4. NATURAL HISTORY AND SPECIES OCCURRENCE

The action area supports one or more life stages of 18 species listed under the ESA (see Table 4-1). Additionally, 11 critical habitat units are present within the action area (see Table 4-1). The sections below describe the occurrence of species and critical habitat within the action area. Appendix C provides detailed natural history information about each species.

Table 4-1. ESA-Listed Species Likely to be Present in the Action Area

ESU/DPS **Species Common Name** ***Species Scientific Name***[a]	Federal Status[b]	Critical Habitat Present	Presence Documented in Action Area[c]	Habitat Use within Action Area[d]
LCR ESU **Chinook** *Oncorhynchus tshawytscha*	LT	Yes	Yes	M/H; S; R
UCR Spring-Run ESU **Chinook** *O. tshawytscha*	LE	Yes	Yes	M/H; R
SR Fall-Run ESU **Chinook** *O. tshawytscha*	LT	Yes	Yes	M/H
SR Spring/Summer-Run ESU **Chinook** *O. tshawytscha*	LT	Yes	Yes	M/H
UWR ESU **Chinook** *O. tshawytscha*	LT	Yes	Yes	M/H; R
LCR DPS **Steelhead** *O. mykiss*	LT	Yes	Yes	M/H; S; R
MCR DPS **Steelhead** *O. mykiss*	LT	Yes	Yes	M/H
UCR DPS **Steelhead** *O. mykiss*	LE	Yes	Yes	M/H
SR DPS **Steelhead** *O. mykiss*	LT	Yes	Yes	M/H
UWR DPS **Steelhead** *O. mykiss*	LT	Yes	Yes	M/H
SR ESU **Sockeye** *O. nerka*	LE	Yes	Yes	M/H
LCR ESU **Coho** *O. kisutch*	LT	None designated	Yes	M/H; S; R
CR ESU **Chum** *O. keta*	LT	Yes	Yes	M/H; S; R

ESU/DPS **Species Common Name** *Species Scientific Name*[a]	Federal Status[b]	Critical Habitat Present	Presence Documented in Action Area[c]	Habitat Use within Action Area[d]
CR DPS **Bull trout** *Salvelinus confluentus*	LT	Yes (Proposed)	Yes	M/H; F
Eastern DPS **Northern (Steller) sea lion** *Eumetopias jubatus*	LT	No	Yes	F, T
Southern DPS **Green sturgeon** *Acipenser medirostris*	LT	No	Yes	F, H
Southern Resident DPS **Killer whale** *Orcinus orca*	LE	No	See discussions regarding killer whale action area in Section 3 and Appendix H.	
Southern DPS **Eulachon** *Thaleichthys pacificus*	LT	N/A	Yes	M, S

Notes:

a LCR = Lower Columbia River; UCR = Upper Columbia River; SR = Snake River; UWR = Upper Willamette River; MCR = Middle Columbia River; CR = Columbia River

b Federal status: LT = Listed Threatened, LE = Listed Endangered, N/A = Not Applicable.

c Source: Columbia River Crossing Fish-Run Working Group 2009 (CRC 2009).

d Habitat uses: S = Spawning, R = Rearing (includes foraging behavior), M/H = Migration/Holding (holding includes resting behavior), F = Feeding, T = Transiting.

In general, all runs of listed salmonids are present in the lower Columbia River during at least a portion of the March through October window as migrating adults and outmigrating juveniles (see Figure 4-1 and Figure 4-2; note that timing represented in these figures is for the mainstem Columbia River and North Portland Harbor only, as comprehensive data on timing in the Columbia Slough and Burnt Bridge Creek are lacking. Also note that timing in these figures is for general illustrative purposes and may vary annually, depending on environmental conditions; for a detailed statistical analysis of abundance and timing by species and life stage, see Appendix K. Most juvenile outmigration between Bonneville and the mouth of the river occurs between March and October, with peaks at various times within this period, depending on species and run type (Carter et al. 2009). For seven of the stocks listed above, adult migration timing extends outside of the March-through-October window. Due to the variety of life history strategies, species, and sizes of salmonids present in the lower Columbia River, outmigrating and rearing juveniles are likely to be present in the action area year-round.

4.1 LOWER COLUMBIA RIVER CHINOOK

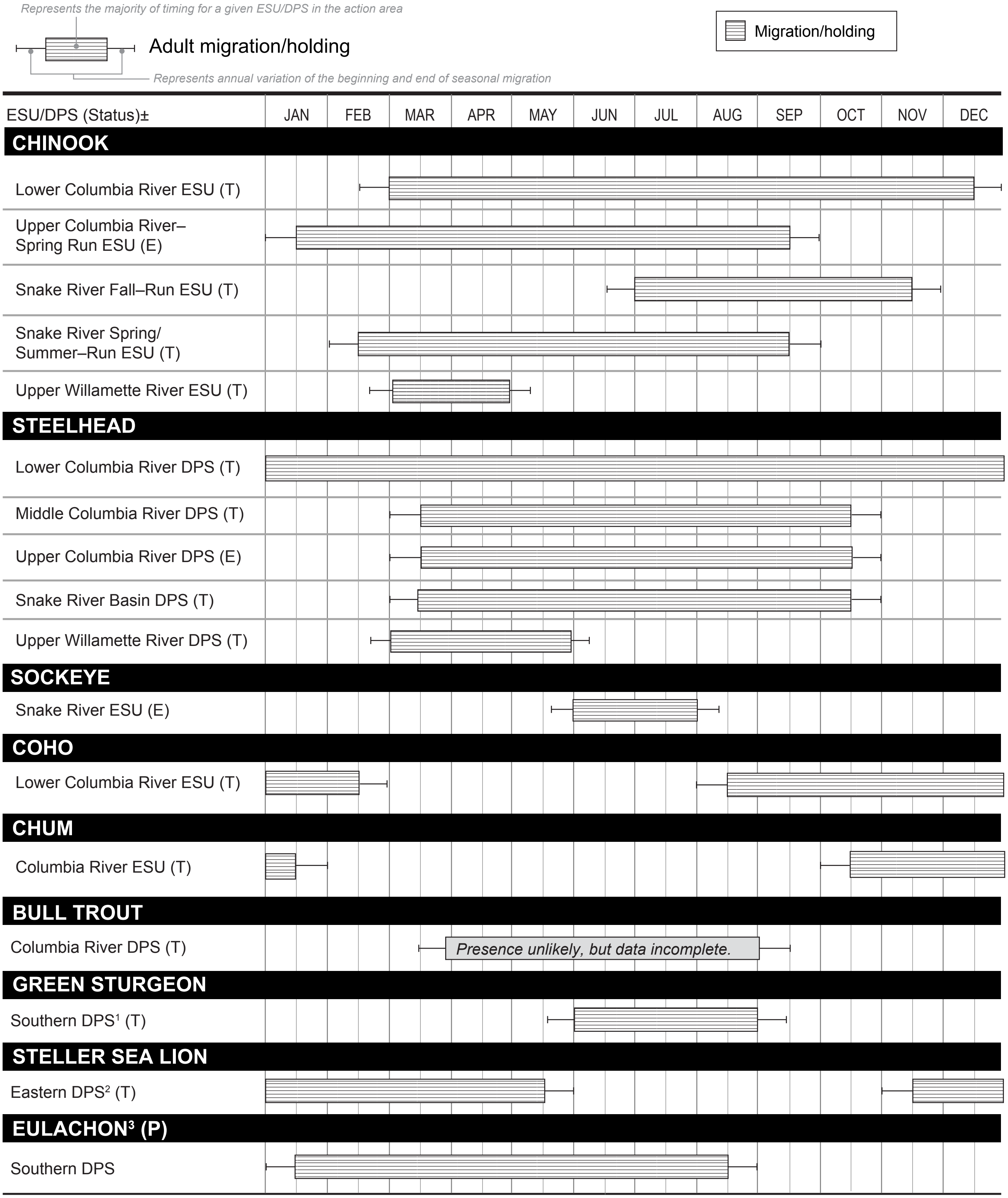
4.1.1 Status and Biological Context

The LCR Chinook ESU includes all naturally spawned populations of Chinook from the Columbia River and its tributaries that occur from the river's mouth at the Pacific Ocean, upstream to a transitional point between Washington and Oregon east of the Hood and White Salmon Rivers (70 FR 37160) (see Figure 4-3). This geographic extent of this ESU also includes the Willamette River to Willamette Falls, Oregon, with the exception of spring-run Chinook in the Clackamas River. There are 17 artificial propagation programs for Chinook in this ESU.

Figure 4-1

TYPICAL PRESENCE–ADULTS

ESA-Columbia River and North Portland Harbor Species Occurring in the Columbia River Crossing Action Area



Columbia River CROSSING

± Status abbreviations: (E) Endangered; (T) Threatened; (P) Proposed for Listing

FEBRUARY 24, 2010

[1] Olaf Langness, WDFW, personal communication 2008

[2] Federal Register (62 FR 24345)

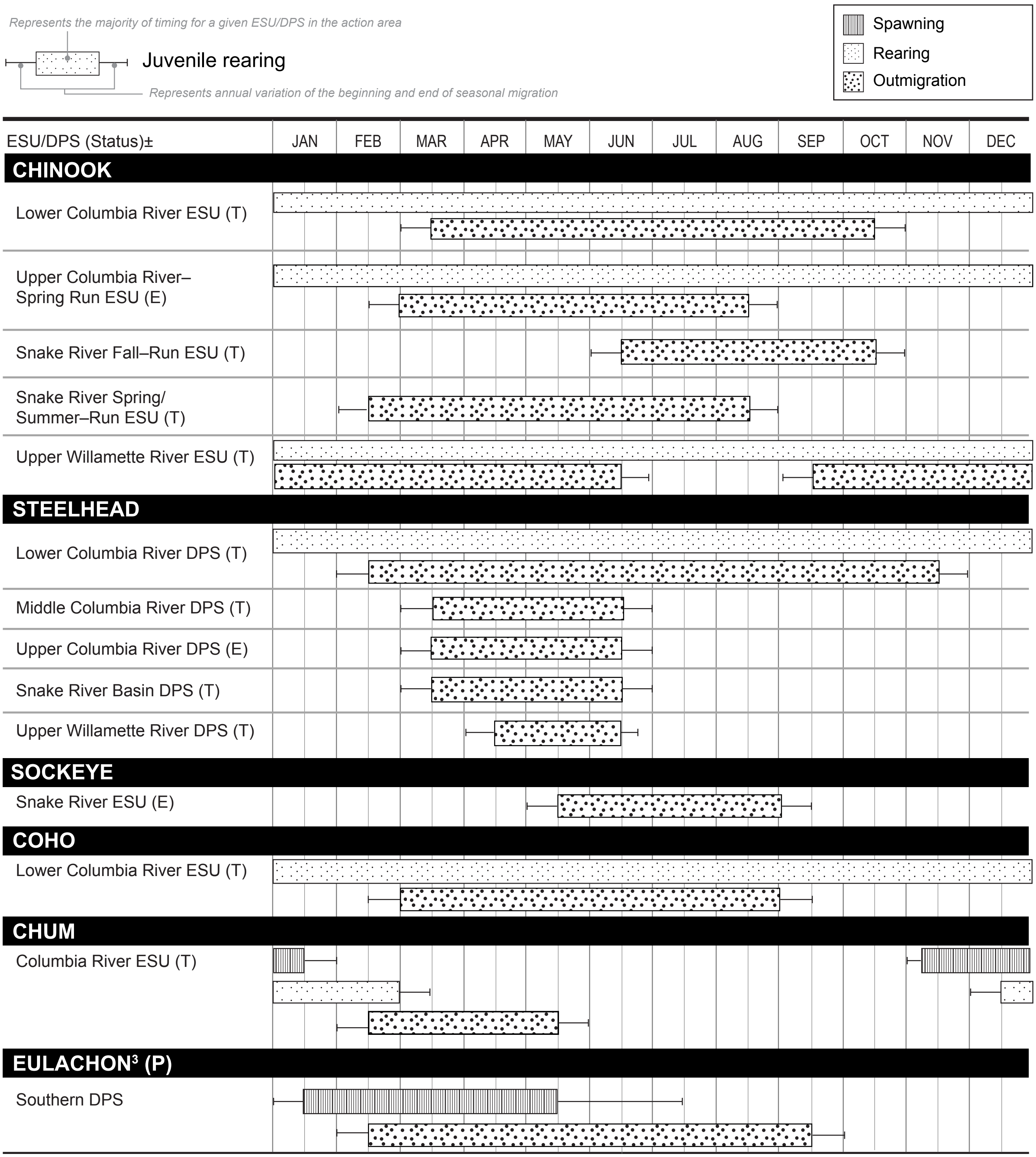
[3] WDFW & ODFW 2001: Washington and Oregon Eulachon Management Plan; Langness personal communication 2009

Sources: Information compiled from Oregon Department of Fish and Wildlife, Washington Department of Fish and Wildlife and National Marine Fisheries Service species experts unless otherwise indicated.

