CHAPTER 9.0 ESSENTIAL FISH HABITAT

9.1 INTRODUCTION

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act, requires Federal action agencies to consult with the Secretary of Commerce (i.e., NMFS) regarding any action or proposed action authorized, funded, or undertaken by the agency that may adversely affect EFH identified under the Act. The EFH regulations [50 CFR 600.920(e)(3)] enable Federal agencies to use existing consultation/environmental review procedures to satisfy EFH consultation requirements if they meet the following criteria: 1) the existing process must provide NMFS with timely notification of actions that may adversely affect EFH; 2) notification must include an assessment of impacts of the proposed action as discussed in section 600.920(g); and 3) NMFS must have made a finding pursuant to section 600.920(e)(3) that the existing process satisfies the requirements of section 305(b)(2) of the MSA. Such a finding was made by NMFS on March 28, 2000, as follows:

> *NMFS finds that the existing National Environmental Policy Act (NEPA), Endangered Species Act (ESA), and Fish and Wildlife Coordination Act (FWCA) consulting requirements used by the Bureau of Reclamation (Reclamation) for Federal activities can be used to satisfy the EFH consultation requirements of the MSA provided that NMFS and Reclamation adhere to the following steps: 1) Timely Notification...2) EFH Assessment...3) NMFS Conservation Recommendations... 4) Reclamation's Response... and 5) Dispute Resolution*...(NMFS 2000c).

9.2 DESCRIPTION OF ESSENTIAL FISH HABITAT

> *Essential Fish Habitat means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. – Magnuson-Stevenson Act § 3*

EFH for the Pacific salmon fishery means those waters and substrate necessary to support a long-term sustainable salmon fishery and salmon contributions to a healthy ecosystem. The Pacific salmon EFH includes all those streams, lakes, ponds, wetlands, and other water bodies currently or historically accessible to salmon in Washington, Oregon, Idaho, and California. The geographic extent of freshwater EFH is specifically defined as all waters currently or historically accessible to salmon within the USGS hydrologic units identified by the Pacific Fishery Management Council (PFMC 1999). Salmon EFH excludes areas upstream from longstanding naturally impassible barriers (e.g., Big Falls on middle Deschutes River), but includes aquatic areas above all artificial barriers except the impassible barriers (dams) specifically listed by Pacific Fishery Management Council (1999), e.g., the Hells Canyon complex on the Snake River.

In the Deschutes River basin, Pacific Salmon EFH includes the hydrologic units as listed in Table 9-1 below.

Table 9-1. Deschutes River Basin, Pacific Salmon EFH Hydrologic Units [1]

Unit #	Hydrologic Unit Name	Species	Current or Historic Distribution
#17070301	Upper Deschutes River	Chinook salmon	Inaccessible Historic Habitat
#17070305	Lower Crooked River	Chinook salmon	Inaccessible Historic Habitat
#17070306	Lower Deschutes River (Barrier = Opal Springs Dam)[2]	Chinook salmon Coho salmon[3]	Current Habitat Current Habitat[3]
#17070307	Trout Creek	Chinook salmon Coho salmon[3]	Accessible but Unutilized Historic Habitat Current Habitat[3]

[1]Taken from PFMC (1999)
Reclamation Notes:
[2]Opal (corrected spelling) Springs Dam is actually on the lower Crooked River (USGS Steelhead Falls Quadrangle)
[3]According to CTWSRO (1999) and Pribyl (2000) coho salmon are neither indigenous nor current inhabitants of the Deschutes Basin.

Chinook salmon EFH overlaps in part the action area of the proposed action. Refer to Chapter 2 of this BA.

9.3 Status, Life History, and Habitat Requirements of Deschutes Basin Salmon Stocks

9.3.1 Spring Chinook Salmon

The lower Deschutes River supports both wild and hatchery runs of spring Chinook salmon (*Oncorhynchus tshawytscha*). Spring Chinook salmon of the Middle Columbia River Spring-run ESU are not listed under the ESA. These fish use the lower Deschutes River primarily as a migration corridor, although some spawning does occur and juveniles also use the river as rearing habitat. Wild stocks currently spawn in the Warm Springs River system and Shitike Creek, both tributaries of the lower Deschutes River on CTWSRO tribal lands (Figure 9-1). Hatchery spring Chinook salmon return to the Warm Springs National Fish Hatchery on the Warm Springs River and to the Round Butte Hatchery via the Pelton Fish Trap on the Deschutes River at the Reregulating Dam.

