Final Assessment of NOAA Fisheries' Critical Habitat Analytical Review Teams For 12 Evolutionarily Significant Units of West Coast Salmon and Steelhead

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EXECUTIVE SUMMARY

This report contains biological assessments supporting NOAA Fisheries, Northwest Region's (NWR) designation of critical habitat under section 4 of the Endangered Species Act for 12 listed salmon and steelhead evolutionarily significant units (ESU).[1] The NOAA Fisheries NWR grouped the ESUs under review in Washington, Oregon, and Idaho into four geographic domains for the purpose of assessing critical habitat. For each domain the agency convened a critical habitat analytical review team (CHART) charged with analyzing the best available data for each ESU to make findings regarding the presence of essential habitat features in each watershed, potential management actions that may affect those features, and the conservation value of each watershed within each ESU's range. This report summarizes the agency's mapping efforts, methods and information used, and final CHART assessments for these 12 ESUs. This information will be used in conjunction with other agency analyses (e.g., economic analyses) to support NOAA Fisheries' final critical habitat designations.

[1] The 12 salmon and steelhead species addressed in this report include the following evolutionarily significant units (ESU) of West Coast salmon and steelhead: (1) Puget Sound chinook salmon; (2) Lower Columbia River chinook salmon; (3) Upper Willamette River chinook salmon; (4) Upper Columbia River spring-run chinook salmon; (5) Hood Canal summer-run chum salmon; (6) Columbia River chum salmon; (7) Ozette Lake sockeye salmon; (8) Upper Columbia River steelhead; (9) Snake River Basin steelhead; (10) Middle Columbia River steelhead; (11) Lower Columbia River steelhead; and (12) Upper Willamette River steelhead. An earlier draft CHART report (November 2004) also included the Oregon Coast coho salmon ESU but that ESU has been removed from this final report because it was not included in the final critical habitat designation.

BACKGROUND

Over the past several years, NOAA Fisheries has listed 27 distinct population segments, or evolutionarily significant units (ESU), of Pacific salmon and steelhead in Oregon, Washington, Idaho and California. Collectively, these ESUs occupy thousands of miles of streams in watersheds covering more than 250 thousand square miles. In 2000, NOAA Fisheries designated critical habitat for 19 of the listed ESUs (65 FR 7764, February 16, 2000). These designations were challenged in court on a number of grounds. NOAA Fisheries entered into a consent decree resolving these claims and pursuant to court order the designations were vacated. Following remand, NOAA Fisheries received a letter from environmental groups providing 60-day notice of intent to sue for not having designations in place for these 19 ESUs and one additional ESU, Northern California Steelhead. The agency entered into a consent decree with the environmental groups establishing a schedule for completing new designations. On December 14, 2004 the agency published a *Federal Register* Notice proposing designation of critical habitat for the 13 Northwest Region ESUs covered by the consent decree (69 FR 74572). Public comment was open for 90 days and there were four public hearings. Under the consent decree, a final designation must be submitted to the *Federal Register* on or before August 15, 2005. This report contains the Northwest Region's biological assessment relating to the final designations for the following 12 of the 13 Northwest ESUs that are listed as of the date of the final designation:[2] (1) Puget Sound chinook salmon; (2) Lower Columbia River chinook salmon; (3) Upper Willamette River chinook salmon; (4) Upper Columbia River spring-run chinook salmon; (5) Hood Canal summer-run chum salmon; (6) Columbia River chum salmon; (7) Ozette Lake sockeye salmon; (8) Upper Columbia River steelhead; (9) Snake River Basin steelhead; (10) Middle Columbia River steelhead; (11) Lower Columbia River steelhead; and (12) Upper Willamette River steelhead.

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[2] The final listing determination for Oregon Coast coho was extended by 6 months (70 Fed. Reg. 37217, June 28, 2005) so this ESU is not listed as of the date of final critical habitat designation.

CRITICAL HABITAT UNDER THE ESA

The ESA defines critical habitat under section 3(5)(A) as follows:

> (i) the specific areas within the geographical area occupied by the species, at the time it is listed . . ., on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and
>
> (ii) specific areas outside the geographical area occupied by the species at the time it is listed . . . upon a determination by the Secretary that such areas are essential for the conservation of the species.

Once critical habitat is designated, ESA Section 7 requires federal agencies to ensure that they do not fund, authorize, or carry out any actions that are likely to destroy or adversely modify that habitat. This requirement is in addition to the Section 7 requirement that federal agencies ensure that their actions do not jeopardize the continued existence of listed species.