Figure 4-2

TYPICAL PRESENCE–JUVENILES AND LARVAE

ESA-Columbia River and North Portland Harbor Species Occurring in the Columbia River Crossing Action Area



Columbia River CROSSING

FEBRUARY 24, 2010

± Status abbreviations: (E) Endangered; (T) Threatened; (P) Proposed for Listing

[1] Olaf Langness, WDFW, personal communication 2008

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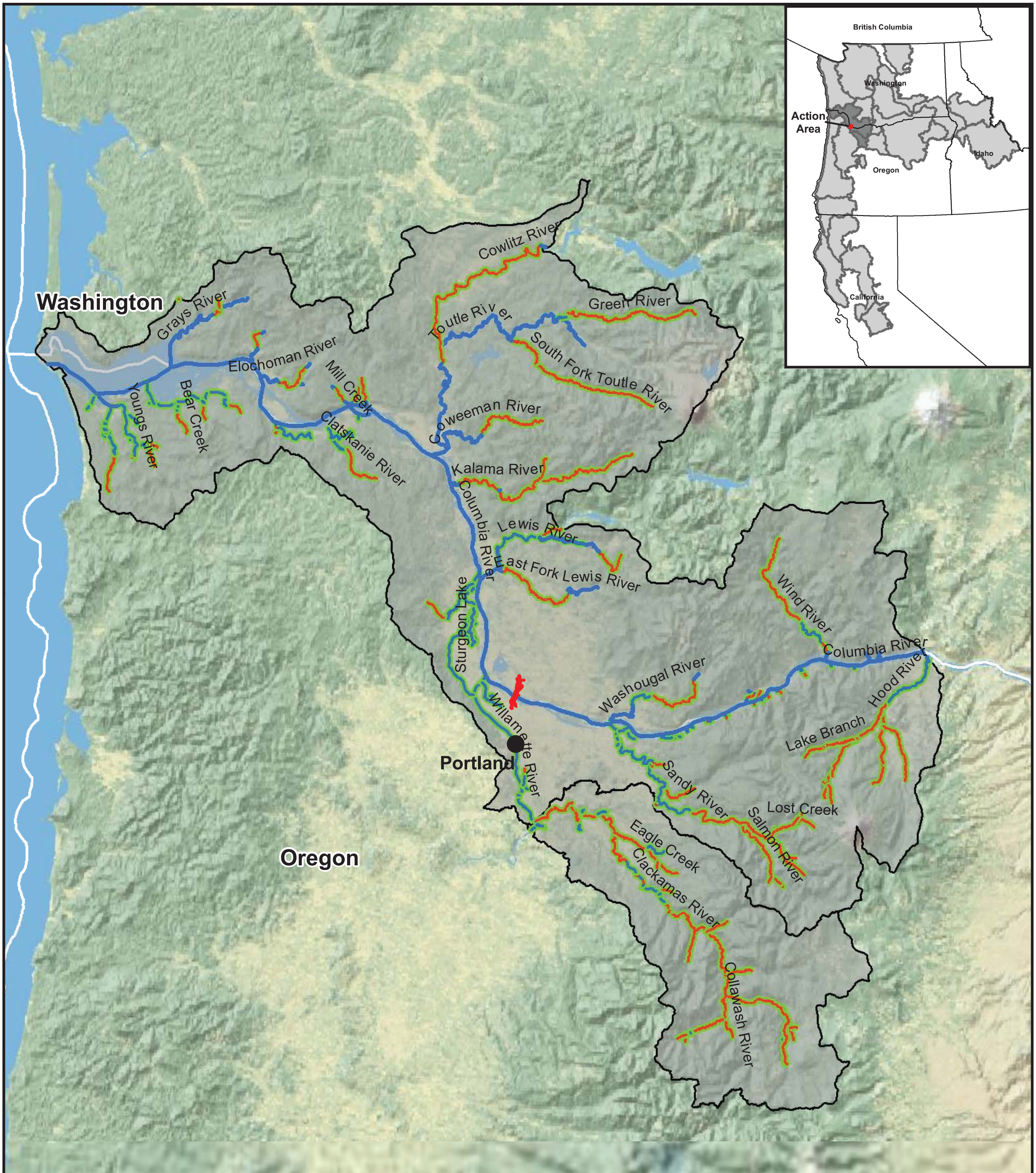
[3] WDFW & ODFW 2001: Washington and Oregon Eulachon Management Plan; Langness personal communication 2009

Sources: Information compiled from Oregon Department of Fish and Wildlife, Washington Department of Fish and Wildlife and National Marine Fisheries Service species experts unless otherwise indicated.



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W
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S

0 10 20
Miles

USE TYPE

Migration only

Rearing and migration

Spawning and rearing

Chinook Salmon ESU

Action Area

Figure 4-3. General Distribution Map - Lower Columbia River Chinook ESU

Map is intended to show distribution of the ESU, and not specific habitat use by life stage within the action area itself.

Columbia River CROSSING

Analysis by J. Koloszar; Analysis Date: May 20, 2009; Plot Date: May 20, 2009; File Name: ESUDPS_JL194.mxd

LCR Chinook exhibit three life history types: early fall runs (“tules”); late fall runs (“brights”); and spring runs; Table 4-2 summarizes the characteristics of these life history types. Fall runs historically (e.g., pre-settlement) occurred throughout the entire range of the ESU, while spring runs historically occurred only in the upper portions of basins with snowmelt-driven flow regimes (e.g., western Cascade Crest and Columbia Gorge tributaries).

Table 4-2. Life History and Population Characteristics of LCR Chinook

Characteristic	Spring	Early Fall (Tule)	Late Fall (Bright)
Number of extant populations	9 (includes 4 potentially extinct)	20	2
Life history type	Stream	Ocean	Ocean
Adults present in action area	February-June	August-September	August-December
Emergence	December-January	January-April	March-May
Rearing duration in freshwater	12-14 months	1-4 months (up to 12 months in some cases)	1-4 months (up to 12 months in some cases)
Rearing habitat	Tributaries, mainstem	Tributaries, mainstem, sloughs, saltwater estuary	Tributaries, mainstem, sloughs, saltwater estuary
Age at return	4-5 years	3-5 years	3-5 years
Estimated historical abundance of spawning adults	125,000	140,000	19,000
Recent natural-origin spawning adults (~1997-2001)	800	6,500	9,000

Sources: NMFS 2008e; Columbia River Crossing Fish-Run Working Group 2009 (CRC 2009).

There are six major population groups in this ESU: Cascade spring, Gorge spring, Coastal fall, Cascade fall, Cascade late fall, and Gorge fall; the populations occurring within the action area are summarized in Table 4-3. These are further delineated according to tributary into 32 historical subpopulations, seven of which are extirpated or nearly so. Eleven subpopulations occur in the action area and are listed in Table 4-3.

Table 4-3. Summary of Status for LCR Chinook in the CRC Project Area (Subpopulations Occurring Within or Above the Action Area Only)

Subpopulation	Legacy[a,e]	Core[b,e]	Abundance Estimate (4-year Average of Natural-Origin Spawners)		Viable Abundance Goal[e]	Current Viability[e]	Extinction Risk[e,f]
			LCFRB 2004[c]	NMFS 2008e[d]			
			Cascade Fall				
Washougal	No	No	1,225	1,130	5,800	Low	High
Clackamas	No	Yes	56	40	1,400	Low	High
Sandy	No	No	208	183	1,400	Low	High

Subpopulation	Legacy[a,e]	Core[b,e]	Abundance Estimate (4-year Average of Natural-Origin Spawners)		Viable Abundance Goal[e]	Current Viability[e]	Extinction Risk[e,f]
			Gorge Fall				
Lower Gorge	No	No	Insufficient data		1,400	Low	High
Upper Gorge	No	Yes	138	109	1,400	Low	High
White Salmon	No	Yes	174	218	1,600	Low	High
Hood	No	No	N/A	36	1,400	Low	High
			Cascade Late Fall				
Sandy	Yes	Yes	445	2771	5,100	Low	High
			Cascade Spring				
Sandy	Yes	Yes	2,649	959	2,600	Medium	Moderate
			Gorge Spring				
White Salmon	No	No	Insufficient data		1,400	Very Low	Very High
Hood	No	Yes	0	51	1,400	Very Low	Very High
Estimated Total for These Populations			**4,895**	**5,497**	**24,900**		

Note: Abundance estimates indicate some measure of overall abundance for a specific and short time series, relative to recovery goals and to other subpopulations; however, estimates vary according to source and statistical methodology, and recent viability estimates (McElhany et al. 2007) indicate that reliable estimates are not available for many subpopulations in this ESU. Estimates here also do not reflect recent (mid-2000s) higher returns of some subpopulations attributed to improved ocean conditions.

a Genetic Legacy designation by the Technical Recovery Team. Genetic legacy populations represent unique life histories or are relatively unchanged by hatchery influences.

b Core population designation by Technical Recovery Team. Core populations were the largest historical populations and were key to metapopulation processes.

c Source: Lower Columbia Fish Recovery Board (LCFRB) 2004; 1997-2000 average natural spawning escapements (from Lower Columbia Salmon Recovery and Fish & Wildlife Subbasin Plan 2004, Appendix A: Focal Fish).

d Source: NMFS 2008e; abundance estimates are 5-year geometric means from approximately 1997-2001/1990-2004.

e Source: LCFRB 2004.

f Source: McElhany et al. 2007.

LCR Chinook use the Columbia River within the action area for migration, holding, and rearing. Rearing habitat is limited in the Columbia River portion of the action area, but is present in off-channel areas downstream of the existing I-5 bridge (e.g., accessible areas of small tributaries, backwater areas, and other low-velocity refugia).

Adults of the fall run migrate through the action area from August to December on their way to spawn in large mainstem tributaries. Upstream migrating adults of the spring run are present from February to June on their way to spawn in upstream and headwater tributaries (CRC 2009; NMFS 2005a).

Spawning habitat is not documented within the Columbia River portion of the action area; however, fall-run Chinook spawn upstream of the action area in the lower Columbia River near Ives Island and Hamilton Creek, at RM 143, 3 miles downstream from Bonneville Dam and 37 miles upstream from the I-5 bridge (FPC 2008).

Spawning occurs between late September and December, and eggs incubate over the fall and winter months. Timing of fry emergence is dependent on egg deposition time and water temperature. Downstream juvenile migration occurs 1 to 4 months after emergence (NMFS 2005a). Stream-type Chinook, which typically rear in higher elevation tributaries for a year before outmigrating, begin downstream migration as early as mid-February and continue through August; they are most abundant in the Columbia River estuary (generally defined as the lower Columbia River between Bonneville Dam and the mouth) between early April and early June (Carter et al. 2009). Spring-run Chinook juveniles outmigrate from freshwater as yearlings (stream-type).

The fall-run Chinook outmigration typically peaks between May and July, although juveniles are present through October (CRC 2009; Carter et al. 2009).

Information regarding Chinook use of Burnt Bridge Creek is limited. The abundance of Chinook is thought to be very low (PSMFC 2003); however, there is the potential for all freshwater life stages of fish in this ESU to occur in the lower reaches (Weinheimer 2007 personal communication; WDFW 2007b). Two juvenile fall-run Chinook were documented in April 2003 in the lower reaches of Burnt Bridge Creek, less than 0.50 mile downstream of I-5 (PSMFC 2003). No juvenile Chinook or redds were observed upstream of I-5 during surveys conducted in November and December 2002 and April and May 2003 (PSMFC 2003).

Within the action area, habitat in the creek between Vancouver Lake and I-5 is characterized by low-gradient pool and marsh habitat with moderate canopy cover, and was described in a 2007 survey as good salmonid rearing habitat (WDFW 2007a). Upstream of the action area between I-5 and Fourth Plain Boulevard, the survey noted increasing canopy cover, abundant beaver activity and pond habitat, and good rearing and spawning habitat in portions where the stream flows through a greenbelt with protected riparian areas (e.g., Leverich and Arnold Parks). Habitat upstream of these areas is degraded by urban development, non-native vegetation, channelization, and bank armoring, and provides much less habitat.

There are no complete passage barriers in Burnt Bridge Creek, although seasonal velocity and flow barriers exist. A 2007 WDFW fish passage inventory of the creek documented several culverts within the action area that function as partial barriers, including the I-5 culvert at MP 3.07 (RM 1.9/RKm 3). This culvert is an undersized box culvert with less than 1 percent slope, which causes high velocities through the culvert at certain flows (WDFW 2007a). Yearly stream flows vary, and the frequency with which the culvert is impassable is unknown; however, the presence of coho redds above the culvert in November and December 2002 (see Section 4.12.1) indicate that access to spawning habitat is possible (WDFW unpublished data).

Because potential spawning habitat occurs in the creek within the action area, there are no complete passage barriers, and there are documented detections in the lower watershed, it is possible that Chinook could use this portion of the action area for migration, rearing, or spawning.

LCR Chinook are known to use the Columbia Slough up to NE 18th Avenue, including the action area. Juvenile Chinook use the Columbia Slough for rearing and migration only, as spawning habitat is absent from the Slough (COP 2009a). Chinook are not likely to be present in the Slough during summer months (approximately June through September, depending on the year), as water temperatures are often too high to support juvenile salmonids (COP 2009a).

Quantitative data for abundance estimates are available for only about half of the populations in this ESU. Of those with available data, abundance estimates are low and many of the long- and short-term abundance trends are sharply negative (see Table 4-3). Natural production of Chinook in the Lower Columbia River basin is generally considered to be substantially reduced compared to historic levels (Myers et al. 1998), and in some cases, natural runs have been effectively replaced by hatchery production. The abundance of fall-run Chinook is currently much higher than that of spring-run Chinook in this ESU (NMFS 2008e). Accessible stream habitat has been significantly reduced from historical conditions by hydroelectric projects in some tributaries, leading to the extirpation of some populations. This ESU was determined to have a high to very high risk of extinction (McElhany et al. 2007) (see Figure 4-4).

LCR Chinook are likely to be present in the Columbia River and North Portland Harbor year-round within the action area and thus are likely to be present during in-water work.

4.1.2 Limiting Factors

Limiting factors for this ESU include habitat degradation (e.g., hydropower development), hatchery effects, fishery management and harvest decisions, and predation. LCR Chinook populations began declining in the early 1900s due to habitat changes and harvest rates. Populations above Bonneville Dam are affected by upstream and downstream passage barriers and by the degradation of spawning habitat in lower tributary reaches. For populations originating in tributaries below Bonneville Dam, migration and habitat conditions in the mainstem and estuary have been affected by hydrosystem flow operations. Tributary habitat degradation is pervasive due to development and other land uses, and hydroelectric projects have blocked some spawning areas. Hatchery production for this ESU has reduced the diversity and productivity of natural populations. Predation is a significant factor for juveniles and adults, particularly for spring-run populations. Key predators include piscivorous birds (e.g., Caspian terns and cormorants), piscivorous fish (e.g., pikeminnow), and marine mammals (e.g., seals and sea lions) (NMFS 2008e).

