United States Department of the Interior

BUREAU OF RECLAMATION
Pacific Northwest Region
Lower Columbia Area Office
825 NE Multnomah Street, Suite 1110
Portland, Oregon 97232-2135

IN REPLY REFER TO:

LCA-1000
ENV-7.00

MAR -8 2004

MEMORANDUM

To: State Supervisor, U.S. Fish and Wildlife Service, Oregon State Office, 2600 S.E. 98th Avenue, Suite 100, Portland, OR 97266
Attn: Kemper M. McMaster

From: Ronald J. Eggers
Area Manager

Subject: Endangered Species Act, Section 7 – Bureau of Reclamation Projects in the Deschutes River Basin, OR Section (USFWS Reference #1-7-02-SP-740)

Supplemental Information to the *Biological Assessment on Ongoing Operation and Maintenance of the Deschutes River Basin Projects and Effects on Essential Fish Habitat under the Magnuson-Stevens Act* -- Deschutes, Crook, Jefferson, and Wasco Counties, Oregon

Reclamation submitted a biological assessment (BA), which you received on October 1, 2003, describing the effects of ongoing operations and maintenance activities at Reclamation's three projects in the Deschutes River basin (Deschutes, Crooked River, and Wapinitia Projects). The BA evaluated and described the proposed action's effects on Canada lynx, northern spotted owl, bald eagle, bull trout and Middle Columbia River steelhead.

Reclamation met on October 17, 2003 with your staff and NOAA Fisheries to brief them on the analyses described in the BA. At this meeting, and later in a November 18, 2003 memorandum, your staff identified consultation issues related to organization of and information in the BA. In response to these comments, we are providing additional written information to clarify and supplement the bald eagle and bull trout discussions in the BA.

The enclosed attachments further explain the basis for our conclusion that the proposed action "may affect, but is not likely to adversely affect" bald eagle and bull trout. We invite your review and will work with your staff to address any remaining issues.

Please contact Ms. Karen Blakney, Endangered Species Act Program Manager, at 503-872-2839 if you have any questions.

Attachments – 2

cc: Ms. Nancy Gilbert
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(all w/copy of attachments)

Mr. Scott Hoefer
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bc: W-6331 (McKeral)
PN-1150 (Viscusi, PN Field Solicitor)
(w/o attachments)
PN-6308 (Berggren), PN-6305 (Barnes), PN-6510 (Rieber)
LCA-6500 (Blakney), LCA-6501 (Pastor), LCA-6502 (Sommer), LCA-1003 (Brown)
BFO-3000 (Busch)
(all w/copy of attachments)

WBR:KBlakney:rvaughn:3/01/04:503-872-2839
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Additional Information and Analyses to Supplement the *Biological Assessment on Continued Operation and Maintenance of the Deschutes River Basin Projects and Effects on Essential Fish Habitat under the Magnuson-Stevens Act*

Bull Trout

U.S. Bureau of Reclamation
Lower Columbia Area Office – Portland, Oregon
Pacific Northwest Region – Boise, Idaho

February 2004

INTRODUCTION

Reclamation submitted a biological assessment on Deschutes River Basin Projects operations and maintenance activities (Deschutes BA) to the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service on October 1, 2003. Reclamation briefed the Services at an October 17, 2003 meeting on the Deschutes BA. At this meeting and later by a November 18, 2003 letter, USFWS requested that Reclamation provide further information about the proposed action's effects to habitat elements to clearly show why Reclamation concluded there is no adverse effect to bull trout in the middle Deschutes, lower Deschutes, and lower Crooked River reaches. The USFWS suggested the bull trout habitat requirements described on page 4-13 of the BA and potential flow and temperature effects be examined to determine if any adverse effects would occur from project operation and maintenance activities.

The information provided here supplements or clarifies information contained in the Deschutes BA. The discussion focuses on bull trout habitat requirements for the middle Deschutes, lower Crooked, and lower Deschutes river reaches. Habitat requirements for bull trout are those habitat components that are essential for the primary biological needs of foraging, reproducing, rearing of young, dispersal, genetic exchange, or sheltering. Certain habitat elements may not apply to some reaches addressed in the Deschutes BA.