Deschutes River Basin

Spring Chinook Salmon

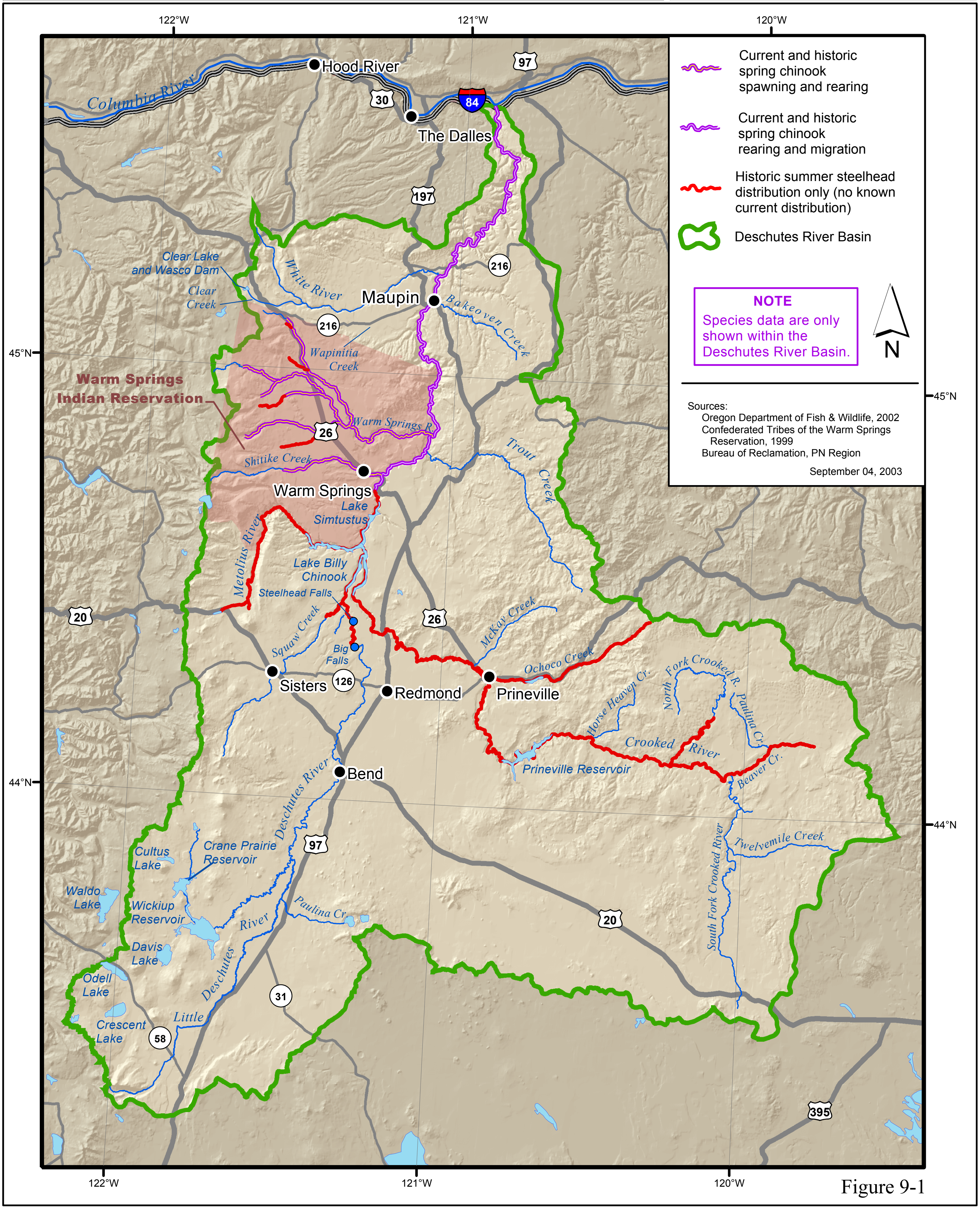

Figure 9-1

Spring Chinook salmon destined for the Warm Springs River and Shitike Creek enter the Deschutes River primarily during April, May, and June (CTWSRO 1999). They normally move quickly through the lower river to cooler water in higher elevation tributaries (Pribyl 2000). Wild stocks are separated from hatchery stocks at hatcheries. The fish mature over the summer and spawn during late August and September. Eggs incubate during the winter and fry emerge from the gravel in late winter or early spring. About one-half of these fish move out of the spawning tributary during the next fall, probably overwintering in the mainstem of the lower Deschutes River before emigrating to the ocean. Other spring Chinook salmon juveniles stay in the tributary until about 18 months of age, then emigrate directly to the ocean (age-1+ smolts). Approximately 80 percent of Deschutes River spring Chinook salmon return to the river after 2 years in the ocean (age-4 adults). Roughly 5 percent return after one year in the ocean (as age-3 jacks); and 15 percent return after three years in the ocean (age-5 adults). It is unknown if spring Chinook salmon use the lower 2 miles of the White River; water temperature periodically exceeds the ODEQ criterion of 64°F for anadromous salmonids.

According to CTWSRO (1999), the optimum management escapement goal for spring Chinook salmon in the Warm Springs River above the hatchery is 1,300 wild adults, a goal that has been met in 14 of the 26 years (including 2000 and 2002) from 1977 to 2002 (Pribyl 2003). Since 1977, the run of wild adult and jack spring Chinook salmon as enumerated at the Pelton fish trap and the Warm Springs National Fish Hatchery trap has averaged 1,954 fish. Escapement of wild adult and jack spring Chinook salmon has ranged from a high of 2,781 in 2000 to a low of 266 in 1995. The Warm Springs River above the hatchery and Shitike Creek are managed for wild fish only. Hatchery fish are not released in Shitike Creek or allowed to spawn in the Warm Springs River upstream from the hatchery. Since 1977, the spring Chinook salmon run (hatchery and wild fish) to the Deschutes River minus harvest has varied between about 1,100 (in 1980) to over 11,000 (in 2002).

