Thus, the likelihood of injury or impaired feeding or sheltering from water quality effects has been minimized, but not eliminated.

Upslope agriculture activities can also contribute sediments into stream systems. Table 11 describes the measures that BLC will implement to minimize effects to water quality, especially items 1, 2, and 4-9. In the upland farming and range areas BLC would also continue to manage farmland and pasture land riparian areas in the current condition, including maintaining grassed waterways and CRP fields and other erosion control expectations under the Farm Bill, as long as the programs continue. If the CRP contracts are not renewed, BLC still commits to implementing their HCP standards, including: maintain minimum till methods; maintaining vegetation and potentially seasonal grazing in areas too erodible for tillage; maintaining grassed waterways in draws, low spots, and high water-table locations as a back-up for filtering sediment; maintaining maintain riparian buffers, including maintaining CREP buffers in farmed

and grazed parcels after the 15-year contract period for the life of the HCP. Thus, many of the upland small tributaries, intermittent streams, and ephemeral draws would be maintained in their current vegetated condition. This continues to minimize impacts such as sediment input to the riparian areas on fish-bearing streams.

The stream-side HCP conservation measures within farming and grazing lands would be implemented and riparian conditions would improve. Improved riparian habitat would result in improved stream channel and bank stability and morphology, stream shade would increase, and water temperature regimes would be improved. Buffers established under CREP and prevention of grazing in those buffers in and adjacent to farmlands (such as on the Tucannon River and Pataha Creek) would be maintained for the life of the HCP. The riparian habitat improvement on the farming and grazing lands would be maintained for the life of the HCP (25 years). Riparian habitats assist in preventing nutrient and sediment entry into streams. A more mature riparian area results in increased shading and lowered stream temperatures, although the change in temperature during summer months would likely not be substantial, since BLC only affects a small portion of the total stream distance.

Migratory bull trout may be injured or killed, or migratory passage may be impaired due to continued use of irrigation water in the Tucannon River parcels. BLC would continue to conserve Tucannon River irrigation water rights instream for the life of the HCP (25 years total, currently protected through 2018), but some impacts still remain. Irrigation water would still be removed from the river during the low-flow season for the river when bull trout could be present. This impact, while possible, is not large since at the time this impact occurs, adult bull trout are not likely to be in the middle reaches of the Tucannon River due to high water temperatures. The Service does not have information on distribution or timing of subadult bull trout in this watershed; their seasonal movements may be impacted by low summer flows and high summer water temperatures.

In summary, the riparian buffers and upland management proposed by BLC would result in a gradual improvement of water quality, although it is built upon a degraded baseline. BLC only controls small portions of the watershed, and other negative water quality contributions would likely continue from other sources.

5.2.3 Effects Tucannon River Habitat Access:
(Physical Barriers)

There are no known structural barriers on BLC lands in the Tucannon River watershed. Thermal barriers are likely to continue in the lower portions of the watershed. Other barriers described in the environmental baseline and outside of BLC's control will continue.

5.2.4 Effects Tucannon River Habitat Elements:
(Substrate Embeddedness, Large Woody Debris, Pool Frequency and Quality, Large Pools, Off-channel Habitat, Refugia)

Agricultural activities, whether cropping or livestock grazing, can lead to channel widening, downcutting, and decreased stream bank stability. There is also the potential for greater sediment delivery to streams. BLC will maintain CREP (about 195 acres) and other riparian buffers (about 17 acres) in the Tucannon River watershed for the life of the HCP (25 years). As riparian areas improve, habitat elements should improve in the affected reaches.

5.2.5 Effects Tucannon River Channel Condition and Dynamics:
(Wetted Width/Max.Depth Ratio, Streambank Condition, Floodplain Connectivity)

In the farming and range areas, BLC will continue to manage farmland and pasture land riparian areas in the current condition, including maintaining grassed waterways and CRP fields and other erosion control expectations under the Farm Bill, as long as the programs continue. Even if the CRP does not continue, BLC will continue farming methods that minimize erosion (see more detail in section 5.2.2). Many of the upland small tributaries, intermittent streams, and ephemeral draws would be maintained in their current vegetated condition. This continues to improve channel condition and dynamics.

HCP conservation measures agreed to for lands and streams within farming and grazing lands would be implemented and riparian conditions would improve. Improved riparian habitat also results in improvements in channel structure, instream habitat, and stream temperature. Improved riparian habitat would result in improved stream channel and bank stability and morphology, stream shade would increase in Pataha Creek and water temperature regimes would be improved. Buffers established under CREP and prevention of grazing or farming in those buffers in and adjacent to farmlands (such as on the Tucannon River and Pataha Creek) would be maintained for the life of the HCP. The riparian habitat improvement would continue for the life of the HCP (25 years) rather than just the life of the CREP contract (usually 15 years.) Longer duration of growth of riparian areas results in larger vegetation which contributes root structure to stabilize banks, and increases the potential for large woody debris contributions to the stream, further stabilizing stream morphology and allowing development of pools.

In addition to fire, flooding is also expected to occur again in the future in both the forested and farming and grazing lands. Maintaining diverse structures and a natural stream channel condition can dampen the energy of floods, and allow faster recovery of habitats after a flood. CREP buffers will allow improvement of this flood amelioration function, and the CREP buffers will be maintained for the life of the HCP.

5.2.6 Effects Tucannon Flow/Hydrology:
(Change in Peak/Base Flows, Drainage Network Increase)

Low flows and high temperatures can inhibit bull trout foraging and spawning migrations, or downstream migrations after spawning. As shown in Table 11, item 3, BLC will maintain their in-river trust water right for the life of the HCP, thereby improving flow quantities in the Tucannon River. While increasing flows is a good thing, it will likely not have a large or long-term impact on temperatures, due to the protected quantity of water being a small proportion of the total river flow, and because other irrigators continue to use their water rights upstream and downstream of the BLC parcels.

5.2.7 Effects Tucannon Watershed Conditions:
(Road Density & Location, Disturbance History, Riparian Conservation Areas, Disturbance Regime)

In the Tucannon River watershed there are few roads under BLC control, other than farm roads. None were noted during the HCP development process as needing additional management.

In the upland farming and range areas BLC would also continue to manage farmland and pasture land riparian areas in the current condition, including maintaining grassed waterways and CRP fields and other erosion control expectations under the Farm Bill, as long as the programs continue. If the CRP is not continued, BLC would still implement HCP standards, including maintaining grassed waterways. Thus, many of the upland small tributaries, intermittent streams, and ephemeral draws would be maintained in their current vegetated condition. This continues to minimize impacts such as sediment input to the riparian areas on fish-bearing streams.

HCP conservation measures agreed to for lands and streams within farming and grazing lands would be implemented and riparian conditions would improve. Improved riparian habitat also results in improvements in channel structure, instream habitat, and stream temperature regimes anticipated may not occur. Improved riparian habitat would result in improved stream channel and bank stability and morphology, stream shade would increase in Pataha Creek and water temperature regimes would be improved, although likely on a small scale because BLC does not own all of the parcels along the creek. Buffers established under CREP and prevention of grazing in those buffers in and adjacent to farmlands (such as on Tucannon River and Pataha Creek) would be maintained for the life of the HCP.

5.2.8 Effects Tucannon Integration of Species and Habitat Conditions

The measures BLC has implemented and plans to implement will establish and maintain riparian buffers, improve livestock management, and dedicate saved water to increase stream flows in the Tucannon River. While many of the measures have been implemented prior to finishing the HCP and issuing a permit, the BLC commits to continue them for the 25 year life of the HCP. These measures are expected to improve habitat conditions for the bull trout. Bull trout

migratory habitat may be improved through resultant cleaner and cooler water from more mature riparian habitats on BLC parcels.

The recovery criteria relevant to the Touchet River watershed were addressed in section 5.1.8. The implementation of the BLC HCP, while it improves aquatic habitat, will have little or no impact on local population distribution, population numbers, or population trends. Overwintering or migratory bull trout could be impacted by continued degraded conditions in the watershed, but BLC lands have no direct impact on spawning or rearing habitats for the bull trout. Downstream effects, such as water quality, temperature, and sediment are minimized by HCP measures, especially through riparian buffers and conserved water on BLC lands.

5.3 Concurrant Effects

The concurrant effects are the same as described for the Touchet River water in section 4.4.