MIDDLE DESCHUTES RIVER - Big Falls to Lake Billy Chinook

The middle Deschutes River upstream of Lake Billy Chinook to Big Falls flows through a 150-foot-deep, steep-walled basalt canyon that increases in depth as it proceeds northward. Riparian vegetation is very diverse. This 11-mile reach is a State Scenic Waterway and is included as a "scenic" component of the National Wild and Scenic River System.

The increased and stable flows from spring discharge combined with the steep basalt canyon have created a stream habitat and riparian zone that is extremely stable and diverse (U.S. Department of Agriculture and U.S. Department of Interior 1992). The middle Deschutes River reach supports bull trout below Big Falls. Big Falls is a natural barrier to bull trout.

Bull trout observed in this reach are a foraging migratory population of adfluvial fish. While no intensive studies have been conducted, these fish appear to originate from the Metolius River and its tributaries, as these are the only sites for which there is evidence of bull trout reproduction above Round Butte Dam. There are no records of bull trout abundance in the middle Deschutes River reach.

Habitat Requirement #1- Permanent water having low levels of contaminants such that normal reproduction, growth, and survival are not inhibited.

As described in the Deschutes BA, at certain times of the year State of Oregon water quality standards are not met for the middle Deschutes River from Bend to about 30 river miles (Big Falls) downstream, but are achieved in the reach downstream from Big Falls where bull trout are present (page 5-29, Section 5.3.2.2, last paragraph). High volumes of spring water positively influence river flows and water chemistry in this reach (Deschutes BA, Appendix B, page 8). Pesticides have not been identified as a concern in the middle Deschutes River by the State through its water quality assessment program.

The direct and indirect effects attributed to the proposed, interrelated and interdependent, and other actions positively influence the volume of groundwater recharge and contribute to the cooler surface water temperatures. Primary sources of groundwater flow are Deschutes River losses in the upper reaches, canal seepages, and deep percolation of water applied to irrigation lands (Caldwell 1998). Gannett et al. (2001) has noted that "[G]eological evidence and hydrologic budget calculations indicate virtually all ground water not consumptively used in the upper Deschutes Basin discharges to the stream system upstream of the vicinity of Pelton Dam. . . . Ground water and surface water are, therefore, directly linked, and removal of ground water will ultimately diminish streamflow." Therefore, although higher summer surface water flows might occur in this reach without Reclamation's proposed action (as described in the "without Reclamation" scenario, table 6-2, page 6-7), groundwater recharge below Big Falls would be expected to decrease. This in turn is expected to result in increased surface water temperatures, because river temperatures closely follow air temperatures (see Mohseni et al. 1998) and the decreased groundwater recharge would minimize the cooling effect currently attributed to recharge.

Because the Metolius River basin bull trout population continues to increase under current conditions and bull trout in this reach originate from the Metolius population, it is expected that growth and survival of bull trout is likely normal and not adversely affected from Reclamation's proposed action.

Habitat Requirement #2 – Water temperatures ranging from 2 to 15C (36 to 59F) 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.

The Deschutes River from Big Falls to Lake Billy Chinook meets Oregon water temperature standards. This reach provides important foraging and overwintering habitat for the bull trout adfluvial population from the Metolius River. Water temperatures near Culver rarely exceed 15C except during the peak summer months, a time when most adult bull trout have left Lake Billy Chinook and migrated into the Metolius River basin. During periods when water temperatures exceed 15C, bull trout may be using localized thermal refugia that were not representative of temperatures in the well-mixed portion of the stream. While data exist on temperature requirements for juvenile bull trout, there is little information on thermal habitat associations and foraging adult bull trout, such as those found in the Middle Deschutes River.

Groundwater inflow influences the water temperature immediately upstream from Lake Billy Chinook, providing a cooling effect. Without the proposed action, higher Deschutes River flows would occur during the summer months between Bend and Culver; however, the resulting temperatures after mixing with groundwater returns would likely be warmer due to the reduced, cooler groundwater discharges. Thus the current volumes of surface water that mix with the cooler groundwater are determined to result in cooler water temperatures in the Big Falls to Lake Billy Chinook reach.

Habitat Requirement # 3 – Complex stream channels with features such as woody debris, side channels, pools, and undercut banks to provide a variety of depths, velocities, and instream structures.