Spring Chinook salmon once inhabited the Deschutes River above the current Pelton-Round Butte Project reservoirs, up to Steelhead Falls (a natural barrier at RM 128), as well as the Metolius River system and the Crooked River system. Access to these subbasins was eliminated with construction of the Pelton-Round Butte Project beginning in 1956. Fish passage facilities provided by the project were unsuccessful, and operation of the facilities was discontinued in 1968 because of the difficulty in attracting outmigrating juvenile anadromous fish to collection facilities (CTWSRO 1999). Hatchery compensation was initiated in 1968 (Nehlsen 1995). As described in Chapter 5 of this biological assessment, CTWSRO, ODFW, and others are actively studying ways to restore anadromous fish runs above the Pelton-Round Butte Hydroelectric Project. A major obstacle to restoration is getting outmigrating juvenile fish back down river because of currents in Lake Billy Chinook that apparently disorient the fish. Nehlsen

(1995) reported that the Round Butte cofferdam altered the behavior of downstream migrants in the Pelton pool.

9.3.2 Summer/Fall Chinook Salmon

The Deschutes River summer/fall-run Chinook salmon were indigenous to the lower Deschutes River. This is a distinct ESU not listed under the ESA. These fish used the river upstream and downstream from the Pelton-Round Butte Project site and probably the lower Metolius and Crooked River systems as well (Figure 9-2). Currently, summer/fall Chinook salmon spawn at preferred sites from the mouth of the Deschutes River to the Pelton Reregulating Dam. From the late 1960s through the early 1980s, large numbers of summer/fall Chinook salmon spawned in the upper portion of the lower Deschutes River. Construction of the fishway at Sherars Falls provided easier access to upstream spawning areas for fall migrants, especially during low water years. However, in the 1980s and 1990s, the number of fish spawning upstream from Sherars Falls has decreased, while the numbers spawning downstream from Sherars Falls has increased dramatically (CTWSRO 1999). Pribyl (2003) reported that 26.2 percent of summer/fall Chinook salmon redds were counted in the 57 miles of the lower Deschutes River upstream from Sherar Falls, while 73.8 percent of summer/fall Chinook salmon redds were counted in the 43 miles downstream from Sherar Falls, for the period 1989-2002. EFH for summer/fall Chinook salmon is combined with that for spring Chinook salmon in the Deschutes River basin by the PFMC (1999).