5.4 Cumulative Effects Bull Trout- Tucannon River Watershed

Forest Management
Much of the Forest Management in the Tucannon River occurs on National Forest Lands, and thus would be considered under future section 7 consultations with the Forest Service. Forest Management on DNR lands is likely to continue, but impacts to bull trout have already been considered by the Service under the Forest Practices HCP.

Residential and Urban Development
The Tucannon River Watershed is not densely populated. But urban and residential development is likely to continue, much of it in floodplain areas of the Tucannon River. (Service 2002c). Roads will also expand with the development, and riparian habitats are likely to be impaired.

Livestock Grazing
Ranching and grazing is likely to continue on private land in the Tucannon River watershed. In some cases the potential impacts to streams and aquatic system are minimized through good stewardship and implementation of riparian buffers, and in other cases the livestock has negative effects on aquatic systems, through erosion, unstable banks, and water quality impacts.

Agriculture/ Irrigation
Agricultural practices, including seeding and tilling result in increased course sediment loads along the lower 20 miles of the Tucannon River (Service 2002c). Upgraded soil conservation practices and increasing no-till farming methods decreases, but does not eliminate sediment impacts. Some landowners are working with conservation districts to implement CREP buffers along streams.

Irrigation removes water from the river and can result in elevated water temperatures. There are 68 or more ongoing water rights on the Tucannon River, (Covert etal 1995 as referenced in Service 2002c). Water is likely to continued to be removed from the Tucannon River, increasing temperatures and impacting bull trout migration. Improper irrigation screens also can

impact bull trout, and it is unknown whether all diversion screens meet State or Federal screen criteria.

Transportation Infrastructure
Use and maintenance of State, county, and private roads will continue in the watershed. Poorly designed roads can contribute to sediment input in streams, or road ditches can trap and then transport sediment from upslope activities. Road maintenence, especially after flood damage, can exacerbate sediment problems.

Restoration Efforts
The Columbia County Conservation Districts has implemented riparian and instream habitat enhancements in the Tucannon River watershed (Service 2002c). They have used various funding sources to implement these projects, and it's likely that similar projects will continue.

Fishing Impacts
Hooking mortality does occur in the Tucannon River watershed. The WDFW continues to consider fishing management changes to protect bull trout, especially in spawning areas (Service 2002c).

Global Climate Change
Concerns regarding climate change are the same in the Tucannon River watershed as described previously under the Touchet River watershed cumulative effects discussion, section 4.4.

6.0 Conclusion- Bull Trout

After revieiwing the current status of the bull trout, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is the Service's opinion that issuance of a section 10(a)(1)(B) permit for the BLC HCP, as proposed, is not likely to jeopardize the continued existence of the bull trout. The Effects of the Action section above fully describes the Service's rationale for arriving at this conclusion. In summary, implementation of the HCP and issuance of the incidental take permit will not appreciably reduce the likelihood of the survival and recovery of bull trout in the wild for the following reasons: 1) there are no direct impacts to spawning or rearing habitats; 2) aquatic functions will improve as riparian areas improve; 3) Riparian buffers and/or CREP will be maintained for the life of the HCP; and, 4) the BLC is implementing measures as recommended for private landowners in the draft recovery plan chapters.

7.0 Status of Bull Trout Critical Habitat

This BO does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 CFR 402.02. Instead, we have relied upon the statute and the August 6, 2004, Ninth Circuit Court of Appeals decision in *Gifford Pinchot Task Force v. U.S. Fish and Wildlife Service* (No. 03-35279) to complete the following analysis with respect to critical habitat.

Legal Status

On September 26, 2005, the Service published a final rule (USDI 2005a) designating critical habitat for the bull trout. Designated critical habitat includes 4,813 miles of stream or shoreline and 143,218 acres of lake or reservoir. In Washington State, 1,519 miles of stream/shoreline habitat and 33,353 acres of lakes and reservoirs were designated (see also Appendix 3). Critical habitat typically includes the width of the stream channel as defined by its ordinary high-water line (for more detail, see USDI 2005a, p. 56257). Although adjacent floodplains are not designated as critical habitat, activities that occur outside the river channels can have effects on the critical habitat.

Description

Critical habitat for the bull trout was designated primarily for the maintenance of populations by "1) protecting sufficient amounts of spawning and rearing habitat in upper watershed areas; 2) providing suitable habitat conditions in downstream rivers and lakes to provide foraging and overwintering habitat for fluvial and adfluvial fish; and 3) maintaining migratory routes and the potential for gene flow between populations by maintaining habitat conditions that allow for fish passage" (USDI 2005a).

Multiple critical habitat units (CHUs) were designated based on the following criteria: a CHU had to be occupied by the species (i.e., have a documented occurrence of the bull trout in the past 20 years) and contain sufficient primary constituent elements (PCEs) to provide for one or more of the following three functions: "1) Spawning, rearing, foraging, or overwintering habitat to support existing bull trout local populations; 2) movement corridors necessary for maintaining migratory life-history forms; and/or 3) suitable occupied habitat that is essential for recovering the species" (USDI 2005a).

Critical Habitat Units

Although critical habitat was designated across a wide area and involves 20 discrete units (Table 12), the function of individual CHUs (and the core area populations contained therein) appreciably contributes to the conservation value of all critical habitat from a genetic, demographic, and distributional perspective (USDI 2005a). All areas designated as critical habitat are determined to be essential to the conservation of the bull trout. The conservation role of individual CHUs is to support viable core areas, which provide for bull trout biological needs in relation to genetic and phenotypic diversity, and spread the risk of extinction caused by stochastic events. The BLC HCP has parcels and activities within the Umatilla-Walla Walla River Basins critical habitat unit, and within the Snake River Basin in Washington critical habitat unit.

Table 12. Areas designated as critical habitat for the bull trout (USDI 2005a).

CHU number (=Chapter of Draft Recovery Plan)	Critical Habitat Unit Name	Stream Miles
1.	Klamath River Basin	50
2.	Clark Fork River Basin	1,136
3.	Kootenai River Basin	56
4.	Willamette River Basin	111
5.	Hood River Basin	30
6.	Deschutes River Basin	78
9.	**Umatilla-Walla Walla River Basins**	**218**
10.	Grande Ronde River Basin	308
11.	Imnaha-Snake River Basins	92
12.	Hells Canyon Complex	125
13.	Malheur River Basin	38
14.	Coeur d'Alene Lake Basin	124
19.	Lower Columbia River Basin	94
20.	Middle Columbia River Basin	188
22.	Northeast Washington River Basins	25
23.	**Snake River Basin in Washington**	**68**
25.	Snake River	17
27.	Olympic Peninsula	388
27.	Olympic Peninsula (Marine)	419
28.	Puget Sound	646
28.	Puget Sound (Marine)	566
29.	Saint Mary-Belly	37
	Total	**4,813**

Bull Trout Critical Habitat

Primary Constituent Elements (PCEs)

Eight PCEs have been defined for bull trout critical habitat (USDI 2005a):

1. Water temperatures that support bull trout use. Bull trout have been documented in streams with temperatures from 32 to 72 degrees Fahrenheit but are found more frequently in temperatures ranging from 36 to 59 degrees Fahrenheit. These temperature ranges may vary depending on bull trout life history stage and form, geography, elevation, diurnal and seasonal variation, shade (such as that provided by riparian habitat) and local groundwater influence. Stream reaches with temperatures that preclude any bull trout use were specifically excluded from the designation.

2. Complex stream channels with features such as woody debris, side channels, pools, and undercut banks to provide a variety of depths, velocities, and instream structures.

3. Substrates of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. This should include a minimal amount of fine substrate less than 0.25 inches in diameter.

4. A natural hydrograph, including peak, high, low, and base flows within historic ranges or, if regulated, currently operate under a biological opinion that addresses bull trout, or a hydrograph that demonstrates the ability to support bull trout populations by minimizing daily and day-to-day fluctuations and minimizing departures from the natural cycle of flow levels corresponding with seasonal variation.

5. Springs, seeps, groundwater sources, and subsurface water to contribute to water quality and quantity as a cold water source.

6. Migratory corridors with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and foraging habitats, including intermittent or seasonal barriers induced by high water temperatures or low flows.

7. An abundant food base including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.

8. Permanent water of sufficient quantity and quality such that normal reproduction, growth, and survival are not inhibited.

Throughout the remainder of this BO, the PCEs will be referred to in full text, or by their by their corresponding number with short summary text (ie: PCE #8, permanent water).

