Biological and Conference Opinions
for
Resource Management Systems
for
Dry Cropland, and Range and Pastureland Agriculture Conservation Practices within the Counties of Gilliam, Sherman, and Wasco, Oregon

Agency: Natural Resources Conservation Service

Consultation and Conferencing Conducted By: Fish and Wildlife Service

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Biological and Conference Opinions for Resource Management Systems (RMS) for Dry Cropland, and Range and Pastureland Agriculture Conservation Practices within the Counties of Gilliam, Sherman, and Wasco, Oregon.

1. INTRODUCTION

This document transmits the Fish and Wildlife Service's (Service) biological and conference opinions (Service opinions), based on our review of the U.S. Natural Resources Conservation Service (NRCS) proposed Resource Management Systems (RMS) planning process and associated Dry Cropland and Range and Pastureland Conservation Practices (CPs) within the Counties of Gilliam, Sherman, and Wasco, Oregon, including Tribal lands. These Service opinions address the Project's effects on the Columbia River Distinct Population Segment (DPS) of bull trout (*Salvelinus confluentus* - hereafter referred to as bull trout) and proposed bull trout critical habitat (Fish and Wildlife Service 2002b, 2002c) in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq*.). NRCS submitted an initial biological assessment (BA) on February 22, 2002, and a revised BA and request for formal consultation was mailed on June 28, 2002 and received by the Service July 5, 2002. The NRCS added additional activities to the BA on July 1, 2003. The NRCS action was further modified on August 26, 2003, when the National Oceanic and Atmospheric Administration-Fisheries (NOAA Fisheries: also referred to as National Marine Fisheries Service, or NMFS) transmitted their draft biological opinion on the NRCS actions, and again on April 22, 2004 when a final BO was provided. Numerous non-discretionary actions were included in the NOAA Fisheries biological opinion, which will be implemented by NRCS. These Service opinions will evaluate the effects of all these amendments to the NRCS BA's proposed action.

When NRCS originally submitted the BA in 2002, coastal cutthroat trout (*Oncorhynchus clarki clarki*) was included for conferencing as a Proposed Threatened species. Coastal cutthroat were jointly proposed for listing by NOAA Fisheries and the Service on April 5, 1999 (National Marine Fisheries Service 1999). In Wasco County, coastal cutthroat exist within the proposed action area in Fivemile Creek, and are thought to occur also in Threemile and Eightmile Creeks (Hooton 1997; Steve Pryibiyl and Tim Unterwegner, Biologists, Oregon Department of Fish and Wildlife, The Dalles, Oregon, pers. comm., 2002). These fish are part of the Southwestern Washington/Columbia River DPS, which is one of six major population groupings of coastal cutthroat, ranging from British Columbia down through Washington, Oregon, and northern California. The proposal to list this DPS as a threatened population was withdrawn by the Service on July 5, 2002 (Fish and Wildlife Service 2002a). Consequently, this species will no longer be considered for conferencing or considered in this BO, other than as a potential Conservation Opportunity species.

After consultation began, critical habitat for bull trout was proposed in November of 2002 (Fish and Wildlife Service 2002b), simultaneously released with the draft recovery plan (Fish and

Wildlife Service 2002c). The proposed critical habitat has been included in this opinion as a conference opinion.

These Service opinions are based on information provided from many sources, including a number of collaborative efforts aimed at reaching a comprehensive understanding of the best available science, the appropriate conservation measures, and the effects of the proposed actions. These collaborative efforts are described in more detail in Section 1.2, Consultation and Conference History, below.

Specific information sources for these Service opinions include the BA, the Service's draft critical habitat proposal, the Service's draft bull trout recovery plan, numerous interagency meetings, field trips to observe specific applied conservation practices, various agency websites, and other published and agency sources of information. A complete administrative record of this consultation and conference is on file in the Service's Oregon Fish and Wildlife Office, Portland, Oregon.

Concurrence for Bald Eagles and Northern Spotted Owls

The February 22, 2002 BA indicates that the proposed action is "not likely to adversely affect" the threatened bald eagle (*Haliaeetus leucocephalus*). The BA substantiates this determination by indicating that few bald eagle nests are known to occur in the action area: seven in Wasco County, and none known in either Gilliam or Sherman Counties (Isaacs and Anthony 2003). However, unknown nests are suspected along the Deschutes and Lower John Day Rivers (Frank Isaacs, Oregon Eagle Foundation, Inc., pers. comm.). No critical habitat exists for bald eagles, but a Recovery Plan was issued for the seven-state Pacific Recovery Region in 1986 (Fish and Wildlife Service 1986), establishing 47 Recovery Zones. Wasco, Sherman, and Gilliam Counties are part of Recovery Zones 10 (Columbia River) and 11 (High Cascades). Limited numbers of winter roosting areas occur along the Columbia, Deschutes, and John Day rivers and their adjacent tributaries (NRCS 2002). The NRCS's action will provide limited improvement in wintering bald eagle habitat, via implementation of RMSs that improve watershed health.

Bald eagles are very sensitive to human disturbance, especially during nest establishment and egg incubation, when disturbance can result in nest abandonment or nestling death. Disturbance or flushing of eagles feeding during the winter can greatly increase their energy needs during an already-stressful time of the year. NRCS's activities will avoid or minimize disturbance to bald eagle nests and roost sites by not allowing work activities producing noise above local ambient conditions in key foraging areas within 0.25 mile of occupied roosts during periods of bald eagle use. For any work activity located within 0.25 mile, or within 0.5 mile line of sight of a known bald eagle nest (as identified by Steve Pribyl or Keith Cole, The Dalles, Oregon Department of Fish and Wildlife, 541-296-4628), no work activities producing noise above local ambient conditions will occur at the project sites from January 1 through August 15 (NRCS 2002). Any activity producing noise above ambient levels within these dates and distances requires site-specific consultation with the Service in order to evaluate the potential for adverse effects and take. Bald Eagles were proposed for nationwide delisting several years ago (Fish and Wildlife Service 1999), but have not yet been delisted due to unresolved issues regarding post-delisting

management and monitoring. After delisting, bald eagles would continue to be regulated under the Migratory Bird Treaty Act (MBTA: 16 U.S.C. 703-712) and the Bald and Golden Eagle Protection Act (16 U.S.C. 668a-668d), and monitored under a post-delisting monitoring plan. See Appendix A for a summary of the Bald Eagle Recovery Plan "Recovery Zone" recovery goals within Wasco, Sherman, and Gilliam Counties.

The BA finds that the proposed actions would have no effect on threatened Northern spotted owls (*Strix occidentalis caurina*) or their Designated Critical Habitat (DCH: Fish and Wildlife Service 1990, 1992), since there are no spotted owls or their critical habitat in the project area, and no off-site owls or critical habitat in Wasco county likely to be impacted by the actions. The Service concurs with NRCS's determinations of effect for bald eagles and spotted owls, and has no additional information at this time to provide which would alter those determinations. If new information reveals that the proposed actions may affect these species in a manner or to an extent not considered, or new species or critical habitat is designated that may be affected by the proposed actions, consultation should be reinitiated.

1.1 Background

The Natural Resources Conservation Service (NRCS), in cooperation with local Soil and Water Conservation Districts (SWCDs) as designated federal representatives in this consultation, and individual farm and ranch operators, propose to develop Resource Management Systems (RMS) that will guide the completion of individual farm and ranch conservation plans (Conservation Plans) for Dry Cropland and Range and Pastureland agriculture in Gilliam, Sherman, and Wasco Counties (Tri-County region), Oregon. Further, the NRCS proposes to assume program responsibility for each RMS Conservation Plan developed by certified NRCS or SWCD planners by providing engineering designs or other final project specifications and/or pay for all or part of the integrated conservation practices (CPs) necessary to carry out each RMS Conservation Plan. The purpose of the proposed action is to achieve sustainable natural resource use by preventing or alleviating resource degradation pursuant to Title 2 of the Farm Security and Rural Investment Act of 2002.

The RMS Conservation Plans consist of a combination of CPs and resource management actions, identified by land or water uses, for the treatment of all resource concerns for soil, water, air, plants and animals that meets or exceeds the quality criteria in the Field Office Technical Guide (FOTG) for resource sustainability (NRCS 1995a, 2003). Treatment levels necessary for an RMS Conservation Plan to adequately address natural resource concerns identified during the planning process, including habitat needs of threatened and endangered species, are set by RMS quality criteria and human considerations described in Title 450, Part 401, Subpart C of the NRCS Online Directives Management System. In cases where individual client actions cannot solve an existing conservation problem in accordance with RMS Conservation Plan criteria, group planning is encouraged and the criteria are deemed to be met if the client is not contributing to the problem. Quality Criteria are defined as a quantitative or qualitative statement of treatment level required to achieve a RMS Conservation Plan for identified resource concerns for a planning unit. Quality Criteria are established in accordance with local, state,

tribal and Federal programs and regulations in consideration of ecological, economic, and social effects (NRCS 2003). To date, there are no Quality Criteria within the Wasco, Sherman, and Gilliam Tri-County region that explicitly addressed aquatic species listed under the Endangered Species Act (ESA), although Quality Criteria do exist for habitat. Quality Criteria and practice standards used to draft, evaluate and install CPs that will be part of each proposed RMS Conservation Plan are the subjects of this consultation.

In 1998, a Memorandum of Understanding (MOU) was signed among the State of Oregon, NRCS, the Service, NOAA Fisheries, and the Environmental Protection Agency (EPA) in regards to streamlining and improving coordination to facilitate Endangered Species Act compliance and conservation for private landowners (Oregon State et al. 1998). Aside from the USDA CREP (United States Dept. of Agriculture, Conservation Reserve Enhancement Program) in Oregon, little consultation and conference with the Service has occurred for USDA programs in the Tri-County region (National Marine Fisheries Service and Fish and Wildlife Service 1999).

1.2 Consultation and Conference History

In 2000, NOAA Fisheries, the Oregon State Office of the NRCS, Tri-County SWCDs, the Oregon Department of Agriculture (ODA), the Fish and Wildlife Service (Service), the Oregon Department of Fish and Wildlife (ODFW), and the Oregon State University Extension Service (OSU Extension), farm and ranch operators, and other interested parties began joint discussions about aquatic conservation goals in the Mid-Columbia region. In March 2001, NOAA Fisheries received a letter from NRCS requesting assistance in the development of a biological assessment for agricultural CPs in the Tri-County region, with an intent to enter into consultation on its completion. In April 2001, NOAA Fisheries and the Service accepted NRCS' invitation and entered into informal discussions with NRCS and its conservation partners during the following year to refine the scope of the proposed action and identify effects and mitigation measures for activities considered in the proposed action. In May 2001, NRCS notified NOAA Fisheries of its intent to designate the Tri-County region SWCDs as the NRCS designated federal representative for the purposes of the consultation. Originally, NRCS and the SWCDs had requested the initiation of a 4(d) ruling under the Act, although the discussion expanded to include all area listed-species' coverage. NOAA Fisheries and the Service also discussed the concept of developing a section 10 Habitat Conservation Plan (HCP) as a possible mechanism administered via RMS Conservation Plan through the SWCDs. In February 2002, NRCS submitted a draft biological assessment (BA) describing the Nine-Step Planning Process for developing RMS Conservation Plans for Dry Cropland and for Range and Pastureland in the Tri-County region. Following further discussions, the NRCS submitted a revised draft biological assessment in June 2002.

Another BA covering the RMS planning process for irrigated cropland and orchard lands is in the process of being developed by the Tri-County SWCDs with NRCS. It is envisioned that groups of counties and their respective SWCDs will be developing, statewide, BAs for specific suites of NRCS conservation practices for their primary RMS Conservation Plan types.

Although it had been proposed that this initial BA could be used as a template for the RMS planning process for other counties in Oregon, it is clear that each county has a different suite of listed or rare species and habitats, as well as a different suite of agricultural systems with a multitude of conservation practices, making it impossible to generalize across counties, at this point in time.

On July 1, 2003, the Service received notification from NRCS of 14 more Conservation Practices that had been added to the original Tri-County BA and draft NOAA Fisheries BO, based on discussions between NRCS, NOAA Fisheries, and the Wasco SWCD. Those 14 additional CPs were: 380 Windbreak/Shelterbelt Establishment, 650 Windbreak/Shelterbelt Renovation, 512 Pasture and Hay Planting, 390 Riparian Herbaceous Cover, 391 Riparian Forest Buffer, 395 Stream Habitat Improvement and Management, 396 Fish Passage, 422 Hedgerow Planting, 561 Heavy Use Area Protection, 601 Vegetative Barriers, 580 Streambank and Shoreline Protection, 612 Tree and Shrub Establishment, 643 Restoration of Declining Habitats, and 647 Early Successional Habitat. CPs 380 and 650 are added to the Dry Cropland RMS Conservation Plans, CP 512 was added to Range and Pastureland RMS Conservation Plans, and the other CPs were added to both systems.

1.3 Relationship to NOAA Fisheries Biological Opinion

On April 22, 2004, NOAA Fisheries transmitted their final biological opinion to NRCS on the Dry Cropland and Range and Pastureland actions (National Marine Fisheries Service 2004). Listed anadromous salmonids, under the jurisdiction of NOAA Fisheries, are expected to experience greater effects than bull trout from the proposed NRCS actions. The NOAA Fisheries biological opinion and Incidental Take Statement require a number of non-discretionary activities that NRCS must undertake. These requirements substantially change the original NRCS proposed action, and make it more protective of aquatic resources. The Service considers NRCS' final proposed action to be a combination of the NRCS BA's proposed action, as well as the actions NRCS has agreed to undertake to fulfill requirements of the NOAA Fisheries BO Incidental Take Statement, including exceptions listed under Section 2.6.

2. BIOLOGICAL AND CONFERENCE OPINIONS

2.1 Proposed Action

Over the next 5 years, using the NRCS 9-Step Planning Process, certified NRCS and SWCD planners propose to develop and complete RMS Conservation Plans for up to 468,000 acres of Dry Cropland and up to 1,107,000 acres of Range and Pastureland for participating landowners in the Tri-County region (Table 1). The NRCS will help to carry out these plans with technical assistance from the local SWCDs and USDA farm program funding. In Oregon, completion of RMS-level planning qualifies participating landowners for funding from various USDA farm programs (NRCS 2002). A portion of Dry Cropland and Range and Pastureland in this category

are already operating under NRCS Progressive Plans, a step below RMS-level planning. NRCS will review and upgrade these to RMS Conservation Plans, as needed (NRCS 2002), and if desired by the producer. The purpose of the proposed action is to achieve sustainable natural resource use by preventing or alleviating resource degradation pursuant to Title 2 of the Farm Security and Rural Investment Act of 2002, and as stated in the BA: "The *context for this work is thus species and land conservation and the need to formally link agricultural conservation practices with species conservation goals*" (NRCS 2002).

Table 1. Dry Land Crops and Range Land Acres Scheduled for RMS-Level Planning in Gilliam, Sherman and Wasco Counties, Oregon over a 10-year period (NRCS 2002)

County	Total Cropland	Cropland Identified for RMS	Total Rangeland	Rangeland for RMS	Total Crop and Rangeland	Total for RMS Planning
Gilliam	267,897	194,447	430,093	418,706	697,936	613,153
Sherman	302,200	144,000	141,700	96,700	443,700	240,700
Wasco	214,000	129,656	663,000	592,000	877,000	721,656
TOTALS	784,097	468,103	1,232,793	1,107,406	2,018,636	1,575,509

The Nine Step planning process used by NRCS to develop and ensure implementation of an RMS Conservation Plan for individual private landowners consists of the following nine steps (NRCS 2002): (1) identify problems and opportunities; (2) determine objectives; (3) inventory resources; (4) analyze resource data; (5) formulate alternatives; (6) evaluate alternatives; (7) make decisions; (8) implement the plan; and (9) evaluate the plan. RMS Conservation Plan alternatives are designed to resolve resource concerns in an integrated way, if properly implemented. The RMS Conservation Plan alternatives also provide farmers and ranchers with different levels of management and structural practices, and different costs (NRCS 2002). This formalized planning and implementation process, and/or subsequent federal funds used to implement some or all of any RMS Conservation Plan, is the federal nexus that requires NRCS to consult on NRCS final designs and financial assistance activities. NRCS is requesting formal consultation on these planning activities, and incidental take coverage (for 5 years from the signatory date on this BO) of private landowner implementation of these RMS Conservation Plans and for management of the implemented RMS Conservation Plans.

NRCS is proposing to alter the existing planning process to provide an adequate assessment of on-site resource conditions and proper selection and use of the CPs to produce an RMS Conservation Plan that will meet the conservation needs of listed species. As part of refining the planning process, NRCS's RMS Conservation Plan cost calculations will identify individual planning unit cost plus additional costs associated with accomplishing those measures necessary to address watershed-wide fish species conservation needs. This is expected to identify new sources of funding for on-farm CPs that contribute to listed fish conservation and recovery.

2.2 Application of Listed Fish Quality Criteria

NRCS has agreed to integrate the following Quality Criteria for listed fish and habitat that will guide their development of RMS Conservation Plans. These Quality Criteria have been derived from the NRCS stream visual assessment protocol methodology (NRCS 1998a).

The NRCS and NOAA Fisheries have identified applicable listed fish habitat, as listed in Table 2, to serve as habitat and biotic based targets to be integrated within the RMS planning and implementation. The Service agrees that these Quality Criteria meet the needs of listed bull trout. These Quality Criteria have been identified from the NRCS Stream Visual Assessment Protocol (SVAP), Technical Note 99-1 (NRCS 1998a). The SVAP was developed by the USDA and the NRCS to serve as "*an easy-to-use assessment protocol to evaluate the condition of aquatic ecosystems associated with streams*." (NRCS 1998a). Using the SVAP as a guide, planners developing RMS Conservation Plans will describe current/baseline conditions of the planning unit, and identify actions within the RMS through CPs that will maintain or improve baseline conditions to meet these Quality Criteria, as appropriate. The listed fish Quality Criteria adopted from the SVAP address a variety of habitat indicators ranging from physical habitat conditions to biotic indicators. These are intended to address the full suite of habitat functions that are necessary for the survival and recovery of bull trout. In addition, the listed fish Quality Criteria will serve as a cross-check on potential CPs actions that are considered as part of the RMS planning process. Those CP actions that reduce the ability of the planning unit to achieve these Quality Criteria will either not be included within the RMS, or altered to the extent that they in turn support listed fish Quality Criteria attainment.

Table 2. NRCS Listed Fish Quality Criteria for RMS planning.

Habitat/Biological Indicator	Target
Channel Condition	Score of 7 or higher – Evidence of past channel alteration, but with significant recovery of channel and banks. Any dikes or levies are set back to provide access to an adequate flood plain.
Hydrologic Alteration	Score of 7 or higher – Flooding occurs only once every 3 to 5 years; limited channel incision. Withdrawals, although present, do not affect available habitat for biota.
Riparian Zone	Score of 10 – Natural vegetation extends at least two active channel widths on each side or, if less than two widths, covers entire flood plain whenever appropriate soils, slope, and topography are present to support natural riparian vegetation..
Bank Stability	Score of 7 or higher – Moderately stable; banks are low (at elevation of active flood plain); more than 33% of eroding surface area of banks in outside bends is protected by roots that extend to the baseflow elevation.

Table 2. NRCS Listed Fish Quality Criteria for RMS planning.	
Habitat/Biological Indicator	**Target**
Water Appearance	Score of 7 or higher-Occasionally cloudy, especially after storm event, but clears rapidly; objects visible at depth 1.5 to 3 ft; may have slightly green color; no oil sheen on water surface.
Nutrient Enrichment	Score of 7 or higher – Clear water along entire reach; diverse aquatic plant community includes low quantities of many species of macrophytes; little algal growth present.
Barriers to Fish Movement	Score of 10 – No barriers to upstream or downstream movements of juvenile or adult life stages, seasonal water withdrawals do not inhibit movement within the reach.
Instream Cover	Score of 8 or higher – 6 to 7 cover types available.
Pools	Score of 7 or higher – Pools present, but not necessarily abundant; from 10 to 30% of the pool bottom is obscure due to depth, or the pools are at least 3 feet deep.
Invertebrate Habitat	Score of 7 or higher – 3 to 4 types of habitat. Some potential habitat exists, such as overhanging trees, which will provide habitat, but have not yet entered the stream.
Canopy Cover	Score of 7 or higher – >50% shaded in reach, or >75% in reach, but upstream 2 to 3 miles poorly shaded.
Riffle Embeddedness	Score of 10 – Gravel or cobble particles are <20% embedded.
Macroinvertebrates	Score of 10 or higher– Community dominated by Group 1(refer to the SVAP) or intolerant species with good species diversity. Examples include caddisflies, may-flies, stoneflies and hellgrammites.