The Deschutes River summer/fall-run Chinook salmon ascend the Columbia River as maturing adults during mid-to late-summer and fall, and enter the Deschutes River from July through late November. Unlike spring-run Chinook salmon, these fish consist of only wild stocks that hold and spawn in the mainstem lower Deschutes River. There is no documented use of the lower White River by these fish (Pribyl 2000). Spawning takes place mainly during October and November. Fry emerge the following spring from March through June. Juvenile residence time in the Deschutes River is relatively short, only several months, with the subyearling smolts leaving the system the same spring or summer they emerge from the gravel and then migrate to the ocean. Mature summer/fall Chinook salmon range in age from 2 to 6 years (CTWSRO 1999). Because these fish spawn and rear in the normally warmer mainstem river, incubation and growth occurs somewhat faster than for spring-run Chinook salmon that spawn in the cooler headwater streams.

Over the last 25 years, the total run of wild summer/fall Chinook salmon has varied between about 2,800 (in 1992) to over 20,000 (in 1997). The 2002 run was about 13,200 fish.

Pacific Northwest Region GIS

Deschutes River Basin

Summer/Fall Chinook Salmon

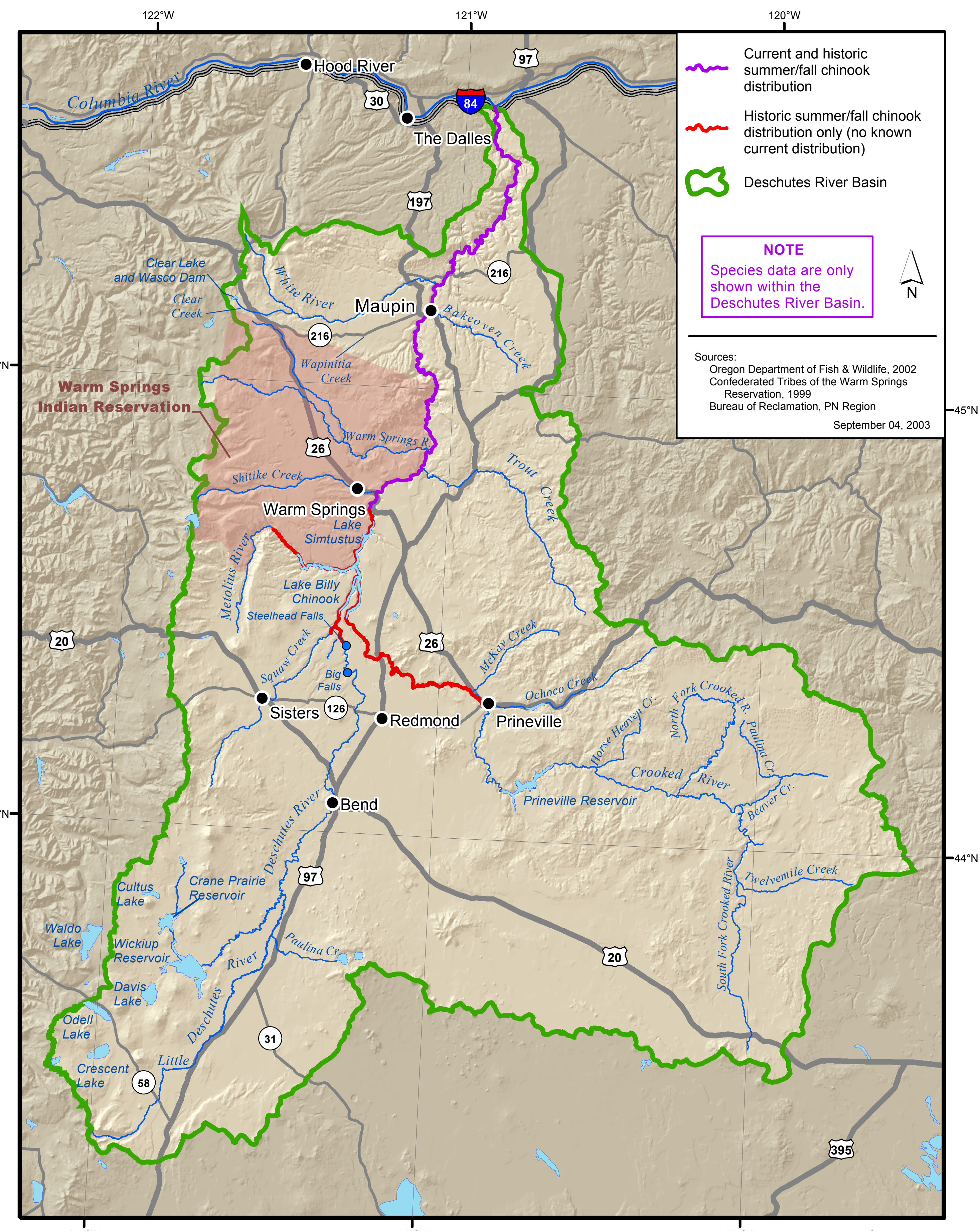

Figure 9-2

9.3.3 Coho Salmon

According to CTWSRO (1999) and Pribyl (2000), coho salmon (*Oncorhynchus kisutch)* are not indigenous to the Deschutes River basin and are not currently propagating in the basin as shown in Table 9-1. The PMFC (1999) designated EFH for coho salmon in the lower Deschtues River and Trout Creek, but since coho salmon are not indigenous to the Deschtutes River basin, their designation of EFH is most likely erroneous. During 24 years of operating the fish trap at Sherars Falls on the lower Deschutes River, Pribyl (2000) has documented only an occasional coho salmon (i.e., one stray every other year or so). CTWSRO released coho salmon in the basin in the 1960s, but these fish had only a one-life-cycle return to the basin.

9.4 Effects Analysis

9.4.1 Inaccessible Historic Habitat (Middle Deschutes Subbasin and Crooked River Subbasin)

Effects of flow alterations resulting from operation of Reclamation facilities of the Deschutes and Crooked River Projects, along with operation of non-Federal water storage and diversion facilities, reduce inflows to the Deschutes River upstream from Pelton-Round Butte project; however, large spring inflows (augmented by irrigation groundwater recharge) restore or replace a substantial amount of the water that is stored or diverted upstream. These spring inflows to the Deschutes River above Lake Billy Chinook help ameliorate the effects of project-caused flow reductions in this reach of the river and dilute potential pollutants contained in irrigation surface return flows. Flows and water quality in this reach of the river appear to be adequate to support resident trout (e.g., bull trout and redband trout) as far upstream as Steelhead Falls (RM 128), a natural fish barrier, and also to provide fish access to lower Squaw Creek.