Threats

Activities that threaten critical habitat include those that alter the PCEs to an extent that the conservation value of critical habitat is adversely affected. Such activities include, but are not limited to: impoundments, water diversions, hydropower generation, vegetation manipulation, road construction, grazing, and stream channelization. Such activities are widespread throughout the range of the bull trout.

Conservation Strategy and Objectives

The Service's primary objective in designating critical habitat was to identify key components of bull trout habitat across the range that supported all life history stages and reflected the goals and objectives outlined in the draft recovery plan chapters for the species. Recovery of the bull trout will require reducing threats to the long-term persistence of populations, maintaining multiple interconnected populations of bull trout across the diverse habitats of their native range, and preserving the diversity of bull trout life-history strategies (e.g., resident or migratory forms,

emigration age, spawning frequency, local habitat adaptations). To do this, recovery objectives for all areas were identified in the draft bull trout recovery plan (Service 2002a, b, c; 2004) as follows: 1) maintain current distribution of bull trout within core areas and restore distribution where possible; 2) maintain a stable or increasing trend in abundance of bull trout; 3) restore and maintain suitable habitat conditions for all bull trout life history stages and strategies; and 4) conserve genetic diversity and provide opportunity for genetic exchange.

Central to the function of individual CHUs is the maintenance of core areas which: 1) contain bull trout populations with the demographic characteristics needed to ensure their persistence; 2) provide for persistence of strong local populations, in part, by providing habitat conditions that encourage the movement of migratory fish; 3) are large enough to incorporate genetic and phenotypic diversity, but small enough to ensure connectivity between populations; and 4) are distributed throughout the historic range of the species to preserve both genetic and phenotypic adaptation (USDI 2005a).

Important considerations in selecting areas for critical habitat designation included factors specific to each river system, such as size (e.g., stream order), gradient, channel morphology, connectivity to other aquatic habitats, and habitat complexity and diversity, as well as range-wide recovery considerations. Threats to those features that define essential habitat (PCEs) are caused by negative changes in water quality, stream complexity, quality and quantity of stream substrate, stream hydrology, migratory corridors, food sources, and nonnative competitors and predators (Reiman and McIntyre 1996; MBTSG 1998).

It is essential for the conservation of the bull trout to use appropriate management to protect those features that define the remaining essential habitat from irreversible threats and habitat conversion. Maintenance or establishment of functional PCEs throughout all core areas is essential to the conservation of the bull trout because: 1) genetic diversity enhances long-term survival of a species by increasing the likelihood that the species is able to survive changing environmental conditions; 2) maintaining multiple bull trout core areas distributed and interconnected throughout their current range will provide a mechanism for spreading the risk of extinction from stochastic events; 3) maintaining core areas with multiple local populations will address potential negative implications associated with low effective population levels; and 4) core areas provide connectivity between areas of high quality habitat and contain important migration corridors for migratory bull trout.

The importance of maintaining the migratory life-history form of bull trout, as well as the presence of migratory runs of other salmonids that may provide a forage base for bull trout, is repeatedly emphasized in the scientific literature (USDI 2005a), and was a foundational concern addressed during designation of bull trout critical habitat. The ability to migrate is important to the persistence of local bull trout populations (Rieman and McIntyre1993; Gilpin in litt. 1997; Rieman and Clayton 1997; Rieman et al. 1997a). Bull trout rely on migratory corridors to move from spawning and rearing habitats to foraging and overwintering habitats and back. Migratory bull trout become much larger than resident fish in the more productive waters of larger streams and lakes, leading to increased reproductive potential (McPhail and Baxter 1996). Migratory corridors are also essential for movement between local populations, as well as within

populations. Local populations that have been extirpated by catastrophic events may become reestablished as a result of movements by bull trout through migratory corridors (Rieman and McIntyre 1993; MBTSG 1998). Corridors that allow such movements can support the eventual recolonization of unoccupied areas or otherwise play a significant role in maintaining genetic diversity and metapopulation viability. Activities that preclude the function of migratory corridors (e.g., stream blockages) may adversely affect bull trout critical habitat.

As described above, critical habitat occurs both in the Umatilla-Walla Walla River Basins and the Snake River Basin in Washington.

8.0 Status of Critical Habitat in the Umatilla- Walla Walla Management Unit

The Umatilla River and Walla Walla River Basins drain almost 4,300 square miles in southeastern Washington and northeastern Oregon (See appendix 1). Providing for connectivity among these core areas and their local populations helps ensure their viability, which is critical to the persistence of the Columbia River interim recovery unit and the species. Total stream miles designated as bull trout critical habitat within the Umatilla-Walla Walla River Basin is 217.7 miles. Of that, 113.5 miles were designated in the Walla Walla River portion of the CHU, and 39 miles occur within the Touchet River Watershed.

8.1 Environmental Baseline Critical Habitat Touchet River Watershed

A total of 39 miles of stream within the Touchet River watershed are designated as bull trout critical habitat, providing a combination of spawning and rearing, as well as foraging, overwintering, and migratory habitat. Within the action area, critical habitat is designated on parts of the North Fork Touchet River and tributaries including: Lewis Creek, Spangler Creek, and Wolf Fork; on parts of the South Fork Touchet River and tributaries including: Griffin Fork (off S. Fork Touchet); and on the mainstem of the Touchet River from the Forks down to about Waitsburg (figure 5). Patit Creek and Robinson Fork are not designated as critical habitat, although it is possible that there may be indirect effects to the designated reaches below their mouths. Table 8 describes which BLC parcels have designated critical habitat or drain into designated critical habitat reaches.

Eight PCEs have been defined for bull trout critical habitat (USDI 2005a), and the environmental baseline is described below for each PCE in the Touchet River watershed.

PCE #1 (water temperatures)

Water temperatures are described along with other water quality parameters in section 4.2.2, and summarized below.

Generally, water temperatures in the Touchet River watershed are elevated due to channel conditions and loss of shade as a result of current and historic agricultural and grazing practices, riparian harvest, road construction, and other uses and development. The water quality

conditions, including elevated temperatures, in streams on BLC's lands are similar to those in the rest of the county.

Ecology's 303(d) list includes segments of the Touchet River for temperatures, with maximum water temperatures often exceeding 24°C (75°F) for extended periods (generally June through September) (Kuttel 2001). These temperatures are considered high for salmonids and are suspected to cause thermal barriers in the lower Touchet and the lower Walla Walla River (Mendel et al. 1999). The Touchet River may contribute to a likely thermal barrier in the Walla Walla River downstream of the Touchet River confluence.

Portions of Robinson Fork are also on Ecology's 303(d) list for temperature. Upper basin reaches such as the North Fork Touchet and Wolf Fork Touchet Rivers maintain temperatures suitable for salmonids even during late summer. Floods in 1996, interacting with then-existing roads and skid trails and the effects of previous riparian harvest, scoured reaches of the Robinson Fork, leaving it in a highly unstable state from which it is now slowly recovering. Water temperatures are elevated above naturally occurring ambient conditions due to channel conditions, riparian harvest, and loss of shade (WDNR 1998). Riparian and erosion conditions may also have been changed as a result of the Columbia Complex Fires in 2006. Summer stream temperatures exceed the Washington state water quality standard of 64.4°F in the lower six to eight miles of the Robinson Fork due to insufficient riparian shade. A temperature of 77°F was observed in the summer of 1999 near the lower end of BLC's lands, and 65°F 6.3 miles further upstream in Section 2, T39N, R8W, near the center of BLC's lands (Mendel et al 2000). Canopy density was assessed in 1997 and ranged from a low of 23 percent in the 2 miles above the Wolf Fork to 72 percent near RM 6, where canopy density was predicted to be adequate to meet the standards (WDNR 1998), which is consistent with WDFW observations (Mendel et al 2000). Mendel et al (1999) reported "Generally, reaches of the Touchet River above Dayton maintained cool temperatures, in a range favorable to most salmonids, throughout the summer."

Because of extremely low summer flows, low elevation and associated hot summer air temperatures, and a continued high degree of solar exposure in some areas, stream temperatures undoubtedly exceed the Washington state water quality standard of 64.4°F throughout Patit Creek below the North/West fork confluence, and likely beyond. The WDFW observed a temperature of 82°F in late July 1998 upstream from BLC lands prior to the time the stream in this area went dry (Mendel et al 1999). Patit Creek is not designated critical habitat, but it does flow into critical habitat in the mainstem Touchet River.