When a project is located within or adjacent to designated critical habitat for bull trout, the NRCS may instead choose to complete the Oregon Stream Habitat Data sheet (NRCS 1998b).

2.3 Specific Activities Addressed in These Service Opinions

As indicated earlier, the proposed actions covered under this BO are limited to dryland crops and range/pasturelands. Typical Dryland RMS Conservation Plans (various combinations of 39 conservation practices as defined by NRCS and SWCD) and typical Range and Pastureland RMS Conservation Plans (various combinations of 33 conservation practices) are described below.

2.3.1 Typical RMS Conservation Plans for Dry Cropland

Typical RMS Conservation Plans for the production of non-irrigated crops in the Tri-County region include a combination of 39 CPs. The practices are listed and described in the BA (NRCS 2002) and subsequent electronic transmissions (July 1,2003, Deborah Virgovic, Natural Resources Conservation Service, Portland). The typical Dry Cropland RMS Conservation Plans involves growing small grains (i.e., soft white wheat, feed barley) usually every other year on a specific piece of land. The majority of the small grain grown is fall or winter wheat planted from September to November into soil that has been fallowed (no crops) the previous growing season. Undesirable vegetation which grows into the fallowed crop land is controlled with mechanical tillage.

Residue Management Mulch Till (CP 329b) begins after harvest of the wheat crop in July or August. The crop residue of stubble and chaff may be harrowed, mowed, sprayed, grazed or just left standing. This crop residue is then typically left over winter from September through March with no further activities.

As the soil warms in March and the surface dries, mechanical tillage (such as chisel) begins. Depending on the amount of undesirable vegetation, rainfall, and soil condition, typically two to four tillage operations will be conducted. Fertilizers for the next fall wheat crop may typically be applied with a shank injector (part of CP 590, Nutrient Management) during February or March, or from June to September prior to seeding.

The fall wheat crop is then seeded (e.g., part of CP328, Conservation Crop Rotation) from September through November into the prepared summer fallow seedbed using a grain drill with disc or hoe openers. This crop usually emerges in two to three weeks and grows until winter temperatures and soil conditions cause it to go dormant for the winter. The fall wheat begins growing again in the early spring with the yield potential dependent on soil moisture, rainfall, fertility, weed competition, disease levels and growing conditions such as temperature. The fall wheat is usually harvested using combines in July or August. The cycle begins again and is repeated. However, very seldom will two years' activities be exactly the same.

Modifications to this typical system include the use of No-Till Residue Management (CP329A) or Residue Management Direct Seed (CP 777). In this system, mechanical tillage is reduced and used only during the seeding and fertilizing process. In this modified system, the crop is seeded and fertilized in one pass into the previous crop's residue. Other modifications to the typical system occur when Conservation Crop Rotation (CP 328) is shifted to a spring grain or recrop spring grain. In these systems, spring barley or wheat or another spring crop is seeded in March or April into the previous fall grain residue and harvested in July or August.

Supporting CPs such as Diversions (CP 362), Terraces (CP 600) or Water and Sediment Control Basins (CP 638) may be constructed as needed in the fields during the fallow period, typically from April to July, or after harvest, from September to December. However, these practices are permanent structures installed once during the timeframes provided. Other CPs, including Contour Buffer Strips, Conservation Cover, and Filter Strips or Grassed Waterways (CP 332,

327, 393, 412, respectively) are established on soils or surfaces that are shallow, non-productive or highly erodible. This is usually done in October or April depending on the vegetation species to be seeded and rainfall zone. Contour Strip Cropping (CP 585) is installed during the fallow period either after September harvest to November, or in the spring from April to June. Deep Tillage (CP 324) is used infrequently in late summer after harvest to break up restrictive layers. Upland Wildlife Habitat Enhancement practices (CP 645, 648), including watering facilities, are installed throughout the year.

2.3.2 Typical RMS Conservation Plans for Range and Pastureland

A typical RMS Conservation Plan on rangeland and pastureland in the Tri-County region consists of prescribed grazing management that incorporates a deferred or rest-rotation type of animal movement to make optimal use of available forage. The RMS Conservation Plans for Range and Pastureland are designed to meet the animals' needs for food, water, security and cover (NRCS 2002), and for the purposes of this BO includes various combinations of 33 CPs. The prescribed grazing system utilizes animal movements to manipulate timing, intensity, frequency, and duration of vegetation harvest to minimize impacts and to meet ecological objectives. The default amount of forage allocated (harvest efficiency) is 25 percent on rangeland, 30-35 percent on pastureland, and 10-15 percent on Dry Cropland aftermath. These figures represent the percentage of the weight of annual growth available during the grazing period, and this amount changes from year-to-year and within each growing season. The other practices associated with the RMS Conservation Plans are either *facilitating* practices that enable the prescribed grazing to work effectively, or *accelerating* practices that result in increased amounts of forages and roughages available for harvest. After a complete inventory and evaluation of existing resources is completed using procedures and protocols in NRCS National Range and Pasture Handbook (NRPH) and Amendment OR-1 to the NRPH (Chapter 4, part 600.0401a, 2002), an initial stocking rate in animal unit months per acre (AUMs/acre) can be developed to meet the objectives of the producer while maintaining or improving the natural resource conditions identified in the survey.

As part of the inventory and evaluation procedures and protocols in the National Range and Pasture Handbook and Amendments, NRCS will use interagency Technical Reference 1734-6 2000, *Interpreting Indicators of Rangeland Health* (version 3: USDI, BLM 2000) for assessing rangeland ecosystem health attributes (soil-site stability, biotic integrity, and hydrologic function). This protocol, which does not address specific strategies to manage rangelands, describes an assessment tool to document and describe seventeen rangeland indicators such as water flow patterns, bare ground, gullies, litter movement, soil surface resistance to erosion, plant community dynamics, and others. The indicators compare current conditions to ideal states for each ecological site. With this assessment tool, the NRCS can document and evaluate baseline conditions, and develop alternatives for the RMS conservation plan. The results of all inventory and evaluation procedures and protocols lead to the development of site-specific prescribed grazing job specifications (CP 528a).

Native or established vegetation on rangelands provides food needs, except in winter when snow covers available forage and supplemental feeds are used. The sustainability of the forage resource is assured by modifying the timing, intensity, frequency, and duration of grazing events, and ensures adequate rest periods before plant communities are subsequently grazed. Deferments and rest are used with other appropriate rotational grazing schemes to integrate management operations and ecological improvements over time. To convert degraded areas or cropland to rangeland, permanent vegetation can be planted to augment or enhance native plant community structure and/or increase forage production (CP 550 for native plant seedings, CP 512 for introduced seedings). Controlling or removing undesirable and unsuitable amounts of brush species to improve ecological condition and increase forage production (CP 314), using prescribed fire to modify plant community structure and function or to manage fuel loads (CP 338 and CP 394), and providing protection from concentrated flow erosion (CP 638) are other commonly applied measures to treat resource concerns on range and pasture lands.

Distribution of grazing across the landscape to prevent livestock from overusing stream courses and to decrease plant damage is designed through strategic water development and distribution. Ponds (CP 378) may be built to catch and hold surface runoff, wells (CP 642) may be drilled with pipelines (CP 516) taking water to drinking troughs (CP 614) or springs may developed (CP 574) with pipeline and troughs to achieve more even grazing distribution. In addition, leaving strategic patches of brush or installing fences can facilitate shelter and cover needs of range animals.

Many practices can have multiple purposes within Range and Pastureland RMS Conservation Plans. Fencing (CP 382) assists in better distribution of livestock for more even use of forages, while excluding cattle grazing and compaction (Use Exclusion: CP 472) from sensitive areas such as riparian zones, newly seeded acres, or program-restricted areas facilitates vegetation growth and recovery. Animal Trails and Walkways (CP 575) can provide easier access to watering areas, livestock movement for rotation purposes, access to areas not normally used, or access across sensitive areas.

Riparian areas are managed to meet desired ecological objectives, as determined by the RMS planner in conjunction with the use of the Oregon Stream Habitat Data Sheet (NRCS 1998b) or the Stream Visual Assessment Protocol (NRCS 1998a). Exclusion is necessary and desirable at times to allow natural plant succession to recover an area. Off-stream water development practices are often used, and timely livestock movement, as part of a grazing management plan, when indicated, are methods to minimize negative grazing impacts to riparian areas.

Consideration for wildlife in forage allocations is a critical component of the inventory and final RMS Conservation Plan. Seeding mixtures for range planting include species compatible with wildlife habitat needs (CP 645), and watering facilities are designed to meet wildlife as well as livestock needs or are sometimes constructed as separate facilities. Travel corridors, nesting seasons, thermal and escape cover, and fisheries issues are factored into the prescribed grazing and support practices. The prescribed gazing system is usually evaluated annually. Its underlying goal is to balance allocated forage supply with animal demand annually.

2.4 NRCS Specifications

Specifications are designed to reduce adverse environmental impacts resulting from the conservation practices. The following language was taken from applicable NRCS specifications, the Service considers to be part of the proposed action, and that they will be a binding requirement within each RMS Conservation Plan.

2.4.1 General Activities

1. Any vandalism, vehicular or livestock damage to earthfills, side slopes, drainage facilities, water ways, and storm water outlets or other appurtenances, will be immediately repaired.

2. Good vegetative cover, mulches, and other covering installed for erosion protection will be maintained. Traffic will be limited with fencing or barriers, when needed.

3. Any damage to any structure will be repaired as soon as possible to prevent soil erosion.

4. Valves and air vents in pipelines will be set to the proper operating condition so they may provide protection to the pipeline and ensure water use efficiency.

5. All structure drains will be kept functional so that soil is not being transported through the drainage system. Screens and/or rodent guards will also be kept in place.

6. All fences will be maintained in good condition to exclude livestock from spring development collection area.

7. Spillways and control gates will be periodically inspected for proper functioning for their ability to maintain the water level to design elevations. Any blockage or obstructions will immediately be removed.

8. Troughs and tanks will be checked for leaks or cracks and repaired or replaced immediately.

2.4.2 General Vegetation

9. The prescribed grazing plan will consider aquatic habitat and requirements of fish populations.

10. Vegetation to be planted will be non-invasive, preferentially native, species when available and economically feasible.

2.4.3 Riparian

11. The timing, duration, frequency, and intensity of grazing will be adjusted to meet instream, riparian and floodplain objectives.

12. Debris that may accumulate at the sediment basin and immediately upstream or downstream of the basin will be removed in order to prevent delivery of fine sediment to a water body.

2.4.4 Activity Timing

13. Duration, timing, frequency, and intensity of grazing will be based on desired plant health and expected productivity of key forage species to meet management unit objectives. Tools that may be used include deferment, rest, rotations, and planned utilization levels.

14. Mowing, prescribed burning, or grazing on filter strips or grassed waterways will be delayed until after the nesting season (July 15th).

2.5 Modifications to Proposed Action Resulting from NOAA Fisheries Final Biological Opinion

The NOAA Fisheries Biological Opinion requires a number of non-discretionary activities that NRCS must undertake. These are included herein as part of the action under consultation (Virgovic 2004). The NOAA Fisheries Biological Opinion and the actions described in the Incidental Take Statement are incorporated herein by reference. The following three additional actions briefly describe these NOAA Fisheries requirements:

Additional Action 1: NRCS will utilize Listed Fish Quality Criteria (Table 2), and document the integration of these Quality Criteria using Appendix C (Project Pre-notification Form) for each RMS Conservation Plan developed.

Additional Action 2: NRCS will incorporate additional NOAA Fisheries Terms and Conditions relative to work area timing restrictions; native plant materials; vehicle staging; access roads and stream crossings; streambank protections; and additional requirements associated with Dry Cropland and Range and Pastureland Conservation Planning activities.

Additional Action 3: NRCS shall implement an Effectiveness Monitoring program.

The Service considers NRCS' final proposed action to be a combination of the NRCS BA's proposed action, as well as the actions NRCS has agreed to undertake in order to fulfill requirements of the NOAA Fisheries BO.

2.6 Actions Not Covered Under Programmatic Consultation

Progressive Plans are excluded from the proposed action and will not be covered under this programmatic consultation. A Progressive Plan is defined as "A plan where the producer is ready, willing and able to make and implement some, but not all of the decisions necessary to achieve a resource management plan. The rate of progress towards a RMS Conservation Plan depends upon the producer's desires and constraints." (p. 6: NRCS 2002).

This programmatic consultation does **not** cover RMS planning for:

- irrigating cropland;
- fruit production;
- orchards;
- new irrigated hay production;
- conversion of native wildlife lands;
- any pesticide applications; or
- other types of agricultural systems besides Dry Cropland and Range and Pastureland that may occur in the Tri-County region.

Finally, due to the inability of the Service and NRCS to analyze effects of some future actions that may be developed during the RMS planning processes, several in-water activities are not covered by this BO, and will require additional consultation. In Wasco County, approximately 20 percent of the RMS work is in close proximity to a stream (excluding Continuous Conservation Reserve Program [CCRP] and CREP buffers), and about 1 to 2 percent of the work is in a perennial stream. In Sherman County, excluding CCRP and CREP, none of the RMS work is in a perennial stream. In Gilliam County, the percent of RMS work in a perennial stream (excluding CCRP and CREP) is about 5 percent, and including CCRP and CREP is about 10 percent (Deborah Virgovic, NRCS, pers. comm. July 22, 2003). Based on the above figures and other information, it is necessary to exclude individual components of some CPs that may have a significant or unpredictable adverse effect on habitats that can only be understood when analyzed at a site specific scale. Actions that can be categorized under the following definitions will not be covered under this programmatic BO and will require an individual consultation:

1. Any new action that will withdraw, redirect, or halt spring water (e.g., spring development) from entering (through subsurface or surface flow) a stream, creek, or river, potentially altering hyporheic flow or stream hydrology and /or raising waterway temperature, must be evaluated in an individual consultation.
2. Excluding annual minor maintenance to existing diversions, any new action that will create or restore a diversion or barrier in a perennial stream channel must be evaluated in an individual consultation.
3. Construction of a new or upgraded instream water control structure.
4. Construction of a new permanent road or impervious heavy use area inside the riparian buffer area or channel migration zone.
5. Construction of a new bridge pier or abutment below the bankful elevation.

2.7 Incidental Take Coverage Under Programmatic

This consultation only covers bull trout, as addressed in the BA for Dry Cropland and Range and Pastureland RMS Conservation Plans in the three Counties. Coverage for incidental take of bull trout requires completion of an RMS Conservation Plan via the Nine-Step planning process, including evaluation and integration of Quality Criteria. Coverage begins only after signature of the RMS by the producer, incorporating both the modifications under the NOAA Fisheries and Service BO, with the intent of implementing the full RMS Conservation Plan in a timely manner.

3. STATUS OF THE SPECIES

Bull trout in the coterminous United States were listed as threatened on November 1, 1999 (64 CFR 58910). An earlier rulemaking had listed the Columbia River Basin bull trout DPS as threatened (63 CFR 31647). The bull trout population has declined in abundance and distribution as a result of combined effects from habitat degradation, fish passage blockage, poor water quality, angler harvest and poaching, irrigation diversions, and introduced non-native fish species. Land management activities that continue to degrade bull trout habitat include dams and diversions, forest management, livestock grazing, other agricultural practices, road construction and maintenance, mining, and urban and rural development.

Bull trout were previously often confused with Dolly Varden (*Salvelinus malma*) due to similarity of appearance, but genetic studies have confirmed they are a distinct and separate species (Crane et al. 1994, Leary and Allendorf 1997). Bull trout may exhibit either migratory or resident life-history strategies, both resident and migratory forms may co-occur, and either form may produce progeny with resident or migratory behavior (Rieman and McIntyre 1993). Migratory bull trout may spawn and rear a year or more in a tributary stream before migrating to a lake or reservoir (adfluvial), to a river (fluvial), or in some coastal areas to saltwater (anadromous) (Cavender 1978, McPhail and Baxter 1996), although anadromy has not yet been found in Oregon (Bond 1992). They reach sexual maturity at 4 to 7 years of age, and may live at least 12 years. Repeat-spawning and alternate-year spawning have been reported (Fraley and Shepard 1989).

Bull trout have more specific habitat requirements than most other salmonids (Rieman and McIntyre 1993). Even in so-called pristine environments, bull trout exhibit a patchy distribution, and the ability to migrate is very important in order to ensure long-term bull trout persistence. Although individuals may be found in larger and warmer river systems throughout the Columbia River basin, they are primarily found in cold streams and are believed to be limited by temperatures above 59 degrees Fahrenheit (15 degrees Celsius), but temperature impact is dependent upon life stage. Optimum egg incubation temperatures may be as low as 35 to 39 degrees Fahrenheit (Goetz 1989), and spawning areas are often associated with cold-water springs, groundwater infiltration, and the coldest streams in the watershed (Baxter et al. 1999). However, adults can tolerate higher temperatures up to 68 degrees Fahrenheit for some amount of time, as long as cold water refugia is present (Gamett 1999). All life-history stages are associated with complex cover, which includes large woody debris, undercut banks, boulders and

pools. Juveniles and adults frequently inhabit side channels, stream margins and pools with cover (Sexauer and James 1997).

Typically, bull trout spawn from August to November when water temperatures are generally decreasing. In Montana, migratory bull trout may begin spawning migrations as early as April and have been known to move as far as 155 miles to spawning grounds (Fraley and Shepard 1989, Swanberg 1997). Total time from egg deposition to emergence of fry from the substrate may be more than 200 days, with 100 to 145 of those days being incubation (Pratt 1992). Fry would normally emerge April through May. Thus, they are sensitive to substrate disturbances.

Bull trout are opportunistic feeders. Resident and juvenile migratory bull trout eat terrestrial and aquatic insects, macro-zooplankton, and small fish. Adult migratory forms eat a variety of fish species (Donald and Alger 1993). Although bull trout sometimes eat them, non-native fish such as brown trout can compete with, and prey upon, bull trout. Non-native brook trout can hybridize with bull trout: the hybrid progeny may be better competitors due to their larger size and more aggressive nature.

3.1 Columbia River Population Segment

The Columbia River DPS includes bull trout residing in portions of Oregon, Washington, Idaho, and Montana. Bull trout are estimated to have occupied about 60 percent of the Columbia River Basin, and presently occur in 45 percent of the estimated historical range (Quigley and Arbelbide 1997). The Columbia River population segment is composed of 141 subpopulations. The Service identifies bull trout within four geographic areas of the Columbia River basin: (1) lower Columbia River (downstream of the Snake River confluence), (2) mid-Columbia River (Snake River confluence to Chief Joseph Dam), (3) upper Columbia River (upstream from Chief Joseph Dam), and (4) Snake River and its tributaries (including the Lost River drainage). For purposes of this consultation and conference, only the lower Columbia River geographical area will be considered.

3.1.1 Lower Columbia River Geographical Area

The lower Columbia River geographical area includes all Columbia River tributaries in Oregon and Washington downstream of the Snake River confluence near the town of Pasco, Washington. The Service identifies 20 subpopulations in watersheds of nine major tributaries of the lower Columbia River: the Lewis River, Willamette River, White Salmon River, Klickitat River, Hood River, Deschutes River (3 subpopulations), John Day River (3 subpopulations), Umatilla River, and Walla Walla River. The present distribution of bull trout in the lower Columbia River basin is less than the historic range (Buchanan et al. 1997; Oregon Department of Fish and Wildlife [ODFW] 1993). Bull trout are thought to be extirpated from several tributaries in five river systems in Oregon--the Middle Fork Willamette River, the North and South Forks of the Santiam River, the Clackamas River, the upper Deschutes River (upstream of Bend, Oregon) and the Crooked River (tributary to the Deschutes River) (Buchanan et al. 1997).

Hydroelectric facilities and large expanses of unsuitable, fragmented habitat have isolated these subpopulations. Large dams, such as McNary, John Day, The Dalles, and Bonneville, separate four reaches of the lower Columbia River. Although bull trout may pass each facility in both upstream and downstream directions, the extent to which bull trout use the Columbia River is mostly unknown. In addition, the nine major tributaries have numerous hydroelectric and water diversion facilities, many of which do not provide upstream passage.