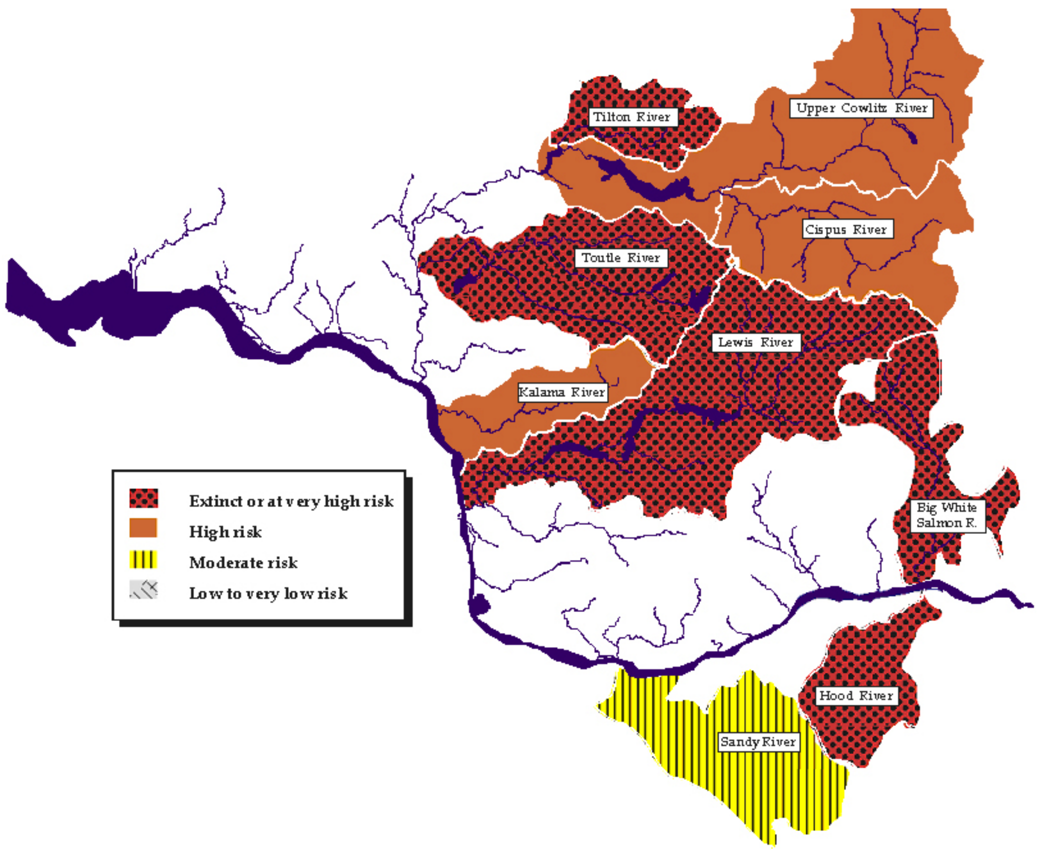
4.1.3 Designated Critical Habitat

Critical habitat was designated for LCR Chinook on September 2, 2005 (70 FR 52630), and includes the Columbia River from the mouth to the confluence with the Hood River, as well as stream reaches in tributary subbasins. Designated critical habitat is present in the action area in the Columbia River and North Portland Harbor. Designated critical habitat occurs in the Columbia Slough up to roughly 1.6 miles downstream of I-5, which is outside of the action area. Burnt Bridge Creek does not contain designated or proposed critical habitat for any of the species discussed in this BA.

Designated critical habitat and its primary constituent elements (PCEs) are discussed in detail in Section 5.4. Critical habitat and PCEs were designated simultaneously for LCR Chinook, UCR Chinook, the five steelhead DPSs addressed in this BA, and CR chum; therefore, the PCEs listed below also apply to these runs.

The following PCEs are present in the action area: freshwater spawning, freshwater rearing, freshwater migration, and estuarine areas.

In the action area, these PCEs are generally in poor condition due to altered channel morphology and stability, lost and/or degraded floodplain connectivity, loss of habitat diversity, excessive sediment, degraded water quality, increased stream temperatures, reduced stream flow, and reduced access to spawning and rearing areas (NMFS 2008e).



SOURCE: Lower Columbia River Fish Recovery Board 2004.
Lower Columbia Salmon Recovery and Fish & Wildlife Subbasin Plan

Figure 4-4.

Extinction Risk - Lower Columbia River Chinook ESU

N W E S

Columbia River CROSSING

4.2 UPPER COLUMBIA RIVER SPRING-RUN CHINOOK

4.2.1 Status and Biological Context

The Upper Columbia River (UCR) spring-run Chinook ESU includes all naturally spawned populations of Chinook in all accessible river reaches in the mainstem Columbia River and its tributaries upstream of Rock Island Dam and downstream of Chief Joseph Dam in Washington, excluding the Okanogan River (70 FR 37160) (see Figure 4-5). The ESU consists of one major population group (MPG) composed of three existing subpopulations (the Entiat, Methow, and Wenatchee) and one extinct population (formerly distributed above Chief Joseph Dam). All of the existing three subpopulations migrate through the action area. Chief Joseph Dam was completed in 1961 and functions as a total passage barrier for further upstream migration of this ESU. There are six artificial propagation programs for Chinook in this ESU.

Within the action area, adult and juvenile UCR Chinook are present in the Columbia River and North Portland Harbor during upstream adult migration, downstream juvenile outmigration, holding, and rearing. Figure 4-1 and Figure 4-2 summarize the timing of Chinook presence in the action area. Upstream-migrating adults are present in the action area from approximately mid-January to mid-September (CRC 2009; NMFS 2005a). Juveniles outmigrating to the ocean are present in the action area from mid-February through August (CRC 2009). Rearing juveniles may be present in the action area year-round. Due to the potential presence of individuals from this ESU at any time of year, UCR Chinook are likely to be present in the action area during in-water work.

The extent to which UCR spring-run Chinook use the Columbia Slough is unknown. Recent genetic analyses of juvenile Chinook in the Slough show that juveniles originating from upriver ESUs are present in the Slough from January to June (Teel et al. 2009). These ESUs include UCR summer/fall-run Chinook and Deschutes River fall-run Chinook. The study did not detect UCR spring-run Chinook specifically. However, the Slough is accessible to and provides potentially suitable habitat for UCR spring-run Chinook. Juveniles would use seasonal wetlands and floodplain areas of the Slough for resting, foraging, and refuge from high flows. Juveniles are not likely to be present in the Slough during summer months (approximately June through September, depending on the year) as water temperatures are often too high to support juvenile salmonids (COP 2009a).

UCR Chinook do not occur in Burnt Bridge Creek.

The Columbia River rearing and migration corridor extends from Rock Island Dam downstream through the action area to the Pacific Ocean (NMFS 2005a). Holding habitat is present in the action area in backwaters, pools, and other low-velocity areas.

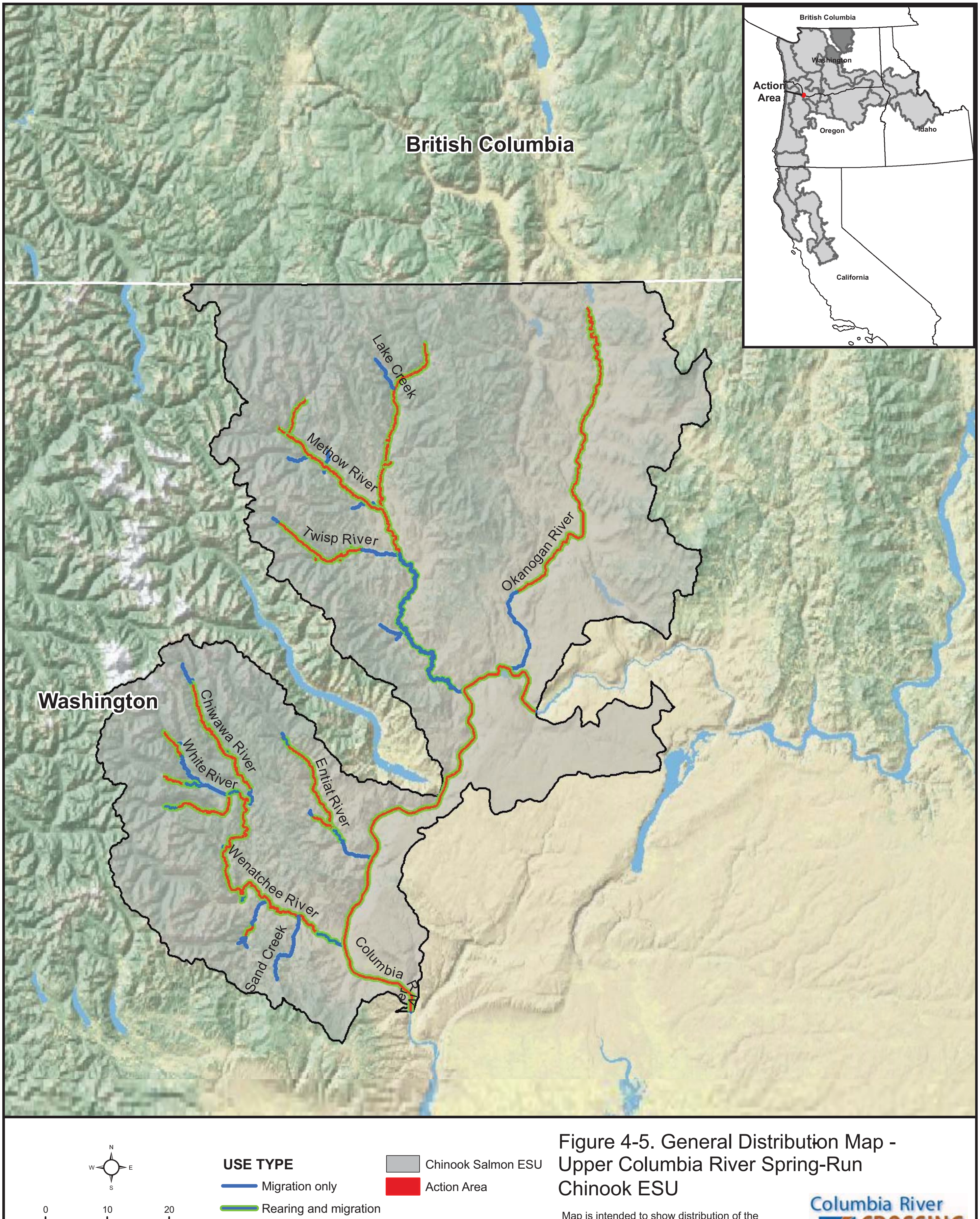


Figure 4-5. General Distribution Map - Upper Columbia River Spring-Run Chinook ESU

Map is intended to show distribution of the ESU, and not specific habitat use by life stage within the action area itself.

Columbia River CROSSING

Analysis by J. Koloszar; Analysis Date: May 20, 2009; Plot Date: May 20, 2009; File Name: ESUDPS_JL194.mxd

Most subpopulations in this ESU experienced a significant decline in abundance in the mid-1990s, followed by an increase to levels above or near the recovery thresholds in the early 2000s, and have since reached levels intermediate to those of the mid-1990s and early 2000s (NMFS 2008d). The geometric mean abundance of natural-origin fish in this ESU returning to the Wenatchee, Methow, and Entiat Rivers has averaged 226, 205, and 63, respectively, for the most recent 10-year period for which data are available (see Table 4-4) (USACE et al. 2007). The 1994 to 1998 geometric mean abundance for these populations was 190, 129, and 38, respectively; the 1999 to 2003 geometric mean abundance was 467, 324, and 103, respectively. This trend reflected a 38 percent improvement in natural-origin spawner abundance for the ESU over the 1994-1998 period. However, longer-term abundance trends of natural-origin fish indicate declines for both the 1980 to 2003 and the 1990 to 2003 periods (with the exception of the Entiat subpopulation, which showed a slight increase) (USACE et al. 2007). The 2007 jack counts, which are used as an indicator of future adult returns, were at the highest level since 1977 (NMFS 2008d). The long-term (100-year) extinction risk for this ESU has been characterized as high (ICTRT 2007a).

Table 4-4. Summary of Status for UCR Spring-Run Chinook

Population	Abundance Estimate (10-year Geometric Mean [a] of Natural-Origin Spawners, 1994-2003)[b]	Recovery Abundance Threshold[c]	Extinction Risk
	Eastern Cascades		
Wenatchee	222	2,000	High
Entiat	59	2,000	High
Methow	180	500	High
Estimated Total for These Populations	**461**	**4,500**	

Sources: ICTRT 2007a, 2007b.

a The geometric mean indicates the central tendency or typical value of a set of numbers.

b Abundance estimates are based on expanded redd counts.

c ICTRT abundance thresholds are average abundance levels that would be necessary to meet ICTRT viability goals at <5% risk of extinction.

4.2.2 Limiting Factors

The key limiting factors for this ESU include hydropower projects, predation, harvest, hatchery effects, degraded estuary habitat, and degraded tributary habitat. Ocean conditions, which have also affected the status of this ESU, generally have been poor over the last 20 years and have improved only recently (NMFS 2008e).

4.2.3 Designated Critical Habitat

Critical habitat was designated for UCR spring-run Chinook on September 2, 2005 (70 FR 52630), and includes all Columbia River estuarine areas and river reaches upstream to Chief Joseph Dam and several tributary subbasins. The critical habitat designation includes the Columbia River rearing/migration corridor, which connects the ESU to the Pacific Ocean and includes the action area (the Columbia River and North Portland Harbor).

The Columbia River rearing/migration corridor is considered to have a high conservation value for rearing and migrating juveniles and migrating adults. Dams, diversions, roads and railways, agriculture (including livestock grazing), residential development, and forest management continue to threaten the conservation value of critical habitat for this species in some locations in the upper Columbia basin (NMFS 2008e).

The action area contains three PCEs: freshwater migration, freshwater rearing, and estuarine areas.