PCE #2 (complex stream channels)

Stream channel complexity was described above in section 4.2.4 (Touchet Habitat Elements and in 4.2.5 (Touchet Channel Condition and Dynamics). The key information is summarized below.

Columbia County has experienced a series of floods that have repeatedly scoured streambeds, stream banks, and riparian vegetation. Floods resulted in streams becoming wider, less stable, the frequency of large pools with large woody debris decreased, and the frequency of

unvegetated stream banks increased. These problems occurred in many locations (Columbia County Conservation District 1997), including in the headwater forks of the Touchet River, and in Robinson Fork where BLC owns land (Reckendorf & Associates 2000).

Some stream channels have been degraded through loss of riparian vegetation, coupled with accelerated runoff. These problems have been reported for the Touchet River (Michaelis 1972; USACE 1997), the North, South, Robinson, and Wolf Forks of the Touchet upstream of Dayton (Reckendorf and Associates 2000; WDNR 1998), and South Fork Patit Creek (Reckendorf and Associates 2000). Stream channelization and straightening, drainage of wetlands, and conversion of grasslands, shrub communities, and forests to croplands resulted in severe channel downcutting, widening, channel instability, and further loss of native riparian communities.

Robinson Fork downstream from and within BLC ownership has fish habitat problems including (WDNR 1998) low frequency of pools and hiding cover, and scour and burying of gravels with fine sediments during peak flows due to the unstable channel. Past road, grazing, and timber management practices, exacerbated by the 1996 flood, have resulted in low near-term LWD recruitment potential (WDNR 1998).

Today, many streams have re-established riparian communities on terraces within incised channels. In other cases, riparian vegetative development continues to be retarded by farming to the stream edge and riparian grazing. Roads located adjacent to streams also adversely affect stream shade and contribute sediment-laden runoff to streams in some areas.

Patit Creek has been subject to the same storms that created the floods and damage experienced by the larger channels in Columbia County. However, the lower reaches of Patit Creek did not experience the degree of channel degradation during the 1996 floods that remain evident in the Touchet River and the Robinson Fork. Reckendorf and Associates (2000) reported that South Patit Creek had already experienced downcutting, sometimes to bedrock, widening, and extensive stream bank erosion. Due to historic effects and recent farming and grazing, Blocks 1 through 4 of Patit Creek on BLC's land have been affected by channel downcutting and widening, rare pools in the stream, and varying degrees of stable and unstable banks. The channel remains vulnerable to these effects in some areas, while in others, current management and the condition of the riparian area render the channel more resistant to erosion processes. Patit Creek's instream large woody debris and near-term LWD recruitment potential are low (Mendel et al 1999).

Cougar Canyon, a tributary to West Patit Creek, supports a well-developed riparian area and pines on the side slopes. Cougar Canyon burned in the 2006 fires; the riparian areas did not burn hot but upland tree plantings were a total loss. Other Patit Creek intermittent and ephemeral tributary channels have evidence of downcutting, erosion, and gullying, although they have stabilized due to recovered vegetation.

Intermittent tributaries to the Touchet River , such as Whetstone Creek, are supported by grassed waterways on BLC lands. Some of the ephemeral side streams in Payne Hollow burned in the 2006 fire, although grass cover in the burned areas is expected to recover quickly.

PCE #3 (sufficient substrates)

This PCE addresses sufficient substrates to ensure success of bull trout egg, embryo, and young-of-the-year survival. The stream portions on or below BLC lands are not expected to provide spawning and rearing habitat for the bull trout, thus this PCE is not affected and is not relevant for further discussion here.

PCE #4 (natural hydrograph)

Section 4.2.6 (Touchet Flow/Hydrology) describes hydrology. The information is summarized below as relevant to designated critical habitat.

During peak flows, water yield and low flow regimes of the Robinson Fork are not measurably different from conditions found under the hypothetical fully forested (natural/unmanaged) condition (WDNR 1998). The DNR watershed analysis (1998) did not expect that BLC's timber harvest contributed to changes in peak/base flows. The fire of 2006 may have changed the situation somewhat, and BLC expects that large storms or rain on snow events may well happen and could cause short-term, "pulse" impacts which are unpreventable. This may be somewhat ameliorated by growth of grass and forbs since the fire.

The volume and speed of runoff in much of the farmland and pastureland in Columbia County is increased above naturally occurring conditions as a result of historical land use practices (HCP). BLC's annual cropping in a no-till system likely allows better absorption of water, and decreases soil erosion from overland flows (BLC HCP).

In the summer months there are no-flow or low-flow areas near the mouth of the Touchet River. This is far downstream of BLC's parcels.

PCE #5 (groundwater connection)

The Service has no information on groundwater connections in the Touchet River watershed.

PCE #6 (migratory corridors)

Section 4.2.3 (Touchet Habitat Access) above describes habitat access. Only barriers which can be affected by BLC activities are again described below.

BLC removed one barrier on Patit Creek in 2003, but we did not and do not expect bull trout to use that area.

BLC's irrigation diversions on Patit Creek have fish screens which meet NMFS fish screen criteria. The WDFW maintains a list of likely fish passage barriers in the Walla Walla and Touchet River watersheds (Glen Mendel, WDFW, pers. comm., October 31, 2007). Some of these partial or complete barriers have been addressed. There are no complete barriers

downstream of BLC lands in the Touchet Watershed, although there is a complete barrier associated with a pond on a tributary to Robinson Fork (not on BLC lands). Some Robinson Fork fords, including those on BLC lands, may act as partial barriers depending on flows and stream conditions, although the Service does not expect regular bull trout use in Robinson Fork; foraging or overwintering is possible.

PCE #7 (abundant food base)

The Service has no watershed-specific information on bull trout food base, but we recognize that a healthy riparian area contributes to natural aquatic functions and provides habitats for a food base. Section 4.2.7 (Touchet Watershed Conditions) includes a description of riparian vegetation. The relevant information is summarized below.

Riparian vegetation has generally been extensively degraded in Columbia County and in many areas that are now in BLC ownership by the historically common practice of farming to the stream bank, by overgrazing, agricultural clearing and herbicides, forest harvest, road construction, flood damage and flood control.

BLC lands include headwater areas to Robinson Fork. After a fire in 2006, BLC implemented CREP buffers in Robinson Fork in 2007. Cattle will be fenced out of the buffer during the CREP contract period. BLC also abandoned the "Bottom Road" in the Robinson Fork parcel for logging use. Logging within riparian areas is addressed under the Forest Practices Rules, and in Robinson Fork a watershed analysis resulted in additional timber harvest prescriptions on unstable slopes.

In the Patit Creek parcels, riparian areas are variable, but generally the channel has been down-cut and widened. BLC has implemented CREP buffers, extended fencing, eliminated grazing in some locations, and modified plowing distance from the creek to allow increased riparian area.

Cougar Canyon is a tributary to West Patit Creek, and the riparian area is well developed with side slopes that supported pines before the 2006 fires. Intermittent and ephemeral tributaries to Patit Creek on BLC lands typically have fully to partially developed shrub and deciduous tree riparian communities, and are often separated from dry croplands by CRP, grazed grasslands, or trees planted by BLC. Some of the ephemeral side streams in the Patit watershed burned in the 2006 fire. Grass cover in the burned areas was expected to recover quickly. Intermittent tributaries, such as Whetstone Creek, are supported by grass waterways on BLC lands. Some of the ephemeral side streams in Payne Hollow burned in the 2006 fire, but again, the grass cover was expected to recover quickly.

PCE #8 (permanent water)

In the action area, migratory bull use is possible in the Robinson Fork, and likely in the Wolf Fork and North Fork Touchet River downstream of Robinson Fork. As described above, we expect Robinson Fork to continue to support near natural flows. We do not expect bull trout to use Patit Creek.

8.2 Effects of the Action Critical Habitat Touchet River Watershed

Effects PCE #1 (water temperatures)
Section 4.3.2 (Effects Touchet Water Quality) describes effects to temperatures and other water quality parameters. Relevant information for this PCE is described below.

BLC's forest management practices would remain subject to the Forest Practice Rules, and the basic protections to riparian zones and road and harvest controls would remain in place. The Forest Practices Rules (WFPB 2001) currently in effect regulate harvest and road management practices within riparian zones. BLC would follow these regulations and in the event that these July, 2001 regulations are modified, BLC would provide and implement equivalent or greater habitat protection to the current requirements. Prescriptions developed under DNR's watershed analysis (1998) would also remain in place until re-evaluated; these prescriptions include limits on roads and skid trails to minimize the potential for sedimentation and landslides. Thus, due to these forest regulations and prescriptions, water quality impacts from forestry activities will be minimized.