Migratory bull trout are present with resident bull trout, or exclusively in, at least 13 of the 20 subpopulations in the lower Columbia River. Many migratory fish are adfluvial (migrate between smaller streams for spawning and lakes and reservoirs for adult rearing) and inhabit reservoirs created by dams. However, this area includes the only natural adfluvial subpopulation in Oregon, which exists in Odell Lake in the Deschutes River basin (Ratliff and Howell 1992; Buchanan et al. 1997). The Metolius River-Lake Billy Chinook subpopulation is also found in the Deschutes River basin. It is the only subpopulation considered "strong" and exhibits an increasing trend in abundance. The Service considers 5 of the 20 lower Columbia River geographic area subpopulations at risk of extirpation caused by naturally occurring events exacerbated by isolation, single life-history form and spawning area, and low abundance.

3.2 Draft Bull Trout Recovery Plan and Recovery Plan Objectives

The Draft Recovery Plan (Fish and Wildlife Service 2002c, 2002d, 2002e, 2002f) for bull trout was published by the Service on November 29, 2002, and covers bull trout that occur in the states of Idaho, Montana, Nevada, Oregon, and Washington, and includes the Klamath River, Columbia River, Jarbidge River, St. Mary-Belly River, and Coastal Puget Sound. The draft Plan was published after the Tri-County BA had been submitted for this consultation.

Bull trout were listed as threatened in the coterminous United States on November 1, 1999 (64 FR 58910). Distinct Population Segments (DPS) of this population had previously been listed as threatened, including the Columbia River, Klamath River, and Jarbridge River basins (63 FR 31647, 63 FR 42757, and 64 FR 17110, respectively). The recovery objectives (Fish and Wildlife Service 2002d) of the draft recovery plan are to: 1) maintain current distribution of bull trout within core areas as described in the recovery unit chapters, and restore bull trout distribution where recommended; 2) maintain stable or increasing trend in abundance; 3) restore and maintain suitable habitat conditions for all life history stages and strategies for bull trout; and 4) conserve genetic diversity and provide opportunity for genetic exchange (connectivity).

3.3 Draft Bull Trout Proposed Critical Habitat and Primary Constituent Elements (PCEs)

The draft recovery plan for bull trout is broken into 27 recovery units, of which 24 are included in the draft plan. The Jarbidge River and Coast Puget Sound recovery units will be released in later recovery plans. Each chapter of the current draft recovery plan addresses a specific recovery unit, and three recovery units occur within the action area of this BO: Deschutes River, John Day River, and the Columbia River mainstem. These are recovery Unit 6 (Deschutes: Fish and Wildlife Service 2002e), Unit 8 (John Day: Fish and Wildlife Service 2002f), and Unit 24 (Columbia River mainstem: Fish and Wildlife Service 2002c, 2002d). Proposed critical habitat occurs in all three of these recovery units, and occurs in or adjacent to Wasco, Sherman, and Gilliam Counties.

All areas proposed for critical habitat for bull trout are within the historic geographic range and represent one or more of the required Primary Constituent Elements (PCEs: Fish and Wildlife Service 2002c), which for bull trout are: (PCE 1) Permanent water having low levels of contamination such that normal reproduction, growth, and survival are not inhibited; (PCE 2) Water temperatures ranging from 2 to 15 degrees Celsius (36 to 59 degrees Fahrenheit), with adequate thermal refugia available for temperatures at the upper end of this range. Specific temperatures within this range will 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; (PCE 3) Complex stream channels with features such as woody debris, side channels, pools, and undercut banks to provide a variety of depths, velocities, and in-stream structures; (PCE 4) Substrates of sufficient amount, size, and composition to ensure success of egg and embryo over-winter survival, fry emergence, and young-of-year and juvenile survival. A minimal amount of fine substrate less than 0.63 cm (0.25 inches) in diameter and minimal substrate embeddedness are characteristic of these conditions; (PCE 5) A natural hydrograph, including peak, high, low, and base flows within historic ranges or, if regulated, a hydrograph that demonstrates the ability to support bull trout populations; (PCE 6) Springs, seeps, groundwater sources, and subsurface water connectivity to contribute to water quality and quantity; (PCE 7) Migratory corridors with minimal physical, biological, or chemical barriers between spawning, rearing, over-wintering, and foraging habitats, including intermittent or seasonal barriers induced by high water temperatures or low flows; (PCE 8) An abundant food base including terrestrial organisms of riparian origin, aquatic macro-invertebrates, and forage fish; and (PCE 9) Few or no predatory, interbreeding, or competitive non-game species present. Eight of the nine PCEs approximately correspond to Habitat/Biological Indicators for Quality Criteria in Table 2. PCE 1 corresponds to Nutrient Enrichment and Barriers to Fish Movement; PCE 2 corresponds to Riparian Zone, Hydrologic Alteration, Pools, and Canopy Cover; PCE 3 corresponds to Instream Cover, Pools, Bank Stability, and Channel Condition; PCE 4 corresponds to Riffle Embeddedness; PCE 5 corresponds to Hydrologic Alteration; PCE 6 corresponds to Hydrologic Alteration and Nutrient Enrichment; PCE 7 corresponds to Barriers to Fish Movement, Pools, Nutrient Enrichment, and Hydrologic Alteration, and PCE 8 corresponds to Riparian Zone, Invertebrate Habitat, and Canopy Cover. PCE 9 does not directly correspond to any of the Quality Criteria listed in Table 2.

Proposed critical habitat does not have to include all 9 PCEs in order to qualify for designation, but it must potentially serve one of the following three functions: (1) Spawning, rearing, foraging, or over-wintering habitat to support existing bull trout local populations; (2) movement corridors necessary for maintaining migratory life-history forms; and/or (3) suitable and historically occupied habitat that is essential for recovering existing local populations that have declined, or that is needed to reestablish local populations required for recovery (Fish and Wildlife Service 2002c).

4. ENVIRONMENTAL BASELINE

Regulations implementing section 7 of the Act (50 CFR 402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area. The environmental baseline also includes 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 that are contemporaneous with the consultation in progress. The action area is defined in 50 CFR 402.02 to mean "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." Therefore, the area for this consultation includes the watersheds of the Tri-County region that are tributaries to the mainstem John Day River, lower Deschutes River, and the Columbia River mainstem downstream of the junctions of the Deschutes and John Day Rivers. The action area for this consultation and conference includes all fields and pastures that will be included in individual farm and ranch conservation plans (RMS plans) and more specifically fields and pastures affected by construction, operation, and maintenance of RMS plan conservation practices installed within 328 feet (100 meters) of wetlands, and on either side of perennial or seasonal streams that are (1) within the present or historic range of an ESA-listed fish species, or are (2) within 0.5 miles upstream of that present or historic range and physically connected to it by an above-ground channel that will deliver water, sediment, or woody material to an area occupied by ESA-listed species, plus the adjacent present or historic range streams themselves.

The buffer width for aquatic habitats is based upon protection from the effects of livestock grazing and agriculture (National Marine Fisheries Service 2004). Adverse effects (e.g., sediments) from RMS conservation practices installed upland more than 328 feet from the edge, or more than 0.5 miles upstream of, a habitat occupied by ESA-listed fish species are likely to be insignificant or discountable because they will be absorbed by the environment before reaching the wetland or stream, or contained by conservation practices and buffers strategically placed along the water body. Moreover, the long term effects of upland conservation practices are likely to be beneficial because they will increase the overall capacity of the RMS plan to achieve and sustain riparian and aquatic habitat functions at levels described in the listed-fish Quality Criteria (Table 2). Use of conservation practices in the upland portion beyond the immediate action area will add a significant margin of protection to the buffering capacity and habitat functions of the RMS plans.

The action area consists of some of the most highly altered and most intensively used landscapes in Oregon. Large scale changes in vegetation cover, soil depth, structure and fertility, and hydrologic regime have resulted in considerable soil, water and habitat loss and degradation. As a consequence, the habitat for listed species has been compromised. The action area is located within two geographic provinces or ecosystems: the East Cascade Slope and Foothills system and the Columbia Plateau. The region is characterized by hot, dry summers and cold harsh winters, and the landscape consists of flat or rolling topography cut by the steep canyons of the tributaries to the lower John Day and Deschutes River systems. Annual precipitation ranges from 8 to 16 inches depending on elevation and most falls as snow from November to March. Streamflow is generated from snowmelt runoff in the upper elevations and from ground water discharge through springs and seeps in many of the tributaries (Oregon Progress Board [OPB] 2000).

Past and present land use management activities have modified the habitat and hydrologic cycle in the action area. Reduced riparian and landscape cover, increased soil compaction and reduced infiltration resulting from logging, grazing and agricultural practices, have resulted in significant soil loss, gully development, stream channel instability, and loss of soil fertility and organic matter (OPB 2000). The estimated average annual erosion measured on agricultural lands in Oregon was 5.7 tons per acre (USDA 1989). The vast soil loss that has occurred throughout the project area and actions over the past century have likely degraded agricultural and wildlife production alike. The consequences of past land use practices, in combination with other factors, has also led to reduction in the amount and quality of habitat and streamflow to meet the biological needs of bull trout (Fish and Wildlife Service 2002c).

4.1 Columbia Plateau Ecoegion

All of Sherman and Gilliam Counties, as well as the eastern half of Wasco County, are located within the Columbia Plateau (or Basin) ecosystem. The plateau is formed from lava flows up to two miles thick. Floodwaters from the Pleistocene Bretz floods surged across the Columbia River plateau, eroding some places and covering others with great thickness of sand and gravel. Winds swept and scoured this floodplain, depositing a deep mantle of silt and sand across the plateau. The huge scale of geologic events produced a landscape of gently rolling lands, deep soil, and cross-cutting rivers, which through time has evolved to include landforms such as steep rugged canyons and many breaks, cliffs and rims

Much of the region's natural vegetation is native bunch grass prairie with areas of bitter brush steppe and western juniper. Riparian vegetation included black cottonwood, willows, chokecherry and aspen with wetlands dotting the plateau (Franklin and Dyrness 1988, Oregon Biodiversity Project 1998). Currently the plant community is dominated primarily by grassland having very few trees. Average annual precipitation in this region ranges from 8 to 12 inches. The Columbia Plateau ecoregion has undergone extensive change over the last 150 years, and is second only to the Willamette valley in the extent of landscape change. Most (over 85 percent) of the former sagebrush steppe, grassland and riparian communities have been converted to dryland wheat. Native dry grasslands in the Plateau have declined by more than half, and

indigenous plants and animals associated with these habitats have also declined (ICBEMP 1997). Native habitat types in the Columbia Basin that have been identified as especially needing conservation are: native grassland, native shrub steppe, and riparian (Oregon Biodiversity Project 1998). Introduced plant species are a major threat to remaining native terrestrial habitats, as well as to farm and pasture productivity: cheatgrass (*Bromus tectorum*), medusa head (*Tanaetherum caput-medusae*), and knapweed (*Centaurea* spp.) are among the most widespread. These plants invade disturbed habitats, replacing native vegetation components (e.g. native bunchgrasses), and are very difficult to remove or control (NRCS 2002).

More than 90 percent of this ecoregion is in private ownership (Oregon Biodiversity Project 1998). The Columbia Plateau has been cultivated since the early 1870s, and travelers along the Oregon Trail found vast natural grasslands on the plateau, with deep fertile soils and adequate water for farming. As early as the 1920s, farmers began expressing concerns about increased erosion, lowered crop yield and reduced grain protein according to a study by the NRCS (OPB 2000). Cropland in grain-fallow rotation on the sandy soils along the Columbia River can experience wind erosion averaging 1 to 4 tons per acre per year, and Dry Croplands in grain-fallow rotation on loess soils can experience from 2 to over 8 tons per year from water erosion alone. The seriousness of soil losses become evident when equated to a soil profile thickness, which varies from 1.5 to 5 feet deep over most of the cropland. On the shallower soils, the NRCS has determined that loss must be less than 2 tons per acre per year to avoid long-term loss of soil fertility. During fallow years, some steep uncovered slopes can lose one inch of topsoil in one season and by 1992, it was estimated that the Columbia Plateau had lost 68 percent of its topsoil.

The intensive land use changes that have visited the Columbia Plateau region have also altered the hydrologic cycle of the region. The removal of vegetation from the landscape and riparian corridors, uncontrolled grazing, and mechanized agriculture resulted in increased vulnerability of soils to erosion and reduction in infiltration capacity of the soils. Runoff events are now more severe (flashier) for the same amount of rainfall, as a result stream channels are destabilized, which causes bed scour and riparian erosion among other adverse impacts. Most of the stream segments in the Lower Deschutes subbasin are water quality limited and are on the 303(d) state list for summer water temperatures that are too high: some also have too much sediment, too little oxygen, and too high of a pH (Oregon Dept. of Agriculture 2002a).

The resource conditions in this region have prompted numerous changes in private land agricultural practices as well as increased conservation assistance to landowners from NRCS. Changes in agricultural practices, for example from tillage to no-till operations, have documented beneficial effects on soil infiltration capacity, organic matter content, and reduced soil loss. More than 95 percent of agricultural producers on private lands in the Tri-County region participate in USDA farm programs, including the Conservation Reserve Program (CRP), the Environmental Quality Incentive Program (EQIP), the Conservation Reserve and Enhancement Program (CREP) and others (NRCS 2002). The geographic scope of USDA farm programs covers more than 75 percent of the total land area in the Tri-County region covered by this consultation and conference (NRCS 2002). To date, the CREP program has been implemented on approximately 2,042 acres in Wasco County. Within Gilliam County, it has

been planned on approximately 245 acres and proposed on 203 more, while Sherman County has 583 acres enrolled (Virgovic 2003). Approximately 25 percent of cropland within the Tri-County region is enrolled in the CRP program (NRCS 2002).

4.1.1 Major Land Resource Areas in the Columbia Plateau Ecoegion

The Columbia Plateau ecoregion has been further classified by the NRCS according to common resource areas (CRAs) which are based on similarities of microclimate, landform, geology, soils, vegetation and other resources. Because of these similarities, landscapes within the same CRA have also the same kinds of resource issues or concerns, for example, loess soils that are considered highly erodible. Geographically associated CRAs are assembled into Major Land Resource Areas (MRLA), which serve as the basis for agricultural planning in the region. A description of the MLRAs is provided in Table 3. The dominant MLRA for non-irrigated cropland in the region is MLRA 8, with 7 subdivisions, and the major NRCS resource concerns are wind- and water-driven soil erosion resulting from the combination of thin loess or silt loam soils, sparse vegetation cover and croplands lacking cover or residue. MLRAs 6, 9 and 10 are considered grazing lands, although vegetation cover differs substantially among them. For example, MLRA 6 is dominated by ponderosa pine, and MLRAs 9 and 10 are characterized by rolling foothills and valleys. The major NRCS resource concerns are water- and wind-driven soil erosion from grazing lands lacking cover or residue, or with reduced soil infiltration capacities.

4.2 East Cascades Slope and Foothills Ecoregion

A small portion of the action area in Wasco County is found in the East Cascades Slope and Foothills ecoregion. The region is a transition zone that extends from below the crest of the Cascade Range east to where the pine forests meet the sagebrush-juniper steppe. Federally-managed forests cover the upper portions of the watersheds with privately managed agricultural lands in the valleys. The primary MLRA in this region is MLRA 3, characterized by densely forested landscapes dotted with alpine lakes.

The largest amount of water produced in the western portion of Wasco County comes from year-round springs on the east flanks of the Cascade Mountains, which provide a relatively stable flow of cold, clean water. In the mid-to-late 1800's, riparian areas within this part of the action area were protected from drought by this year-round supply of water. Diversion of water from the many streams in this region and degradation of stream-side vegetation reduced streamflows and raised stream temperatures. Water in many subwatersheds in this ecoregion area are over-allocated (NRCS 2002).

The range of land uses that occur and have occurred in the Columbia Plateau region also were present in this ecoregion, and have contributed to degraded soil fertility, degraded stream courses, elevated water temperatures, water quality degradation, and flow modification. Altered riparian and wetland structure has diminished functions such as filtering and cleaning water and

moderating the effects of floods and drought. Wetlands have been affected by water diversions, withdrawals and excess nutrient inputs associated with agriculture and population growth.

Table 3. Major Land Resources Areas (MLRA) for Gilliam, Sherman, and Wasco Counties, Oregon.

MLRA	Description	Major Land Use	Major Resource Concern
MLRA 3	5 subdivisions. Forested with douglas fir, western hemlock, sub-alpine fir and noble fir. Meadows and alpine lakes common. Annual precip. 60 to 130 inches.	Recreation and wood products.	Soil erosion.
MLRA 6	5 subdivisions. Forested with ponderosa pine, lodgepole pine, douglas fir and oak. Soils are derived from ash-mantled lava flows. Annual precip. 18 to 60 inches.	Wood products and grazing.	Soil erosion by water
MLRA 7	2 subdivisions. Lowest elevation in action area; soils are dominantly sand, sandy loam with some silt loam textures. Precip. 6 to 10 inches.	Irrigated Cropland	Wind erosion during the spring and fall where cover crops and residue are absent. Lowering of water table aquifers is a concern.
MLRA 8	7 subdivisions, 5 present in action area; shallow soils with rock outcrop; loess-mantled basalt plateaus; and valleys with moderately deep to very deep silt loam. Precip. 10 to 16 inches.	Non-Irrigated Cropland	Water erosion on sloping croplands lacking cover or residue especially during winter
MLRA 9	6 subdivisions, 1 present in the action area; shallow and moderately deep soils on gently to steeply sloping hills and mountains adjacent to forest land. Precip. 16 to 25 inches.	Non-Irrigated Cropland Livestock Grazing	Water erosion on sloping cropland soils lacking residue or cover, especially during winter

Table 3. Major Land Resources Areas (MLRA) for Gilliam, Sherman, and Wasco Counties, Oregon.

MLRA	Description	Major Land Use	Major Resource Concern
MLRA 10	9 subdivisions, 1 present in action area; rolling foothills and valleys with moderately deep silt-loam soils. Precip. 8 to 16 inches.	Irrigated crops, hay, & pasture	Water erosion on sloping soils lacking residue or cover; sodium and salt build-up in soils. Juniper invasion a concern.

4.3 Status of Bull Trout in the Project Area

Historically, bull trout occurred throughout the entire action area for the current Tri-County consultation (Fish and Wildlife Service 2002d). Although they are still relatively widespread within their historical range within the United States, they have declined in overall distribution and abundance over the last century, and are now extirpated locally in some basins and tributaries. Declines are the result of habitat degradation and fragmentation, blockage of migratory corridors, degraded water quality (including temperature), past fisheries management, and the introduction of non-native fishes. These limiting factors have reduced or eliminated migratory bull trout, which has subsequently reduced their opportunity for genetic exchange, reduced their opportunity to recolonize after local extirpations, and reduced their access to resources. This reduced migratory behavior places bull trout at increased risk for further loss of distribution and abundance.

The primary conservation and recovery issues relevant to bull trout in the action area are: 1) maintenance and improvement of passage and movement opportunities, especially during the winter and spring; 2) improving water quality (reducing nutrients and contaminants) and cooling water temperatures; 3) improving prey base during winter migratory movements; 4) improving or re-accessing habitat for migration and foraging.

4.3.1 Bull Trout in the Deschutes River Basin

Historically bull trout were found throughout most of the Deschutes River basin (Ratliff et al. 1996). The Deschutes River and its tributaries is considered to comprise the Deschutes River Recovery Unit (Fish and Wildlife Service 2002e). There are two Critical Habitat Sub-Units (CHSUs) proposed for the Deschutes River Basin: (i) Lower Deschutes CHSU and (ii) Upper Deschutes CHSU (Fish and Wildlife Service 2002c, 2002e). The Lower Deschutes is considered to be a Core Area, and the Upper Deschutes is considered to be core habitat, which could become a Core Area if bull trout were reestablished (Fish and Wildlife Service 2002e). In the Draft Recovery Plan, the lower Deschutes Core Area is considered to be the mainstem Deschutes

River and its tributaries, from Big Falls downstream to the Columbia River. There are 5 known local bull trout populations in the lower Deschutes basin, and all are identified as essential to the long-term conservation of bull trout. These local populations are: Warm Springs, Shitike Creek, Whitewater River, Jefferson/Candle/Abbot complex, and Canyon/Jack/Heising/mainstem Metolius complex. Of these five populations, all except the Warm Springs population are generally considered to be increasing (Fish and Wildlife Service 2002e). The apparent decline of redds in Warm Springs River (100 redds in 1998, 84 redds in 1999, and 78 redds in 2000) supports the notion that the Warm Springs population may not be stable and is probably declining (Fish and Wildlife Service 2002e).