The middle Deschutes River reach, as described previously, is located in a deep basalt canyon that supports a healthy riparian zone, deep pools, steep gradient, and provides complex stream channels (large rock), variable depths, and numerous instream structure. Adult bull trout requirements are met for this habitat element. This reach is a refugia for bull trout due to its uniquely stable flows coupled with the deep basalt canyon, a healthy riparian zone, and deep pools.

Any flow changes attributed to the proposed action are expected to result in little to no change to the physical habitat indicators associated with habitat requirement #3 because of the incised nature of the Deschutes River channel and its associated steep bank slopes. Because of current channel stability, the proposed action is not expected to negatively affect pool habitat.

Habitat Requirement #4 – Substrates of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount of fine substrate less than 0.63 cm (0.25 in) in diameter and minimal substrate embeddedness are characteristic of these conditions.

There is no spawning, young-of-the-year, and juvenile rearing habitat in the middle Deschutes River reach.

Habitat Requirement #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.

Despite water development upstream, year-round flows in this reach exceed the 250 cubic feet per second (cfs) instream flow requirements recommended by the Oregon Department of Fish and Wildlife (ODFW). Historically, flows at Culver have ranged from a minimum of 500 cfs to a maximum of 5,000 cfs for the 1950 to 1990 period (Deschutes BA, figure 3-14, page 3-13). These flows are influenced largely by groundwater discharge, which ensures consistent flows year round during wet and dry years and provides sufficient water to support foraging bull trout.

Habitat Requirement #6 – Springs, seeps, groundwater sources, and subsurface water connectivity to contribute to water quality and quantity.

The *Middle Deschutes/Lower Crooked River Management Plan* states "The increase of water from springs and stability of flows along with the steep basalt canyons in both river corridors has created a stream habitat and riparian zone that is extremely stable and diverse year round" (U.S. Department of Agriculture and U.S. Department of Interior 1992). Discussion of habitat requirements #1, #2, and #5 describe the water quantity and quality conditions in this reach.

Habitat Requirement #7 – Migratory corridors with minimal physical, biological, or chemical barriers between spawning, rearing, overwintering, and foraging habitats, including intermittent or seasonal barriers induced by high water temperatures or low flows.

The proposed action has little to no effect on this habitat element as evidenced by the adequate conditions in the Deschutes River where adult bull trout are present. Foraging bull trout from the Metolius River basin are able to move year-round to and from Lake Billy Chinook into the middle Deschutes River without any limitations from high water temperature or low flows. However, during migration periods (May to October), adult bull trout are more likely to be present in the Metolius River basin as opposed to the middle Deschutes River reach.

Habitat Requirement #8 – An abundant food base including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.

The U.S. Department of Agriculture and U.S. Department of Interior (1992) identify the resident fish diversity supported in this reach as "an outstandingly remarkable value." The year-round groundwater discharge supports a productive macroinvertebrate community. In the past 15 years the local bull trout population has increased in abundance, largely attributed to reduced harvest levels and an abundant food supply in Lake Billy Chinook and the lower reaches of the lower Crooked and middle Deschutes Rivers as they enter Lake Billy Chinook.

Summary

Overall, the effect of Reclamation's proposed action to bull trout in the middle Deschutes River reach appears to be negligible. Although modeled streamflows may be reduced from about 10 to 45 percent near Culver from November to April (maximum reduction of 635 cfs based on modeled 50 percent exceedance in November), a time when foraging bull trout are likely present, the ODFW's recommended year-round instream flow requirement at Culver (250 cfs) is still met (Deschutes BA, table 6-4, page 6-27). Modeled streamflows at the 50 percent exceedance range from 574 to 1555 cfs during this period (Deschutes BA, table 6-2, page 6-7). The modeled streamflows indicate that flows are more than triple the recommended instream flow throughout the entire year, providing suitable conditions for foraging adult bull trout. Proposed and interrelated and interdependent actions have a positive effect on groundwater discharges as described earlier. This groundwater discharge increases river flows and improves water quality in the reach below Big Falls.

Local bull trout population abundance has increased and most water quality standards are met during periods of bull trout use. These conditions exist with the several decades of water development activity by Reclamation and others upstream of this reach. Those effects attributed to Reclamation's proposed action, described here and in the BA, when added to the current condition may affect, but are not likely to adversely affect bull trout.