A recent amendment to section 4(a) of the ESA precludes military land from designation, where that land is covered by an Integrated Natural Resource Management Plan that the Secretary has found in writing will benefit the listed species.

ESA Section 4(b)(2) requires NMFS to designate critical habitat for threatened and endangered species "on the basis of the best scientific data available and after taking into consideration the economic impact, impact on national security, and any other relevant impact, of specifying any particular area as critical habitat." This section grants the Secretary [of Commerce] discretion to exclude any area from critical habitat if he determines "the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat." The Secretary's discretion is limited, as he may not exclude areas if it "will result in the extinction of the species."

Salmonid Life History

Pacific salmon and steelhead are anadromous fish, meaning adults migrate from the ocean to spawn in freshwater lakes and streams where their offspring hatch and rear prior to migrating back to the ocean to forage until maturity. The migration and spawning times vary considerably between and within species and populations (Groot and Margolis, 1991). At spawning, adults pair up to lay and fertilize thousands of eggs in freshwater gravel nests or "redds" excavated by females. Depending on lake/stream temperatures, eggs incubate for several weeks to months before hatching as "alevins" (a larval life stage dependent on food stored in a yolk sac). Following yolk sac absorption, alevins emerge from the gravel as young juveniles called "fry" and begin actively feeding. Depending on the species and location, juveniles may spend from a few hours to a few years in freshwater areas before migrating to the ocean. The physiological and behavioral changes required for the transition to salt water result in a distinct "smolt" stage in most species. On their journey, juveniles must migrate downstream through every riverine and estuarine corridor between their natal lake or stream and the ocean. For example, smolts from Idaho will travel as far as 900 miles from their inland spawning grounds. En route to the ocean, the juveniles may spend from a few days to several weeks in the estuary, depending on the species. The highly productive estuarine environment is an important feeding and acclimation area for juveniles preparing to enter marine waters.

Juveniles and subadults typically spend from 1 to 5 years foraging over thousands of miles in the North Pacific Ocean before returning to spawn. Some species, such as coho and chinook salmon, have precocious life history types (primarily male fish) that mature and spawn after only several months in the ocean. Spawning migrations known as "runs" occur throughout the year, varying by species and location. Most adult fish return or "home" with great fidelity to spawn in their natal stream, although some do stray to non-natal streams. Salmon species die after spawning, while steelhead may return to the ocean and make repeat spawning migrations.

This complex life cycle gives rise to complex habitat needs, particularly during the freshwater phase (Spence et al. 1996). Spawning gravels must be a certain size and free of sediment to allow successful incubation of the eggs. Eggs also require cool, clean, and well-oxygenated waters for proper development. Juveniles need abundant food sources, including insects, crustaceans, and other small fish. They need places to hide from predators (mostly birds and bigger fish), such as under logs, root wads, and boulders in the stream, as well as beneath overhanging vegetation. They also need places to seek refuge from periodic high flows (side channels and off-channel areas) and from warm summer water temperatures (coldwater springs and deep pools). Returning adults generally do not feed in fresh water but instead rely on limited energy stores to migrate, mature, and spawn. Like juveniles, they also require cool water and places to rest and hide from predators. During all life stages, salmon and steelhead require cool water that is free of contaminants. They also need migratory corridors with adequate passage conditions (timing, water quality, and water quantity) to allow access to the various habitats required to complete their life cycle.

The homing fidelity of salmon and steelhead is reflected in the distribution of distinct, locally adapted populations among watersheds with differing environmental conditions and distinct habitat characteristics (Taylor 1991, Policansky and Magnuson 1998, McElhany et al. 2000). Spatially structured populations in which populations or subpopulations occupy habitat patches, connected by some low-to-moderate stray rates, are often generically referred to as "metapopulations" (Levins 1969). Low-to-moderate levels of straying result in regular genetic exchange among populations, creating genetic similarities among populations in adjacent watersheds (Quinn 1993, Utter et al. 1989, Ford 1998).