The Pelton Round-Butte Hydroelectric Dams create barriers to upstream and downstream movements of bull trout in the Deschutes River mainstem, and in the Upper Deschutes, the old dams such as Crane Prairie, Crescent Lake, and Wickiup Reservoir have blocked fish passage and altered water flow and quantity (Buchanan et al. 1997, Newton and Pribyl 1994). Dams are a major limiting factor on bull trout recovery, by eliminating fish passage and population genetic exchange, as well as access to historic habitats. The dams have also altered water quality and quantity in the basin.

Bull trout are no longer found in most of the Upper Deschutes subbasin CHSU in parts of Deschutes, Crook, and Klamath Counties (Fish and Wildlife Service 2002c, Buchanan et al. 1997), but fluvial subpopulations in Shitike Creek (Jefferson county) and Warm Springs River (Wasco County) in the Lower Deschutes subbasin CHSU still contribute bull trout into the lower Deschutes River (Newton and Pribyl 1994). Historically, some individuals in the lower Deschutes likely originated from the Upper Deschutes (Newton and Pribyl 1994). Bull trout are no longer found in Trout Creek, although reported to be present there in 1960 (Goetz 1989).

Prior to 1990, bull trout occurred in the Deschutes River all the way to the mouth of the Deschutes at the Columbia River (Figure 21: Buchanan et al. 1997), and spawning, rearing, migrating, or resident adult bull trout currently occur in the Deschutes River from Round Butte Dam to Lower Dam, and from Lower Dam down past Maupin to above Sherars Falls (Deschutes river mile 43) on the Deschutes, and in the Warm Springs River (Wasco and Sherman Counties: Buchanan et al.1997). Migratory adult bull trout are the primary form present, although juveniles, subadults, and redds also occur (Fish and Wildlife Service 2002e, Newton and Pribyl 1994). There are unverified reports from anglers of bull trout being captured at approximately river mile 7 on the lower Deschutes (Newton and Pribyl 1994). Although few bull trout currently occur below Sherar's Falls north to the mouth of the Deschutes, they occurred there historically, and two bull trout were caught in a tribal dipnet fishery at Sherar's Falls during 2001 (S. Pribyl, pers. comm. cited in Fish and Wildlife Service 2002e). Anglers have recently reported higher incidental hooking of bull trout in the Deschutes River, which may indicate that the population is increasing (Fish and Wildlife Service 2002e). Between Sherar's Falls south to the Warm Springs River, the population of bull trout is better known. In Warm Springs River, between 1998 and 2000, bull trout redd counts averaged 88 per year, although the number of redds appeared to decline between the years 1998 and 2000, and the Recovery Plan draft indicates that the Warm Springs River population is declining (Fish and Wildlife Service 2002e). Juvenile bull trout densities in a 3.6 km reach of the Warm Springs River were 0.005 per square

meter (Brun and Dodson 2000, Brun 1999). Warm Springs River averaged 202 spawning bull trout annually between 1998 and 2001 (Fish and Wildlife Service 2002e).

Adults begin their migration in mid-May, moving upstream to spawning areas and then quickly downstream after spawning (Brun and Dodson 2000). In the Warm Springs River, the water temperatures average 6.6 degrees Celsius (44 degrees Fahrenheit) during the late-August to early November bull trout spawning period (Brun 1999). Juveniles move downstream during both spring and fall months.

Proposed critical habitat for bull trout in the Lower Deschutes CHSU includes the Deschutes River from its mouth at the Columbia River upstream 212 km (131.5 mi), so the entire length of the mainstem Deschutes River in Wasco and Sherman Counties is proposed as FMO (Foraging, Migrating and Overwintering) habitat for bull trout (Fish and Wildlife Service 2002c). The Deschutes River is important migration habitat connecting the local populations in the lower part of the river, as well as providing rearing and foraging habitat. Much of the Warm Springs River from its confluence with the Deschutes River at about mile 84 (134 km) and Bunchgrass Creek contain Foraging, Migrating, and Overwintering (FMO) habitat proposed as critical habitat (see Unit 6 map, p. 71347, Fish and Wildlife Service 2002c), although some reaches of Warm Springs River are not included due to their special status as "Conditional Use Areas." In addition, Lake Billy Chinook, Lake Simtustus, Pelton Reservoir, and other nearby rivers and creeks are proposed as critical habitat outside the action area of this BO.

Dams have been a major limiting factor affecting bull trout for the lower and upper Deschutes subbasins, having interrupted or eliminated fish passage and population interconnectedness, and also having altered water quality to an unknown extent (Fish and Wildlife Service 2002e). In the lower Deschutes, decades of excessive grazing degraded riparian vegetation, which reduced juvenile bull trout cover, also reduced aquatic and terrestrial insect production for bull trout food, increased water temperature, bank erosion and sedimentation in some migratory and overwintering areas (Newton and Pribyl 1994). Sedimentation from agricultural practices, low stream flows from stream diversions, fish barriers from diversion dams, high stream temperature resulting from low stream flows, and lack of instream cover also are limiting factors (Oregon Dept. of Fish and Wildlife 1997). In the lower Deschutes CHSU, approximately 23 percent of the proposed streams are located on federal lands, primarily Bureau of Land Management (BLM). The other proposed streams occur on private lands (44 percent), Confederated Tribes of Warm Springs (32 percent) and state lands (1 percent)(Fish and Wildlife Service 2002c).

4.3.2 Bull Trout in the John Day River Basin

The John Day River is one of the longest free-flowing streams in the continental U.S. The lower John Day River from Parish Creek downstream to Tumwater Falls is part of the Oregon Scenic Waterway and National Wild and Scenic River systems (Fish and Wildlife Service 2002f). For the entire basin (larger than the action area of this BO), 62 percent of the land is private, 30 percent is U.S. Forest Service, 7 percent is Bureau of Land Management (BLM), and 1 percent is State of Oregon. Historically bull trout are known to have occurred throughout much of the

upper John Day River Basin, and prior to basinwide habitat degradation, seasonal use of the Columbia River by bull trout originating in the John Day River Basin is believed to have occurred (Clarie and Gray 1993, Fish and Wildlife Service 2002f). Within the action areas of Sherman and Gilliam Counties, the lower John Day River mainstem is not known for harboring bull trout, although a few may occur seasonally. However, the Confederated Tribes of Umatilla Indian Reservation (CTUIR; 1941) had fishing sites along the mainstem John Day River and its tributaries, where they caught "trout," which presumably included bull trout.

Past and present land uses, such as mining, forestry, agriculture, and livestock grazing, have altered the movement and storage of water within the basin, and also resulted in stream dewatering, high summer water temperatures, substrate embeddedness, and streambank instability throughout much of the basin (Fish and Wildlife Service 2002f).

There is one proposed critical habitat unit for the John Day Basin, and there are three local populations currently recognized in the basin, none of which occur in the action area of this BO. They are: 1) upper John Day Basin, including tributaries; 2) North Fork of the John Day, including tributaries; and 3) Middle Fork of the John Day and its tributaries. All three local populations are unrestricted by physical barriers, but low water flows and high water temperatures in the summer limit bull trout movement from one population to another. Recovery criteria identify the need for functional migratory corridors between the mainstem John Day and the North Fork of the John Day. There are no physical barriers to prevent dispersal throughout the basin (Buchanan et al. 1997).

Elevated water temperatures that affect the survival of aquatic species are a major problem in the John Day Basin. In the Upper Mainstem and South Fork of the John Day River, 30 of 32 stream segments are on the state Water Quality Limited 303(d) list (Oregon Dept. of Agriculture 2002b) due to elevated temperatures. Water temperature is elevated due, in part, to degraded riparian vegetation, and water withdrawal (e.g., irrigation). Water quality that is substantially impaired due to land-based activities upstream may preclude recovery of aquatic listed species downstream. Within the action area itself, the John Day River mainstem is a deep canyon.

None of the critical habitat proposed for the John Day River Basin occurs in Wasco, Sherman, or Gilliam Counties, although any restoration activities in the project area would further benefit bull trout recovery.

4.3.3 Bull Trout in the Mainstem Columbia River

Although still relatively widely distributed in the Columbia River Basin, bull trout occur in low numbers in many areas, and populations are depressed or declining over much of their range (Ratliff and Howell 1992, Quigley and Arbelbide 1997). The entire mainstem of the Columbia River is proposed as a bull trout critical habitat unit (CHU 24: see Appendix D), as is the mainstem of the Snake River (CHU 25: Fish and Wildlife Service 2002c). Critical habitat for the Columbia River is proposed from rkm 0 (river mile 0) at the Pacific Ocean, upstream to Chief Joseph Dam at rkm 877 (river mile 545), and provides, or foraging, migrating, and overwintering

habitat, for tributary populations of bull trout. It includes free-flowing reaches and the reservoirs to ordinary high water elevation or normal operating pool elevation, respectively (Fish and Wildlife Service 2002c). Land ownership adjacent to the Columbia River is a mixture of Federal and non-Federal, with non-Federal predominant.

Although foraging and migratory habitat is currently fragmented by the presence of dams in the mainstem Columbia River, bull trout have been observed passing the fish ladders at Wells, Rocky Reach, and Rock Island dams, and in the fish ladder counting stations at Bonneville Dam (Fish and Wildlife Service 2002d). Bull trout use of the mainstem Columbia River has recently been documented by radio-tagging studies conducted by the Service (Kelly-Ringel and DeLaVergne 2001, 2002) and Grant County Public Utility Districts (Kreiter 2001, 2002). Bull trout are likely foraging and/or overwintering throughout the mainstem Columbia River.

The Columbia River mainstem is the northernmost boundary for the three Counties of this BO. The two major river drainages for these Counties both contain bull trout, and empty into the Columbia River. Restoring and maintaining connectivity between existing populations of bull trout is important for the persistence of the species, as well as providing for expression of the migratory life history form, whereby genetic variability is maintained.

5. EFFECTS OF PROPOSED ACTION

From a watershed perspective, the practices within Dry Cropland and Range and Pastureland RMS Conservation Plans can have many effects on soil and water resources, including changes to vegetation cover, soil characteristics, water infiltration, nutrient dynamics, and water temperature. As detailed below, each agricultural system influences sediment delivery rates to surface waters through exposed and degraded soils, and on the rate and quantities of runoff to streams. A RMS Conservation Plan can improve upland vegetation quantity, in turn altering soil composition, hydrology and preventing erosion. A RMS Conservation Plan can also improve and restore riparian vegetation, cool in-stream temperature, reduce excess in-stream nutrient levels, and improve stream biota by streamside and upland improvements. The following bull trout and proposed critical habitat effects analyses evaluates each RMS type (Dry Cropland, Range and Pastureland) separately. Some conservation practices may occur in either RMS type.

5.1 Effect of Dry Cropland RMS

For purposes of evaluating effects to bull trout and proposed critical habitat from Dry Cropland RMS Conservation Plan implementation, Table 4 was developed. The 39 Dry Cropland RMS Conservation Plan practices are combined into generalized functional groups that exhibit similar beneficial and adverse effects to bull trout and its habitats.

Table 4. Dry Cropland RMS Practices Divided into Function Groups, with Effects to Bull Trout and Proposed Critical Habitat, and Linkages to the Incidental Take Statement and Primary Constituent Elements (for PCEs, see Section 3.3).

RMS Practice	Functional Group (see definitions below this table)	Beneficial Effects and Relevant PCEs	Adverse Effects and Relevant PCEs
324 Deep Tillage	Erosion Control	Increased infiltration by fracturing compacted soil: reduced runoff. PCE 1, 4, 6.	Soil erosion from equipment, particularly near surface waters. Drainage of wetland areas. PCE 4.
350 Sediment Basin (Assume no in-channel basins)	Erosion Control	Reduced small (ephemeral) watercourse erosion, improved water quality. PCE 1, 4, 6.	Construction related erosion. Change in hydrograph esp. with many in one watershed. PCE 4, 5.
362 Diversion	Erosion Control	Routing of water around exposed soils. Increased water infiltration. PCE 1, 4, 6.	Construction related erosion. Decreased stream baseflows if consumptive use of water, migration barrier from low flows or temperature. PCE 2,4,5,7
380 Windbreak/ Shelterbelt Establishment	Erosion Control	Reduced soil erosion from high winds. PCE 1, 4	Construction related erosion during planting. PCE 4.
402 Dam, Floodwater Retarding	Erosion Control	Reduced erosion and sediment flow from large storm events. Increased water infiltration. Downstream riparian areas protected from high run-off. PCE 1, 4.	Within perennial or intermittent streams, inhibition of fish passage, channel migration, hydrology, bedload and large woody debris movement downstream. Construction related erosion. PCE 3, 4, 5, 7.
410 Grade Stabilization Structure	Erosion Control	Reduced channel and gully erosion and incision. Control of gully head cutting. PCE 3, 4.	See 402 effects. PCE 4, 7.
600 Terrace	Erosion Control	Reduced erosion, prevention of gully development. Increased water infiltration. PCE 3, 4, 6.	Construction related erosion. PCE 4.
620 Underground Outlet	Erosion Control	Prevents erosion from water outfalls. PCE 4.	Construction related erosion. PCE 4.

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RMS Practice	Functional Group (see definitions below this table)	Beneficial Effects and Relevant PCEs	Adverse Effects and Relevant PCEs
650 Windbreak/Shelterbelt Renovation	Erosion control	Reduced soil erosion from high winds. PCE 1, 4.	Construction related erosion. PCE 4.
638 Water and Sediment Control Basin (Assumed In-channel)	Erosion Control	Reduced small (ephemeral) watercourse erosion, trap sediment. Increased water infiltration. PCE 1, 4, 6.	Construction related erosion. Migration barrier, altered hydrology, loss of large substrates, increase stream temperature. PCE 2, 4, 5, 7.
328 Conservation Crop Rotation	Cropping Design	Maintain/improve soil quality through organic matter retention; improved water retention and less surface runoff, erosion. PCE 1, 2, 4, 6.	Soil erosion from tillage equipment. PCE 1, 4.
329a Residue Management, No-till/Strip Till	Cropping Design	Improved organic matter within soils, reduced sheet, wind and rill erosion. Increased water infiltration. PCE 1, 2, 4, 6.	Negligible soil erosion from no-till equipment. PCE 1, 4.
329b Residue Management/ Mulch Till	Cropping Design	Improved organic matter within soils, reduced sheet, wind and rill erosion. Increased water infiltration. PCE 1, 2, 4, 6.	Negligible soil erosion from equipment. PCE 1, 4.
330 Contour Farming (Assume no new farming near streams and buffers next to streams)	Cropping Design	Reduced sheet and rill erosion. PCE 1, 4.	Soil erosion from equipment. PCE 4.
585 Contour Strip Cropping (Assume no new farming near streams and buffers next to streams)	Cropping Design	Reduced sheet and rill erosion. PCE 1, 4.	Soil erosion from equipment. PCE 4.

Table 4. Dry Cropland RMS Practices Divided into Function Groups, with Effects to Bull Trout and Proposed Critical Habitat, and Linkages to the Incidental Take Statement and Primary Constituent Elements (for PCEs, see Section 3.3).

RMS Practice	Functional Group (see definitions below this table)	Beneficial Effects and Relevant PCEs	Adverse Effects and Relevant PCEs
777 Residue Management Direct Seed	Cropping Design	Improved organic matter within soils, reduced sheet, wind and rill erosion. Increased water infiltration. PCE 1, 4, 6.	Negligible soil erosion from equipment. PCE 1, 4.
586 Field Stripcropping (Assume no new farming near streams and buffers next to streams)	Cropping Design	Reduced sheet and rill erosion. PCE 1, 4.	Soil erosion from equipment. PCE 4.
327 Conservation Cover Establishment	Vegetative Ground Cover	Reduced soil erosion and increased water infiltration. PCE 2, 4, 6.	Soil erosion from equipment. PCE 4.
332 Contour Buffer Strip	Vegetative Ground Cover	Reduced soil erosion and increased water infiltration. PCE 1, 4, 6.	Soil erosion from equipment. PCE 4.
342 Critical Area Planting	Vegetative Ground Cover	Soil stabilization, reduced erosion and runoff. Increased water infiltration. PCE 1, 2, 4, 6.	Soil erosion while planting. PCE 4.
382 Fence	Vegetative Treatment	Protection of sensitive areas, e.g., that filter sediments, reduce runoff. PCE 1, 4.	Negligible soil erosion during construction. PCE 4
386 Field Border	Vegetative Treatment	Reduced erosion from wind and precipitation or upslope runoff. PCE 1, 4.	Negligible soil erosion during construction. PCE 4.
390 Riparian Herbaceous Cover	Vegetative Treatment	Reduced erosion. Reduced pollutants and sediment within waterways. Increased food items for fish. Moderate stream temperature PCE 1, 4, 8.	Soil disturbance during installation. PCE 2, 4.

Table 4. Dry Cropland RMS Practices Divided into Function Groups, with Effects to Bull Trout and Proposed Critical Habitat, and Linkages to the Incidental Take Statement and Primary Constituent Elements (for PCEs, see Section 3.3).

RMS Practice	Functional Group (see definitions below this table)	Beneficial Effects and Relevant PCEs	Adverse Effects and Relevant PCEs
391 Riparian Forest Buffer	Vegetative Treatment	Reduced erosion. Reduced pollutants and sediment within waterways. Increased food items for fish. Create shade and moderate water temperatures. PCE 1, 2, 4, 8.	Soil disturbance during installation. PCE 4.
393 Filter Strip	Vegetative Treatment	Reduced erosion from wind and precipitation or upslope runoff. PCE 1, 4.	Negligible soil erosion during construction. PCE 4.
412 Grassed Waterway (Assume none in streams)	Vegetative Treatment	Reduced erosion and contaminants within ephemeral waterways. PCE 4.	Negligible soil erosion during construction. PCE 3, 4.
422 Hedgerow Planting	Vegetative Treatment	Reduced erosion during storm events. PCE 4.	Soil disturbance during planting. PCE 4.
580 Streambank and Shoreline Protection (Assume Vegetative treatment only; no rock)	Vegetative Treatment	Reduced erosion and sedimentation within waterways. May reduce stream temperature. PCE 2, 4.	Construction related erosion. Other variable effects such as; channlization, loss of floodplain, & channel complexity, effects to food base. PCE 3, 4, 8.
601 Vegetative Barrier	Vegetative Treatment	Reduced erosion. Reduced sediment in waterways. PCE 1, 4.	Soil disturbance during planting. PCE 4.
612 Tree and Shrub Establishment	Vegetative Treatment	Reduced erosion. Reduced sediment in waterways. PCE 1, 4.	Soil disturbance during planting. PCE 4.

Table 4. Dry Cropland RMS Practices Divided into Function Groups, with Effects to Bull Trout and Proposed Critical Habitat, and Linkages to the Incidental Take Statement and Primary Constituent Elements (for PCEs, see Section 3.3).

RMS Practice	Functional Group (see definitions below this table)	Beneficial Effects and Relevant PCEs	Adverse Effects and Relevant PCEs
395 Stream Habitat Improvement and Management	Wildlife Enhancement	Enhance fish habitat, e.g. Placement of large wood in stream, eliminating fish passage barriers, increasing fish access. May increase invertebrates food items, may decrease stream temperature. PCE 2, 3, 7.	Construction related erosion and increased sedimentation during installation. Effects will depend on action. PCE 4, 7.
396 Fish Passage	Wildlife Enhancement	Removal of fish passage barriers, increasing fish movement and access. PCE 7.	Construction related erosion and increased sedimentation. PCE 4.
643 Restoration of Declining Habitats	Wildlife Enhancement	May reduce erosion and sedimentation. May reduce stream temperatures. May improve vegetative cover. May increase invertebrate food sources. PCE 2, 4, 8.	May increase erosion and sedimentation during burning, mowing, and/or planting. Change in hydrology (runoff rate from burned area) PCE 4, 5.
645 Upland Wildlife Habitat Management	Wildlife Enhancement	Improved vegetative cover. PCE 4, 5	Negligible soil erosion during construction. PCE 4.
647 Early Successional Habitat	Wildlife Enhancement	May reduce erosion and sedimentation. May improve vegetative cover. PCE 4.	May increase erosion and sedimentation during burning, mowing, and/or planting. PCE 1, 4.
648 Wildlife Watering Facility (Assumes collected rainwater in upland reservoir and no loss of subsurface flow)	Wildlife Enhancement	Improved vegetative cover. PCE 2, 6	Negligible soil erosion during construction. PCE 4.