LOWER CROOKED RIVER – Downstream from the Pelton-Round Butte Project

The lower Crooked River is approximately 9.8 miles in length and is designated as a "recreation" component of the National Wild and Scenic River System. The river flows through a rugged, highly scenic, steep-walled basalt canyon that increases in depth as it proceeds northwest. There are numerous natural and geologic features such as springs, waterfalls, and rapids along the river. Excellent fishing opportunities exist for rainbow trout upriver from Opal Springs, and for brown trout, bull trout, and kokanee downriver from Opal Springs. Riparian vegetation includes willow, alder, juniper, sedges, wild rose, dogwood, and many other species.

Upstream diversions for private and agricultural uses reduce river flows in the lower Crooked River reach above Terrebonne. However, several springs in the lower part of the reach positively influence water flow, water temperature, and water quality. Gannet et al. (2001) documented gains of about 1,100 cfs in the reach from Terrebonne to the Opal Springs gauge, with most discharge entering the river in the lower 7 miles of the reach. This is considered a conservative estimate as seepage runs to derive the estimate occurred after a series of relatively dry years. Increased groundwater discharges since the 1900s can be attributed to irrigation canal leakage and irrigation practices.

The lower 2 miles of the Crooked River supports foraging adult bull trout up to the Opal Springs Dam, an impassible barrier since 1982. Like the middle Deschutes River reach, groundwater contributions in the Opal Springs area improve water temperatures and provide refugia for bull trout during extreme summer and winter temperatures in both Lake Billy Chinook and the lower Crooked River. No records of bull trout abundance are available for the lower Crooked River reach.

Habitat Requirement #1- Permanent water having low levels of contaminants such that normal reproduction, growth, and survival are not inhibited.

Bull trout are present in the lower Crooked River between Opal Springs Dam and Lake Billy Chinook. High volumes of cold, clean spring water discharge into the river. Oregon water quality standards are for the most part met when bull trout are present. Pesticides have not been identified as a concern in the lower Crooked River by the State through its water quality assessment program. Groundwater discharges in this reach are attributed to canal leakage and irrigation application (Gannet et al. 2001). Although higher surface water flows might occur without Reclamation's proposed action, because the hydrologic interactions between surface water and groundwater are similar to those described for the middle Deschutes River reach, groundwater discharges would decrease and water quality standards might not be met. Growth and survival of bull trout in this reach are not inhibited by Reclamation's proposed action.

Habitat Requirement #2 – Water temperatures ranging from 2 to 15C (36 to 59F) 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.

Water temperatures exceed 15C during the months of July and August when bull trout are not present in the reach. At other times during bull trout use, water temperatures are suitable. Water temperatures are likely suitable at depth in Lake Billy Chinook in summer months.

This reach provides important foraging and overwintering habitat for the adfluvial bull trout population from the Metolius River. While data exist on temperature requirements for juvenile bull trout, there is little information on thermal habitat associations and foraging adult bull trout, such as those found in the lower Crooked River.

Water temperatures immediately upstream from Lake Billy Chinook are controlled by groundwater inflows. Groundwater inflows are influenced by irrigation in the basin. As described for the middle Deschutes River reach, higher summer flows might occur between Opal Springs Dam and Lake Billy Chinook without Reclamation's proposed action. However, because of the interactions between the surface and groundwater in this reach, water temperatures may in fact be warmer without Reclamation's proposed action.

Habitat Requirement # 3 – Complex stream channels with features such as woody debris, side channels, pools, and undercut banks to provide a variety of depths, velocities, and instream structures.

As described previously, the lower Crooked River reach is located in a deep basalt canyon that supports a healthy riparian zone, deep pools, steep gradient, and provides complex stream channels (large rock), variable depths, and numerous instream structure. The stable flows provide a refugia for bull trout. Habitat indicators for adult bull trout are achieved year-round as a result of groundwater discharge and existing physical characteristics.

Any flow changes attributed to the proposed action are expected to result in little change to the habitat indicators associated with habitat requirement #3 because of the nature of the Crooked River channel and its associated steep bank slopes. Because of existing channel stability and groundwater discharge, the proposed action is not expected to negatively affect pool habitat.

Habitat Requirement #4 – Substrates of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount of fine substrate less than 0.63 cm (0.25 in) in diameter and minimal substrate embeddedness are characteristic of these conditions.