The overall health and likelihood of persistence of salmon and steelhead metapopulations are affected by the abundance, productivity, connectivity/spatial structure, and diversity of the component populations (see McElhaney et al. 2000). With respect to the habitat requirements of a healthy ESU, an ESU composed of many diverse populations distributed across a variety of well-connected habitats can better respond to environmental perturbations including catastrophic events (Schlosser and Angermeier 1995, Hanski and Gilpin 1997, Tilman and Lehman 1997, Cooper and Manger 1999). Additionally, well-connected habitats of different types are essential to the persistence of diverse, locally adapted salmonid metapopulations capable of exploiting a wide array of environments, as well as capable of responding to and surviving both short- and long-term environmental change (e.g., Groot and Margolis 1991, Wood 1995). Differences in local flow regime, temperature regime, geological, and ecoregion characteristics correlate strongly with ESU population structure (Ruckelshaus et al. 2001).

ESUs with fewer and less diverse habitat types and associated populations are more likely to become extinct due to catastrophic events. They also have a lower likelihood that the necessary phenotypic and genotypic diversity will exist to maintain future viability. ESUs with limited geographic range are similarly at increased extinction risk due to environmental variability and catastrophic events. ESUs with populations that are geographically distant from each other, or that are separated by severely degraded habitat, may lack the connectivity to function as metapopulations and are more likely to become extinct. ESUs with reduced local adaptation and limited life-history diversity are more likely to go extinct as the result of correlated environmental catastrophes or environmental change that occurs too rapidly for an evolutionary response. Assessing the conservation value of specific habitat areas to ESU viability involves evaluating the quantity and quality of habitat features (for example, spawning gravels, wood and water condition, side channels), the relationship of the area to other areas within the ESU, and the significance to the ESU of the population occupying that area.

Geographical Area Occupied by the Species and Specific Areas within the Geographical Area

In past critical habitat designations, NOAA Fisheries concluded that the limited availability of species distribution data prevented mapping salmonid critical habitat at a scale finer than occupied river basins. While various efforts were underway to address these data limitations, the agency noted that "most have yet to be completed or fail to depict salmonid habitats in a consistent manner or at a fine geographic scale." (65 FR 7764, February 16, 2000). Therefore, the 2000 designations indicated that the "geographical area occupied by the species" was best characterized by all accessible river reaches within the current range of the listed species.

For specific areas within that geographical area occupied by the species, NOAA Fisheries relied on the U.S. Geological Survey's (USGS) identification of subbasins, which was the finest scale mapped by USGS at that time. The subbasin boundaries are based on an area's topography and hydrography, and USGS has developed a uniform framework for mapping and cataloging drainage basins using a unique hydrologic unit code (HUC) identifier (Seaber et al. 1986). The HUCs contain separate two-digit identifier fields wherein HUC1 refers to a region comprising a relatively large drainage area (e.g., Region 17 for the entire Pacific Northwest), while subsequent fields identify smaller nested drainages. Under this convention, subbasins are commonly referred to as HUC4s. In its 2000 designations, then, NOAA Fisheries identified as critical habitat all areas accessible to listed salmon within an occupied HUC4.

Since the previous designations in 2000, two key efforts have significantly improved NOAA Fisheries' ability to identify freshwater and estuarine areas occupied by salmonids and to group the occupied stream reaches into finer scale "specific areas." The first key effort has allowed NOAA Fisheries to be more precise about the "geographical area occupied by the species." Federal, state, and tribal fishery biologists have made progress mapping species distribution at the level of stream reaches. The mapping includes areas where the species has been observed or where it is presumed to occur based on the professional judgment of biologists familiar with the watershed. Much of these data can now be accessed and analyzed using geographic information systems (GIS) to produce consistent and fine-scale maps. As a result, nearly all salmonid freshwater and estuarine habitats in Washington, Oregon, and Idaho are now mapped and available in GIS at a scale of 1:24,000 (NMFS 2005a, and see references in Appendices). Previous distribution data were often compiled at a much coarser scale of 1:100,000 or greater. NOAA Fisheries made use of these finer-scale data for the current critical habitat designations and now believes that they enable a more accurate delineation of "geographical area occupied by the species" referred to in the ESA definition of critical habitat.

The second key effort has allowed NOAA Fisheries to identify "specific areas" (section 3(5)(a)) and "particular areas" (section 4(b)(2)) at a much finer scale. Since 2000, various federal agencies have identified HUC5 watersheds throughout the Pacific Northwest using the USGS mapping conventions referred to above. This information is now generally available from these agencies and via the internet (California Spatial Information Library 2004, Interior Columbia Basin Ecosystem Management Project 2003, Regional Ecosystem Office 2004). NOAA Fisheries used this information to organize critical habitat information systematically and at a scale that was relevant to the spatial distribution of salmon and steelhead. Organizing information at this scale is especially relevant to salmonids, since their innate homing ability allows them to return to particular reaches in the specific watersheds where they were born. Such site fidelity results in spatial aggregations of salmonid populations (and their constituent spawning stocks) that generally correspond to the area encompassed by HUC4s or HUC5s (Washington Department of Fisheries et al. 1992, Kostow 1995, McElhany et al. 2000).