In addition, improved cattle management practices, including removing cattle from Robinson Fork until 2008 and implementing CREP buffers proposed by BLC would improve the riparian vegetation and channel banks, and help ameliorate the effects of the 2006 fire. After the CREP contract expires within Robinson Fork, BLC agrees to manage cattle to ensure that the riparian habitat is maintained, and will coordinate with Service and NMFS at that time. BLC commitments in the forest lands will result in improved riparian habitat conditions. Improved riparian habitat results in more shading and decreased stream temperatures.

The BLC HCP conservation measures agreed to for lands and streams within farming and grazing lands would be implemented and riparian conditions would improve. Improved riparian habitat would result in improved stream channel and bank stability and morphology, stream shade would increase in Patit Creek, and water temperature regimes would be improved. Buffers established under CREP and prevention of grazing or farming in those buffers in and adjacent to farmlands (such as on Patit Creek) would be maintained for the life of the HCP. BLC will maintain these or similar riparian buffers for the life of the HCP (25 years) rather than just the life of the CREP contract (usually 15 years). A more mature riparian area results in increased shading and lowered stream temperatures.

In summary, the riparian buffers and upland management proposed by BLC would result in a gradual improvement of water temperature in the area where BLC implements riparian buffer. The Touchet River watershed has a degraded baseline condition. BLC only controls small portions of the watershed, and other negative water temperature contributions would likely continue from other sources.

Effects PCE #2 (complex stream channels)

Effects to stream channel complexity are addressed above under 4.3.4 (Effects Touchet Habitat Elements) and 4.3.5 (Effects Touchet Channel Condition & Dynamics). The information relevant to effects to critical habitat PCE #2 are described below.

Following Forest Practice Rules, required prescriptions, and implementing CREP buffers or similar buffers for the life of the HCP should allow improvement of habitat elements and stream channels in the Robinson Fork. The benefit to bull trout, however, will be small, because Robinson Fork is not expected to be used as a spawning area or migration corridor (Service, 2004). Robinson Fork does flow into migration habitats, and there could be intermittent overwintering use in Robinson Fork. BLC commitments in the forest lands will result in improved riparian habitat conditions, thereby stabilizing the stream bank, and allowing development of a natural wetted width/maximum depth ratio. In Robinson Fork, there should be little change to floodplain connectivity due to the steep narrow valley.

In the farming and range areas BLC would also continue to manage farmland and pasture land riparian areas in the current condition, including maintaining grassed waterways and CRP fields and other erosion control expectations under the Farm Bill, as long as the programs continue. Thus, many of the upland small tributaries, intermittent streams, and ephemeral draws would be maintained in their current vegetated condition. This continues to minimize impacts such as sediment input to the riparian areas on fish-bearing streams, thereby allowing natural recovery of stream channels.

The HCP conservation measures agreed to for lands and streams within farming and grazing lands would be implemented and riparian conditions would improve. Improved riparian habitat would result in improved stream channel and bank stability and morphology in Patit Creek. Buffers established under CREP and prevention of grazing in those buffers in and adjacent to farmlands would be maintained for the life of the HCP. Longer duration of growth of riparian areas results in larger vegetation which contributes root structure to stabilize banks, and increases the potential for large woody debris contributions to the stream, further stabilizing stream morphology and allowing development of pools. On Patit Creek and its tributaries, riparian habitat will improve with resultant improvement in habitat elements, but Patit Creek is not a key area for bull trout.

Flooding is expected to occur again in the future in both the forested and farming and grazing lands. Maintaining diverse structures and a natural stream channel condition can dampen the energy of floods, and allow faster recovery of habitats after a flood.

Effects PCE #3 (sufficient substrates)

This PCE addresses sufficient substrates to ensure success of bull trout egg, embryo, and young-of-the-year survival. The stream portions in the action area are not expected to provide spawning and rearing habitat for the bull trout, thus this PCE is not relevant for further discussion here.

Effects PCE #4 (natural hydrograph)

There will only be minimal effects to Touchet Watershed flow and hydrology. Robinson Fork covered activities do not include water withdrawals. Due to improved riparian habitats and stream stability, when peak flows do occur less aquatic damage and scouring should occur. There will be no change to the current flow on Patit Creek, including the small screened diversion, or the vegetable plant waste-water pasture irrigation. Patit Creek is not a key area for bull trout.

Effects PCE #5 (groundwater connection)

The Service has no information on groundwater connections in the Touchet River watershed.

Effects PCE #6 (migratory corridors)

As described in 4.3.3 (Effects Touchet Habitat Access), BLC has already removed a barrier on their lands in Patit Creek, although this area is unlikely to be used by bull trout. Other barriers in the watershed will continue in the current condition, as most of them are beyond the control of BLC. Under some flows and stream conditions, the fords on Robinson Fork may act as partial barriers, but this should have a minor effect on bull trout because Robinson Fork is not expected to be used as a spawning area or major migration corridor (Service, 2004).

All items listed in Table 9 minimize effects for foraging, migratory, and overwintering bull trout, mainly through a continuing slow riparian recovery process. Spawning and rearing areas for bull trout will not be affected. The riparian areas will gradually increase shade to minimize water temperature, increase structural diversity in the streams, decrease sediment and nutrient entry into streams, increase channel stability and increase cover for bull trout and its prey base.

Effects PCE #7 (abundant food base)

The Service recognizes that a healthy riparian area contributes to natural aquatic functions and provides habitats for a food base. Section 4.3.7 (Touchet Watershed Conditions) includes a description of riparian vegetation. The relevant effects information is described below.

BLC will follow the Forest Practice Rules (WFPB 2001), and mandatory prescriptions (WDNR 1988). While the BLC will be building one upslope road, the “Bottom Road” in Robinson Fork will only receive administrative use. In addition, improved cattle management practices, including removing cattle from Robinson Fork until 2008 and implementing CREP buffers proposed by BLC would improve the riparian vegetation and channel banks, and help ameliorate the effects of the 2006 fire. After the CREP contract expires within Robinson Fork, BLC agrees to manage cattle to ensure that riparian habitat is maintained, and will coordinate with Service and NMFS at that time.

In the farming and range areas BLC would also continue to manage farmland and pasture land riparian areas in the current condition, including maintaining grassed waterways and CRP fields and other erosion control expectations under the Farm Bill, as long as the programs continue. Thus, many of the upland small tributaries, intermittent streams, and ephemeral draws would be maintained in their current vegetated condition. This continues to minimize impacts such as sediment input to the riparian areas on fish-bearing streams.

Disturbance regimes, such as fire, storms, or floods will still occur. Larger more mature riparian areas will help to minimize the impacts of these events through maintaining vegetated buffers, instream diversity, and bank stability.

Effects PCE #8 (permanent water)

There should be no change to the availability of permanent water for bull trout in the Touchet River Watershed as a result of the BLC HCP.

8.3 Cumulative Effects Critical Habitat- Touchet River Watershed

Cumulative effects to critical habitat are likely to be the same as those described for bull trout in section 4.3.8.

9.0 Status of Critical Habitat in the Snake River Management Unit

The Snake River Basin in Washington has 68 stream miles designated as critical habitat (appendix 1).

9.1 Environmental Baseline Bull Trout Critical Habitat -Tucannon River Watershed

Within the Snake River Basin in Washington, critical habitat is designated on most of the mainstem Tucannon River, on some of the headwaters on private land, and on Cummings Creek. Forest Service lands were not included in the designation. Direct and indirect effects to the mainstem Tucannon River are most relevant to the HCP. Pataha Creek was not designated as bull trout critical habitat, although effects to critical habitat are still possible since it flows into the mainstem Tucannon River.

The baseline conditions for the eight PCE's are described below.

PCE #1 (water temperatures)
Water temperatures are described above as part of 5.1.2 (Tucannon Water Quality). Relevant information to PCE#1 is described or summarized below.

Portions of Pataha Creek and the Tucannon River are on the 303(d) list for temperature, fecal coliform, and/or pH. Tucannon River water temperatures in the summer are well above bull trout optimums (below 59° F with an optimum for rearing about 46-48° F) rearing limits, and are not noticeably cooler until about Cummings Creek, at River Mile 35 (Columbia County

Conservation District 2001 as referenced in Service 2002c). Elevated water temperatures limit bull trout distribution in some areas of the Tucannon River from July through October (Service 2002c).