Habitat requirement #4 is not applicable to the lower Crooked River since spawning, young-of-the-year, and juvenile rearing habitat do not occur in this reach.

Habitat Requirement #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.

The lower Crooked River below Opal Springs has year-round flows that exceed the ODFW instream flow recommendations that range from 75 to 255 cfs. Historically, flows near Opal Springs have ranged from a minimum of 1,090 cfs to a maximum of 6,130 cfs for the period 1961 to 1998 (table 1). Groundwater discharge results in consistent surface-water flows during wet and dry years and provides sufficient water to support foraging bull trout.

Table 1. Minimum, Maximum, and Average Flow in Crooked River below Opal Springs, 1961 to 1998. (in cfs)

	Jan	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec
Maximum	5520	5110	5410	4970	5590	5070	1880	2060	1690	1800	3200	6130
Average	1611	1795	1970	2113	1684	1331	1270	1299	1361	1426	1374	1506
Minimum	1150	1170	1160	1140	1090	1119	1100	1100	1100	1140	1160	1120

Habitat Requirement #6 – Springs, seeps, groundwater sources, and subsurface water connectivity to contribute to water quality and quantity.

As described earlier, groundwater recharge in this reach results in beneficial effects to water flows and water quality year round. Gannet et al. (2001) describes the interactions between surface water and groundwater and influences to groundwater recharge in this reach. The proposed action is not likely to affect this interaction.

Habitat Requirement #7 – Migratory corridors with minimal physical, biological, or chemical barriers between spawning, rearing, overwintering, and foraging habitats, including intermittent or seasonal barriers induced by high water temperatures or low flows.

Adequate conditions for adult bull trout exist in the lower Crooked River downstream of Opal Springs Dam; the proposed action has little to no effect on this habitat element. Foraging bull trout from the Metolius River basin are able to move to and from Lake Billy Chinook into the lower Crooked River without any limitations from high water temperature or low flows year round. However, adult bull trout are less likely to be present in this reach during migration periods (May to October) when they are located in the Metolius River basin.

Habitat Requirement #8 – An abundant food base including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.

The BLM (1992) identifies the diversity of resident fish supported in this reach as "an outstandingly remarkable value." The year-round groundwater discharge supports a productive macroinvertebrate community. In the past 15 years the local bull trout population has increased in abundance, largely attributed to reduced harvest levels and an abundant food supply in Lake Billy Chinook and the lower reaches of the lower Crooked and middle Deschutes Rivers as they enter Lake Billy Chinook.

Summary

The overall effect to bull trout in the lower Crooked River below Opal Springs from Reclamation's proposed action is negligible. Although modeled streamflows for the proposed action predict flow reductions in the reach above Opal Springs during December through April, groundwater discharge in the reach below Opal Springs, where bull trout are present, result in improved flows and water quality. The groundwater recharge effects are attributed in part to the proposed action because of the surface water groundwater interactions as described in Gannet et al. (2003). The minimum flow documented in this reach is quadruple the ODFW's recommended instream flows (75 to 255 cfs) (table 1).

Local bull trout population abundance has increased and water quality standards are met during periods of bull trout use. These conditions exist with the several decades of water development activity by Reclamation and others upstream of this reach. Those effects attributed to Reclamation's proposed action, described here and in the BA, when added to the current condition may affect, but are not likely to adversely affect bull trout.

LOWER DESCHUTES RIVER – Downstream from the Pelton-Round Butte Project

The lower Deschutes River downstream from the Pelton-Round Butte Project offers outstanding trout fishing. The 8-mile segment from the town of Maupin downstream to Sherars Falls (the lower distribution of bull trout) is the most developed and highly used section of the lower Deschutes River. The canyon has been greatly altered by intensive livestock grazing. While there have been recent improvements from fencing and better livestock management practices, the riparian zone has not recovered to full potential. In many areas, native vegetation has been replaced by juniper stands.

Both fluvial and resident bull trout populations are believed to exist in the lower Deschutes River reach to Sherars Falls. According to Brun and Dodson (2001), the majority of bull trout in this reach exhibit a fluvial life history pattern. Adults leave the lower Deschutes River from early May through mid-June and spawn near the headwaters of the Warm Springs River and Shitike Creek. After spawning, adults return to the

Deschutes River from late September through November. Juveniles rear for two to three years in these streams before migrating to the Deschutes River during the spring period (April to May). Adults return to their natal streams to spawn beginning at age 4. The Shitike Creek and Warm Springs River bull trout populations are thought to be fluvial, but may contain a resident component as well. No quantifiable information is available on lower Deschutes River bull trout populations.