Table 4. Dry Cropland RMS Practices Divided into Function Groups, with Effects to Bull Trout and Proposed Critical Habitat, and Linkages to the Incidental Take Statement and Primary Constituent Elements (for PCEs, see Section 3.3).

RMS Practice	Functional Group (see definitions below this table)	Beneficial Effects and Relevant PCEs	Adverse Effects and Relevant PCEs
561 Heavy Use Area Protection	Other	Animal exclusion from sensitive areas, e.g. stream crossings. PCE 4.	Animal access to spawning and rearing habitat. Arrested channel migration from crossing infrastructure. Decreased riparian function, increased nutrient loading and runoff. Construction related erosion. PCE 1, 2, 3, 4, 7.
590 Nutrient Management	Other	Improved plant growth from fertilization. PCE 4.	Contamination to waterways from accidental discharge; surface or groundwater nutrient loading from non-agronomic applications. PCE 1, 4.
595 Pest Management	Other	Enhanced plant growth; soil retention, increased infiltration. PCE 4.	Soil erosion from mechanical disturbance. See 590. PCE 1, 4.

Erosion Control practices are related to mitigating upland and riparian Dry Cropland management impacts to sediment and water yields.
Cropping Design practices are related to minimizing soil erosion and enhancing hydrology through various crop orientation and growing methods.
Vegetative Ground Cover practices are related to minimizing soil erosion and enhancing hydrology through the establishment of vegetation on exposed soils.
Vegetative Treatment practices are related to minimizing soil erosion near surface waters from wind and precipitation and/or upslope runoff.
Wildlife Enhancement practices are related to benefitting wildlife and/or fish species**.**
Other Practices: these practices have not been placed into functional groups because they do not easily fit into one of the above categories, and may have a wide variety of positive or negative effects.

Dry Cropland RMS practices generally do not have direct effects to individual bull trout. Most effects of Dry Cropland use occur through longer term changes to upland hydrology, soil erosion, riparian habitat composition and functions such as shade and bank stability, and downstream channel modifications. These longer term indirect effects can influence the quality of in-stream and riparian habitats utilized by bull trout. Crop production can degrade soil structure and hydrology (NRCS 2002), in turn altering flow regimes and sediment delivery rates which adversely impact bull trout within the action area. Because of the effects to soils and altered hydrology, agricultural lands can contribute substantial quantities of sediment to streams. Dry Cropland agriculture can smooth and loosen the land surface, enhancing the opportunity for surface erosion. Dry Cropland agriculture can involve repeated tillage, fertilization, irrigation,

and harvesting of the cropped acreage. The repeated mechanical mixing and aeration significantly alter physical soil characteristics and soil microorganisms. Further, tillage renders a uniform characteristic to soils in the cropped areas. Although tillage aerates the upper soil, compaction of fine textured soils typically occurs just below the depth of tillage, altering the infiltration of water to deep aquifers. Other activities requiring farm machinery to traverse the cropped lands, and roads along crop margins, causes further compaction, reducing infiltration and increasing surface runoff. Soil erosion rates are generally greater from croplands than from other land uses but vary with soil type and slope.

5.1.1 Erosion Control

To achieve T soil loss goals ("T" is the maximum rate of sustainable soil loss), the Dry Cropland RMS includes a variety of practices that can minimize and avoid soil and hydrological degradation. Table 4 identifies ten RMS practices (Deep Tillage, Sediment Basin, Diversion, Windbreak/Shelterbelt Establishment, Windbreak/Shelterbelt Renovation, Dam and Floodwater Retarding, Grade Stabilization Structure, Terrace, Underground Outlet, Water and Sediment Control Basin) that may have adverse or beneficial effects to soil erosion "functional group." Soil erosion produces sediment which may be transported to fish-bearing streams. Increased sediment can have several adverse effects to bull trout, including the potential for direct lethal and sublethal effects to all life stages, depending upon sediment "dose," which is comprised of [*concentration* X *exposure time*] (Fish and Wildlife Service 2002h, Newcombe and Jensen 1996). Increased sediments also reduce pool depth, alter substrate composition, reduce interstitial space, and cause channel morphological changes, including changes in slope, velocity, flooding regime, and sediment transport (Rhodes et al. 1994, Castro and Reckendorf 1995). Weaver and Fraley (1991) indicated that any increase in fine sediments reduces bull trout embryo survival. Others have found that when the percent of fine sediments in the substrate was higher, rearing bull trout were also less abundant (McPhail and Murray 1979; Shepard et al.1984; Weaver and Fraley 1991). It is difficult to predict how much a particular change in substrate composition will affect survival for any salmonid (Weaver and Fraley 1991). Some substrates are more likely to accumulate fines than others, and bull trout populations may vary in their sensitivity. In the absence of detailed local information on population habitat dynamics, any increase in the proportion of fines in substrates should be considered a risk to productivity of an environment and to the persistence of associated bull trout populations.

Erosion Control practices are designed to moderate sediment delivery to perennial streams by slowing surface water runoff, often in small gullies and ephemeral waterways that drain cropland. Slowing runoff velocities allows some suspended sediment to be deposited prior to reaching perennial streams, and reduces in-channel erosion. However, if the Erosion Control practices are implemented within intermittent streams, they may impede fish passage, and alter channel migration and bedload movement (e.g., Dam, Floodwater Retarding [CP 402] and Grade Stabilization structure [410]). Utilizing Erosion Control practices within gullies and ephemeral waterways will prevent significant sediment delivery to streams from upland sources.

Short-term adverse effects from the erosion control practices primarily involve soil disturbance and potential increases in water sediment due to water and wind-borne soil erosion resulting from the use of heavy equipment. High winds are not infrequent in the Tri-County area, but are generally more concentrated during February through June (NRCS Staff, pers. comm. 2004). Rainfall is sparse, but when it occurs, can produce very heavy run-off in a short amount of time: these rare events are the most likely scenario for death, injury, or harm to bull trout, if such rainfall occurs during critical bull trout migration and spawning periods. In addition, fertilizers are most likely to spike in run-off during these episodic events. However, the majority of the erosion in this area is not due to rainfall. It is primarily due to the freezing and thawing of soil during the winter months resulting in runoff and potential erosion. Deep Tillage (CP 324) would typically occur in July, August and September, but most of the other Erosion Control practices occur during March/April/May or Sept/Oct (Sediment Basin CP 350, Diversion CP 362, Dam and Floodwater Retarding CP 402, Terrace CP 600: NRCS 2002). Bull trout spawning is from August through November and adults begin migration in May, so these time periods do overlap.

Long-term, Erosion Control practices should contribute towards reducing sediment in the water, thus improving the PCE #4 for bull trout involving water sediment and substrate embeddedness, where a minimal amount of fine substrate less than 0.63 cm in diameter and minimal substrate embeddedness are goals. Reduction of sediment into water also improves PCE#1 (low levels of contaminants), presuming that contaminants (whether chemical or excess nutrient) are attached to sediment or running off simultaneously with sediment. Deep tillage (CP 324) breaks restrictive soil layers and increases water infiltration, which may assist with PCE #2, by increasing groundwater contributions to neighboring watercourses and reducing water temperatures. Generally, the cooler the water temperature, the more life stages of bull trout can be supported.

5.1.2 Cropping Design

The purpose of the seven Cropping Design practices is to minimize soil erosion, prevent concentrated flow, and enhance hydrology through various crop orientation and cropping techniques. Many of the practices (e.g., CP 328 Conservation Crop Rotation, CP 329a Residue Management No-till/strip till, CP 329b Residue Management/Mulch till, CP 777 Residue Management Direct Seed) are designed to disturb the soil as little as possible during seedbed preparation and seeding and planting the next crop into the residue of the previous crop. The retention of previous crop residue help to build organic soil, which retains moisture better (USCC 1997), increases water infiltration, decreases run-off, and prevents erosion.

The impact of Cropping Design practices is to leave year-round crop residue cover on the ground surface. The residue cover reduces water runoff, soil particle detachment, traps sediment on the slope, and facilitates improved water infiltration. Some of these practices alternate crop types or fallow land with strips of grass or low-growing crops, which enhances soil retention by trapping mobilized sediments and increasing water infiltration. Erosion in this area is primarily due to the freezing and thawing of soil during the winter months resulting in runoff and potential erosion. Unless Cropping Design practices are combined in an RMS with other Erosion Control practices

(above), however, there could still be considerable erosion, especially during the intense episodic wind or rainfall events which sometimes occur in the Tri-County area. Although these soil disturbance events are not common, summer thunderstorms or rapid winter snowmelt events can cause the transport of sediment from crop areas to stream systems (NRCS 2002). At least three of these practices (329A, 329B, and 777) are evaluated in the RMS by Revised Universal Soil Loss Equation (RUSLE), Wind Erosion Equation (WEQ), and Soil Conditioning Index (SCI: NRCS 2002).

Most of these practices are used in conjunction with herbicides to control weeds, since there is less tilling. Less tilling improves soil structure by increasing macropores in the soil within a year of implementing direct see or no till systems. By increasing macropores in the soil over the short-term and increasing organic material in the soil over the long-term, the soil will provide better water infiltration and retention, so that there is less surface run-off. The risk/benefit of more pesticide use and more organic material in the soil, traded off for less sediment run-off to streams, is unclear, and entirely dependent upon the quantity of any given pesticide and/or adjuvant ending up in the food chain or otherwise impacting listed species in a lethal or sublethal manner. However, pesticide use is not covered under this consultation.

If correctly coupled with Erosion Control practices, these practices may be effectively neutralized for sediment contribution, and would constitute a negative effect to bull trout PCE #4 (sediment and substrate embeddedness) only during infrequent events of summer thunderstorms and rapid snowmelt. These practices, because they will increase soil macropores and eventually increase organic material in the soil over time, will eventually increase water infiltration and hence help to retain groundwater resources, contributing to PCE #5 and #6 (natural hydrograph and subsurface water contributions to stream quality and quantity). The net effect of these practices may slightly adversely affect PCE #1 (water with low levels of chemical and nutrient contamination), due to the increased use of herbicides for weed control, and also due to the time period needed to increase soil organic material to a level where it can increase water infiltration. Adequate buffering of these Crop Design practices by Erosion Control practices might keep most sediment and pesticides out of the water, although aerial applications of pesticides would not be ameliorated.

5.1.3 Vegetative Ground Cover

All three of the Vegetative Ground Cover practices (CP 327 Conservation Cover Establishment, CP 332 Contour Buffer Strip, and CP 342 Critical Area Planting) are useful in minimizing erosion by revegetating exposed soils, and enhancing water infiltration through the establishment of vegetation. All three of these practices can also be used to enhance habitat for wildlife, and enhance existing native vegetation for Conservation Cover Establishment where land is being retired from cropping. These practices reduce sheet and rill erosion, and help prevent concentrated water flow, halting sediment and chemicals from being transported to nearby watercourses. There may be short-term erosion associated with installation of the practices and some pesticide use if management includes removing noxious weeds from the cover area or buffers. These practices have the added advantage that vegetation may be left on site for longer

than a year or two, allowing the development of deeper roots to bind soils and allowing more organic buildup in the soil. Over the longer term, these practices are contributing toward PCE #4 (eliminating sediment) and helping to restore a better hydrograph and cold subsurface water nearby streams (PCE #5, and #6).

5.1.4 Vegetative Treatment

Vegetative Treatment practices such as 382 Fence, 386 Field Border, 393 Filter Strip, 391 Riparian Forest Buffer, 390 Riparian Herbaceous Cover, 391 Tree and Shrub Establishment and 412 Grassed Waterway are designed to be used to reduce and buffer negative effects from other practices, either by further reducing sediment in runoff or by protecting sensitive areas, like riparian zones, by animal or human exclusion. These filters, borders, and grassed waterways are sometimes installed as grass species. Especially along riparian areas, grasses will not provide adequate height and structure for needed shade, cover, bank stability, and invertebrate food production. When appropriate, black cottonwood, mountain alder, willows, and other tall, unmowed mature plants will provide the shade and bank stability needed over the long term along first and second order streams.

Short-term negative effects include some erosion from installation of the practices. In the longer term, however, there should be a reduction in soil loss, especially when used in combination with cropping practices that potentially need additional filtering of soil, nutrients, and chemicals from their runoff. The overall effect of these practices is to reduce sedimentation into water courses (PCE 4) but in riparian areas, PCE 2 (cool water temperatures) may or may not be adequately addressed, depending upon which plants are planted or restored, and the placement and amount of these practices.

5.1.5 Wildlife Enhancement and Other Practices

These categories of practices (e.g., CP 648 Wildlife Watering Facility, CP 645 Upland Wildlife Habitat Management, CP 590 Nutrient Management, 395 Stream Habitat and Management, 396 Fish Passage, 643 Restoration of Declining Habitats, 647 Early Successional Habitat and CP 595 Pest Management) are used in conjunction with, and may even overlap, all the other practices (see Interrelated and Interconnected section of this BO). It is recognized that the Pest Management conservation practice requires integrated pest management, however, pesticide use is not covered under this consultation. The short-term effects for all of these practices may be some erosion (affecting PCE 4) during installation of the practices, and also other chemicals and nutrients (PCE 1) entering the water directly or as run-off, for both short and long-term, depending upon the management scheme. The long-term effects of these practices are considered to range from neutral to beneficial for bull trout.

5.1.6 Summary of Effects of Dry Cropland RMS

Dry Cropland agriculture can significantly alter runoff and erosion rates to streams, as well as impact functions of riparian areas. The Dry Cropland RMS system can minimize and avoid adverse effects to listed fish and their habitat through the proper selection, and comprehensive implementation of individual RMS practices. The Cropping Design, Vegetative Treatment and Erosion Control practices all influence soil quality and reduce soil loss. Improving and maintaining upland soils and hydrology through the use of T (maximum rate of sustainable soil loss) reduces runoff volumes to streams, in turn reducing soil loss, and thereby reducing indirect sediment and hydrologic effects to bull trout and their habitats.

Even though the proposed activity is designed to have long term beneficial effects for bull trout, there are some short term adverse effects to bull trout and proposed critical habitat. Implementation of Dry Cropland RMS practices can modify hydrologic conditions and increase sediment delivery, resulting in stream channel and bed alterations. These alterations can reduce available foraging and migratory habitat for bull trout, and may adversely affect bull trout proposed critical habitat Primary Constituent Elements. PCEs include effects to water temperature, stream channel complexity, substrate, and natural hydrograph. In more severe situations, especially during heavy episodic rainfall, increased sediment run-off can cause sublethal and even lethal effects to bull trout by reducing feeding rates, impairing homing behavior, and reducing growth rates (Fish and Wildlife Service 2002h, Newcombe and Jensen 1996). Fish may avoid high concentrations of suspended sediments. At low concentrations, they may decrease their feeding, while at higher concentrations may cease their feeding. Sediment may also physically abrade and mechanically disrupt respiratory structures (fish gills) and respiratory epithelia of benthic macroinvertebrates (Rand and Petrocelli 1985), and at high concentrations can affect survival, growth, and amount of stream biota upon which listed fish feed (Bjornn et al. 1974).

If they are present in the action area the take of juvenile, subadult, and adult bull trout is expected to occur primarily in the form of sublethal take when suspended sediments reach high levels (e.g., 55 mg/l or greater) for four to seven hours, as a result of reduced feeding, reduced growth, impaired homing, increased predation, and increased physiological stress. Lethal take could be expected under the worst scenarios of sediment run-off, such as suspended sediments of 55 mg/l or greater for more than seven hours (Fish and Wildlife Service 2002h, Newcombe and Jensen 1996). The sublethal take of eggs, alevin, and fry bull trout begins at much lower concentrations of suspended sediments than older fish can tolerate, beginning at 20 mg/l suspended sediments for as little as 1 hour, with 20 percent or more lethal take on egg, alevin, and fry beginning at seven or more hours (Fish and Wildlife Service 2002h, Newcombe and Jensen 1996). If suspended sediments reached the upper levels, sublethal take could be the entire population of bull trout present in that section of river, where turbidity/suspended sediment can extend up to 600 feet downstream of sediment source (Washington Dept. of Transportation 2001).

5.2 Effect of Rangeland and Pastureland RMS

For purposes of evaluating effects to bull trout from Rangeland and Pastureland RMS Conservation Plan implementation, Table 5 was developed. The 33 Range and Pastureland RMS practices are combined into generalized functional groups that exhibit similar beneficial and adverse effects to bull trout and its habitats.

Table 5. Range and Pastureland RMS Practices Divided into Functional Groups, with Effects to Bull Trout and Proposed Critical Habitat, and Linkages to the Incidental Take Statement and Primary Constituent Elements (for PCEs, see Section 3.3)

RMS Practice	**Functional Group** (see definitions below this table)	**Beneficial Effects and Relevant PCEs**	**Adverse Effects and Relevant PCEs**
528a Prescribed Grazing	Access Control, Off-channel watering, Vegetation manipulation, Erosion Control	(See below for all functional groups.)	(See below for all functional groups.)
382 Fence	Access Control	Animal exclusion from sensitive areas. PCE 1, 2, 3, 4.	Construction related erosion. PCE 4.
472 Use Exclusion	Access control.	Animal exclusion from sensitive areas. PCE variable.	Construction related erosion. PCE 4.
575 Animal Trails and Walkways	Access control	Animal exclusion from sensitive areas. PCE variable.	Construction related erosion. PCE 1, 4, 3, 7.
516 Pipeline	Off-channel Watering	Water provided to animals away from sensitive areas (e.g. riparian and aquatic). PCE 1, 3, 4.	Construction related erosion. May be decreased baseflows if consumptive water use. PCE 2, 4, 5, 7.
574 Spring Development	Off-channel Watering	Water provided to animals away from sensitive areas (e.g. riparian and aquatic). PCE 1, 3, 4.	Construction related erosion. May be decreased baseflows if consumptive water use. May eliminate or reduce hypoheric or subsurface flow affecting temperature, flow & substrate condition PCE 1, 2, 4, 5, 6, 7, 8.

Table 5. Range and Pastureland RMS Practices Divided into Functional Groups, with Effects to Bull Trout and Proposed Critical Habitat, and Linkages to the Incidental Take Statement and Primary Constituent Elements (for PCEs, see Section 3.3)

RMS Practice	**Functional Group** (see definitions below this table)	**Beneficial Effects and Relevant PCEs**	**Adverse Effects and Relevant PCEs**
614 Watering Facility (See 574)	Off-channel Watering	Water provided to animals away from sensitive areas (e.g. riparian and aquatic). PCE 1, 3, 4.	Construction related erosion. May be decreased baseflows if consumptive use. PCE 2, 4, 5.
642 Water Well	Off-channel Watering.	Water provided to animals away from sensitive areas (e.g. riparian and aquatic). PCE 1, 3, 4.	Construction related erosion. May be decreased baseflows if consumptive use. PCE 2, 4, 5, 6, 7, 8.
648 Wildlife Watering facility	Off-channel Watering.	Water provided to animals away from sensitive areas (e.g. riparian and aquatic). PCE 1, 4.	Construction related erosion. May be decreased stream baseflows if consumptive use. Loss of subsurface flow from spring development impact to substrate, flow & temperature. PCE 1, 2, 4, 5, 6, 7, 8.
314 Brush Management	Vegetation Manipulation	Enhanced plant community structure, decreased sediment mobilization, increased hydrologic function. PCE 4.	May eliminate or prevent site potential native vegetation growth. Construction related erosion. May alter hydrograph. PCE 4, 5.
338 Prescribed Burning	Vegetation Manipulation	May promote site potential native vegetation growth, or may control invasive species, depending on frequency.	Increase erosion potential and surface runoff from vegetation removal PCE 4, 5
342 Critical Area Planting	Vegetation Manipulation	Enhanced plant community structure, decreased sediment mobilization and increased hydrological function. PCE 4.	Construction related erosion. May or may not eliminate site potential native vegetation growth, e.g. in riparian habitats. PCE 4, 8.