4.3 SNAKE RIVER FALL-RUN CHINOOK

4.3.1 Status and Biological Context

The SR fall-run Chinook ESU includes all naturally spawned populations of fall-run Chinook in the mainstem Snake River below Hells Canyon Dam, and in the Tucannon River, Grande Ronde River, Imnaha River, Salmon River, and Clearwater River subbasins (see Figure 4-6) (70 FR 37160; June 28, 2005). There are four artificial propagation programs for Chinook in this ESU.

Within the action area, adult and juvenile SR fall-run Chinook use the Columbia River and North Portland Harbor for upstream adult migration and holding, and for juvenile outmigration. Upstream-migrating adults are potentially present in the action area from approximately July to November (CRC 2009; NMFS 2005a). Juveniles outmigrating to the ocean are present in the action area between approximately June and October (CRC 2009).

SR fall-run Chinook are likely to be present in the Columbia River and North Portland Harbor in the action area when in-water work will take place. SR fall-run Chinook do not occur in Burnt Bridge Creek. The extent to which SR fall-run Chinook use the Columbia Slough is unknown; use is assumed to be similar to previously described up-river Chinook ESUs (COP 2009a).

Data for the most recently published 10-year period (1994-2004) for this ESU show an average abundance of 1,273 returning adults; this number is below the 3,000 natural spawner average abundance threshold that has been identified as a minimum for recovery (see Table 4-5) (NMFS 2008e). Total returns to Lower Granite Dam increased steadily from the mid-1990s to the present. Natural returns increased at approximately the same rate as hatchery origin returns through run year 2000, but since then, hatchery returns have increased disproportionately to natural-origin returns. On average, for full brood year returns from 1977 to 2004, the naturally spawned fish population has not replaced itself (NMFS 2008e). The long-term (100-year) extinction risk for this ESU has been characterized as moderate to high (ICTRT 2007a).

Table 4-5. Summary of Status for SR Fall-Run Chinook

Population	Abundance Estimate (10-year Geometric Mean of Natural-Origin Spawners, 1995-2004)[a]	Viable Abundance Goal	Extinction Risk
Lower Mainstem	1,273	3,000	Moderate - High
Estimated Total for These Populations	**1,273**	**3,000**	

Sources: NMFS 2008e; NMFS 2006a.

a Abundance estimates based on passage counts at Lower Granite Dam.

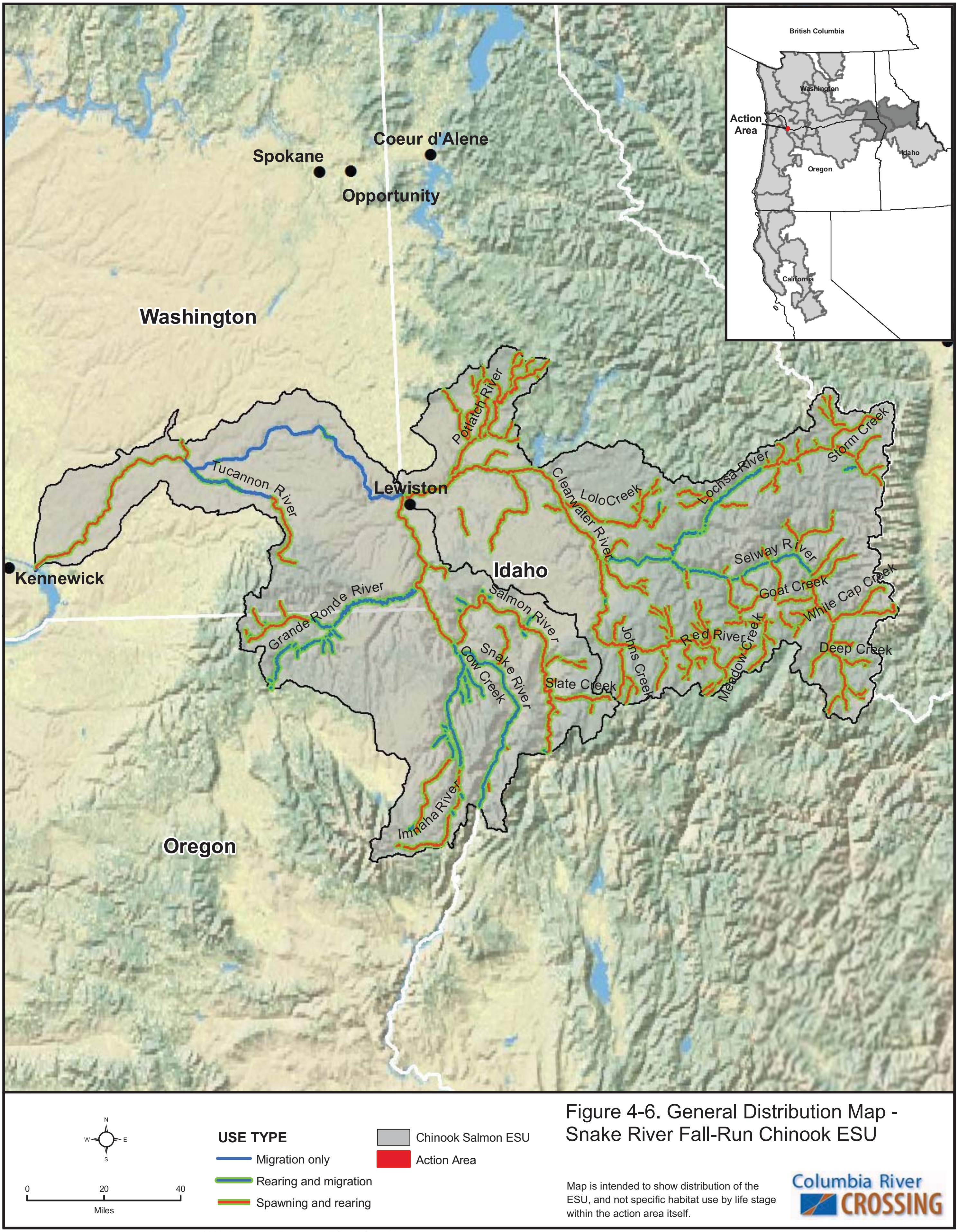


Figure 4-6. General Distribution Map - Snake River Fall-Run Chinook ESU

Map is intended to show distribution of the ESU, and not specific habitat use by life stage within the action area itself.

Columbia River CROSSING

Analysis by J. Koloszar; Analysis Date: Aug., 2009; Plot Date: File Name: ESUDPS_JL194.mxd

4.3.2 Limiting Factors

Limiting factors for this ESU include mainstem hydroelectric projects in the Columbia and Snake Rivers, predation, harvest, hatchery effects, ocean conditions, and poor tributary habitat.

4.3.3 Designated Critical Habitat

Critical habitat was designated for SR fall-run Chinook on December 28, 1993 (58 FR 68543). The critical habitat designation includes the Columbia River rearing/migration corridor, which connects the ESU to the Pacific Ocean and includes the Columbia River and North Portland Harbor within the action area.

The following PCEs occur within in the action area: juvenile migration corridors and adult migration corridors. Essential features of the juvenile migration corridor include substrate, water quality, water quantity, water velocity, cover/shelter, food, riparian vegetation, space, and safe passage conditions. See Section 5.4.2 for additional discussion of specific PCEs.

The Columbia River migration corridor is considered to have a high conservation value for rearing and migrating juveniles and migrating adults. The PCEs are generally degraded due to hydropower systems on the Snake and Columbia Rivers that cause high juvenile mortality, altered seasonal temperature regimes, and a reduction in spawning and rearing habitat associated with the mainstem lower Snake River hydropower system (NMFS 2008e).

4.4 SNAKE RIVER SPRING/SUMMER-RUN CHINOOK

4.4.1 Status and Biological Context

This ESU includes all naturally spawned populations of spring/summer-run Chinook in the mainstem Snake River and the Tucannon River, Grande Ronde River, Imnaha River, and Salmon River subbasins (70 FR 37160; June 28, 2005) (see Figure 4-7). There are 15 artificial propagation programs for Chinook in this ESU.

Within the action area, adults and juveniles are present in the Columbia River and North Portland Harbor during upstream adult migration and downstream juvenile outmigration (see Table 4-6, Figure 4-1, and Figure 4-2). Adult spring-run Chinook migrate through the action area from approximately mid-February until the first week of June; adults classified as summer-run Chinook migrate through the action area from June through approximately mid-September (NMFS 2005a). Juveniles outmigrating to the ocean are potentially present in the action area between approximately February and August (CRC 2009). Individuals from this ESU are likely to be present in the Columbia River and North Portland Harbor in the action area from February through September and will probably be present during some periods of in-water work.

The extent to which SR spring/summer-run Chinook use the Columbia Slough is unknown; use is assumed to be similar to that of upriver Chinook ESUs, described above (COP 2009a).

SR spring/summer-run Chinook do not occur in Burnt Bridge Creek.

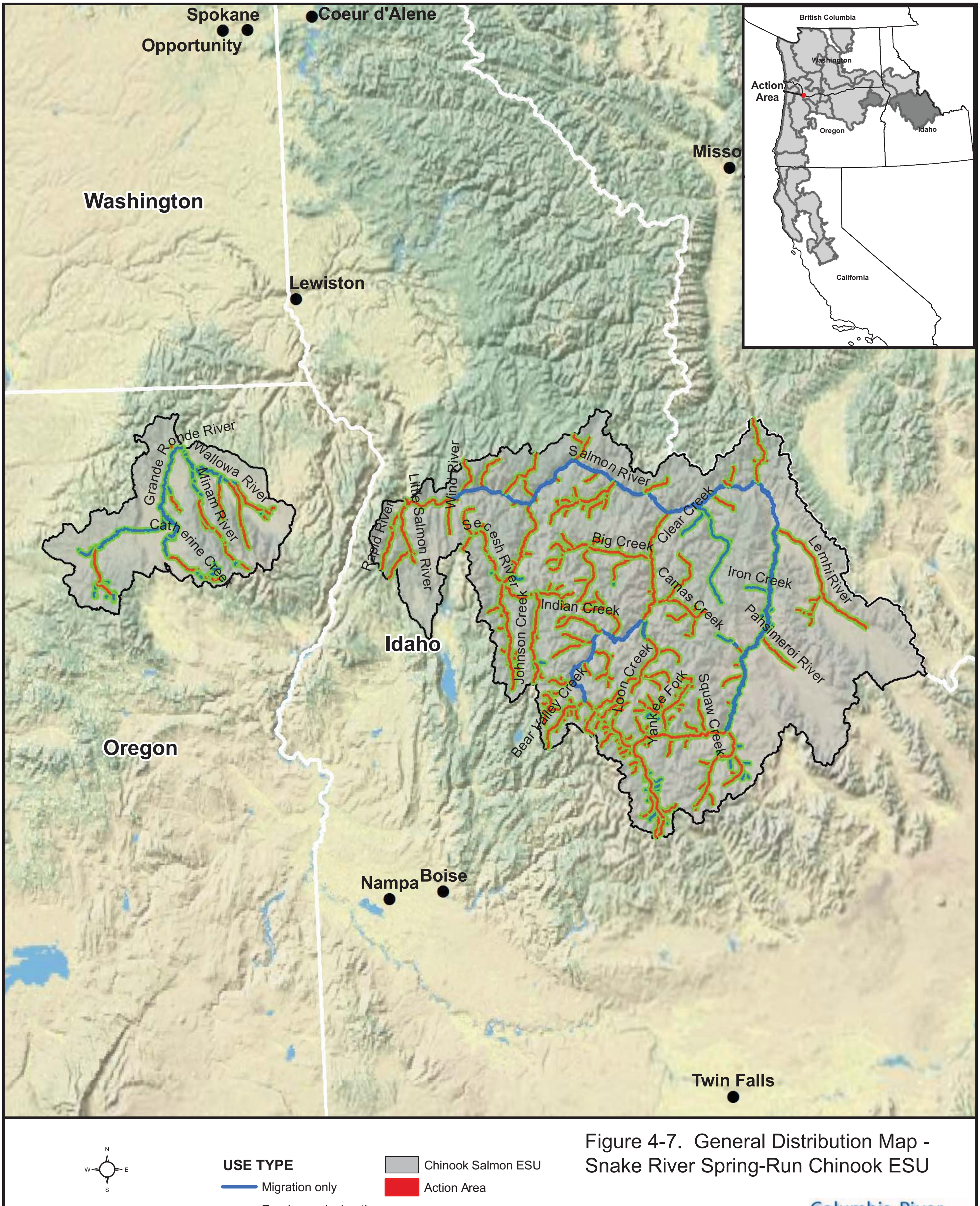


Figure 4-7. General Distribution Map - Snake River Spring-Run Chinook ESU

Map is intended to show distribution of the ESU, and not specific habitat use by life stage within the action area itself.

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Overall, average abundance of this ESU has been stable or increasing over the last 20 years. However, average abundance over the most recent 10-year period (1994-2004) is below the thresholds identified as the minimum for low risk (ICTRT 2007a). Abundance for most populations declined to extremely low levels in the mid-1990s, increased to levels near the recovery abundance thresholds for a few years in the early 2000s, and is now at levels intermediate to those of the mid-1990s and early 2000s. The geometric mean abundance of natural-origin fish for the 2001 to 2005 period was 25,957, compared to 4,840 for abundance of natural-origin fish for the 1996 to 2000 period, a 436 percent improvement (Fisher and Hinrichsen 2006). In 2007, jack counts (a qualitative indicator of future adult returns) were the second highest on record. However, on average, the natural-origin components of SR spring/summer-run Chinook populations have not replaced themselves (NMFS 2008e). Most populations in this ESU were determined to have a moderate long-term (100-year) risk of extinction; however, six populations were ranked at high risk and six populations were ranked at low risk of extinction (ICTRT 2007a).

Table 4-6 summarizes the abundance status and extinction risk for the various SR spring/summer-run Chinook populations.