Operations of and the existence of the Pelton-Round Butte Project are the most significant factors affecting bull trout in the lower Deschutes River reach. The most significant effect is the barrier created by the Project, which prevents upstream and downstream movement of juvenile and adult bull trout and access to habitat in the Deschutes River and its tributaries below the project.

Habitat Requirement #1- Permanent water having low levels of contaminants such that normal reproduction, growth, and survival are not inhibited.

As described in the water quality discussion in the Deschutes BA, Appendix B, Pelton-Round Butte Project operations and the seasonal dynamics of environmental conditions in the Pelton-Round Butte reservoirs in large part drive the water quality conditions in this river reach. However, Oregon State water quality standards related to habitat element #1 are attained in the lower Deschutes River reach downstream of the Pelton-Round Butte Project to the White River confluence. Pesticides have not been identified as a concern in the lower Deschutes River by the State through its water quality assessment program. Reclamation's proposed action does not impact bull trout relative to habitat requirement #1.

Habitat Requirement #2 – Water temperatures ranging from 2 to 15C (36 to 59F) 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.

Lower Deschutes River water temperatures are primarily driven by the existing operation of the Pelton-Round Butte Project. Water temperatures are usually suitable for salmonids and adult and subadult bull trout. As described in the Deschutes BA (Appendix B, page 17), effects on thermal regimes in the lower Deschutes River from Reclamation activities upstream from the Pelton-Round Butte Project are not apparent.

Studies conducted for the Pelton-Round Butte Project Federal Energy Regulatory Commission re-licensing process found that post-dam temperatures were slightly cooler in the lower Deschutes River than they had been before the dam was built, particularly in May. The peak summer temperature occurred about a month later than it did under pre-dam conditions. This effect is mostly due to current Pelton-Round Butte Project water withdrawals from Lake Billy Chinook.

The large volume of high-quality water that is delivered from spring sources into the three main tributaries to Lake Billy Chinook contributes to the maintenance of relatively stable levels of inflow, low water temperatures, high dissolved oxygen levels, and low levels of turbidity. These spring flows are influenced by agricultural diversions in the upper basin. Favorable conditions generally persist as the water flows through the Pelton-Round Butte Project reservoirs and the 100-mile length of the lower Deschutes River downstream.

Habitat Requirement # 3 – Complex stream channels with features such as woody debris, side channels, pools, and undercut banks to provide a variety of depths, velocities, and instream structures.

The current and future condition of these habitat indicators are associated with past, present, and future operations of the Pelton-Round Butte Project and land management activities that have occurred along this river reach.

Habitat Requirement #4 – Substrates of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount of fine substrate less than 0.63 cm (0.25 in) in diameter and minimal substrate embeddedness are characteristic of these conditions.

It is unknown whether bull trout spawning occurs in the lower Deschutes River downstream of the Pelton-Round Butte Project. Gravel suitable for trout spawning appears to be abundant in the 3-mile section between the reregulating dam and Shitike Creek (Zimmerman and Reeves 1999). Regardless, habitat element indicators present, such as substrate, would not be affected by Reclamation's proposed action.

Bull trout are not abundant in this reach, but some subadult and adult bull trout from populations in Shitike Creek and the Warm Springs River enter the Deschutes River to forage. These populations are apparently self-sustaining and fairly abundant (Brun 2003; Brun and Dodson, 2001).

Habitat Requirement #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.

The existing hydrograph below the Pelton-Round Butte Project demonstrates an ability to support bull trout in the lower Deschutes River. The lower Deschutes River has a uniquely stable flow regime for its size, with minimum flows of at least 3,000 cfs year round (Deschutes BA, figure 3-18, page 3-17). Although Reclamation's proposed action is estimated to reduce flows for low water years (at the 90 percent exceedance) for the October through May period by about 130 to 690 cfs, flows are still estimated to range

from about 3,700 to 4,200 cfs (Deschutes BA, table 6-2, page 6-7). The proposed action is estimated to increase flows in this reach for the June through September period.