In addition, HUC5 watersheds are consistent with the scale of recovery efforts for West Coast salmon and steelhead. In its review of the long-term sustainability of Pacific Northwest salmonids, the National Research Council's (NRC) Committee on Protection and Management of Pacific Northwest Anadromous Salmonids concluded that "habitat protection must be coordinated at landscape scales appropriate to salmon life histories" and that social structures and institutions "must be able to operate at the scale of watersheds" (NRC 1996).

Watershed-level analyses are now common throughout the West Coast (Forest Ecosystem Management Assessment Team 1993, Montgomery et al. 1995, Spence et al. 1996). There are presently more than 400 watershed councils or groups in Washington, Oregon, and California alone (For the Sake of the Salmon 2004). Many of these groups operate at a geographic scale of one to several HUC5 watersheds and are integral parts of larger-scale salmon recovery strategies (Northwest Power Planning Council 1999, Oregon Plan for Salmon and Watersheds 2001, Puget Sound Shared Strategy 2002, CALFED Bay-Delta Program 2003). Concurrent with these efforts, NMFS has developed various ESA guidance documents that underscore the link between salmon conservation and the recovery of watershed processes (NMFS 1996 and 1999). Aggregating stream reaches into HUC5 watersheds allowed the agency to delineate "specific areas" within or outside the geographical area occupied by the species at a scale that corresponds well to salmonid population structure and ecological processes.

Occupied estuarine and marine areas were also considered. In previous designations of salmonid critical habitat we did not designate marine areas outside of estuaries and Puget Sound. In the Pacific Ocean, we concluded that there may be essential habitat features, but they did not require special management considerations or protection. Since that time we have considered the statutory and regulatory direction, the best available scientific information, and related agency actions, such as the designation of Essential Fish Habitat under the Magnuson-Stevens Fishery Conservation and Management Act.

We now conclude that it is possible to delineate specific estuarine areas in Puget Sound and the Columbia River, as well as specific nearshore areas of Puget Sound that are occupied and contain essential habitat features that may require special management considerations or protection. Estuarine areas are crucial for juvenile salmonids given their multiple functions as areas for rearing/feeding, freshwater-saltwater acclimation, and migration (Simenstad et al. 1982, Marriott et al. 2002). In many areas, especially the Columbia River estuary, these habitats are occupied by multiple populations and ESUs. We are delineating occupied estuarine areas in similar terms to our past designations, as being defined by a line connecting the furthest land points at the estuary mouth.

Nearshore areas also provide important habitat for rearing/feeding and migrating salmonids, and in Puget Sound support multiple populations of Puget Sound Chinook and Hood Canal summer-run chum salmon (Bakkala 1970, Healey 1982, Simenstad et al. 1982, Bax 1983, Salo 1991 as cited in Johnson et al. 1997, Beamish et al. 1998, Pacific Fishery Management Council, 1999, WDFW and Point No Point Treaty Tribes (PNPTT), 2000; Battelle Marine Sciences Laboratory et al. 2001, Nightingale and Simenstad 2001, Ruckelshaus et al. 2001 and 2002, Williams and Thom 2001, Puget Sound Nearshore Ecosystem Restoration Program 2003; Williams et al. 2003, Brennan et al. 2004, Fresh et al. 2004, Washington State Conservation Commission 1999-1003). As noted in the previous rulemaking (65 FR 7764, February 16, 2000), the unique ecological setting of Puget Sound allowed us to focus on defining specific occupied marine areas. As with the freshwater areas described above, we identified 19 nearshore marine zones in Puget Sound based on water resource inventory areas defined by the state of Washington (Washington Department of Ecology 2004). In delineating these nearshore areas in Puget Sound, we focused on the area contiguous with the shoreline out to a depth no greater than 30 meters relative to mean lower low water. This nearshore area generally coincides with the maximum depth of the photic zone in Puget Sound and contains physical or biological features essential to the conservation of salmonids (Puget Sound Nearshore Ecosystem Restoration Program 2003, Williams et al. 2003).