Table 4-6. Summary of Status for SR Spring/Summer-Run Chinook

Population	Abundance Estimate (10-year Geometric Mean of Natural-Origin Spawners)	Viable Abundance Goal	Extinction Risk
Lower Snake (1997-2006)			
Tucannon	82	750	Moderate
Grande Ronde/Imnaha (1996-2005)			
Catherine Creek	107	1,000	Moderate
Lostine/Wallowa	276	1000	High
Minam	337	750	Moderate
Imnaha	380	750	Moderate
Wenaha	376	750	Moderate
Upper Grande Ronde	38	1,000	Moderate
South Fork Salmon (1994-2003)			
South Fork Mainstem	601	1,000	Moderate
Secesh (1996-2005)	403	750	Low
East Fork South Fork	105	1,000	Low
Little Salmon	Insufficient data	500	Insufficient data
Middle Fork Salmon (1995-2004)			
Big Creek	90	1,000	Low
Bear Valley/Elk Creek (1994-2003)	182	750	Moderate
Marsh Creek (1994-2003)	42	500	Low
Sulphur Creek (1994-2003)	21	500	Moderate

Population	Abundance Estimate (10-year Geometric Mean of Natural-Origin Spawners)	Viable Abundance Goal	Extinction Risk
Camas Creek	28	500	Moderate
Loon Creek	51	500	Moderate
Chamberlain Creek	Insufficient data	500	Low
Lower Middle Fork Salmon	Insufficient data	500	Moderate
Upper Middle Fork Salmon	Insufficient data	750	Insufficient data
	Upper Salmon (1996-2005)		
Lemhi (1994-2003)	79	2,000	High
Valley Creek (1994-2003)	34	500	Moderate
Yankee Fork (1994-2003)	13	500	High
Upper Salmon	246	1,000	Moderate
North Fork Salmon	Insufficient data	500	Low
Lower Salmon	103	2,000	Low
East Fork Salmon	148	1,000	High
Pahsimeroi	127	1,000	High
Estimated Total for These Populations	**3,869**	**23,250**	

Source: NMFS 2008e.

4.4.2 Limiting Factors

Limiting factors for SR spring/summer-run Chinook include federal and private hydropower projects, predation, harvest, poor passage through the estuary, ocean conditions, and degraded tributary habitat. Although hatchery management is not identified as a limiting factor for the ESU as a whole, hatchery impacts may be a factor for a few individual populations (NMFS 2008e; ICTRT 2007a).

4.4.3 Designated Critical Habitat

Critical habitat was designated for SR spring/summer-run Chinook on October 25, 1999 (64 FR 57399). The critical habitat designation includes the Columbia River rearing/migration corridor, which connects the ESU to the Pacific Ocean and includes the action area (Columbia River and North Portland Harbor).

The following PCEs occur within the action area (in the Columbia River and North Portland Harbor): juvenile migration corridors and adult migration corridors. Essential features of the juvenile migration corridor include substrate, water quality, water quantity, water velocity, cover/shelter, food, riparian vegetation, space, and safe passage conditions. See Section 5.4.2 for additional discussion of specific PCEs.

The migration corridor is considered to have a high conservation value for rearing and migrating juveniles and migrating adults. The PCEs are generally degraded due to mortality in the mainstem hydrosystem, lack of adequate pool and riffle channel structure in tributaries, high summer water temperatures, low flows, poor overwintering conditions due to loss of floodplain connection, and high sediment loads (NMFS 2008e).

4.5 UPPER WILLAMETTE RIVER CHINOOK

4.5.1 Status and Biological Context

This ESU includes all naturally spawned populations of spring-run Chinook in the Clackamas River and in the Willamette River, and its tributaries, above Willamette Falls, Oregon, as well as seven artificial propagation programs (see Figure 4-8) (70 FR 37160; June 28, 2005). All naturally spawned spring-run populations of Chinook (and their progeny) residing in these waterways are included in this ESU. Fall-run Chinook above Willamette Falls were introduced and are not considered part of this ESU (Myers et al. 1998).

The ESU is made up of seven historical populations: Clackamas, Molalla/Pudding, Calapooia, North Santiam, South Santiam, McKenzie, and the Middle Fork Willamette; Table 4-7 summarizes the status of each of these populations. Of these, significant natural production now occurs only in the Clackamas and McKenzie subbasins; the other naturally spawning populations are small and are dominated by hatchery-origin fish (NMFS 2008e).

UWR Chinook differ from other Columbia basin Chinook in both genetic composition and life history strategy (Schreck et al. 1986; Utter et al. 1989; Myers et al. 1998). Adult Chinook in this ESU are present in the action area from approximately late February through early May (Myers et al. 1998).

Table 4-7. Summary of Status for UWR Chinook

Population	Legacy[a,d]	Core[b,d]	Abundance Estimate (Natural-Origin Spawners, 1990–2006[e])	Viable Abundance Goal[c,e]	Extinction Risk[e]
			Upper Willamette		
Clackamas	No	Yes	500–6,000	2,900	Low
Molalla	No	No	<50	1,000–1,400	Very High
North Fork Santiam	No	Yes	<50	1,400–2,000	Very High
South Fork Santiam	No	No	<50	2,000–2,600	Very High
Calapooia	No	No	<50	1,000–1,400	Very High
McKenzie	Yes	Yes	900–5,800	3,100	Moderate
Middle Fork Willamette	No	Yes	<50	1,400–2,000	Very High
Estimated Total for These Populations			**1,400–11,800[f]**	**12,800–15,400**	

a Genetic Legacy designation by the Technical Recovery Team. Genetic legacy populations represent unique life histories or are relatively unchanged by hatchery influences.

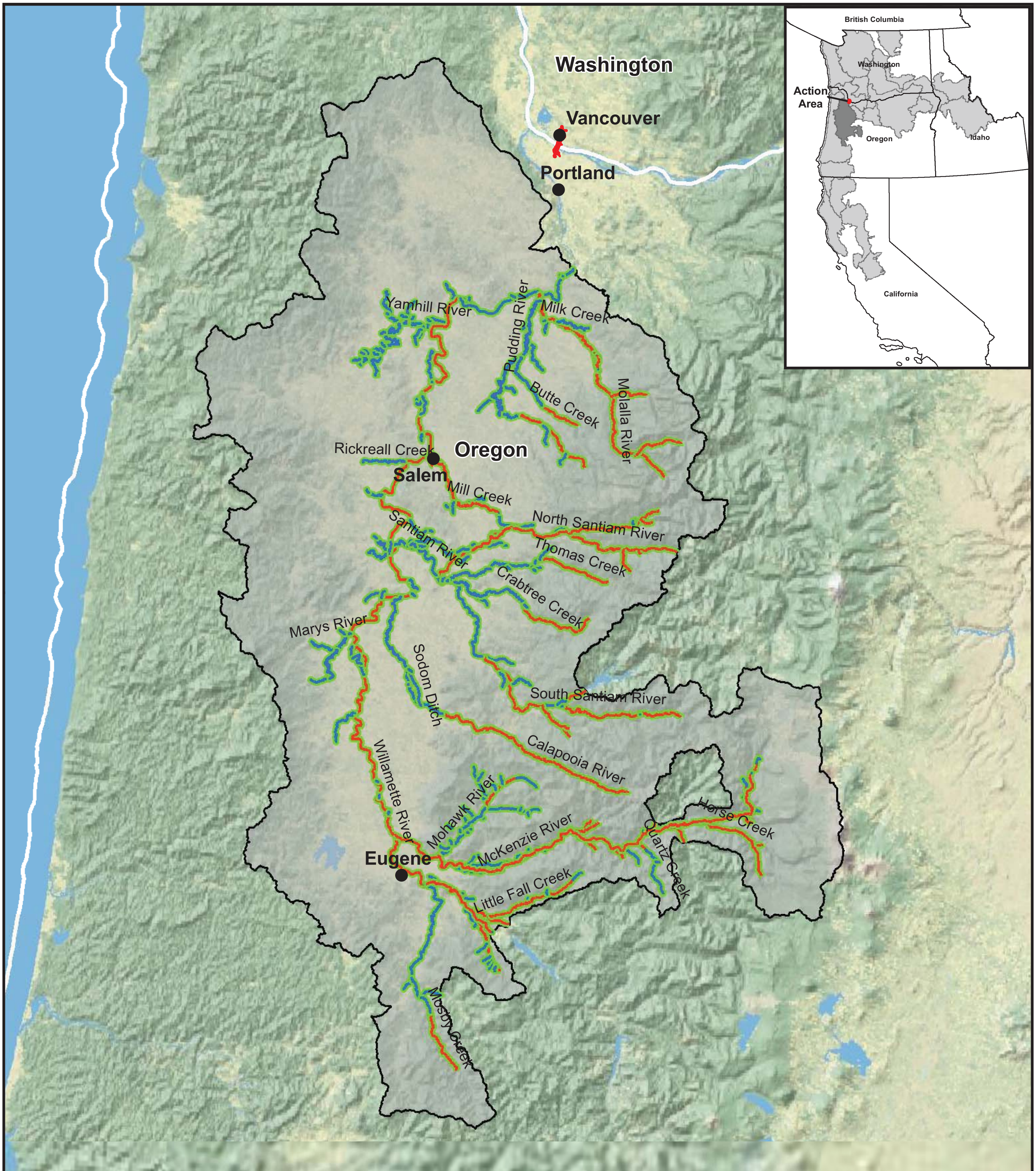
b Core population designation by Technical Recovery Team. Core populations were the largest historical populations and were key to metapopulation processes.

c The delisting goals for abundance are the average number of wild spawners expected for a population whose probability of declining below the critical risk threshold during a 100-year period is 5% or less (i.e., low extinction risk) (ODFW 2007b). NOTE: These abundance goals are Draft and may be revised when the newer version of the draft recovery plan is released in early 2010.

d Source: WLCTRT 2003.

e Source: ODFW 2007b.

f Lower bound does not include populations <50. Upper bound assumed to be unaffected by potential production from populations <50.



USE TYPE

- Migration only
- Rearing and migration
- Spawning and rearing
- Chinook Salmon ESU
- Action Area

Figure 4-8. General Distribution Map
Upper Willamette River
Chinook Salmon ESU

Map is intended to show distribution of the ESU, and not specific habitat use by life stage within the action area itself.

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Juveniles exhibit a diverse migratory life history in the lower Willamette River, with separate spring and fall emigration periods. Spring juvenile emigrants move through the action area from February through April (ODFW 2007a; Teel et al. 2009). Fall juvenile emigrants move into the lower Willamette mainstem in summer, rear through summer in the lower Willamette River, Columbia Slough, or lower reaches of other Willamette tributaries, and then emigrate in the fall, winter, or spring (ODFW 2007a). Juveniles may be present in the action area (Columbia Slough and Kelley Point area) at any time of year. They may use the action area to rest, forage, and find refuge from high flows in the Columbia.

UWR Chinook are documented in the action area year round, and may be present in the action area during in-water work. These Chinook use the action area as a rearing and migration corridor.

UWR Chinook also use seasonally wet areas of the Columbia Slough for juvenile rearing, foraging, and refuge from high flows (Teel et al. 2009). Habitat use and timing are similar to those for other Chinook ESUs, as described earlier (i.e., juveniles are not present during summer months when water temperatures exceed tolerance thresholds) (COP 2009a).

UWR Chinook do not occur in North Portland Harbor or Burnt Bridge Creek (see Figure 4-8) (70 FR 37160).

Abundance of UWR spring-run Chinook is extremely depressed (McElhany et al. 2007). Historically, this run may have exceeded 275,000 fish (Myers et al. 1998). Most of the natural-origin populations in this ESU have very low current abundances (less than a few hundred fish), and many have been largely replaced by hatchery production. The current abundance of naturally produced fish is less than 10,000 fish, and only the McKenzie and Clackamas River populations contribute significantly to this estimate (NMFS 2008e). Long- and short-term abundance trends are negative (NMFS 2008e). This ESU has been characterized as having a high risk of extinction (McElhany et al. 2007).

4.5.2 Limiting Factors

Limiting factors for UWR Chinook include habitat loss and degradation, hatchery effects, fishery management and harvest decisions, and predation (NMFS 2008e). Dams and other barriers within the river influence sedimentation, flows, temperatures, and water quality. Native spring-run Chinook above Willamette Falls declined in abundance and distribution after construction of the numerous Willamette Valley dams; development of dams on the McKenzie, Santiam, and Middle Fork Willamette Rivers resulted in a loss of approximately 50 percent of historic Chinook habitat (WRI 2004).

The introduction of fall-run Chinook into the basin and the construction of fish ladders at Willamette Falls increased the potential for genetic introgression between wild spring-run and hatchery fall-run Chinook. However, there is no direct evidence of hybridization between these two runs (WRI 2004).

Chinook harvest levels also constitute a limiting factor for species recovery. Harvest on this ESU is high, both in the ocean and in freshwater (NOAA Fisheries 2003).

4.5.3 Designated Critical Habitat

Critical habitat was designated for UWR Chinook on September 2, 2005 (70 FR 52630), and is present in the action area in the Columbia River near its confluence with the Willamette River at Kelley Point.

The action area contains three PCEs: freshwater migration, freshwater rearing, and estuarine areas.

The migration corridor is considered to have a high conservation value for rearing and migrating juveniles and migrating adults. The PCEs are generally degraded due to mortality in the mainstem hydrosystem, lack of adequate pool and riffle channel structure in tributaries, high summer water temperatures, low flows, poor overwintering conditions due to loss of floodplain connection, and high sediment loads (NMFS 2008e).

4.6 LOWER COLUMBIA RIVER STEELHEAD

4.6.1 Status and Biological Context

This DPS includes all naturally spawned anadromous steelhead populations below natural and manmade impassable barriers in tributaries to the Columbia River between (and including) the Cowlitz and Wind Rivers in Washington, and the Willamette and Hood Rivers in Oregon (71 FR 834, January 5, 2006) (see Figure 4-9). There are 10 artificial propagation programs for steelhead in this DPS.

In the lower Columbia River basin, migrating adult steelhead can occur in the action area year-round. Steelhead can be classified into summer and winter runs. Of the 25 extant populations in this DPS, 6 are summer runs and 19 are winter runs. Returning adults of both runs are 4–6 years of age. Summer-run steelhead return to the Columbia River between May and October, and require several months in fresh water to reach sexual maturity and spawn. Spawning typically occurs between January and June (NMFS 2005a; CRC 2009). Winter-run steelhead return to the Columbia River between November and May as sexually mature individuals that spawn shortly after returning to fresh water (NMFS 2005a; CRC 2009).