Storage and diversion of flows on the Deschutes and Crooked Rivers do not significantly affect the levels of Lake Billy Chinook. Operation of the Pelton-Round Butte Hydroelectric Project has the major influence relative to water quantity in Lake Billy Chinook and its tributary arms.

Return flows from irrigated project lands add nutrients, bacteria, and agricultural chemicals via the Deschutes and Crooked River inflows into Lake Billy Chinook. While these pollutants are diluted by large spring inflows, they do reduce the overall water quality of the lake, which often experiences seasonal algal blooms. There is no indication to date that water quality of Lake Billy Chinook is adversely affecting resident fish populations in the lake.

Operation of Prineville and Ochoco Reservoirs, pumping into the NUID canal from the Crooked River, and agricultural return flows have significantly reduced flows and impaired water quality in the lower Crooked River and its tributaries, adversely affecting fish habitat. However, at this time, Opal Springs Dam, a private facility, located immediately upstream from Lake Billy Chinook, blocks all upstream fish passage on the Crooked River. Opal Springs Dam is considered the upstream extent of Pacific salmon EFH.

9.4.2 Accessible/Current and Historic Habitat (Lower Deschutes Subbasin)

Reclamation's upper Deschutes River subbasin irrigation storage and withdrawals result in modeled net stream depletions in the lower Deschutes River as described in Chapter 6, and indirect and indiscernible effects on water quality. Changes in modeled streamflow at Madras in the "with Reclamation" scenario compared to "without Reclamation" flow conditions as described in Chapter 6, range from -14.5 percent in March to a +2.8 percent in August (Table 6-5). This is due to water storage during the winter and irrigation releases during the summer. However, Reclamation projects in the upper Deschutes subbasin have no effect on the current spring Chinook salmon spawning tributaries in the lower Deschutes River, e.g., Shitike Creek and the Warm Springs River, nor on accessible historic spawning tributaries, e.g., Trout Creek. Flow fluctuations and water quality effects in the lower Deschutes River are influenced by operation of the Pelton-Round Butte Hydroelectric Project and by downstream surface and groundwater inflows. Water temperature effects of Reclamation's operations on the lower Deschutes River are offset by cooler groundwater returns reducing in-river water temperatures (Appendix B). There are no easily discernible or quantifiable effects of Reclamation's operations on the thermal regimes of the lower Deschutes River.