Due to the relatively incised nature of the lower Deschutes River channel and its associated steep bank slopes, changes in flow associated with Reclamation projects upstream would result in very little change in the deeper riverine habitat that bull trout likely occupy when present in the lower Deschutes River.

Habitat Requirement #6 – Springs, seeps, groundwater sources, and subsurface water connectivity to contribute to water quality and quantity.

Stable flows combined with a confined channel have created conditions in the lower Deschutes River typically found in smaller spring streams. In most places the river banks are vegetated to the waters edge, and in many places, streambanks are overhanging or vertical. The main exception is where livestock grazing has not been controlled.

Habitat Requirement #7 – Migratory corridors with minimal physical, biological, or chemical barriers between spawning, rearing, overwintering, and foraging habitats, including intermittent or seasonal barriers induced by high water temperatures or low flows.

High water temperatures at certain times of the year may create intermittent or seasonal barriers to migratory bull trout in the lower Deschutes River downstream of the Pelton-Round Butte Project. However, these impacts are a result of Pelton-Round Butte Project operations and the natural tendency of the lower Deschutes River to warm the further downstream you go. Based on telemetry studies conducted by the Confederated Tribes of the Warms Springs Reservation, there appears to be no barriers to bull trout moving from the Deschutes River to Shitike Creek and Warm Springs River as a result of flow conditions (Brun and Dodson 2001).

Habitat Requirement #8 – An abundant food base including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.

The population of bull trout present is apparently self-sustaining and fairly abundant (Brun and Dodson, 2001). In 1999, a total of 89 bull trout redds were counted in the Warm Springs River system, and 117 redds were counted in Shitike Creek.

Macroinvertebrate sampling conducted in 1999 and 2000 indicate that the lower Deschutes River possesses a highly productive invertebrate community (Kvam et al. 2002). The productivity of invertebrates year round in the lower Deschutes River helps provide an abundant food source for the resident fish species in the river. This habitat element is not impacted by the proposed action as it is influenced primarily by the operations of the Pelton-Round Butte Project.

Summary

The overall effect to bull trout in the lower Deschutes River below the Pelton-Round Butte Project from Reclamation's proposed action is negligible. Bull trout spawning has only been documented in Shitike Creek and the Warm Springs River. Reclamation's proposed action is predicted to reduce modeled median streamflows near Madras 5 to 13 percent during the October to June period; this equates to a reduction of about 50 to 760 cfs (Deschutes BA, table 6-2, page 6-7). Despite this, flows are predicted to range from 4100 to 5500 cfs at the 50 percent exceedance. The ODFW has applied with the Oregon Water Resources Department for instream flow permits ranging from 3,500 to 4,500 cfs for the purposes of anadromous and resident fish habitat and rearing. These flows are achieved with Reclamation's proposed action.

The thermal effects in the lower Deschutes River reach of the proposed action and other water and land use activities on water temperature upstream from the Pelton-Round Butte Project are buffered by groundwater flow above Lake Billy Chinook and Pelton-Round Butte Project operations. The upstream effects from Reclamation's proposed action, if any, on the thermal regime of the lower Deschutes River reach are not apparent. Based on this information, the proposed action effects on bull trout in the lower Deschutes River reach are insignificant. Those effects attributed to Reclamation's proposed action, described here and in the BA, when added to the current condition may affect, but are not likely to adversely affect bull trout.

PROPOSED BULL TROUT CRTICIAL HABITAT

The FWS's November 18, 2003 letter requested Reclamation to consider conferencing on proposed bull trout critical habitat. As noted in the Deschutes BA at page 5-26, bull trout critical habitat was proposed in the action area on November 2002. A final rule has not been published.

The FWS proposed critical habitat in areas determined to possess primary constituent elements necessary for spawning, rearing, foraging, overwintering, or migration. Reclamation's analysis of habitat elements in the Middle and Lower Deschutes and Lower Crooked Rivers shows negligible affects to any proposed bulltrout critical habitat that may be affected by the proposed action. Reclamation's ongoing operations will have no adverse affect on the habitat constituent elements existing at the time of the proposed critical habitat designation and Reclamation has determined that the proposed action described in the Deschutes BA will not adversely affect bull trout critical habitat. Given this conclusion, Reclamation has determined that it is not necessary to conference on proposed critical habitat.

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