We did not identify offshore marine areas of Puget Sound and the Pacific Ocean. For salmonids in offshore marine areas beyond the nearshore extent of the photic zone, it becomes more difficult to identify specific areas where essential habitat features that may require special management considerations can be found. We did identify certain prey species that are harvested commercially (e.g., Pacific herring) as physical or biological features essential to conservation that may require special management considerations or protection. However, because salmonids are opportunistic feeders we could not identify "specific areas" beyond the nearshore marine zone where these or other essential features are found within this vast geographic area occupied by Pacific salmon. Prey species move or drift great distances throughout the ocean and would be difficult to link to any "specific" areas (NMFS 2004).

Unoccupied Areas

ESA Section 3(5)(A)(ii) defines critical habitat to include "specific areas outside the geographical area occupied" if the areas are "essential for the conservation of the species." NOAA Fisheries regulations at 50 CFR 424.12(e) emphasize that the agency "shall designate as critical habitat areas outside the geographical area presently occupied by a species only when a designation limited to its present range would be inadequate to ensure the conservation of the species." The agency focused its attention on the species' historical range when considering unoccupied areas since these logically would have been adequate to support the evolution and long-term maintenance of evolutionarily significant units. As with occupied areas, the agency considered the stream segments within a HUC5 to best describe specific areas. While it is possible to identify which HUC5s represent geographical areas that were historically occupied with a high degree of certainty, this is not the case with specific stream segments. This is due, in part, to the emphasis on mapping currently occupied habitats and to the paucity of site-specific or systematic historical stream surveys. As described later in this document, the CHARTs did identify unoccupied HUC5s and stream reaches that may be essential for conservation for some ESUs.

"Physical or Biological Features Essential to the Conservation of the Species" (Primary Constituent Elements)

Agency regulations at 50 C.F.R. 424.12(b) interpret the statutory phrase "physical or biological features essential to the conservation of the species." The regulations state that these features include, but are not limited to, space for individual and population growth and for normal behavior; food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, and rearing of offspring; and habitats that are protected from disturbance or are representative of the historical geographical and ecological distribution of a species. The regulations further direct us to “focus on the principal biological or physical constituent elements . . . that are essential to the conservation of the species, and specify that these elements shall be the “known primary constituent elements.” The regulations identify primary constituent elements (PCE) as including, but not being limited to: “roost sites, nesting grounds, spawning sites, feeding sites, seasonal wetland or dryland, water quality or quantity, host species or plant pollinator, geological formation, vegetation type, tide, and specific soil types.”

NMFS biologists developed a list of PCEs specific to salmon steelhead and relevant to determining whether occupied stream reaches within a watershed meet the ESA section (3)(5)(A) definition of “critical habitat,” consistent with the implementing regulation at 50 CFR 424.12(b). Relying on the biology and life history of each species, we determined the physical or biological habitat features essential to their conservation. We identified these features in the ANPR (68 FR 55926, September 29, 2003) and subsequently, as a result of the initial CHART assessments, developed a revised set of PCEs described in the proposed rule (69 FR 74572, December 14, 2005). We received very few comments specifically addressing PCEs described in the proposed rule but have included clarifications (see below) regarding why each PCE is essential to the conservation of these ESUs.

The ESUs addressed in this rulemaking share many of the same rivers and estuaries and have similar life history characteristics and, therefore, many of the same physical and biological features are essential to their conservation. These features include sites essential to support one or more life stages of the ESU (sites for spawning, rearing, migration and foraging). These sites in turn contain physical or biological features essential to the conservation of the ESU (for example, spawning gravels, water quality and quantity, side channels, forage species). Specific types of sites and the features associated with them (both of which are referred to as PCEs) include the following:

1. Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation and larval development. These features are essential to conservation because without them the species cannot successfully spawn and produce offspring.

2. Freshwater rearing sites with water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; water quality and forage supporting juvenile development; and natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation,

large rocks and boulders, side channels, and undercut banks. These features are essential to conservation because without them juveniles cannot access and use the areas needed to forage, grow, and develop behaviors (e.g., predator avoidance, competition) that help ensure their survival.

3. Freshwater migration corridors free of obstruction with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival. These features are essential to conservation because without them juveniles cannot use the variety of habitats that allow them to avoid high flows, avoid predators, successfully compete, begin the behavioral and physiological changes needed for life in the ocean, and reach the ocean in a timely manner. Similarly, these features are essential for adults because they allow fish in a non-feeding condition to successfully swim upstream, avoid predators, and reach spawning areas on limited energy stores.