Table 5. Range and Pastureland RMS Practices Divided into Functional Groups, with Effects to Bull Trout and Proposed Critical Habitat, and Linkages to the Incidental Take Statement and Primary Constituent Elements (for PCEs, see Section 3.3)

RMS Practice	**Functional Group** (see definitions below this table)	**Beneficial Effects and Relevant PCEs**	**Adverse Effects and Relevant PCEs**
394 Firebreak Assume none through riparian areas)	Vegetation Manipulation	Protects against wide-spread loss of vegetation by fires, preventing exposed soils, erosion, and increased sediment in streams. PCE 4.	Firebreak may contain exposed soils which can erode into streams. PCE 4.
550 Range Planting	Vegetation Manipulation.	Decrease sediment mobilization, increase hydrological function. PCE 4.	May eliminate or prevent site potential native vegetation growth. Installation related erosion. Change in vegetation type may alter hydrology. PCE 4, 5.
512 Pasture and Hay Planting	Vegetation Manipulation	May decrease sediment mobilization PCE 4.	May eliminate or prevent site potential native vegetation growth. Installation - related erosion. Change in vegetation type may alter hydrology. PCE 4, 5.
595 Pest Management	Vegetation Manipulation	Selectively enhance plant growth. PCE 4.	Soil erosion from mechanical disturbance. Surfactant and adjuvants may enter water courses. PCE 1, 4, 8.
350 Sediment Basin (Assume no in-channel basins)	Erosion Control	Reduced small (ephemeral) watercourse erosion, improved water quality. PCE 1, 4, 6.	Construction- related erosion. Change in hydrograph esp. with many in one watershed. PCE 4, 5.

Table 5. Range and Pastureland RMS Practices Divided into Functional Groups, with Effects to Bull Trout and Proposed Critical Habitat, and Linkages to the Incidental Take Statement and Primary Constituent Elements (for PCEs, see Section 3.3)

RMS Practice	**Functional Group** (see definitions below this table)	**Beneficial Effects and Relevant PCEs**	**Adverse Effects and Relevant PCEs**
362 Diversion	Erosion Control	Control of run-off, increased water infiltration. Pollution abatement. PCE 1, 4, 6.	Construction related erosion. May be decreased baseflows if consumptive water use, migration barrier from low flows or tempera-ture. PCE 2, 4, 5, 7.
402 Dam, Floodwater Retarding	Erosion control	Reduced erosion from large storm events. PCE 1, 4.	Within perennial or intermittent streams, inhibition of fish passage, channel migration, bedload and large woody debris movement downstream. Construction related erosion. PCE 3, 4, 5, 7.
410 Grade Stabilization Structure	Erosion control.	Reduced erosion from large storm events and incision. PCE 3, 4.	Within perennial or intermittent streams, inhibition of fish passage, channel migration, bedload and large woody debris movement downstream. Construction related erosion. PCE 4, 7.
638 Water and Sediment Control Basin (Assumed In-channel)	Erosion Control	Reduced small (ephemeral) watercourse erosion, trap sediment. Increased water infiltration. PCE 1, 4, 6.	Construction related erosion. Migration barrier, altered hydrology, loss of large substrates, increase stream temperature. PCE 2, 4, 5, 7.

Table 5. Range and Pastureland RMS Practices Divided into Functional Groups, with Effects to Bull Trout and Proposed Critical Habitat, and Linkages to the Incidental Take Statement and Primary Constituent Elements (for PCEs, see Section 3.3)

RMS Practice	**Functional Group** (see definitions below this table)	**Beneficial Effects and Relevant PCEs**	**Adverse Effects and Relevant PCEs**
390 Riparian Herbaceous Cover	Vegetative Treatment	Reduced erosion. Reduced pollutants and sediment within waterways. Increased food items for fish. Moderate stream temperature PCE 1, 4, 8.	Soil disturbance during installation. PCE 2, 4.
391 Riparian Forest Buffer	Vegetative Treatment	Reduced erosion. Reduced pollutants and sediment within waterways. Increased food items for fish. Create shade and moderate water temperatures. PCE 1, 2, 4, 8.	Soil disturbance during installation. PCE 4.
422 Hedgerow Planting	Vegetative Treatment	Reduced erosion during storm events. PCE 4.	Soil disturbance during planting. PCE 4.
580 Streambank and Shoreline Protection (Assume Vegetative treatment only; no rock)	Vegetative Treatment	Reduced erosion and sedimentation within waterways. May reduce stream temperature. PCE 2, 4.	Construction related erosion. Other variable effects such as; channelization, loss of floodplain, & channel complexity, effects to food base. PCE 3, 4, 8.
601 Vegetative Barrier	Vegetative Treatment	Reduced erosion. Reduced sediment in waterways. PCE 1, 4.	Soil disturbance during planting. PCE 4.
612 Tree and Shrub Establishment	Vegetative Treatment	Reduced erosion. Reduced sediment in waterways. PCE 1, 4.	Soil disturbance during planting. PCE 4.

Table 5. Range and Pastureland RMS Practices Divided into Functional Groups, with Effects to Bull Trout and Proposed Critical Habitat, and Linkages to the Incidental Take Statement and Primary Constituent Elements (for PCEs, see Section 3.3)

RMS Practice	Functional Group (see definitions below this table)	Beneficial Effects and Relevant PCEs	Adverse Effects and Relevant PCEs
395 Stream Habitat Improvement and Management	Wildlife Enhancement	Enhance fish habitat, e.g. Placement of large wood in stream, eliminating fish passage barriers, increasing fish access. May increase invertebrates food items, may decrease stream temperature. PCE 2, 3, 7.	Construction related erosion and increased sedimentation during installation. Effects will depend on action. PCE 4.
396 Fish Passage	Wildlife Enhancement	Removal of fish passage barriers, increasing fish movement and access. PCE 7.	Construction related erosion and increased sedimentation. PCE 4, 9.
643 Restoration of Declining Habitats	Wildlife Enhancement	May reduce erosion and sedimentation. May reduce stream temperatures. May improve vegetative cover. May increase invertebrate food sources. PCE 2, 4, 8.	May increase erosion and sedimentation during burning, mowing, and/or planting.. Change in hydrology (runoff rate from burned area) PCE 4, 5.
645 Upland Wildlife Habitat Management	Wildlife Enhancement	May improve vegetative ground cover. PCE variable.	May cause construction related erosion. PCE 4.
647 Early Successional Habitat	Wildlife Enhancement	May reduce erosion and sedimentation. May improve vegetative cover. PCE 4.	May increase erosion and sedimentation during burning, mowing, and/or planting. PCE 1, 4.

Table 5. Range and Pastureland RMS Practices Divided into Functional Groups, with Effects to Bull Trout and Proposed Critical Habitat, and Linkages to the Incidental Take Statement and Primary Constituent Elements (for PCEs, see Section 3.3)

RMS Practice	Functional Group (see definitions below this table)	Beneficial Effects and Relevant PCEs	Adverse Effects and Relevant PCEs
561 Heavy Use Area Protection	Other	Animal exclusion from sensitive areas, e.g. stream crossings. PCE 4.	Animal access to spawning and rearing habitat. Arrested channel migration from crossing infrastructure. Decreased riparian function, increased nutrient loading and runoff. Construction related erosion. PCE 1, 2, 3, 4, 7.

Access Control practices are related to excluding animals from riparian and aquatic habitats, and other sensitive areas.
Off-channel Watering practices are related to providing water to animals away from riparian and aquatic habitats and other sensitive areas.
Vegetation Manipulation practices are related to maintaining and improving forage quality/quantity to grazing ungulates.
Erosion Control practices are related to mitigating upland and riparian Rangeland and Pastureland management impacts to sediment and water yields.
Vegetative Treatment practices are related to minimizing soil erosion near surface waters from wind and precipitation and/or upslope runoff.
Wildlife Enhancement practices are related to benefitting wildlife and/or fish species**.**
Other practices do not fit easily into other functional groups and may have a wide variety of positive and negative effects.

Livestock grazing may have direct effects to individual bull trout, in parts of the action area where livestock enter spawning areas (e.g., redds and eggs, or areas where juveniles occur). Indirect effects from altered stream flows and sediment especially in the fall may disrupt bull trout during spawning, and decrease survival of eggs and young in the gravel during the winter through to spring (Fish and Wildlife Service 2002c). Elevated sediments (10 NTU or 50 mg/l) for 4 hours or more are anticipated to reduce fry to adult bull trout survival by impairing homing, reducing feeding, reducing growth, and increasing predation (Fish and Wildlife Service 2002h). Improperly managed livestock grazing has numerous negative indirect impacts on aquatic systems that support listed fish, including soil compaction, increased nutrients, devegetation, erosion, reduced water infiltration, loss of streambank stability and shading, increased water temperatures, and decreased flows. Although total water yield may increase due to vegetation removal (Elmore and Beschta 1987), summer streamflows may become intermittent in a heavily grazed area, whereas in a well-vegetated area may have permanent flows (Li 1994). Any coordinated practices designed to keep livestock out of riparian and aquatic areas, to revegetate riparian corridors, maintain fish passage in stream flows with cooler temperatures, and reduce sediment will minimize negative effects and maximize bull trout recovery.

5.2.1 Access Control

Access Control practices include conservation practices designed to keep grazing livestock away from sensitive areas such as riparian or aquatic habitat, or other practices where plantings are involved and grazing needs to be controlled. If Access Control practices are used to control riparian or aquatic habitat use, it is designed to protect the riparian vegetation from damage or removal, or to prevent streams or other wetlands from being damaged by hooves, resulting in sediment release or redistribution within the water column. Fencing may also be used in conjunction with upland practices, such as Prescribed Grazing (CP 528A) that address potential erosion and soil compaction.

A short-term adverse effect is ground disturbance (potential for sediment) associated with fence installation. Long-term effects can generally be beneficial, as long as the access control is not used to concentrate livestock in riparian areas or other wetlands. Fences will generally be used to restrict access by livestock and humans into sensitive sites, such as riparian areas, thus allowing riparian vegetation restoration to occur, and reducing soil erosion and decreasing sediments in nearby watercourses. In the Tri-County area, fences will generally be used to improve PCE #2, #3, and #4 by keeping livestock directly out of the water (thus reducing nutrient and sediment loads), allowing riparian vegetation to regrow or be restored for cover and shade, and increasing prey items for bull trout (improving PCE #s 1, 2, 3, and 8).

5.2.2 Off-Channel Watering

Off-channel Watering practices are generally designed to provide alternate water sources to livestock in order to limit their impact on riparian and aquatic habitats, and sometimes includes actions to channel excess run-off water (e.g., CP 362 Diversion) before it enters streams.

Livestock grazing removes vegetation along streambanks, leading to destabilization (Platts 1991) and prolonged grazing in riparian areas increases surface erosion and mass wasting. Loss of riparian vegetation decreases shading and increases stream temperatures. Off-channel watering, especially with Access Control practices, would improve streamside shading and decrease solar radiation. For example, in the John Day River Basin, an unshaded stream received six times the solar radiation than an adjacent, well-shaded stream, and two streams at the same elevation, one shaded and one unshaded, differed by 11 degrees Celsius (Li 1994). Juvenile bull trout are strongly associated with cooler water, typically found in stream pools and under both instream and overhead cover (Fish and Wildlife Service 2002c).

Short-term effects from these off-channel watering practices are primarily soil disturbance and vegetation removal during installation, with resulting erosion and possible loss of riparian vegetation in some instances, and potential for increased sediments to move to adjacent streams in cases of sudden thunderstorms or rapid winter snowmelt events.

Long-term effect may be both positive and negative, depending upon installation. Off-channel watering practices may reduce erosion, by allowing livestock to be redistributed more evenly and away from riparian areas, hence improving PCE #4. But, some of the practices (e.g., spring development CP 574 and water well CP 642), could potentially reduce spring, seep, and groundwater that was formerly available for cooling streams and effect upwelling and flow that in turn effects substrate conditions. This could negatively impact PCE #5, 6, 7, and 8, depending upon how much water was removed.

5.2.3 Vegetation Manipulation

Vegetation Manipulation practices are those practices that primarily maintain or improve forage nutritional quality and/or quantity for grazing livestock, or otherwise restore vegetation and may include 342 Critical Area Planting, 390 Riparian Herbaceous Cover, or 391 Forest Buffer. Some practices, however, such as 314 Brush Management and 338 Prescribed Burning can be used to control "undesirable" vegetation. In some cases native vegetation is considered undesirable and, therefore, these practices would negatively impact relatively rare shrub-steppe habitats and their associated native wildlife species. However, these practices can also be used to maintain native habitat types, especially if non-native weed species are targeted for removal.

Short-term effects for these practices generally include erosion and potentially increased sedimentation below the site (effects to PCE 4), since these practices usually involve vegetation removal. The Firebreak practice (CP 394) may require temporary or permanently bare ground to be maintained, although mowed or grazed fire-resistant vegetation may also be used. However, a properly designed firebreak should usually prevent more erosion (by controlling wildfires or prescribed burns) than it causes.

Long-term effects for these practices are variable. Some practices may be used to maintain a range or pastureland in either native or non-native vegetation, depending upon which practices are utilized and the goal. For maintaining positive effects for listed fish, some vegetation is always better than none for long-term control of erosion and sediment reduction, but effects at an ecosystem level are better served by attempting to maintain native plants already pre-adapted to the site, whenever possible. Not only are native plants' water and nutrient needs adapted, but the loss of other ecosystem components that may be at risk due to continued habitat loss or alteration (e.g. migratory birds, reptile and amphibians, other native mammals) will benefit. For a short discussion of Pest Management CP 595, see previous Dry Cropland Effects discussion.

5.2.4 Erosion Control

See discussion of Erosion Control practices under Dry Cropland Effects section: the four conservation practices under Range and pastureland are the same as four of the Dry Cropland practices (CP 402, CP 410, CP 638, and CP350).

5.2.5 Wildlife Enhancement and Other Practices

Upland Wildlife Habitat Management (CP 645) and the other wildlife and fishery CPs do not fit easily into the other functional categories, and may encompass a wide range of management activities spanning all months of the year. Generally, CP 645 may include prescribed burning, or mechanical, biological, or chemical vegetative manipulation, or any combination of these four. Consequently, this practice overlaps with many of the other conservation practices, and the short and long-term effects to bull trout will be similar to the effects of those practices. The net effect of this practice and the other Wildlife Enhancement practices (Stream Habitat Improvement and Management, Fish Passage, Restoration of Declining Habitats, Early Successional Habitat, and Heavy Use Area Protection) are expected to be No Effect to Beneficial Effect, but could include negative short-term effects that result from erosion, increased chemical and nutrient content of run-off, and decreased infiltration (e.g., after prescribed burning).

5.2.6 Summary of Effects of Rangeland and Pastureland RMS

Grazing can cause major vegetation changes, habitat alterations, and increased sediment to streams. To adequately minimize adverse effects, each RMS should prescribe ecologically conservative grazing systems with good range management practices, such as adequate fencing, good distribution of water and salt, and adequate riding and herding management to ensure uniform cattle distribution. The proper selection and implementation of RMS practices, in conjunction with Prescribed Grazing (CP528a) as determined by site specific conditions, will determine the relative habitat protection provided by the Rangeland and Pastureland RMS. Proper grazing management will improve riparian vegetative communities within areas that are degraded. While riparian areas can be subject to the most acute effects from animal use, upland animal management influences hydrology and sediment yields to streams as well. The Forage Improvement and Protection and Erosion Control practices, and Prescribed Grazing (CP528a) provide the proper tools for comprehensive animal management in the Rangeland and Pastureland RMS.

Even though the proposed activity is designed to have long term beneficial effects for bull trout, there are some short term adverse effects to bull trout and proposed critical habitat. Implementation of Range and Pastureland “accelerating” and “facilitiating” practices can increase short-term sediment delivery, resulting in stream channel and bed alterations. These alterations can reduce available foraging and migratory habitat for bull trout, and may adversely affect bull trout proposed critical habitat PCEs, including effects to water temperature, stream channel complexity, and substrate. In more severe situations, especially during heavy episodic rainfall, increased sediment run-off can cause sublethal and even lethal effects to bull trout by reducing feeding rates, impairing homing behavior, and reducing growth rates (Fish and Wildlife Service 2002h, Newcombe and Jensen 1996). Fish may avoid high concentrations of suspended sediments. At low concentrations, they may decrease their feeding, while at higher concentrations may cease their feeding. Sediment may also physically abrade and mechanically disrupt respiratory structures (fish gills) and respiratory epithelia of benthic macroinvertebrates

(Rand and Petrocelli 1985), and at high concentrations can affect survival, growth, and amount of stream biota upon which listed fish feed (Bjornn et al. 1974).

If present, the take of juvenile, subadult, and adult bull trout is expected to occur primarily in the form of sublethal take when suspended sediments reach high levels (e.g., 55 mg/l or greater) for four to seven hours, as a result of reduced feeding, reduced growth, impaired homing, increased predation, and increased physiological stress. Lethal take could be expected under the worst scenarios of sediment run-off, such as suspended sediments of 55 mg/l or greater for more than seven hours (Fish and Wildlife Service 2002h, Newcombe and Jensen 1996). The sublethal take of eggs, alevin, and fry bull trout begins at much lower concentrations of suspended sediments than older fish can tolerate, beginning at 20 mg/l suspended sediments for as little as 1 hour, with 20 percent or more lethal take on egg, alevin, and fry beginning at seven or more hours (Fish and Wildlife Service 2002h, Newcombe and Jensen 1996). If suspended sediments reached the upper levels, sublethal take could be the entire population of bull trout present in that section of river, where turbidity/suspended sediment can extend up to 600 feet downstream of sediment source (Washington State Department of Transportation 2001). Range and Pastureland practices can also modify native riparian vegetation, which modifies bull trout food sources and stream channel stability. Range and Pastureland practices may adversely affect all of the bull trout proposed critical habitat PCEs, except PCE #9, including effects to water temperature, stream channel complexity, and substrate.

5.3 CUMULATIVE EFFECTS

Cumulative effects (as defined in 50 CFR 402.02) 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 in this section because they require separate consultation pursuant to section 7 of the Act; e.g., ongoing operation of hydropower plants, hatcheries, fisheries, and other land management activities.

In 1997, the State of Oregon adopted “The Oregon Plan” to improve water quality and restore declining native fish populations (State of Oregon 1997). Agricultural water quality management plans have been or are being developed in watersheds around the State pursuant to The Oregon Plan, and are expected to gradually reduce water quality degradation associated with agriculture. In the Wasco and Sherman County action area of this BO, the Lower Deschutes Agricultural Water Quality Management Area Plan (Oregon Department of Agriculture 2002a) was published on October 5, 2002. The administrative rules for the Lower Deschutes set forth the requirements and/or prohibitions that will be used by Oregon Department of Agriculture in exercising its enforcement authority for the prevention and control of water pollution from agricultural activities. Area Rules include Upland Soil Erosion limits, and by January of 2005, will implement additional active streambank erosion limits as well as a requirement for the establishment and development of adequate riparian vegetation for streambank stability and shading consistent with site capability. These requirements are consistent and complementary with RMS planning efforts for Dry Cropland and Range and Pastureland as described in this BO.

In addition, the provisions and requirements outlined in the Water Quality rules apply to all agricultural and rural lands, including fallow croplands and rested pastures with no active use.

The Water Quality Management Plan for the Lower John Day (includes parts of Sherman and Gilliam Counties) has been finalized. The document indicates January 2008 as the deadline for controlling upland soil erosion and stabilizing streambanks: waste management rules regarding nearby water will be effective upon adoption of the Management Plan rules.

In 1993, the Oregon legislature passed Senate Bill 1010 (ORS 568.900-.933), the Agricultural Water Quality Management Act, designating Oregon Department of Agriculture as the lead agency to work with agriculture to address water pollution from agricultural activities and soil erosion, as well as compliance with federal and state clean water regulations. The State Board of Agriculture has appointed Local Advisory Committees that have, along with that county's SWCD, assisted in the development of these Water Quality Management Area Plans for large scale watersheds, such as the Lower Deschutes, and Upper Mainstem and South Fork of the John Day River (Oregon Department of Agriculture 2002a, 2002b). The Lower Mainstem of the John Day River does not yet have a final Water Quality Management Plan (Oregon Department of Agriculture 2003, Celina Long, pers. comm.). Water quality standards that are considered under the plans include: temperature, sedimentation, pH, dissolved oxygen, flow modification, and habitat modification. Area Rules (Prohibited Conditions) are being or have been written to achieve goals regarding upland soil erosion, stream bank erosion, riparian vegetation, and waste management for each area. The ongoing development of these area plans directly interacts with individual RMS Conservation Plans, since most of the conditions are addressed by conservation practices within RMS Conservation Plans. Timelines for implementation, monitoring, and mechanisms for reporting non-compliance and enforcement, are included in the area plans.