As noted in Chapter 6, the lower Deschutes River has a relatively uniform and stable annual flow regime, although natural warming of the river occurs as it flows downstream. The Deschutes River water temperature meets the ODEQ water temperature criterion for anadromous salmonids of 17.8°C at Madras (Table 5-12), but exceeds this criterion in the summer at Moody (Aney et al. 1967). Nonetheless, some upper Columbia River adult salmon and steelhead use the lower Deschutes River seasonally as a thermal refugium during their upstream migration. Operations of the Pelton-Round Butte Hydroelectric Project mask for the most part any affect Reclamation's upper Deschutes River projects have on water temperature in the lower Deschutes River. It would be difficult if not impossible to separate out the effects of Reclamation's upper Deschutes River operations on water temperature in the lower Deschutes River.

Dissolved oxygen is decreased somewhat downstream from Lake Billy Chinook in the lower Deschutes River, in large part the result of the complex interaction of nutrient inputs, water temperature, other environmental conditions, and the subsequent production of algae in the lake and not by Reclamation operations. The seasonal decrease in dissolved oxygen has resulted in a portion of the lower Deschutes River being placed on the Oregon 303(d) list of impaired streams. The reach of the lower Deschutes River just downstream from the Pelton Reregulating Dam supports some salmonid spawning.

Some sedimentation occurs in the lower Deschutes River, but Reclamation has no projects on the tributary sources of sediment except in the White River, and much of that sediment contribution is of glacial origin upstream from the Wapinitia Project lands.

The relatively small amount of water storage and streamflow depletions from diversions to the Wapinitia Project lands in the White River subbasin (about -102 cfs in February but about +6 cfs during the irrigation season) do not substantially affect lower Deschutes River flows, especially considering the amount of carriage losses that are eventually returned to the adjacent streams. However, the sum total of all lower basin agricultural diversions and practices (both Federal and non-Federal) may significantly affect flows and water quality (e.g., dissolved oxygen and water temperature) during the irrigation season, especially in low water years.

9.5 EFFECTS CONCLUSION

This effects conclusion is limited to Chinook salmon EFH in the Deschutes River basin. Available scientific information indicates that the operation of Reclamation projects in the upper Deschutes River basin, in conjunction with the operation of non-Federal irrigation projects in the basin, may have an adverse affect on historical but presently unoccupied EFH, (i.e., the river basin upstream from the Pelton-Round Butte Hydroelectric Project), but has no adverse affect on currently accessible Chinook salmon EFH in the lower Deschutes River and no effect on EFH in Trout Creek. Spring Chinook salmon generally spawn and rear in westside tributaries, while summer/fall Chinook salmon predominantly spawn and rear in the main river.

The effects of Reclamation’s operations on environmental conditions and habitat in the lower Deschutes River are difficult to partition out from the effects that the Pelton-Round Butte Hydroelectric Project has downstream, except perhaps for the modeled hydrology with and without Reclamation as described in the accompanying biological assessment. The effects of operation of the Pelton-Round Butte Hydroelectric Project far outweigh the effects of Reclamation’s upper river operations on the lower Deschutes River.

Current Reclamation operations in the upper Deschutes River do not measurably degrade anadromous salmonid habitat of the lower Deschutes River. Table 6-6 and the accompanying discussion of the habitat indicators in Chapter 6 of the biological assessment, based on the NMFS habitat matrix of pathways and indicators, does not indicate degradation in habitat indicators in the lower Deschutes River from operation of Reclamation projects in the upper Deschutes River. Water temperatures at Madras meet the ODEQ water temperature criterion of 17.8°C for anadromous salmonids. Summertime warming of the river further downstream is the result of natural processes. The seasonal reduction in dissolved oxygen is the result of physical and biological processes operating in Lake Billy Chinook.

Reclamation's ongoing operations in the Deschutes River basin will not adversely affect currently occupied EFH for Chinook salmon in the lower Deschutes River.