4. Estuarine areas free of obstruction with water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh- and saltwater; natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels; and juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation. These features are essential to conservation because without them juveniles cannot reach the ocean in a timely manner and use the variety of habitats that allow them to avoid predators, compete successfully, and complete the behavioral and physiological changes needed for life in the ocean. Similarly, these features are essential to the conservation of adults because they provide a final source of abundant forage that will provide the energy stores needed to make the physiological transition to fresh water, migrate upstream, avoid predators, and develop to maturity upon reaching spawning areas.

5. Nearshore marine areas free of obstruction with water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation; and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels. As in the case with freshwater migration corridors and estuarine areas, nearshore marine features are essential to conservation because without them juveniles cannot successfully transition from natal streams to offshore marine areas. We have focused our designation on nearshore areas in Puget

Sound because of its unique and relatively sheltered fjord-like setting (as opposed to the more open coastlines of Washington and Oregon).

6. Offshore marine areas with water quality conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation. These features are essential for conservation because without them juveniles cannot forage and grow to adulthood.

Special Management Considerations or Protection

NOAA Fisheries' ESA regulations at 424.10(j) define "special management considerations or protection" to mean "any methods or procedures useful in protecting physical and biological features of the environment for the conservation of listed species." Based on discussions with NOAA Fisheries biologists in the Habitat Conservation Division (HCD) and the report by Spence et al. (1996), NOAA Fisheries identified a number of activities that may threaten the features, such that there would be any methods or procedures useful in protecting the features. The Spence et al. (1996) report contains a comprehensive review of factors limiting salmonid growth and production and relates them to specific human activities and useful management practices/actions. Major categories of habitat-related activities, identified in this report and through discussions with HCD biologists, include (1) forestry (2) grazing, (3) agriculture, (4) road building/maintenance, (5) channel modifications/diking, (6) urbanization, (7) sand and gravel mining, (8) mineral mining, (9) dams, (10) irrigation impoundments and withdrawals, (11) river, estuary, and ocean traffic, (12) wetland loss/removal, (13) beaver removal, and (14) exotic/invasive species introductions. In addition to these, the harvest of salmonid prey species (e.g., herring, anchovy, and sardines) may present another potential habitat-related activity (PFMC 1999). All of these activities have PCE-related impacts via their alteration of one or more of the following: stream hydrology, flow and water-level modifications, fish passage, geomorphology and sediment transport, temperature, dissolved oxygen, vegetation, soils, nutrients and chemicals, physical habitat structure, and stream/estuarine/marine biota and forage (Spence et al. 1996; PFMC 1999). The CHARTs identified and documented such activities for each area in tables contained in this report.

CRITICAL HABITAT ANALYTICAL REVIEW TEAMS

OVERVIEW

To assist in the designation of critical habitat, the agency convened several CHARTs. The CHARTs consisted of federal salmonid biologists and habitat specialists tasked with assessing biological information pertaining to areas under consideration for designation. The CHARTs explored a variety of data sources and used their best professional judgment to (1) verify the presence of PCEs within each occupied area, (2) verify the existence of activities that may affect the PCEs, and (3) rate the conservation value of watersheds, riverine corridors, and estuarine and nearshore marine areas and determine if any unoccupied areas may be essential to conservation.

In the NOAA Fisheries NWR, the agency created CHARTS organized by major geographic domains that roughly correspond to recovery planning domains. Each CHART had a team leader from the NOAA Fisheries HCD and several federal employees with demonstrated expertise regarding salmonid habitat within the domain. Most CHART members came from various NOAA Fisheries divisions and programs (i.e., the HCD, Salmon Recovery Division, Hydropower program), while some teams included experts from the U.S. Forest Service, U.S. Bureau of Land Management, U.S. Fish and Wildlife Service, and National Park Service. To date, more than 65 federal biologists have participated on these CHARTs. Some CHARTs also benefited from expertise provided by state fisheries biologists working for NOAA Fisheries under Interagency Personnel Agreements or from Tribal biologists familiar with particular ESUs or areas. These experts were not, however, considered part of the CHART membership for the purposes of deliberation, scoring and rating watersheds and areas.