Dewatering of streams for irrigation clearly has potential (depending upon amount and timing) to negatively impact stream and river flows and temperatures downstream, and reduces the ability of unoccupied proposed critical habitat (e.g., Lower Deschutes) to support bull trout migration. This is an ongoing practice in the three Counties.

The Service assumes that similar future private and State actions will continue within the action area, but at increasingly intense levels as population density continues to rise. If all farms and ranches were enrolled in well-designed RMS farm and ranch plans, there should be a gradual reversal of the habitat trend from degradation to restoration. However, it is impossible to predict the ultimate percent of farm and ranchland in the Tri-County area which will be enrolled, as well as the consistency of funding for farm and ranch planning, although both have been stable or increasing in recent years.

5.4 CONCLUSION

Bull trout distribution in the Conservation Program action area is restricted to the Deschutes River, John Day River, and Columbia River mainstem. Proposed critical habitat for bull trout in the action area is limited to the lower Deschutes River (Unit 6, Subunit i) and the Columbia

River mainstem, as described and mapped in the November 29, 2002 Federal Register notice (Fish and Wildlife Service 2002b). These river areas currently support low numbers of migratory bull trout. Bull trout are not currently known to migrate into tributary streams where RMS Conservation Plans may be implemented, although it is believed that stabilization of the watersheds will eventually allow expansion of bull trout distribution back into some areas of historical occurrence.

The Service has determined, based on the information described in these Biological and Conference Opinions, that the proposed action is not likely to jeopardize the continued existence of bull trout, nor result in the further destruction or adverse modification of proposed bull trout critical habitat. In reaching this conclusion, the Service considered the best available scientific and commercial information regarding the status of bull trout, environmental baseline conditions, the direct and indirect effects of the proposed action, and the cumulative effects anticipated in the action area. Accomplishment of the proposed actions will cause short-term degradation of some environmental baseline indicators for bull trout, including temperature, stream channels, and sediment. Depending upon weather conditions, some amount of sublethal and lethal take of bull trout might accompany the installation of soil-disturbing RMS plan practices, which could be significant, since the Warm Springs River population is already small (about 202 spawners) and the number of redds for that population may be slowly declining (Brun and Dodson 2000). However, the proposed action, in conjunction with NRCS Specifications and Terms and Conditions of this Opinion, should, over the long term, improve upland, riparian, and in-water habitat conditions on the private lands where the actions are implemented, as well as in downstream river reaches.

6. INCIDENTAL TAKE STATEMENT

Sections 4(d) and 9 of the Act, as amended, prohibit taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without a special exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined 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. Under the terms of section 7(b)(4) and section 7(a)(2), taking that is incidental to and not intended as part of the NRCS action is not considered a prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement. The measures described in the Terms and Conditions section of this Incidental Take Statement are non-discretionary. Failure to comply with these measures may cause the protective coverage of section 7(o)(2) to lapse.

The Incidental Take Statement included in this Biological Opinion is limited to the Act. It does not constitute an exemption for non-listed migratory birds and bald and golden eagles from the prohibitions of take under the Migratory Bird Treaty Act of 1918, as amended (U.S.C. 703-712), or the Bald and Golden Eagle Protection Act of 1940, as amended (U.S.C. 668-668d), or any other Federal statutes.

Section 7(b)(4) and 7(o)(2) of the Act do not apply to the incidental take of listed plant species. However, protection of listed plants is provided to the extent that the Act requires a Federal permit for removal and reduction to possession of endangered plants from areas under Federal jurisdiction, or for any act that would remove, cut, dig up, or damage or destroy any such species on any other area in knowing violation of any regulation of any State or in the course of any violation of a State criminal trespass law. In addition, section 2(c)(1) of the Act directs all Federal agencies to conserve endangered and threatened species (without regard to taxa), and to use their authorities to further the purposes of the Act.

An Incidental Take Statement specifies the impact of any incidental taking of endangered or threatened species. It also provides reasonable and prudent measures that are necessary to minimize impacts and sets forth mandatory terms and conditions required to accomplish the reasonable and prudent measures.

6.1. AMOUNT OR EXTENT OF TAKE

The Service anticipates that individual RMS farm and ranch Conservation Plans for Dry Cropland and Range and Pastureland, as previously described, will incidentally take a small number of listed bull trout, although the exact amount is difficult to predict at this time. The exact number, placement, and composition of future RMS plans (during the next five years) is unknown in the Tri-County area; rainfall duration, intensity, and timing in the action area is unpredictable; the presence, distribution, and number of bull trout within the project area is poorly known; and detecting dead, sick, or impaired bull trout is not common. Comparable data from other situations with which the Service could estimate anticipated incidental take for this BO do not exist. The amount of sublethal and lethal incidental take caused by sediment run-off produced during and after the installation of RMS conservation practices is expected to be small, localized, and temporary in nature and primarily produced during infrequent episodes of concentrated rainfall. The extent of the incidental take is limited to that occurring due to construction, operation, and maintenance of the RMS conservation practices installed within 328 feet (100 meters) of wetlands and on either side of perennial or seasonal streams that (1) are within the present or historic range of an ESA-listed species, or (2) are within 0.5 miles upstream of that range and physically connected to it by an above-ground channel that will deliver water, sediment, or woody material to an area occupied by ESA-listed species. The extent of take also includes riparian and aquatic features up to 0.5 miles downstream of these areas.

For the action area covered under this BO the Service expects a low level of incidental take to occur due to harm caused by the proposed actions. The best scientific and commercial data available are not sufficient to enable the Service to estimate a specific amount of incidental take. Therefore, in this instance, the expected level of incidental take is “unquantifiable”. The potential for take has been substantially reduced through the application of the NRCS Specifications and other Terms and Conditions of this and NOAA Fisheries’ BO.

The Service anticipates that the long-term effect of planning and implementing cohesive RMS Conservation Plans throughout the Lower Deschutes and John Day River mainstem sub-basins should benefit listed species, including bull trout. The Service has determined that the anticipated level of take resulting from the proposed actions is not likely to jeopardize bull trout nor adversely modify the proposed bull trout critical habitat.

6.2. Effect of the Take

In this BO, the Service has determined that the level of anticipated incidental take resulting from proposed actions and NRCS Specifications, is not likely to jeopardize bull trout, or result in the destruction or adverse modification of proposed critical habitat when the reasonable and prudent measures are implemented. Sublethal and lethal take associated with sediment run-off is likely to be short-term, and could be expected to occur primarily when unpredictable, intense episodes of rainfall occur within the project area, especially during initial installation of RMS practices.

6.3. Reasonable and Prudent Measures

The measures described below are non-discretionary. They must be implemented as binding conditions in order to be exempt from section 9 take prohibitions in the process described under section 7(a)(2) of the Act. NRCS and its applicants must comply with the Terms and Conditions, which implement the following Reasonable and Prudent Measures. If NRCS or its applicants with RMS Conservation Plans fail to adhere to the Terms and Conditions, the protective coverage of section 7(o)(2) will lapse. The Terms and Conditions apply to each RMS farm and ranch Conservation Plan and identified conservation practices as designed, planned, selected, and carried out as part of the proposed action. The Service believes that activities carried out in a manner consistent with the Proposed Action, including NRCS Specifications, Quality Criteria, and the following Reasonable and Prudent Measures (RPMs) and implementing Terms and Conditions, except as otherwise identified in the BO, do not necessitate further site-specific consultation. Activities which differ from the Proposed Action, NRCS Specifications, or RPMs and implementing Terms and Conditions, or were excluded from consultation (see Section 2.6), require further consultation. Should additional species become listed, or additional critical habitat be designated in the project area, re-initiation is necessary to order to ensure the additional listed species and critical habitat coverage under this BO.

The Service considers the following Reasonable and Prudent Measures as necessary and appropriate to minimize take of listed fish resulting from implementation of the proposed actions. These reasonable and prudent measures would also minimize adverse effects to proposed critical habitat. The NRCS and its applicants shall:

1) Avoid or minimize incidental take by specifying that each conservation practice included as part of a farm or ranch RMS plan will be designed, constructed, implemented, and maintained as necessary to ensure that adverse effects, such as increased sediment, to listed fish and their

habitats will be brief, minor, and scheduled during the least sensitive portion of the species' life cycle.

2) Complete a comprehensive planning, monitoring, and reporting program in order to confirm that this BO is meeting its objective of minimizing take under the activities covered by this consultation.

6.4. Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, NRCS and its applicants must also comply with the following Terms and Conditions, which implement the Reasonable and Prudent Measures listed above. These Terms and Conditions are non-discretionary.

1) To implement Reasonable and Prudent Measure #1 (Avoiding and minimizing incidental take); the NRCS and its applicants shall ensure:

a. General conditions. All terms and conditions in regulatory permits and other official project authorizations to eliminate or reduce adverse impacts to any endangered or threatened species or their critical habitats will be followed.

i. New staging and refueling areas will be located outside of the 5-year flood plain to prevent potential contamination of any water body.

b. Timing. Conservation practice activities at individual RMS sites will be completed in an expeditious manner. In addition, proper scheduling will be used to reduce disturbance and/or displacement of fish and wildlife species in the immediate project area.

c. Sediment and erosion control. Sedimentation and erosion controls will be implemented on all project sites where the implementation of activities has the potential to deliver sediment into a stream or water body, as determined by the RMS planner.

i. Structures/techniques must be placed and/or anchored appropriately to prevent adverse impacts to down slope habitats. Control structures/techniques may include, but are not limited to: silt fences, straw bale structures, seeding by hand and hydro-seeding, jute mats, and coconut (coir) logs.

ii. Vehicular access way to project sites will provide for minimizing impacts on riparian corridors.

iii. The use of heavy equipment and techniques that will result in soil disturbance or compaction of soils, especially on steep or unstable slopes, will be minimized to the extent practicable.

iv. Trees and/or shrubs will be planted, or vegetated waterways or filter strips placed in areas with steeper slopes and/or with a lower percentage of ground cover.

v. Vegetative planting techniques must not cause major disturbances to soils and slopes. Hand planting is the preferred technique for all tree, shrub, and riparian plantings, except for filter strips and vegetated waterways. Plantings will occur during the appropriate seasonal period for the respective plant species involved.

vi. Qualified personnel will develop plant specifications detailing types of seeds, sources for seed, handling of plant material, and planting techniques. Seedling competition in riparian areas may be reduced by controlling grasses, forbs, and woody shrubs from around each seedling for an appropriate distance. Proper methods to protect seedlings from animal, insect, and environmental damage will be employed.
vii. Cropland adjacent to streams and stream buffer zones with sensitive fish species will maintain an adequate residue cover to control erosion or prevent sediment from moving to the waterway, as determined by the RMS planner.
viii. There will be no in-stream work except activities defined under Terms and Conditions #2 under Section 2.23 of the NOAA Fisheries (National Marine Fisheries Service 2004) Biological Opinion (e.g., installation of stream crossings, off-stream livestock watering facilities, and restoration/habitat enhancement) or if otherwise individually consulted upon with NOAA Fisheries and the Service.
ix. Off-channel livestock watering facilities will not be located in areas where compaction and/or damage could occur to sensitive soils, slopes, or vegetation due to congregating livestock. Stream crossings will be constructed in compliance with Term and Condition #2 under section 2.2.3 of NOAA Fisheries' BO (National Marine Fisheries Service 2004).
x. Exclude livestock and vehicular traffic from newly vegetated areas until vegetation is established.

2) To implement Reasonable and Prudent Measure # 2 (Planning, monitoring and reporting); the NRCS and its applicants shall ensure:

a. Project notification. For each RMS plan that has ESA-listed fish species present in the planning unit and that will be covered by this Opinion, the NRCS will ensure that a complete, electronic notification with the following information (e.g., Appendix C Pre-notification Form) is sent to the Service within five working days of approval by the designated conservationist.

i. A map or list of all stream reaches present in the RMS planning unit that are also within the present or historic range of ESA-listed fish, designated or proposed critical habitat, or up to 0.5 miles upstream of such areas.
ii. Dates of spawning, rearing, migrating, and over-wintering, if any, by stream.
iii. Problems and Opportunities' identified for ESA-listed fish.
iv. Habitat objectives for ESA-listed species.
v. Alternatives identified to encourage cooperative group planning.
vi. A description of the Selected Alternative, its Conservation Practice components, and how those will affect the ESA-listed fish habitat quality criteria.

b. Implementation monitoring. The NRCS will complete the following actions and collect and retain the following information to assess the level of program participation and use of conservation practices as described in this Opinion.

i. After conservation practices have been installed on an individual farm or ranch, the NRCS will meet with the appropriate land manager to ensure that the practices were

installed and are managed correctly, and will notify the producer in writing if any corrections or modifications are necessary.

ii. The NRCS will compile a summary of conservation practice systems installed under this Opinion throughout the Tri-County area.

(1) Dry Cropland-By type and number of conservation practices systems installed, including field and landscape buffer zones; total acres.

(2) Range and Pastureland-By type and number of conservation practices systems installed; including field and landscape buffer zones; total acres.

(3) Streams affected-By type (perennial, seasonal, ephemeral) and number; linear feet or miles; channel width.

(4) Riparian buffers established-By type and number; average width, acres linear feet or miles.

(5) Streambank protection installed-By type and number; total linear feet or miles.

iii. Each year, the NRCS will complete a full plan-level and onsite review of at least 5 percent of the RMS plans selected at random from those developed under this Opinion, to ensure that they are being designed, installed, and operated as described in this Opinion.

c. Effectiveness monitoring. Besides implementation monitoring, the NRCS will also assess habitat trends as a result of conservation actions at the stream reach level using Stream Visual Assessment Protocol (SVAP) indicators, and, to the extent feasible, at the watershed and landscape-levels, to ensure that the plans are: (1) resulting in satisfactory progress toward achieving Quality Criteria, including listed-fish quality criteria specifically; (2) are producing effects consistent with those predicted in this Opinion; and (3) are not giving rise to new resource concerns that adversely affect aquatic or riparian habitats. This assessment must be quantitative, to the maximum extent feasible, based on empirical and predicted trends in listed-fish quality criteria indicators and any other indicators or comparisons that the NRCS deems useful for this purpose (such as a comparison of indicators for streams where a significant number of conservation systems are in place and similar streams where such systems are not yet in place), and may make use of reviews completed for implementation monitoring and other existing monitoring efforts.

d. Annual monitoring report. By January 31 of each year, provide the Service with an annual monitoring report that includes a summary of the monitoring information described above, including project notifications, implementation, and effectiveness monitoring. As appropriate, the report will also include a description of any other efforts by the NRCS to carry out this Opinion and any recommendations the NRCS may have to make the program more effective.

e. Timeliness. Failure to provide timely implementation monitoring and/or reporting will result in the selective coverage of this Incidental Take Statement to lapse.

f. Annual coordination. Unless the Service determines that such a meeting is not warranted, NRCS will meet with the Service by March 31st of each year to discuss the annual monitoring report and any action necessary to assess the effectiveness of the program.

g. Reinitiation of consultation. Reinitiate formal consultation on this Biological Opinion within five years of the date of issuance. This Term and Condition is in addition to reinitiation requirements described in sections below under section 10 "Reinitiation of section 7 Consultation." To reinitiate consultation, contact the Service at: State Supervisor, U.S. Fish and Wildlife Service, Oregon Fish and Wildlife Office, 2600 SE 98th Ave., Suite 100, Portland, OR 97266.

h. Notification regarding sick, injured, or dead listed species**.** NRCS or designee will notify the Service within three (3) working days if a dead, injured, or sick endangered or threatened species is found on a farm or ranch under a covered RMS plan and that is the result of the actions of the landowner or other human actions. Contact the U.S. Fish and Wildlife Service Law Enforcement at 503-682-6131 (9025 SW Hillman Court, Wilsonville, OR 97070). Notification must include the date, time, precise location of the injured animal or carcass, and any other pertinent information. Care should be taken in handling sick or injured specimens to ensure effective treatment, and in handling dead specimens to preserve biological material in the best possible condition for later analysis for cause-of-death. The finder has the responsibility to carry out instructions provided by FWS Law Enforcement to ensure that evidence intrinsic to the specimen is not disturbed unnecessarily.

7. CONSERVATION RECOMMENDATIONS

Conservation recommendations are discretionary measures suggested to the action agency by the Service on how to: 1) minimize or avoid adverse effects of a proposed action on listed species or critical habitat, 2) promote the recovery of listed species, and 3) develop new studies and information (50 CFR 402.2). Section 7(a)(1) of the ESA directs all Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. The Service believes the conservation recommendations listed below are consistent with these obligations, and therefore should be implemented by NRCS, in that these recommendations will benefit listed and proposed species and critical habitats, and help, proactively, to prevent the decline of other species and habitats currently at risk.

1. NRCS should develop the BA proposed in their June 28, 2002 letter describing an interim pesticide consultation for Tri-County Dry Cropland and Range and Pastureland, where: 1) NRCS will run WIN-PST (Windows Pesticide Screening Tool) for the top ten (or more) most commonly used pesticide formulations, and/or those pesticides or formulations with the highest toxicity values, used in the current BA's action area, 2) NRCS will identify where there are Intermediate, High, or Extremely High toxicity ratings for fish and/or humans, 3) NRCS

recommends mitigation measures (such as filter strips, grassed waterways, residue management, etc.) for the areas where the pesticides will be used, and 4) the interaction of the mitigation measures with the pesticide formulations would be the focus of the consultation. Further, the Service recommends that one or more NRCS personnel from the West Region Technical Center (soon to be established) obtain training in NRCS's more sophisticated pesticide screening method, NAPRA (National Agricultural Pesticide Risk Analysis), so that NAPRA assistance can be provided for RMS plan development in Oregon, when requested. WIN-PST is the first tier pesticide screening tool, whereas NAPRA is considered to be the second and third tier of NRCS's three-tiered method for assessing water quality in relation to pesticide risks. Focusing on formulations rather than solely the pesticide acknowledges that the surfactant or carrier applied with the pesticide may be of equal or even greater toxic concern than the pesticide itself (Dr. Ted Buerger, Fish and Wildlife Service, Environmental Contaminants Specialist, pers. comm.).

2. Presidential Executive Order 13186 (Clinton 2001), signed on January 10, 2001, directed Federal agencies to minimize their negative impacts on migratory birds and to carry out reasonable actions to implement the Migratory Bird Treat Act (MBTA:16 U.S.C. 703-711). This Executive Order followed a 2000 court ruling stipulating that Federal agencies are subject to the MBTA prohibitions regarding "take" of migratory birds. On a national level, the Service, NRCS, and Farm Service Agency (FSA) are drafting a Memorandum of Understanding (MOU), which is one of 20 such MOUs being drafted with Federal agencies. In the interim, NRCS and the Service will make a good faith effort to promote measures that conserve migratory birds, and especially migratory birds of Conservation Concern (Fish and Wildlife Service 2002g), as identified at the website http://migratorybirds.fws.gov/reports/speccon/tblconts.html. A summary of these migratory birds for the Wasco, Sherman, and Gilliam Tri-County area, along with candidate species and other Species of Concern (refer to attached Appendix B of this Opinion) present outstanding conservation opportunities. Please note that Federal candidate species are plants and animals for which the Service has on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposal to list, but issuance of a proposed rule is currently precluded by higher priority listing actions.

The Service strongly encourages NRCS to incorporate conservation and/or restoration actions for these species or species groups into the RMS planning process as much as possible. These are the species that have shown declines in distribution, populations, or loss of habitat. By halting these species' declines with positive conservation actions, they may be kept off the list of threatened and endangered species. When the MOU is final, the Service and NRCS will incorporate any relevant sections into the reinitiation of this BO, as appropriate.

3. Because the Tri-County area has several native habitat types (and their associated native animal and invertebrate components) that are becoming rarer, established native vegetation of these rarer habitat types should not be removed and replanted with non-natives, if at all possible. In addition, native vegetation should be used whenever possible for plantings and restoration, as requested under Executive Order 13112 (Clinton 1999). A good faith attempt should be made to locate or develop appropriate native stock or seed sources

8. RE-INITIATION OF SECTION 7 CONSULTATION

This concludes formal consultation and conferencing with NRCS, in cooperation with local Soil and Water Conservation Districts, on the RMS planning process for Dry Cropland, and Range and Pastureland conservation plans for farms and ranches in Wasco, Sherman, and Gilliam Counties. As required by 50 CFR Part 402.16, reinitiation of formal consultation is required 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 that was 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 that are causing such take must be stopped, and formal consultation must be reinitiated. If consultation is reinitiated, the Service, along with NOAA Fisheries and NRCS, would review the need for possible modifications to the reasonable and prudent measures, and the terms and conditions.