Riparian vegetation has been extensively degraded in Columbia County and in many areas that are now in BLC ownership by historic and current farming and grazing practices, flood damage, flood control efforts, and other factors. Loss of riparian vegetation is a major contributor to increased water temperature and sedimentation throughout the Tucannon. Some stream reaches within BLC's lands, including along Pataha are not well protected and vegetated, and channel and bank erosion and stream shade/water temperature are problems. Stream temperatures commonly exceed 80°F throughout mid-summer in the lower miles of the river downstream of Pataha Creek (River Mile 31) (Mendel et al 1993) due to low elevation and the effect of naturally warm air temperatures, naturally occurring thermal-artesian springs, and loss of riparian vegetation. The Washington state water quality standard of 64.4°F is exceeded on most summer days in some years at Pomeroy (River Mile 21) (Pomeroy Conservation District 1997). Stream temperatures and general water quality improve once the stream reaches forest land several miles upstream of Pomeroy (Pomeroy Conservation District 1997).

PCE #2 (complex stream channels)

Sections 5.1.4 (Tucannon Habitat Elements) and 5.1.5 (Tucannon Channel Cond. & Dynamics) describe some stream channel complexity conditions. Relevant information to PCE #2 is described or summarized below.

Tributaries of the Tucannon River draining BLC lands include Pataha Creek, Willow Creek, Whetstone Creek, Smith Hollow Creek, and Cougar Canyon Creek. As a result of the loss of riparian vegetation, and in some cases in combination with accelerated runoff, stream channels in some areas have become degraded. These problems have been reported for parts of the Tucannon River (Columbia County Conservation District 1997), and for Pataha Creek (Pomeroy Conservation District 1997). Stream channelization and straightening, drainage of wetlands, and conversion of grasslands, shrub communities, and forests to croplands resulted in severe channel downcutting, widening, channel instability, and further loss of native riparian communities.

In lower portions of Pataha Creek, the channel is extensively incised as a result of ditching along farm fields and subsequent erosion. The stream has downcut through more than 20 feet of silt and clay to expose raw bedrock in many locations from the City of Pomeroy to the mouth of the creek. Today, riparian communities have re-established on flood terraces within many portions of the incised channels. In other cases, riparian vegetative development continues to be retarded by farming to the stream edge and riparian grazing. Section 6.2.2, and Appendix 1 of the HCP provide details on channel conditions on BLC's Pataha Creek parcels. Within BLC ownership, Pataha Creek has a deep incised channel through BLC lands. Trees and shrubs were planted under CREP, with the goal to stabilize the floodplain and banks. Intermittant draws, such as Dry Gulch and Miller Gulch drain into Pataha Creek. Miller Gulch is incised to meet the lowered elevation of Pataha Creek. BLC maintains grass cover in steep draws to stabilize the draws.

PCE #3 (sufficient substrates)

This PCE addresses sufficient substrates to ensure success of bull trout egg, embryo, and young-of-the-year survival. The stream portions adjacent to BLC lands within the Tucannon River watershed are not expected to provide spawning and rearing habitat for the bull trout, and there will not be indirect effects on the spawning substrates, thus this PCE is not relevant for discussion here.

PCE #4 (natural hydrograph)

Section 5.1.6 (Tucannon Flow/Hydrology) above describes flows and hydrology in the Tucannon River watershed. Relevant information to this PCE is described below.

Elevated water temperatures in the lower Tucannon River are believed to be caused, in part, by reduced water volume from withdrawals for irrigation. Water removed from the Tucannon River during peak crop irrigation may cause a reduction in stream flow that could have adverse impacts on stream temperatures and bull trout migration. Impacts could be particularly severe during spring and fall migration periods in dry years with low snow pack runoff. In dry years, the base summer flows before any withdrawal are well below the volume allocated in combined irrigation permits (Service 2002c). As of 1995, Ecology had issued 68 surface water rights for the Tucannon River (Covert et al. 1995, as referenced in Service 2002c) for a total diversion of 60 cubic feet per second to irrigate 1,147 acres (TRMWP 1997 as referenced in Service 2002c).

BLC irrigates farmland from the Tucannon River. At the Tucannon River irrigated parcel, BLC has implemented irrigation efficiency measures and protected the saved water instream. Beginning in 2004, BLC protected 6.4 cfs of the saved water instream as “trust water”, out of an 11.15 cfs water right. This water is protected through January 1, 2019.

Pataha Creek is the single largest tributary of the Tucannon River, entering the Tucannon at RM 31, and with a mainstem stream length of more than 60 miles. The total watershed area is 185 mi^2. While Pataha Creek is not gaged, and its mean annual flow has not been calculated, flow measurements ranged between 5 cubic feet per second in September 1998 to 0.76 cubic meter per second 27 cubic feet per second in March 1999 (HCP). BLC does not divert water from Pataha Creek.

PCE #5 (groundwater connection)

The Service has no information on groundwater connections in the Tucannon River watershed.

PCE #6 (migratory corridors)

Section 5.1.3 (Tucannon Habitat Access) describes barriers to migration in the Tucannon River watershed. Relevant information to this PCE is described below.

Within the Tucannon River watershed, several important streams that support bull trout spawning and rearing have impassable natural barriers that substantially reduce the stream area available to fish. Most of these barriers are sizable waterfalls that may eliminate opportunities to bring additional stream area into production, and they occur on Sheep Creek, Bear Creek, and Cold Creek (Service 2002c). All three streams support spawning bull trout below these barriers, but the spawning areas are well above any BLC lands.

In addition to man-made barriers, destruction of riparian zones, leading to high water temperatures, is the most significant factor acting to reduce fish movement and habitat use in the middle to lower reaches of the Tucannon River. Elevated water temperatures act as thermal barriers and limit bull trout distribution in some areas from July through October. Juvenile rearing and adult migration in lower stream reaches is prevented during this period (USFWS 2002c).

PCE #7 (abundant food base)

Section 5.1.7 (Tucannon Watershed Conditions) includes a description of riparian vegetation. The relevant information is described below.

Section 6.2.3 of the HCP/EA provides detail on riparian conditions on BLC parcels adjacent to the Tucannon River and its tributaries. The riparian conditions are variable, and include broad forested riparian zones from 60-100 feet wide, and other locations with unstable stream banks. One location, near the mouth of Willow Creek, has had efforts to stabilize the channel with rock and log revetments. The riparian areas are bordered by grass and alfalfa fields, and in one area cattle are grazed on the lands to the south of the river during the winter, but BLC implements feed and water stations on the high slopes to keep cattle out of the steep slopes and riparian area of the Tucannon River. CREP buffers and fencing installed by BLC in 2002 further prevent cattle access to the riparian zone. Cattle would only be allowed access to or across the river during emergencies.

Willow Creek, where it occurs on a BLC parcel has a vegetated incised channel, but supports minimal shrubs and trees. Other tributary intermittent streams on BLC lands typically support a well-vegetated riparian area bordered by relatively steep canyon grass/grazed areas, with dryland wheat and peas on gentle slopes above. There are several ephemeral draws that drain the Pentecost Pasture, but they have no surface water connection with the Tucannon River. These draws are generally vegetated with grasses and forbs. Other ephemeral draws drain into the Snake River. These draws are vegetated, they may be grazed, and they are separated from the river by at least ½ mile, a state highway, and a railroad.

Conditions on Pataha Creek Parcels are described in the HCP/EA in section 6.2.2. Within BLC ownership, Pataha Creek has a deep incised channel through BLC lands. BLC has eliminated grazing and farming from the lands that occur between Highway 12 and Pataha Creek. Trees and shrubs were planted under CREP, and the riparian vegetation is recovering. Intermittant draws, such as Dry Gulch and Miller Gulch, drain into Pataha Creek. Miller Gulch is incised to

meet the lowered elevation of Pataha Creek. Grazing is managed in the Pataha block to maintain grass cover in steep draws, preventing erosion.

PCE #8 (permanent water)

In the action area within the Tucannon River watershed, bull trout may use the mainstem Tucannon River adjacent to and downstream of BLC parcels for overwintering and migration habitats. Pataha Creek is not expected to support bull trout, but could have indirect effects on Tucannon River water quantity and quality.