The CHARTS have completed four phases of work associated with critical habitat designations. In the first phase, each CHART met to discuss the assignment and to identify the best scientific information available regarding the habitats supporting the ESUs in their domain. This phase also involved developing a CHART scoring system for systematic discussion and evaluation of PCEs and for contributing to the determination of the overall conservation value of particular watersheds and areas. After collecting and synthesizing the available data for an ESU, the CHARTs met during Phase 2 to review and discuss the information. In this phase the CHARTs verified the presence of the PCEs in each occupied watershed/area, identified management activities that may affect those PCEs, and collectively scored each occupied watershed/area using the system developed in the first phase. In Phase 3, the CHARTs reviewed the scores derived in Phase 2 and then considered additional information about the relationship of each watershed/area to others in the range of the ESU and information about the population occupying each watershed/area and that population's relationship to other populations in the ESU. Based on the scores and the additional considerations, the CHARTs assigned conservation value ratings of high, medium, or low to each watershed/area. In the fourth and final phase, the CHARTs re-convened to review relevant comments received on the proposed critical habitat designations (69 FR 74572, December 14, 2004) and any additional information bearing on the final designations. Details and key considerations involved in each phase are discussed below.

CHART PHASE 1

In Phase 1, CHARTs convened for a one-day orientation to the statutory and regulatory aspects of ESA critical habitat and discussed ways to identify the best available scientific data relevant to assessing critical habitat for each ESU. CHART biologists also helped develop and test a multi-factor scoring system that provided a consistent framework within which the CHARTs could process information that would ultimately inform its conservation value rating of each watershed or area. The basis for using this factor-based scoring system was twofold. First it allowed CHART members with varied levels of experience in a particular geographic area to share and discuss their knowledge of specific places and biological/physical features using a consistent set of relevant factors for each watershed in the range of an ESU. Second it generated quantitative results (i.e., sums of factor scores) that displayed numerical variation between watersheds/areas that greatly facilitated the ultimate CHART rating of each watershed/area's conservation value. Third, it provided a uniform and systematic way to assess the overall conservation value of component watersheds and areas for each ESU under agency consideration. The scoring system used by the CHARTs is shown in Table 1.

CHART PHASE 2

In Phase 2, each CHART met to discuss the information identified in Phase 1 and to (1) verify the presence of PCEs in each HUC5, (2) identify current or potential activites that may affect the PCEs, and (3) apply the scoring system. This phase required approximately 1 to 7 days to complete, depending on the size of the ESU under consideration and the number of watersheds assessed. For each watershed, the CHART members assessed the best available fish distribution data and noted any discrepancies with their own knowledge of the area (which included documented sources of information). If discrepancies were found, they were flagged for follow-up and resolution with the appropriate state fishery agency. The CHARTs then confirmed whether the occupied reaches/areas were likely to contain one or more of the specified

PCEs. To aid in these assessments, the teams were provided with GIS data and maps displaying a variety of data layers including fish and PCE distributions, ESU population boundaries, stream hydrography, land use, land cover, and land ownership. The CHARTs were also asked to determine whether, consistent with the regulatory definition of "special management considerations or protection" (50 C.F.R. 402.02 (j)), there were "any methods or procedures useful in protecting physical and biological features." The CHARTs were asked to determine whether there were actions occurring in occupied areas that may threaten the PCEs, such that there would be any methods or procedures useful in protecting the PCEs. CHART members drew upon their first-hand knowledge of the areas and the physical or biological features as well as their experience in section 7 consultations. The CHARTs identified and documented such activities for each area (see ESU appendices).

CHART PHASE 3

In Phase 3, the CHARTs met to discuss the watershed scores generated in Phase 2, along with additional considerations, to assign a high, medium, or low conservation value[3] to each watershed/area (the conservation value of a given HUC5 is the relative importance of the HUC5 to conservation of the ESU). The additional considerations included the relationship of each HUC5 to other HUC5s in the ESU and the significance to the ESU of the population occupying each HUC5. As an example of the first additional consideration, a HUC5 with a particular raw score might receive a medium rating if it is in close proximity to several other high-scoring HUC5s that support the ESU, while another HUC5 with that same raw score might receive a high rating if it is one of only a few HUC5s supporting an ESU, or if the other HUC5s have low scores.