If bull trout proposed critical habitat is designated, you may ask the Service to adopt the conference opinion incorporated in this consultation as the biological opinion issued through formal consultation. The request must be in writing. If the Service reviews the proposed action and finds that there have been no significant changes in the proposed action nor in the information used during the conference, the Service will adopt the conference opinion and no further section 7 consultation regarding bull trout critical habitat for the Dry Cropland and Range and Pastureland RMS planning process for Wasco, Sherman, and Gilliam Counties will be necessary.

Thank you for your concern for listed and rare species, and for your cooperation in the development of this biological opinion. If you have any comments or require additional information, please contact Dr. Marie Morin, Stephen Zylstra, or Doug Young at (503) 231-6179, Oregon Fish and Wildlife Office, Portland, Oregon for the duration of the BO.

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APPENDIX A. BALD EAGLE STATUS IN WASCO, SHERMAN, AND GILLIAM COUNTIES.

Recovery goals for delisting the Bald Eagle in the Pacific Recovery Region (WA, OR, CA, ID, MT, WY, and NV: Fish and Wildlife Service 1986) are: 1) Minimum of 800 nesting pairs in the Recovery Region, 2) Average reproductive rate of 1.0 fledged young per pair, 3) Attain breeding population goals in at least 80% of the 47 management zones (or 38 zones), and 4) Maintain stable or increasing wintering populations. The Recovery Goal for Oregon was 233 nesting pairs: in 20023 there were 416 nesting pairs in Oregon. The 2003 productivity for all occupied nest sites in Oregon was 1.06 young/site, resulting in a 5-year average production of 1.03 young/occupied site (Isaacs and Anthony 2003). 2002 was the first year since 1980 that the 5-year average productivity was greater than the Recovery Goal of 1.0. Of the 1,106 known Oregon nest trees in 2002 (there may be more than one nest tree per territory), 35% occur on private land, and 46% on BLM or Forest Service lands (Isaacs and Anthony 2002). In 2003, there were 456 nest sites with 1,303 nest trees. Recent satellite tracking of immature bald eagles has shown that habitat in Oregon is important to immature bald eagles from Arizona (Isaacs and Anthony 2003).

Gilliam, Sherman, and Wasco Counties are part of Pacific Recovery Regions Zone 10 (Columbia River) and Zone 11 (High Cascades). As of 2002, both Zone 10 and Zone 11 have more than met their recovery targets for number of territories. Zone 10 recovery target was 31 for WA and OR, and Zone 10 in OR alone had 49 nests in 2002. Zone 11 recovery target for territories was 33, and in 2002 there were 60 pairs in Zone 11 in OR. There are no reported nest sites in Sherman and Gilliam Counties, and there are 7 known nest sites in Wasco county (Isaacs and Anthony 2003). Three of the 7 known nests in Wasco fledged at least one young in 2003. Known nest sites in the action area represent about 1.6 % of the Bald Eagle nesting in Oregon (Isaacs and Anthony 2003).

Winter roosting occurs in Gilliam, Sherman, and Wasco. Food supply helps determine winter roost distribution. In eastern Oregon, Bald Eagles tend to roost in windbreak trees, away from human disturbance (Frank Isaacs, pers. comm.). In 2002, 805 Bald Eagles were counted in all of Oregon during the Mid-winter Bald Eagle roosting surveys (see below), and at least 2.7 % of the total were in Gilliam, Sherman, and Wasco.

Mid-winter Bald Eagle winter roosting surveys are coordinated annually along standardized survey routes during the first two weeks of January (Frank Isaacs, pers. comm., and archived by Karen Steenhof, http://srfs.wr.usgs.gov/midwinte.htm). There are five routes that partially or totally traverse parts of Wasco, Sherman, and Gilliam:

Mid-winter Bald Eagle Surveys (1998 through 2003) : # of Bald Eagles counted						
Route	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**
10-03	4	3	4	5	7	9
10-4A	0	0	0	0	0	1
10-4B*	(15)	(5)	(6)	(1)	(5)	(2)
11-01	1	3	5	10	4	unknown
11-08	unknown	10	14	16	11	10
Minimum Totals**	5	16	23	31	22	20

* Only about 10 miles of this route is in Gilliam County.

** Excluding route 10-4B, since unclear how many eagles were in proposed action area.

1). Route 10-03 (called Mid-Columbia River route), Sherman and Wasco Counties. Typical counter is Keith Cole of Oregon Dept. of Fish and Wildlife (541-296-4628). Route runs along the Columbia River, and is about 70 miles long. Average Bald Eagle winter roost counts for all of Zone 10 averaged 109.4 eagles for the years1998-2002, and route 10-03 (over that time period) averaged 4.2% of that amount.

2) Route 10-04A (called Arlington to John Day) in Gilliam county. Typical counter is Greg Rimbaugh of Oregon Dept. of Fish and Wildlife (541-564-6130). Route runs along the Columbia River and is about 22 miles long.

3) Route 10-04B (called Boardman to Arlington). Typical counter is Keith Cole or Greg Rimbaugh of Oregon Dept. of Fish and Wildlife. Route runs along the Columbia River. Only about 10 miles of the 58 mile route is in Gilliam County.

4) Route 11-01 (called Wamic). Typical counter is Keith Cole of Oregon Dept. of Fish and Wildlife. Route runs along through the heart of Wasco county, and includes Tygh Valley, Juniper Flat, and White River. Route is about 104 miles long. See Route 11-08 below.

5) Route 11-08 (called Deschutes River route), Wasco and Sherman Counties. Typical counter is Bruce Hust (541-395-2249). Route runs along the railroad track along the Deschutes River from South Junction (Jefferson county line) to Columbia River, on the border of Wasco and Sherman Counties. Route is about 86 miles long. Average Bald Eagle winter roost countes for all of Zone 11 averaged 89.0 eagles for the 5 years of 1998-2002, and Routes 11-01 and 11-08 taken together averaged 19% of that amount over the past 5 years.

APPENDIX B. SPECIES (OTHER THAN THREATENED OR ENDANGERED) THAT PRESENT CONSERVATION OPPORTUNITIES IN WASCO, SHERMAN, AND GILLIAM.

1). Migratory Birds of Conservation Concern (as prioritized under Executive Order 13186). ("Cand." are federal Candidate species and "SOC" are federal Species of Concern.)

For Bird Conservation Region 9 and 10 -(BCR 9 and 10: see Fish and Wildlife Service 2002g):

Common name	Scientific name
Avocet, American	*Recurvirostra americana*
Blackbird, Tricolored (SOC)	*Agelaius tricolor*
Cuckoo, Yellow-billed (Cand.)	*Coccyzus minor*
Curlew, Long-billed	*Numenius americanus*
Eagle, Golden	*Aquila chrysaetos*
Falcon, Peregrine	*Falco peregrinus*
Falcon, Prairie	*Falco mexicanus*
Godwit, Marbled	*Limosa fedoa*
Golden-Plover, American	*Pluvialis dominica*
Hawk, Ferruginous (SOC)	*Buteo regalis*
Hawk, Swainson's	*Buteo swainsoni*
Longspur, McCown's	*Calcarius mccownii*
Nuthatch, Pygmy	*Sitta pygmaea*
Owl, Burrowing (SOC)	*Athene cunicularia*
Owl, Flammulated	*Otus flammeolus*
Phalarope, Wilson's	*Phalaropus tricolor*
Plover, Mountain	*Charadrius montanus*
Plover, Snowy	*Charadrius alexandrinus*
Rail, Yellow	*Coturnicops noveboracensis*
Sage-grouse, Greater	*Centrocerus urophasianus*
Sanderling	*Calidris alba*
Sandpiper, Solitary	*Tringa solitaria*
Sandpiper, Upland	*Bartramia longicauda*
Sapsucker, Red-naped	*Sphyrapicus nuchalis*
Sapsucker, Williamson's	*Sphyrapicus thyroideus*
Shrike, Loggerhead	*Lanius ludovicianus*
Sparrow, Brewer's	*Spizella breweri*
Sparrow, Sage	*Amphispiza belli*
Swift, Black	*Crypseloides niger*
Vireo, Gray	*Vireo vicinior*
Warbler, Virginia's	*Vermivora virginiae*
Whimbrel	*Numenius phaeopus*
Woodpecker, Lewis's (SOC)	*Melanerpes lewis*
Woodpecker, White-headed (SOC)	*Picoides albolarvatus*

2). Federal Candidate or Species of Concern Species for Gilliam (G), Sherman (S), and Wasco (W) Counties.

Candidate species (county/ies)	**Scientific name**
Cuckoo, Yellow-billed (G, S,W)	*Coccyzus americanus*
Frog, Oregon spotted (W)	*Rana pretiosa*
Ground squirrel, Washington (G)	*Spermophilus washingtoni*
Wormwood, Northern (G, S,W)	*Artemisia cammpestris ssp. wormskioldii*

Species of Concern (county/ies)	**Scientific name**
Mammals	
Pygmy rabbit (W)	*Brachylagus idahoensis*
Pacific fisher (W)	*Martes pennanti pacifica*
Pale western big-eared bat (G,S,W)	*Corynorhinus (=Plecotus) townsendii pallescens*
Pacific big-eared bat (G,S,W)	*Corynorhinus (=Plecotus) townsendii townsendii*
Silver-haired bat (G,S,W)	*Lasionycteris noctivagans*
Small-footed myotis (G,S,W)	*Myotis ciliolabrum*
Long-eared myotis (G,S,W)	*Myotis evotis*
Fringed myotis (G)	*Myotis thysanodes*
Long-legged myotis (G,S,W)	*Myotis volans*
Yuma myotis (G,S,W)	*Myotis yumanensis*
California bighorn sheep (G,S,W)	*Ovis canadensis californiana*
Birds	
Northern goshawk (W)	*Accipiter gentilis*
Tricolored blackbird (G,S,W)	*Agelaius tricolor*
Western burrowing owl (G,S,W)	*Athene cunicularia hypugea*
Ferruginous hawk (G, W)	*Buteo regalis*
Band-tailed pigeon (W)	*Columba fasciata*
Olive-sided flycatcher (W)	*Contopus cooperi (=borealis)*
Willow flycatcher (G,S,W)	*Empidonax traillii adastus*
Harlequin duck (W)	*Histrionicus histrionicus*
Yellow-breasted chat (G,S,W)	*Icteria virens*
Lewis' woodpecker (G,S,W)	*Melanerpes lewis*
White-headed woodpecker (W)	*Picoides albolarvatus*
Mountain Quail (G,S,W)	*Oreortyx pictus*
Purple Martin (W)	*Progne subis*
Black Tern (S,G)	*Chlidonias niger*
Amphibians and Reptiles	
Tailed frog (W)	*Ascaphus truei*

Oregon slender salamander (W)	*Batrachoseps wrighti*
Northwest pond turtle (W)	*Clemmys marmorata marmorata*
Northern red-legged frog (W)	*Rana aurora aurora*
Cascades frog (W)	*Rana cascadae*
Northern sagebrush lizard (G,S,W)	*Sceloporus graciosus graciosus*

Fish

Coastal cutthroat trout (W)	*Oncorhynchus clarki clarki*
Pacific lamprey (G,S,W)	*Lampetra tridentata*
Interior redband trout (G,S,W)	*Oncorhynchus mykiss gibbsi*

Invertebrates

Beller's ground beetle (W)	*Agonum belleri*
Great Columbia River spire snail (W)	*Fluminicola columbianus*
California floater (mussel) (G,S,W)	*Anodonta californiensis*
Minor Pacific sideband (snail) (G,S,W)	*Monadenia fidelis minor*

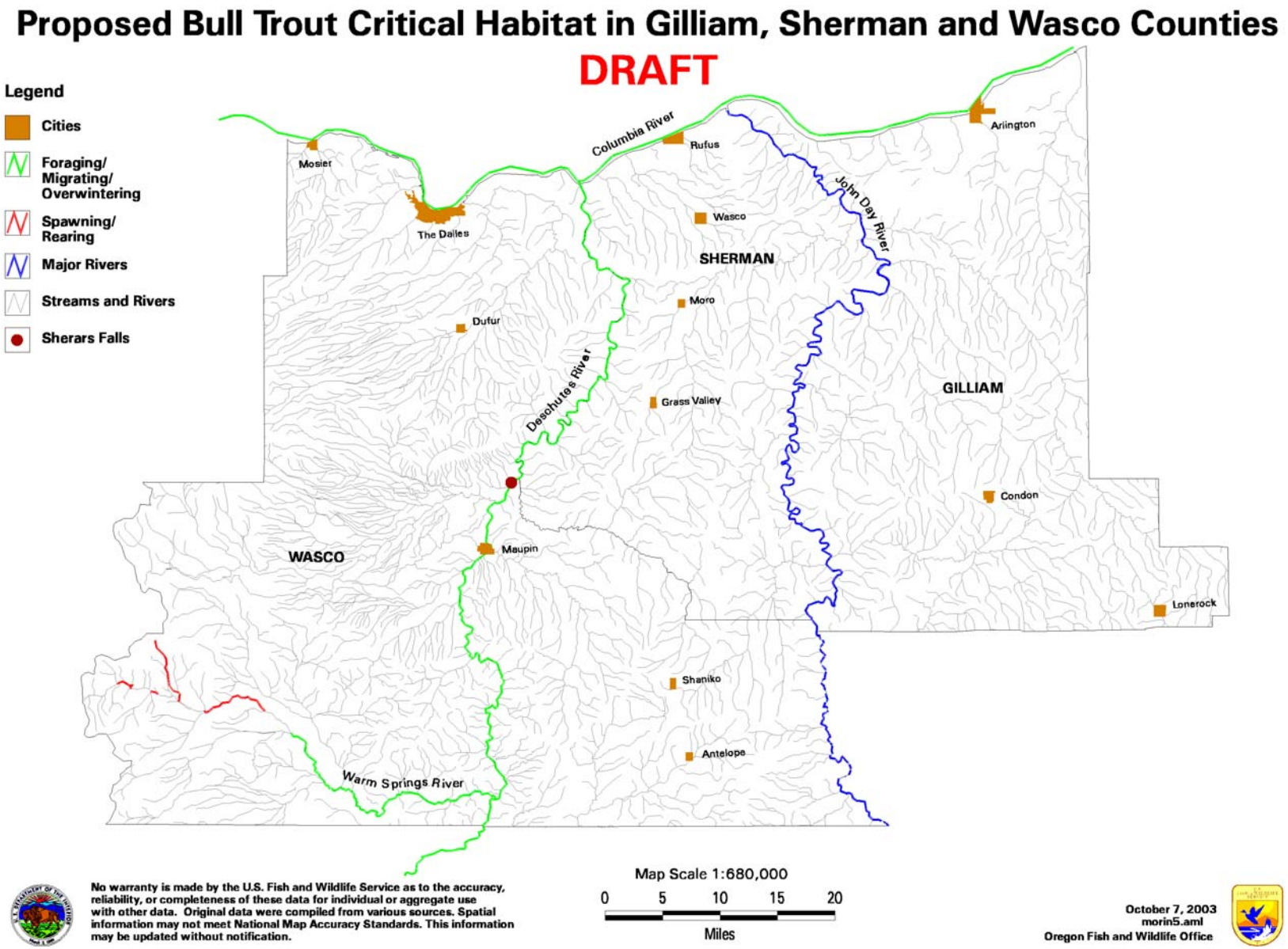
Plants

White meconella (W)	*Meconella oregana*
Barrett's penstemon (W)	*Penstemon barrettiae*
Obscure buttercup (W)	*Ranunculus reconditis*
Pale blue-eyed grass (W)	*Sisyrinchium sarmentosum*
Laurence's milk-vetch (G,S)	*Astragalus collinus* var. *laurentii*
Disappearing monkeyflower (G,S,W)	*Mimulus evanescens*
Little mousetail (G,S,W)	*Myosurus minimus* ssp. *apus* (=var. *sessiliflorus*)

Appendix C. Sample Project Pre-notification Form

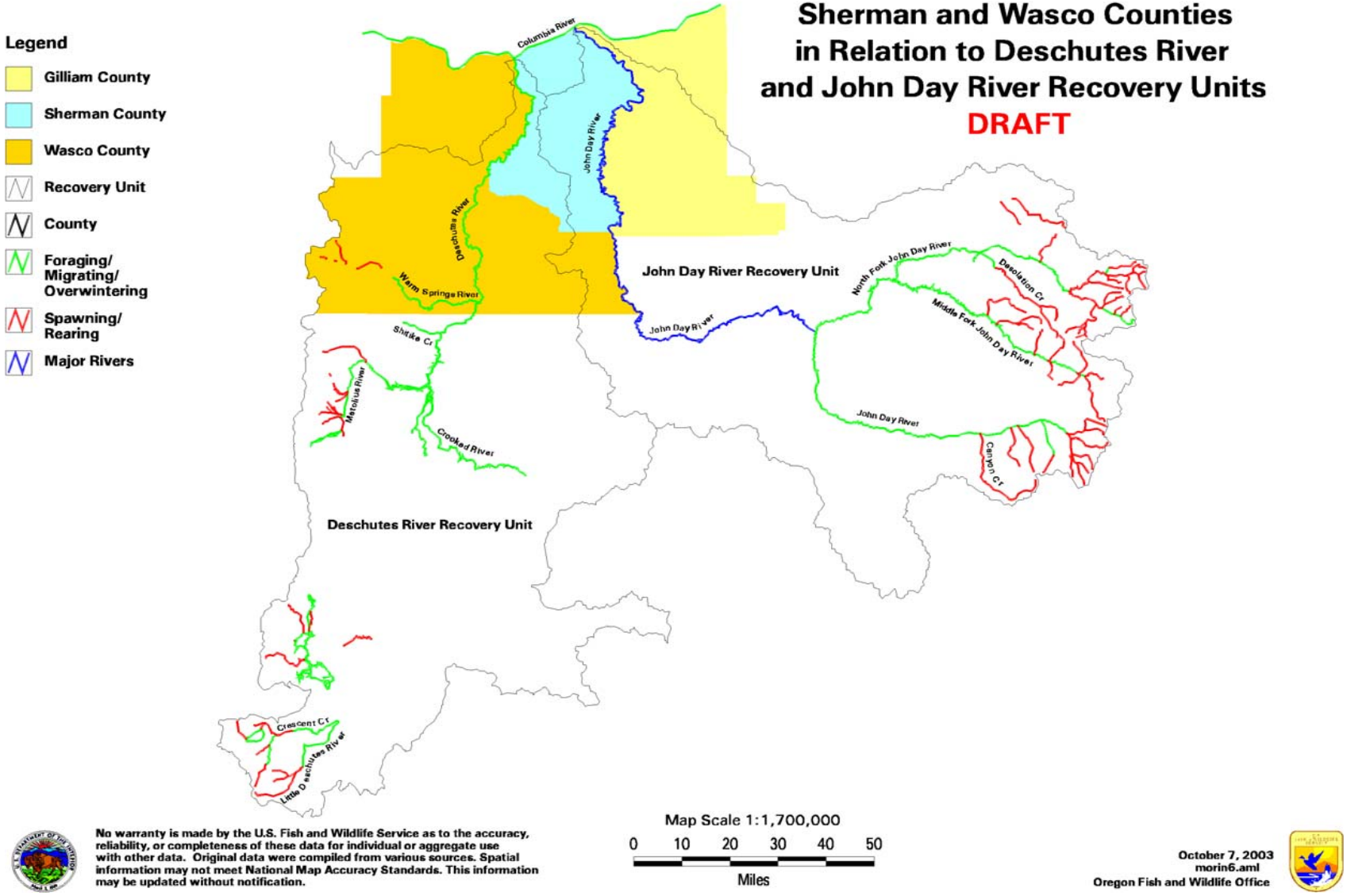
(see attached NRCS template)

FIGURES 1 AND 2. MAPS OF BULL TROUT PROPOSED CRITICAL HABITAT (FISH AND WILDLIFE SERVICE 2002C).



Proposed Bull Trout Critial Habitat in Gilliam Sherman and Wasco Counties in Relation to Deschutes River and John Day River Recovery Units

DRAFT



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October 7, 2003
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