As described in PCE #4, elevated water temperatures in the lower Tucannon River are believed to be caused, in part, by reduced water volume from withdrawals for irrigation. Impacts could be particularly severe during spring and fall migration periods in dry years with low snow pack runoff. In dry years, the base summer flows before any withdrawal are well below the volume allocated in combined irrigation permits (Service 2002c). Section 5.1.6 (Tucannon Flow/Hydrology describes the environmental baseline for flows in the Tucannon River Watershed. In the last few years the daily mean low flows upstream of the BLC irrigated lands at the Tucannon @ Marengo gage, varied from 50 to 58 cfs (Ecology website 2008), and downstream of BLC irrigated lands at the Tucannon near Starbuck gage, the daily mean flow varied from 35 to 45 cfs (USGS National Water Information System Web Interface, 2008).

9.2 Effects of the Action Bull Trout Critical Habitat- Tucannon River Watershed

Effects PCE #1 (water temperatures)
Section 5.2.2 (Effects Tucannon Water Quality) describes effects to water quality including temperature. Relevant discussion to this PCE is described below.

BLC would continue to conserve Tucannon River irrigation water rights instream, for the life of the HCP (25 years). Irrigation water would still be removed from the river during low flow periods, and temperatures would likely continue to be high in the river during summer months.

HCP conservation measures within farming and grazing lands would be implemented and riparian conditions would improve. Improved riparian habitat would result in improved stream channel and bank stability and morphology, stream shade would increase in Pataha Creek and the Tucannon River, and water temperature regimes would be improved. Buffers established under CREP and prevention of grazing in those buffers in and adjacent to farmlands (such as on Tucannon River and Pataha Creek) would be maintained for the life of the HCP. The riparian habitat improvement on the farming and grazing lands would be maintained for the life of the HCP (25 years). A more mature riparian area results in increased shading and lowered stream temperatures. Despite BLC's efforts, temperatures would likely continue to be high in the river during summer months because most of the impacts are beyond the control of BLC.

Effects PCE #2 (complex stream channels)

Section 5.2.4 (Effects Tucannon Habitat Elements) and section 5.2.5 (Effects Tucannon Channel Condition & Dynamics) address various components of complex stream channels. Relevant topics for this PCE are described below.

Livestock grazing, if not well managed, can impact riparian habitats and water quality. Stream bank trampling and reduction in riparian vegetation due to grazing can lead to channel widening, downcutting, and decreased stream bank stability. There is also the potential for greater sediment delivery to streams, along with increased bacterial and nutrient loads from animal wastes. BLC will maintain CREP and other riparian buffers for the life of the HCP (25 years). As riparian areas improve, habitat elements should improve in the affected reaches.

In the farming and range areas BLC would also continue to manage farmland and pasture land riparian areas in the current condition, including maintaining grassed waterways and CRP fields and other erosion control expectations under the Farm Bill, as long as the programs continue. Thus, many of the upland small tributaries, intermittent streams, and ephemeral draws would be maintained in their current vegetated condition. This continues to maintain or improve channel condition and dynamics.

The HCP conservation measures agreed to for lands and streams within farming and grazing lands would be implemented and riparian conditions would improve. Improved riparian habitat would result in improved stream channel and bank stability and morphology, stream shade would increase in Pataha Creek and water temperature regimes would be improved. Buffers established under CREP and prevention of grazing in those buffers in and adjacent to farmlands (such as on Tucannon River and Pataha Creek) would be maintained for the life of the HCP. The riparian habitat improvement would continue for the life of the HCP (25 years) rather than just the life of the CREP contract (usually 15 years.) Longer duration of growth of riparian areas results in larger vegetation which contributes root structure to stabilize banks, and increases the potential for large woody debris contributions to the stream, further stabilizing stream morphology and allowing development of pools.

In addition to fire, flooding is also expected to occur again in the future in both the forested and farming and grazing lands. Maintaining diverse structures and a natural stream channel condition can dampen the energy of floods, and allow faster recovery of habitats after a flood.

Effects PCE #3 (sufficient substrates)

This PCE addresses sufficient substrates to ensure success of bull trout in spawning and rearing areas. No spawning and rearing substrates are likely to be affected by the HCP.

Effects PCE #4 (natural hydrograph)

BLC will maintain their in-river trust water right for the life of the HCP, thereby improving flow quantities in the Tucannon River. BLC would continue to conserve Tucannon River irrigation

water rights instream, for the life of the HCP (25 years). Irrigation water would still be removed from the river during low flow periods, and temperatures would likely continue to be high in the river during summer months. The flow and hydrology in other tributaries of the Tucannon River are unlikely to change with implementation of the HCP.

Effects PCE #5 (groundwater connection)

The Service has no information on groundwater connections in the Tucannon River watershed.

Effects PCE #6 (migratory corridors)

There are no known structural barriers on BLC lands in the Tucannon River watershed. Thermal barriers may continue in the lower watersheds with implementation of the HCP. All items listed in Table 11 minimize effects to subpopulation characteristics, especially for migratory and overwintering bull trout. Bull trout move upstream April through June. Outmigrants leave the upper headwater spawning areas in about late September, and overwinter throughout the Tucannon River, with two tagged bull trout noted to use the Snake River reservoir (Faler, Mendel, and Fulton, 2006). Spawning and rearing areas for bull trout will not be affected, other than through migration corridors, and we have no evidence of potential migration barriers on BLC lands.

Effects PCE #7 (abundant food base)

The Service expects that improved aquatic functions and riparian areas provide an improved food base for bull trout. As described in section 5.2.8 (Effects Tucannon Watershed Conditions), in the farming and range areas BLC would continue to manage farmland and pasture land riparian areas in the current condition, including maintaining grassed waterways and CRP fields and other erosion control expectations under the Farm Bill, as long as the programs continue. Thus, many of the upland small tributaries, intermittent streams, and ephemeral draws would be maintained in their current vegetated condition. This continues to minimize impacts such as sediment input to the riparian areas on fish-bearing streams.

The HCP conservation measures agreed to for lands and streams within farming and grazing lands would be implemented and riparian conditions would improve. Improved riparian habitat would result in improved stream channel and bank stability and morphology, stream shade would increase in Pataha Creek and water temperature regimes would be improved. Buffers established under CREP and prevention of grazing in those buffers in and adjacent to farmlands (such as on Tucannon River and Pataha Creek) would be maintained for the life of the HCP.

Effects PCE #8 (permanent water)

Permanent water should be slightly improved in the Tucannon River. As shown in Table 11, item 3, BLC will maintain their in-river trust water right for the life of the HCP, thereby improving flow quantities in the Tucannon River. BLC will continue to conserve Tucannon River irrigation water rights instream, for the life of the HCP (25 years). Irrigation water would still be removed

from the river during low flow periods, but due to the protected quantity of water being a small proportion of the total river flow, and because other irrigators continue to use their water rights upstream and downstream of the BLC parcels temperatures would likely continue to be high in the Tucannon River during summer months. Permanent water in Pataha Creek should remain unchanged with the HCP.

9.3 Cumulative Effects Bull Trout Critical Habitat- Tucannon River

Cumulative effects to bull trout critical habitat in the Tucannon River watershed are likely to be the same as those discussed in section 5.3 (Cumulative Effects-Tucannon River Watershed). Forest management, residential and urban development, livestock grazing, and agriculture is likely to continue. These activities will likely result in continuing effects to riparian areas, water quantity, and water quality.

10.0 Conclusion Bull Trout Critical Habitat

After revieiwing the current status of the bull trout, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is the Service's opinion that issuance of a section 10(a)(1)(B) permit for the BLC HCP, as proposed, is not likely to destroy or adversely modify designated critical habitat for the bull trout. The Effects of the Action sections above fully describes the Service's rationale for arriving at this conclusion. In summary, implementation of the HCP and issuance of the incidental take permit will not destroy or adversely modify designated critical habitat for the bull trout for the following reasons: 1) the proposed action will have no effect on habitats within spawning or rearing areas for the bull trout; 2) the landowner is doing the items expected of private landowners in the draft recovery plan; 3) aquatic habitats under the control of BLC will improve with implementation of the HCP and associated farming and forestry methods and practices, resulting in an improvement for some stretches of rivers and streams which support bull trout or flow into designated critical habitat reaches.

11.0 Incidental Take Statement

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns including breeding, feeding, or sheltering. Harass is defined by the Service as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7 (b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with this incidental take statement.