In river systems that contain both summer- and winter-run fish, those with summer-run life history strategies usually spawn higher in the watershed than those of winter runs. In rivers where both winter and summer runs occur, they may be separated by a seasonal hydrologic barrier (e.g., a waterfall). Coastal streams are typically occupied by winter-run steelhead, and interior subbasins are typically occupied by summer-run steelhead. Historically, winter-run steelhead may have been excluded from interior Columbia River subbasins by Celilo Falls (NMFS 2005a).

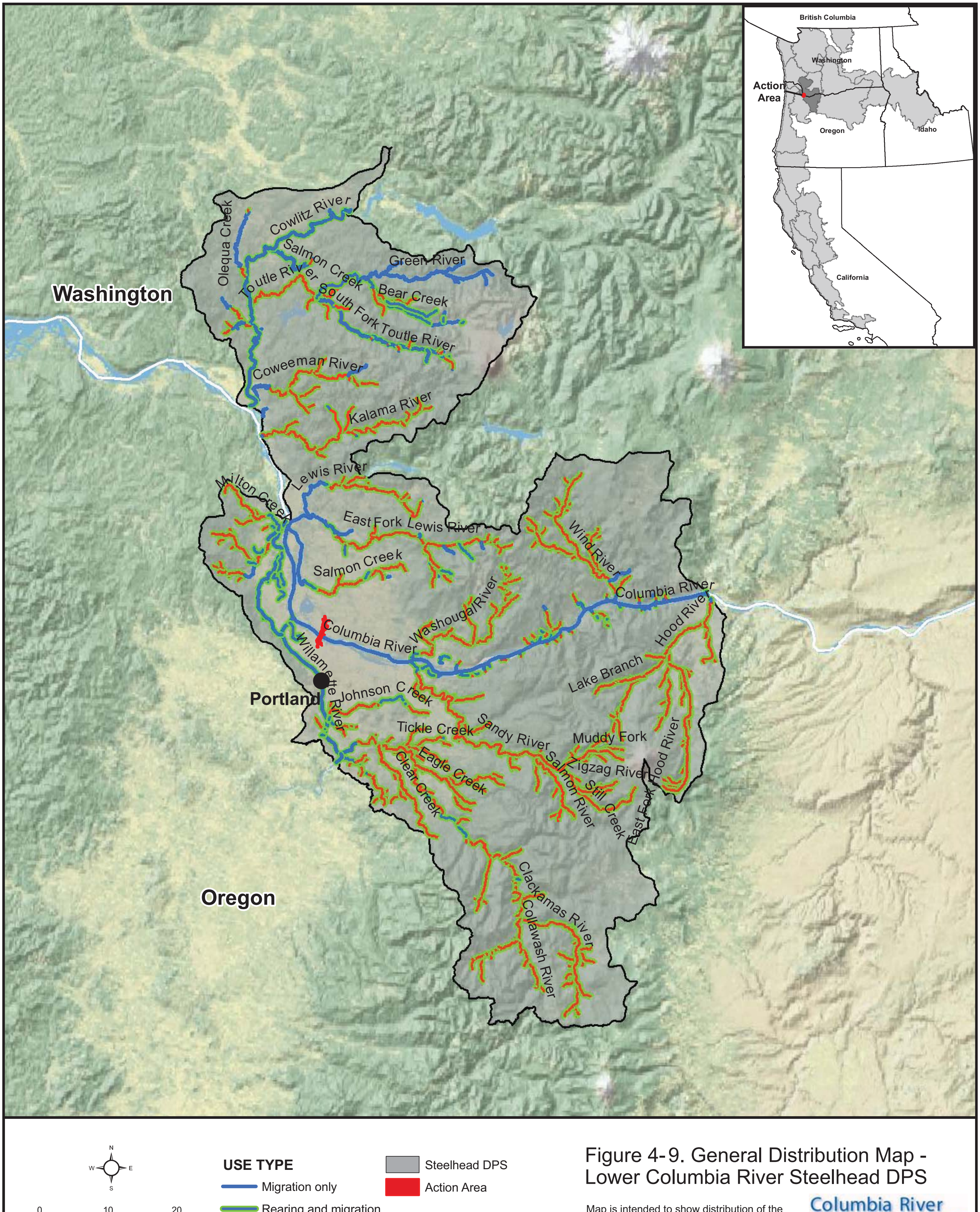

Figure 4-9. General Distribution Map - Lower Columbia River Steelhead DPS

Map is intended to show distribution of the DPS, and not specific habitat use by life stage within the action area itself.

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LCR steelhead use the Columbia River within the action area for migration, holding, and rearing. Steelhead typically rear in freshwater tributaries for 1 to 4 years prior to outmigration, and spend limited time rearing in the lower mainstem Columbia River (Quinn 2005, as cited in Carter et al. 2009). Rearing winter-run steelhead use the lower Columbia River year-round (CRC 2009). Rearing habitat is limited in the action area, but is present in off-channel areas downstream of the existing I-5 bridge (e.g., accessible areas of small tributaries, backwater areas, and other low-velocity refugia).

Outmigrating juvenile winter-run steelhead are present in the action area from mid-February through November; outmigrating juvenile summer-run steelhead are present in the action area from March to September (CRC 2009). Juvenile steelhead abundance in the Columbia River estuary peaks between late May and mid-June (Carter et al. 2009). Outmigrating kelts (adults that have spawned and are returning to the ocean) pass through the action area in March and April, and are primarily summer-run steelhead (Boggs et al. 2008.). Given that LCR steelhead are documented in the Columbia River and North Portland Harbor year-round, they are likely to be present during in-water work.

Some evidence suggests that steelhead occur within the Burnt Bridge Creek portion of the action area. Surveys conducted in April and May 2003 documented juvenile steelhead within or immediately upstream and downstream of the action area: eight juvenile steelhead were observed between the mouth of Burnt Bridge Creek and Nicholson Road (a stream reach of approximately 3.5 miles, extending about 1.5 miles upstream of I-5), three at Leverich Park (within the action area), and one at the Second Avenue bridge (less than 0.50 mile downstream of I-5) (PSMFC 2003). Some suitable spawning habitat is present in the action area in Burnt Bridge Creek, and steelhead may use the creek for spawning and migration. Rearing steelhead may be present in the action area year-round. However, the water temperature during the summer months is often above the range tolerated by steelhead, and seasonal barriers may limit access to the action area in certain flows (see discussion on passage barriers in Section 4.1.1) (WDFW 2007a).

LCR steelhead are known to use the Columbia Slough up to NE 18th Avenue, including the action area. LCR steelhead use the Columbia Slough for rearing, holding, and migration only, as spawning habitat is absent from the Slough (COP 2009a). Timing in the Slough is similar to that previously described for Chinook ESUs (i.e., juveniles are not present during summer months when water temperatures exceed tolerance thresholds) (COP 2009a).

There are four major population groups in this DPS: Cascade summer, Gorge summer, Cascade winter, and Gorge winter. These are further divided into subpopulations (see Table 4-8), all of which migrate through the action area. Wild steelhead in the lower Columbia basin, although depressed from historical levels, are generally thought to occur in most of their historical range (McElhany et al. 2007). However, many of the populations in this DPS are small, and many of the long- and short-term trends in abundance of individual populations are negative to severely negative (see Table 4-8). Many of the populations also have a significant component of hatchery-origin spawners. Exceptions include several populations which have few hatchery fish spawning in natural spawning areas; however, these populations have relatively low recent abundance estimates (NMFS 2008e). Most populations of LCR steelhead have a high risk of extinction (McElhany et al. 2007) (see Figure 4-10).

Table 4-8. Summary of Status for LCR Steelhead in the CRC Project Area (Subpopulations Occurring Within or Above the Action Area Only)

Subpopulation	Legacy[a,c]	Core[b,c]	Abundance Estimate (4-year Average of Natural-Origin Spawners)		Viable Abundance Goal[d]	Current Viability[d]	Extinction Risk[d]
			LCFRB 2004	NMFS 2008e			
Cascade Winter							
Washougal	No	No	421	323	600	Low	High
Clackamas	No	Yes	277	1,168	1,000	Low	Moderate
Sandy	No	Yes	589	1,040	1,800	Low	High
Gorge Winter							
Lower Gorge Tributaries (Hardy)	No	No	Not available		200	Low	High
Upper Gorge Tributaries (Wind)	No	No	Not available		100	Low	Moderate-High
Hood	Yes	Yes	436	756	1,400	Low	Moderate-High
Cascade Summer							
Washougal	Yes	Yes	136	264	500	Low	High
Gorge Summer							
Wind	No	Yes	391	472	1,200	Med	Moderate
Hood	No	No	154	195	600	Low	High-Very High
Estimated Total for These Populations			**2,404**	**4,218**	**7,400**		

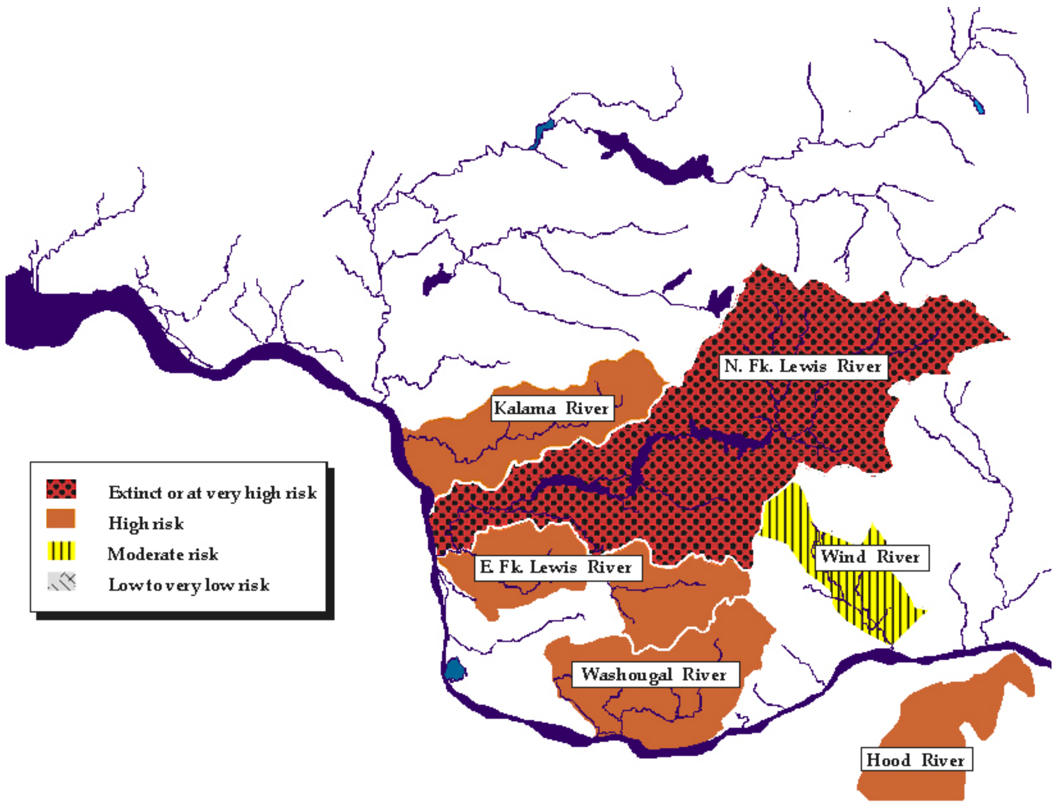
a Genetic Legacy designation by the Technical Recovery Team. Genetic legacy populations represent unique life histories or are relatively unchanged by hatchery influences.

b Core population designation by Technical Recovery Team. Core populations were the largest historical populations and were key to metapopulation processes.

c Source: WLCTRT 2003.

d Source: LCFRB 2004.

e Source: McElhany et al. 2007.



SOURCE: Lower Columbia River Fish Recovery Board 2004.
Lower Columbia Salmon Recovery and Fish & Wildlife Subbasin Plan

Figure 4-10.
Extinction Risk - Lower Columbia River Steelhead DPS

Columbia River CROSSING

4.6.2 Limiting Factors

Limiting factors for this DPS include habitat degradation (including tributary hydropower development), hatchery effects, fishery management and harvest decisions, and ecological factors, including predation. Tributary habitat has been degraded by extensive development and other effects of changing land use. This has adversely affected stream temperatures and reduced the habitat diversity needed for steelhead spawning, incubation, and rearing. All populations are affected by habitat degradation in the Columbia River mainstem and estuary (NMFS 2008e).

4.6.3 Designated Critical Habitat

Critical habitat was designated for LCR Steelhead on September 2, 2005 (70 FR 52630) and is present in the action area in the Columbia River and North Portland Harbor. Designated critical habitat also occurs in the Columbia Slough, but ends roughly 3.4 miles downstream of I-5 and is therefore outside of the action area.

The action area contains the following PCEs: freshwater rearing, freshwater migration, and estuarine areas.

The critical habitat designation includes the Columbia River rearing/migration corridor, which is considered to have a high conservation value. This corridor connects the DPS with the ocean and is used by rearing and migrating juveniles and migrating adults. The Columbia River estuary is an essential area for juveniles and adults making the physiological transition between life in freshwater and marine habitats (NMFS 2005a). The PCEs within the action area are of generally poor quality due to altered channel morphology and stability, lost and/or degraded floodplain connectivity, loss of habitat diversity, excessive sediment, degraded water quality, increased stream temperatures, reduced stream flow, and reduced access to spawning and rearing areas.

4.7 MIDDLE COLUMBIA RIVER STEELHEAD

4.7.1 Status and Biological Context

This DPS includes all naturally spawned anadromous steelhead populations below natural and manmade impassable barriers in tributaries from above the Wind River, Washington, and the Hood River, Oregon, upstream to (and including) the Yakima River, Washington (see Figure 4-11) (71 FR 834; January 5, 2006). (Steelhead from the Snake River basin and the Wind and Hood Rivers are not considered part of this DPS.) There are seven artificial propagation programs for steelhead in this DPS.

Middle Columbia River (MCR) steelhead are predominantly summer-run fish, and use the Columbia River within the action area for migration and holding. Returning adults in this DPS are present in the action area from May through October (see Figure 4-1). Outmigrating juveniles are present in the action area from approximately March to June (see Figure 4-2) (CRC 2009). Outmigrating kelts pass through the action area in March and April, and are primarily summer-run steelhead (Boggs et al. 2008).

MCR steelhead are likely to be present in the Columbia River and North Portland Harbor during the time that in-water work will take place.

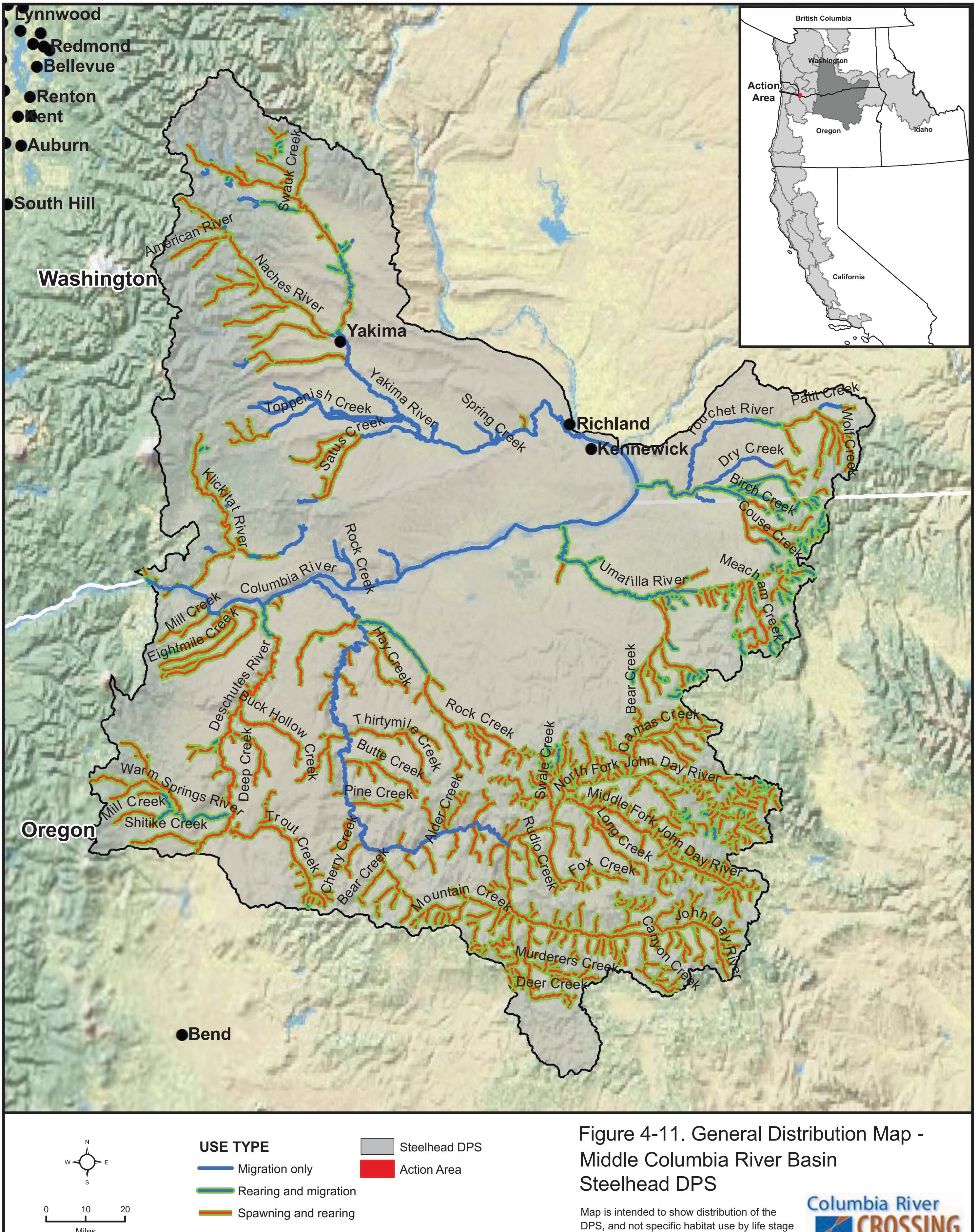


Figure 4-11. General Distribution Map - Middle Columbia River Basin Steelhead DPS

Map is intended to show distribution of the DPS, and not specific habitat use by life stage within the action area itself.

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The extent to which MCR steelhead use the Columbia Slough is unknown; however, use is assumed to be similar to that described for LCR steelhead (i.e., juveniles may be present, except during summer months when water temperatures exceed tolerance thresholds) (COP 2009a).

MCR steelhead do not occur in Burnt Bridge Creek.

The DPS consists of 14 populations, all of which migrate through the action area. During the most recent 10-year period for which trends in abundance could be estimated, trends were positive for approximately half of the populations and negative for the remainder. For 3 of the 14 populations with estimates of recent abundance, average abundance over the most recent 10-year period is above the thresholds identified as a minimum for low risk (ICTRT 2007a). The Interior Columbia Technical Recovery Team (ICTRT) considers the remaining 11 populations to be low risk (see Table 4-9). Abundance for most populations was relatively high during the late 1980s, declined to low levels in the mid-1990s, and increased to levels similar to the late 1980s during the early 2000s. On average, when only natural production is considered, most of the populations in this DPS have replaced themselves (NMFS 2008e). Most populations in this DPS have a low or moderate long-term (100-year) risk of extinction; however, one population has very low risk and five populations have high risk (ICTRT 2007a).

Table 4-9. Summary of Status for MCR Steelhead

Population	Abundance Estimate (10-year Geometric Mean of Natural-Origin Spawners)	Abundance Range	Viable Abundance Goal	Current Viability	Extinction Risk
Cascade Eastern Slope Tributaries					
Deschutes R. West	456	108-1,283	1,000	High Risk	High
Deschutes R. East	1,599	299-8,274	1,000	Viable	Medium
Klickitat	Insufficient data	Insufficient data	1,000	Maintained	Moderate
Fifteenmile Creek	703	231-1,922	500	Viable	Low
Rock Creek	Insufficient data	Insufficient data	500	High Risk	High
Yakima River					
Upper Yakima	85	34-283	1,500	High Risk	High
Naches	472	142-1,454	1,500	High Risk	High
Toppenish	322	44-1,252	500	Maintained	Moderate
Satus Creek (Tributary Only)	379	138-1,000	1,000	Maintained	Moderate
John Day River					
Lower Mainstem John Day	1,800	563-6,257	2,250	Maintained	Moderate
North Fork John Day	1,740	369-10,235	1,500	Highly Viable	Very Low
Upper Mainstem John Day	524	185-5,169	1,000	Maintained	Moderate
Middle Fork John Day	756	195-3,538	1,000	Maintained	Moderate
South Fork John Day	259	76-2,729	500	Maintained	Moderate

Population	Abundance Estimate (10-year Geometric Mean of Natural-Origin Spawners)	Abundance Range	Viable Abundance Goal	Current Viability	Extinction Risk
		Umatilla/Walla Walla			
Umatilla	1,472	592-3,542	1,500	Maintained	Moderate
Walla Walla Mainstem	650	270-1,746	1,000	Maintained	Moderate
Touchet	Insufficient data	Insufficient data	1,000	High Risk	High
Estimated Total for These Populations	**11,217**	**3,246-48,684**	**22,000**		

Source: NMFS 2009a.

4.7.2 Limiting Factors

Limiting factors for MCR steelhead include mainstem hydropower projects, degradation and loss of tributary habitat, water storage projects, predation, hatchery effects, harvest, and ocean and estuary conditions.

4.7.3 Designated Critical Habitat

Critical habitat was designated for MCR steelhead on September 2, 2005 (70 FR 52630), and is present in the action area in the Columbia River and North Portland Harbor.

PCEs present in the action area include: freshwater migration and estuarine areas.

The critical habitat designation includes the Columbia River migration corridor, which connects the DPS with the ocean. The corridor is considered to have a high conservation value for rearing and migrating juveniles and migrating adults. PCEs in the action area are limited by degradation of tributary habitat conditions, dams, water diversions, roads and railways, agriculture (including livestock grazing), residential development, and forest management in some locations in the upper Columbia basin (NMFS 2008e).

4.8 UCR STEELHEAD

4.8.1 Status and Biological Context

This DPS includes all naturally spawned anadromous steelhead populations below natural and manmade impassable barriers in tributaries in the Columbia River Basin upstream from the Yakima River, Washington, to the Canadian border (NMFS 2008a) (see Figure 4-12). There are six artificial propagation programs for steelhead in this DPS.

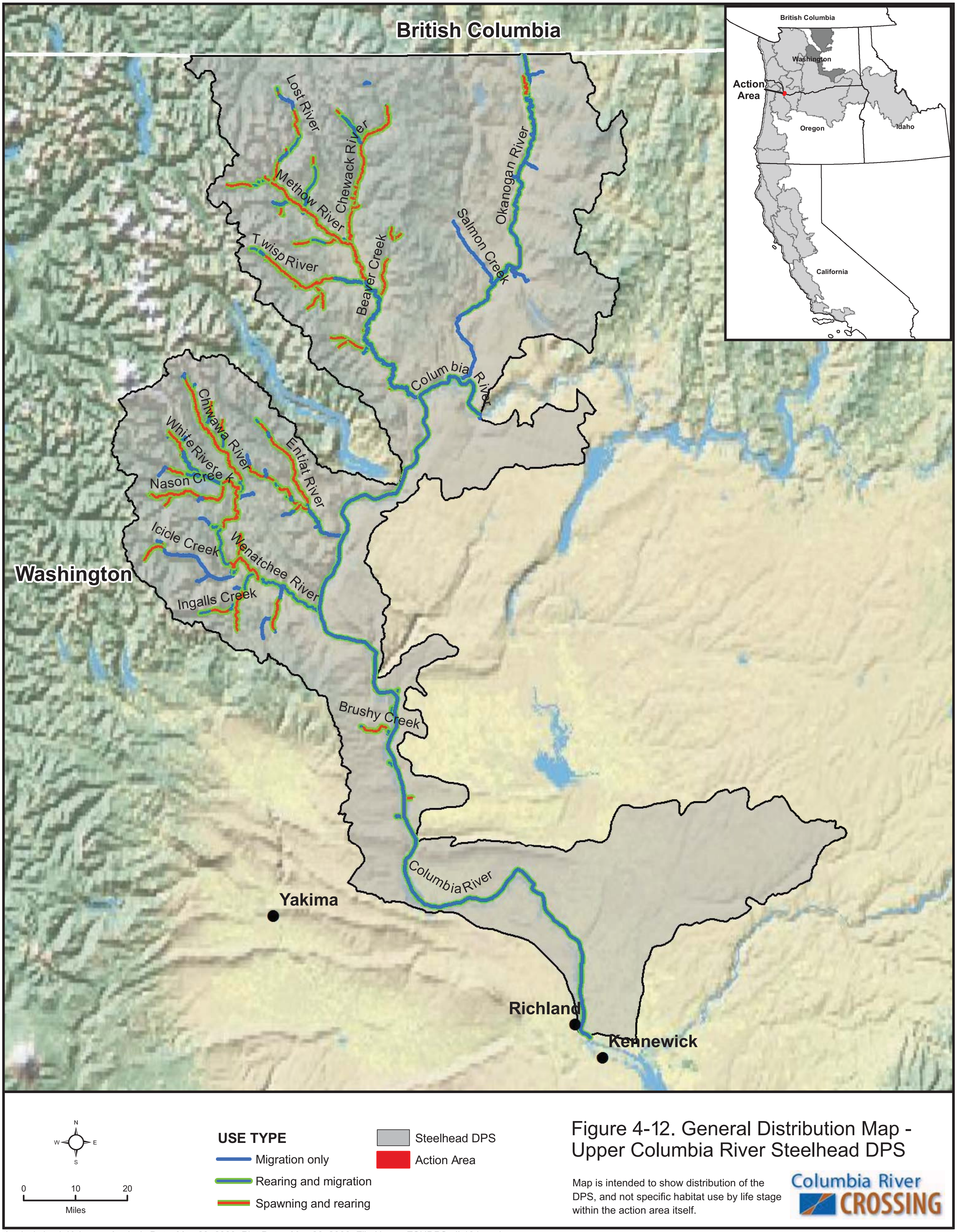


Figure 4-12. General Distribution Map - Upper Columbia River Steelhead DPS

Map is intended to show distribution of the DPS, and not specific habitat use by life stage within the action area itself.

Columbia River CROSSING

Analysis by J. Koloszar; Analysis Date: May 20, 2009; Plot Date: May 20, 2009; File Name: ESUDPS_JL194.mxd

UCR steelhead are entirely summer-run fish, and use the Columbia River within the action area for migration and holding (see Figure 4-1 and Figure 4-2). Returning adults are present in the action area from May through October. Juveniles tend to rear higher in the watershed than steelhead juveniles from the Lower and Middle Columbia River DPSs (NMFS 2005a). Outmigrating juveniles are present in the action area from approximately March to late June (CRC 2009). Outmigrating kelts pass through the action area in March and April, and are primarily summer-run steelhead (Boggs et al. 2008.). Overall, UCR steelhead are likely to be present in the action area (Columbia River and North Portland Harbor) from March to October and are likely to be present during in-water work.

The extent to which UCR steelhead use the Columbia Slough is unknown; use is assumed to be similar to that described for previous steelhead DPSs.

UCR steelhead may also use the Willamette River en route to seasonally wet areas of the Slough.

UCR steelhead do not occur in Burnt Bridge Creek.