The measures described below are non-discretionary, and must be undertaken by the Service so that they become binding conditions of the incidental take permit issued to BLC, as appropriate, for the exemption in section 7(o)(2) to apply. The Service has a continuing duty to regulate, to the full extent of its authority, the activities covered by this incidental take statement wherever they occur. If the Service (1) fails to assume and implement the terms and conditions or (2) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms in the HCP, the protective coverage of section 7(o)(2) may lapse [50 CFR § 402.14(i)(3)]. In order to monitor the impact of incidental take, the applicant must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement (50 CFR 402.14(i)(3)).

It is our policy (per Region 1 memorandum of July 27, 1998) to not consider for inclusion, pesticide and herbicide applications as a covered activity under section 10(a)(1)(B) Permits. The exceptions are those HCPs that address this topic and were submitted to us before July 27, 1998. The subject HCP was submitted to us after 1998. No take is anticipated herein as a result of pesticide or herbicide use in the HCP area as a result of the proposed action. Pesticide or herbicide use is not a proposed covered activity. No take is authorized for pesticide or herbicide use under the proposed permit.

11.1 Amount or Extent of Take

The Service expects bull trout take to occur in the following situations:

1. Migratory bull trout are likely to be injured or killed through motor vehicle use of Robinson Fork fords, although this is likely to be a rare event based on known bull trout distribution, and because the fords will only be used for administrative use, generally with ATVs, and not for log-haul. Overwintering or migragory adult or subadult bull trout are likely to be able to move away from vehicles, however as described in the effects discussion, the Service assumes conservatively that one bull trout could be injured or killed annually from the use of Robinson Fork fords. Bull trout spawning and rearing is unlikely in Robinson Fork, therefore redds are unlikely to be harmed.

2. Migratory bull trout are likely to be injured or killed due to livestock or vehicle trampling at fords on the Tucannon River, although this is likely to be a rare event because those fords are now fenced off, would only be used to move cattle in emergencies, and foraging, migratory, or overwintering adult or subadult bull trout are likely to be able to move away from vehicles. Bull trout spawning and rearing is unlikely in the affected reaches of the Tucannon River, therefore redds are unlikely to be harmed. Migratory bull trout may also be injured or killed, or migratory passage may be impaired due to continued use of irrigation water in the Tucannon River parcels. BLC commits to maintain a portion of its water right in the river as a “trust water right”, however water use continues in the low-flow season for the river when bull trout could be present. At the time this impact occurs, bull trout are not likely to be in the middle reaches of the Tucannon River, due to high water temperatures. As described in section 5.1.1, and

5.2.1, the Service assumes 7 adult bull trout could be harmed, injured, or harassed anually in the Tucannon River during implementation of this HCP.

3. Migratory bull trout may be injured or killed due to water quality effects caused by farming or livestock grazing contribution of sediment or nutrients into tributary streams or occupied bull trout streams, or continued high temperatures from lack of riparian shading. However, this also would be a rare event since Forest Practices Rules prescriptions and HCP conservation measures help to minimize this risk. Riparian buffers have been implemented, but not all reach out to a site-potential-tree height distance, or about 100 feet, which would be more likely to eliminate the risk of incidental take. Tucannon River buffers include some areas (in particular Tucannon Block 4) that only reach 75 feet wide in an area with likely migratory bull trout presence. The Service assumes that approximately 4.2 miles of 75-foot wide buffers could result in sediment or nutrients into the Tucannon River that could result in harm or injury of bull trout.

The Service has modified table 13 from the HCP to clarify the effects that rise to the level of take. With implementation of the HCP, these potential types of take are less likely, but still possible.

Table 13. Possible Effects of BLC Activities on Covered Species

	Potential Level of Effect							
	Current Activities				**Activities With HCP Conservation Measures**			
Covered Activities	**No Effect**	**Not Likely to Effect**	**May Effect**	**Take**	**HCP No Effect**	**HCP Not Likely to Effect**	**HCP May Effect**	**HCP Take**
Forest Management								
Timber Harvest[1, 2]			x	x		x	x	x
Hauling on Roads			x			x		
Use of Robinson Fork fords			x	x			still risk of take but minimized	x
Road Construction			x			x		
Road Maintenance			x			x		
Road Decommissioning			x			x		
Wildfire Management		x				x		
Stream Enhancement		x				x		

	Potential Level of Effect							
	Current Activities				Activities With HCP Conservation Measures			
Covered Activities	**No Effect**	**Not Likely to Effect**	**May Effect**	**Take**	**HCP No Effect**	**HCP Not Likely to Effect**	**HCP May Effect**	**HCP Take**
Grazing								
Pasture Management			x			x		
Herd Dispersion			x	x			x - still fords on Tucannon – but minimized	x
Winter Feeding		x				x		
Salt/nutrient Placement		x				x		
Fencing and Water			x			x		
Corrals and Loading		x				x		
Veterinary Facilities		x				x		
Temporary Housing		x				x		
Animal Waste Mgmt.		x				x		
Animal Disposal		x				x		
Farming								
Plowing, Tillage, planting			x	x		x	x – still within 100 feet of bull trout occupied Tucannon R.	x
Fertilization			x			x		
Manure Application		x				x		
Harvest and Mowing			x			x		
Vegetation & Weed Control			x			x		

	Potential Level of Effect							
	Current Activities				Activities With HCP Conservation Measures			
Covered Activities	**No Effect**	**Not Likely to Effect**	**May Effect**	**Take**	**HCP No Effect**	**HCP Not Likely to Effect**	**HCP May Effect**	**HCP Take**
Fencing			x			x		
Road Management			x			x		
Use of Existing Fords		x		x		x	x – still possible take but minimized	x
Pumping, Water Storage, irrigation			x	x		x	x – still using water in Tucannon in low flow seasons	x
Ditch Management		x				x		
Fallow Management		x				x		

[1] While take may occur from timber harvest activities, including sediment and water quality effects to bull trout habitat, these have already been considered, and permitted, under the Forest and Fish HCP.
2 Timber harvest includes: Helicopter Use, Site Preparation, Tree Planting, Thinning

The Service anticipates that incidental take of bull trout will be difficult to detect because of the inherent biological characteristics of bull trout that make the likelihood of discovering an individual death or injury attributable to BLC activities very small. For example, the small size of juvenile fish, the difficulty of seeing dead or injured fish in the stream, and rapid rates of decomposition make finding an incidentally taken individual fish extremely unlikely. For purposes of establishing a clear trigger for possible reinitiation of consultation, if the BLC, in the course of implementing the reasonable and prudent measures and monitoring requirements below, detects one dead or injured adult or subadult bull trout within the project footprint, the BLC shall immediately contact the Service (see contact information below) to determine if monitoring or adaptive management measures under the HCP need to be addressed.

11.2 Effect of the Take

In the accompanying BO, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

11.3 Reasonable and Prudent Measures/Terms and Conditions

The proposed HCP and accompanying documents identify anticipated impacts to bull trout likely to result from the proposed action, and the specific measures and levels of species and habitat protection that are necessary and appropriate to minimize those impacts. All of the conservation and management measures in the final HCP are hereby incorporated by reference as reasonable and prudent measures and terms and conditions for this incidental take statement pursuant to 50 CFR 402.14(I). Such terms and conditions are non-discretionary and must be undertaken by BLC for the exemptions under section 10(a)(1)(B) and section 7(o)(2) of the ESA to apply. If BLC fails to adhere to these terms and conditions, the protective coverage of the section 10(a)(1)(B) permit and section 7(o)(2) may lapse.

11.4 Reporting Requirements

In accordance with 50 CFR 402.14(i)(3), the HCP specifies provisions for monitoring and reporting the effects and effectiveness of the mitigation and minimization measures on the covered species and their habitats. BLC will also submit periodic monitoring reports to the Service, according to the monitoring and reporting schedule contained in the HCP.

12.0 Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service believes that the following recommendations should be considered for implementation:

1. The Service should provide technical assistance to Broughton Land Company throughout the term of the ITP.
2. The Service should review periodic, scheduled monitoring reports and use that opportunity to provide technical assistance.

13.0 Re-initiation Notice

This concludes formal consultation on the action outlined in the HCP/EA. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: 1) the amount or extent of incidental take is exceeded; 2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; 3) the agency action is subsequently modified in a manner that causes an effect to

the listed species or critical habitat not considered in this opinion; or 4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

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Appendix 1
Ciitical Habitat Federal Register Notice
Umatilla-Walla Walla
and
Snake River Washington