This DPS includes four populations, all of which migrate through the action area. For all populations, abundance over the most recent 10-year period is below the minimum threshold for recovery (ICTRT 2007a) (see Table 4-10). Abundance for most populations declined to extremely low levels in the mid-1990s, increased to levels above or near the recovery abundance thresholds (all populations except the Okanogan) in a few years in the early 2000s, and is now at levels intermediate to those of the mid-1990s and early 2000s. Abundance since 2001 has substantially increased for the DPS as a whole. All populations in this DPS were determined to have a high long-term (100-year) risk of extinction (ICTRT 2007a).

Table 4-10. Summary of Status for UCR Steelhead

Population	Abundance Estimate (10-year Geometric Mean of Natural-Origin Spawners, 1997-2006)	Viable Abundance Goal	Extinction Risk
Eastern Cascades			
Wenatchee	900	1,000	High
Methow	281	1,000	High
Entiat	94	500	High
Okanogan	104	1,000	High
Estimated Total for These Populations	**1,379**	**3,500**	

Source: NMFS 2008e

4.8.2 Limiting Factors

The key limiting factors and threats for this DPS include hydropower projects, predation, harvest, hatchery effects, degraded tributary habitat, ocean conditions, and degraded estuary habitat.

4.8.3 Designated Critical Habitat

Critical habitat was designated for UCR steelhead on September 2, 2005 (70 FR 52630). The critical habitat designation includes the Columbia River rearing/migration corridor, which connects the DPS to the Pacific Ocean and includes the action area (Columbia River and North Portland Harbor). The action area contains the following PCEs: freshwater migration and estuarine areas.

The Columbia River rearing/migration corridor is considered to have a high conservation value for rearing and migrating juveniles and migrating adults. The Columbia River estuary is an essential area for juveniles and adults making the physiological transition between life in freshwater and marine habitats (NMFS 2005a). Factors such as dams, diversions, roads and railways, agriculture (including livestock grazing), residential development, and forest management threaten the conservation value of the PCEs in the action area (NMFS 2008e).

4.9 SR STEELHEAD

4.9.1 Status and Biological Context

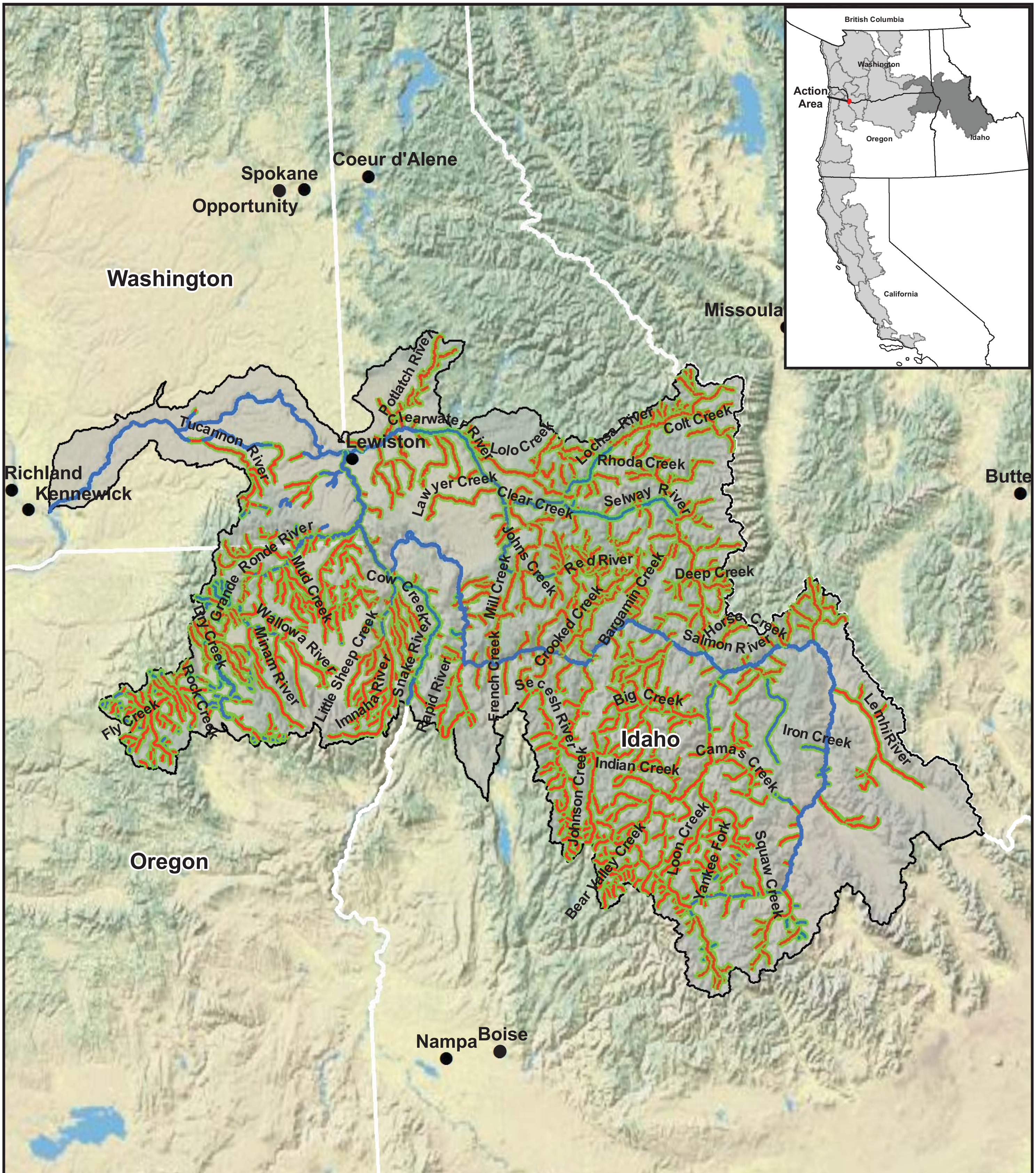
This DPS includes all naturally spawned anadromous steelhead populations below natural and manmade impassable barriers in tributaries in the Snake River basin of southeast Washington, northeast Oregon, and Idaho (71 FR 834; January 5, 2006) (see Figure 4-13). There are six artificial propagation programs for steelhead in this DPS.

SR steelhead are generally classified as summer-run, based on their adult run timing patterns. Adults use the Columbia River within the action area for migration and holding, and are present between June and October (see Figure 4-1 and Figure 4-2). Juveniles of this DPS tend to rear higher in the watershed than steelhead that occupy lower tributaries of the Columbia River. Outmigrating juveniles are present in the action area from March to late June (CRC 2009). Outmigrating kelts pass through the action area in March and April, and are primarily summer-run steelhead (Boggs et al. 2008.).

The extent to which SR steelhead use the Columbia Slough is unknown. Use is assumed to be similar to that described for other steelhead DPSs in the action area.

SR steelhead may also use the Willamette River en route to seasonally wet areas of the Slough.

SR steelhead do not occur in Burnt Bridge Creek.



N W E S

0 20 40
Miles

USE TYPE

Migration only

Rearing and migration

Spawning and rearing

Steelhead DPS

Action Area

Figure 4-13. General Distribution Map - Snake River Steelhead DPS

Map is intended to show distribution of the DPS, and not specific habitat use by life stage within the action area itself.

Columbia River CROSSING

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Numerous SR steelhead subpopulations migrate through the action area (see Table 4-11). Specific adult abundance estimates are generally not available for SR steelhead due to difficulties conducting surveys in much of their range. Population-specific estimates for this DPS are supplemented with Lower Granite Dam counts (see Table 4-11). Abundance declined to low levels in the mid-1990s, increased to levels at or above the recovery abundance thresholds for a few years in the early 2000s, and are now at levels intermediate to those of the mid-1990s and early 2000s.[1] Overall, the abundance of SR steelhead has been stable or increasing for most populations during the last 20 brood cycles. Most populations in this DPS were determined to have a high long-term (100-year) risk of extinction (ICTRT 2007a).

Table 4-11. Summary of Status for SR Steelhead

Population	Abundance Estimate (10-year Geometric Mean of Natural-Origin Spawners)[a]	Recovery Abundance Threshold[b]	Extinction Risk[c]
Average “A-Run” Populations (1995–2004)	456	1,000	Insufficient data
Average “B-Run” Populations (1995–2004)	272	1,000	Insufficient data
	Lower Snake		
Tucannon (A, but below Lower Granite)	Insufficient data	Insufficient data	Moderate
Asotin (A)	Insufficient data	Insufficient data	Moderate
	Imnaha		
Imnaha (A)	Insufficient data	1,000	Moderate
	Grande Ronde		
Upper Mainstem (1997–2006) (A)	1,226	1,500	Moderate
Lower Mainstem (A)	Insufficient data	1,000	Insufficient data
Joseph Creek (1996–2005) (A)	2,132	500	Low
Wallowa River (A)	Insufficient data	1,000	Moderate
	Clearwater River		
Lower Mainstem (A)	Insufficient data	Insufficient data	High
Lolo Creek (A and B)	Insufficient data	Insufficient data	High
Lochsa River (B)	Insufficient data	Insufficient data	High
Selway River (B)	Insufficient data	Insufficient data	High
South Fork (B)	Insufficient data	Insufficient data	High
	Salmon River		
Little Salmon/Rapid (A)	Insufficient data	Insufficient data	Moderate
Chamberlain Creek (A)	Insufficient data	Insufficient data	High
Secesh River (A)	Insufficient data	Insufficient data	High
South Fork Salmon (B)	Insufficient data	Insufficient data	High

[1] Using 10-year geometric mean abundance estimates for two populations in the Grande Ronde major population group (MPG), average abundance can be used as an indicator for the other populations. MPGs were defined as sets of populations that share genetic, geographic (hydrographic), and habitat characteristics within the ESU (ICTRT 2007a). For the two Grande Ronde MPG populations, one recent average abundance estimate exceeds the abundance threshold and the second is below the threshold. Both are below the average abundance thresholds identified as a minimum for low risk.

Population	Abundance Estimate (10-year Geometric Mean of Natural-Origin Spawners)[a]	Recovery Abundance Threshold[b]	Extinction Risk[c]
Panther Creek (A)	Insufficient data	Insufficient data	High
Lower Middle Fork Tributaries (B)	Insufficient data	Insufficient data	High
Upper Middle Fork Tributaries (B)	Insufficient data	Insufficient data	High
North Fork (A)	Insufficient data	Insufficient data	Moderate
Lemhi River (A)	Insufficient data	Insufficient data	Moderate
Pahsimeroi River (A)	Insufficient data	Insufficient data	Moderate
East Fork Salmon (A)	Insufficient data	Insufficient data	Moderate
Upper Mainstem (A)	Insufficient data	Insufficient data	Moderate
Estimated Total for These Populations	**Insufficient data**	**Insufficient data**	

a Source: NMFS 2008e.

b Source: NMFS 2008e; ICTRT abundance thresholds are average abundance levels that would be necessary to meet ICTRT viability goals at <5% risk of extinction.

c Source: NMFS 2006c.

4.9.2 Limiting Factors

Historically, the key limiting factors for SR steelhead include hydropower projects, predation, harvest, hatchery effects, ocean conditions, and tributary habitat.

4.9.3 Designated Critical Habitat

Critical habitat was designated for SR steelhead on September 2, 2005 (70 FR 52630). The critical habitat designation includes the Columbia River rearing/migration corridor, which connects the DPS to the Pacific Ocean and includes the action area (the Columbia River and North Portland Harbor).

The action area contains the following PCEs: freshwater migration, and estuarine areas.

The Columbia River rearing/migration corridor is considered to have a high conservation value for rearing and migrating juveniles and migrating adults. The Columbia River estuary is an essential area for juveniles and adults making the physiological transition between life in freshwater and marine habitats (NMFS 2005a). The PCEs are generally degraded due to mortality from the mainstem dams, lack of adequate pool and riffle channel structure in tributaries, high summer water temperatures, low flows, poor overwintering conditions due to loss of floodplain connection, and high sediment loads (NMFS 2008e).

4.10 UWR STEELHEAD

4.10.1 Status and Biological Context

This DPS includes all naturally spawned winter-run steelhead populations below natural and manmade barriers in the Willamette River and its tributaries from Willamette Falls upstream to the Calapooia River (inclusive) (see Figure 4-14). NMFS originally listed this DPS as threatened on March 25, 1999, and reaffirmed its status on January 5, 2006 (71 FR 834). There are four subpopulations of the UWR steelhead: the Molalla, North Santiam, South Santiam, and Calapooia—all use the action area. Table 4-12 summarizes the status of these populations.

Within the action area, UWR steelhead are likely to be present in the Columbia River and Columbia Slough. They are likely to use the action area only when they are migrating into or out of the mouth of the Willamette River (approximately late February to early June for adults, April through June for juveniles).

UWR steelhead do not use North Portland Harbor or Burnt Bridge Creek (70 FR 37160) (see Figure 4-14).

Steelhead of this DPS are late-migrating winter-run steelhead, entering fresh water primarily in March and April (Howell et al. 1985, as cited in 63 FR 11797) and entering the mouth of the Willamette River from March through May (Busby et al. 1996). Winter-run steelhead historically occurred above Willamette Falls, while summer-run steelhead did not. Juvenile outmigration past Willamette Falls occurs between early April and early June (Howell et al. 1985), with migration peaking in early to mid-May. Steelhead juveniles generally migrate away from the shoreline and enter the Columbia via Multnomah Channel rather than the mouth of the Willamette. Most spend 2 years in the ocean before re-entering fresh water to spawn (Busby et al. 1996). Steelhead in this DPS generally spawn once or twice. Repeat spawners are predominantly female and generally account for less than 10 percent of the total run size (Busby et al. 1996).

Population counts of this DPS have been reduced from historical levels, due in part to the alteration and reduction of spawning and rearing habitat associated with hydropower development. Willamette Falls (at RM 26.5/RKm 42.7) is a known migration barrier. All populations migrate through and rear in the Willamette River and are relatively small, with the recent mean abundance of the entire DPS at less than 6,000 (Good et al. 2005). Based on recent analyses of the population criteria, the species risk of extinction is moderate, with the highest risk category being genetic diversity (McElhany et al. 2007).