The second consideration involves population characteristics and is relevant because some populations have a higher conservation value to the ESU than others. Thus a HUC5 that received a medium score might nevertheless be rated high if it supports a unique or significant population within the ESU. As an example of applying both the first and second considerations, connectivity of habitats is an important consideration for anadromous salmonids, which require access to the ocean as well as to a network of connected spawning habitats. Thus a HUC5 might have medium-value tributary habitat but contain a high-value rearing and migration corridor because it is a rearing and migration corridor for fish from a high-valued spawning area. To accommodate this

[3] In the Advance Notice of Proposed Rulemaking (68 FR 55926, September 29, 2003) we describe the conservation value of a site as depending on "(1) the importance of the populations associated with a site to the ESU conservation, and (2) the contribution of that site to the conservation of the population either through demonstrated or potential productivity of the area."

situation, we assigned separate conservation ratings where a HUC5 contains both tributary habitat and a migration corridor. We gave the migration corridor the same rating as the highest-rated HUC5 for which it serves as a migration corridor.[4]

In other words, the scores provided a judgment about the value of each HUC5 in isolation, while the additional considerations allowed the CHARTs to evaluate the relative contribution of each HUC5 and come up with an overall rating.

Based on the raw scores and the additional considerations, high-value watersheds/areas were those deemed to have a high likelihood of promoting ESU conservation, while low-value watersheds/areas were expected to contribute relatively less to conservation. The watershed scoring system proved to be a useful tool for informing the rating of conservation value; in general, those watersheds and areas that received the highest scores in Phase 2 also were deemed to have a high conservation value for the ESU, while the opposite was true for low-scoring watersheds and areas.

The next step in Phase 3 involved asking the CHARTs to identify any unoccupied areas that may be essential for the conservation of an ESU. Section 3(5)(C) of the ESA defines critical habitat as including unoccupied areas, but only upon making a finding that "such areas are essential for the conservation of the species." Regulations at 50 CFR 424.12(e) state that the agency "shall designate as critical habitat areas outside the geographical area presently occupied by a species only when a designation limited to its present range would be inadequate to ensure the conservation of the species." The CHARTs were asked to provide their professional judgment as to whether limiting the designation to the entire occupied range would be adequate to ensure the conservation of the ESU. It was not possible for the CHARTs to determine conclusively that particular unoccupied areas "are" essential for the conservation of an ESU because such a determination would require a more comprehensive assessment than was possible at this point in the recovery planning process. The CHARTs were, however, able to identify those areas that may be essential for conservation. In making this assessment, the CHARTs used information regarding the ESU's historic distribution, as well as pertinent information from Section 7 consultations and developing recovery plans. The types of HUC5s considered included

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[4] The CHARTs discussed this concept at length and were unanimous in concluding that it was a logical conclusion for anadromous salmon and steelhead to assign a conservation value to a migration corridor based on the conservation value of the spawning areas to which it connects and the fish it serves. Moreover, it helped resolve a recurring issue for some ESUs with HUC5s having relatively low or limited value tributary spawning habitats but which had primary importance as a rearing/migration corridor for fish/habitats upstream. In this case, the HUC5 could be assigned a lower overall conservation value, but could still contain a rearing/migration corridor with a higher conservation value.

those that are entirely blocked (e.g., areas above impassable dams). They also included HUC5 areas with some occupied stream reaches, as well as other reaches that were historically occupied, but that have been rendered inaccessible due to manmade obstructions. Although the CHART determinations were inadequate to support a designation of unoccupied areas at this time, we nevertheless identified these areas to benefit those engaged in section 7 consultations, recovery planning, or other activities aimed at conserving the listed ESUs.

The final step in Phase 3 involved asking the CHARTs to consider whether excluding from critical habitat designation particular areas with certain economic impacts would significantly impede conservation. The CHARTs considered these areas both alone or in combination with other eligible areas. In making this determination, the CHARTs considered such factors as the role the particular area plays in the conservation of the population(s), the uniqueness or importance to the population(s), any recovery planning emphasis on the area, and similar considerations.

CHART PHASE 4

In Phase 4, the CHARTs re-convened in the Spring of 2005 to review comments received on the agency's proposed rule as well as any new information they had identified that would assist in making final conclusions about areas under consideration as critical habitat. Comments reviewed included those submitted by the public as well as those solicited from peer reviewers with expertise regarding West Coast salmon and their habitats. The CHARTs evaluated this new information and then made necessary adjustments in their final conclusions for each ESU. The general types of changes made (and described for each ESU in this report) include: (1) adding or removing specific areas due to new information regarding species and PCE distribution; (2) revising the types of actions occurring in occupied areas that may threaten the PCEs; (3) revising the conservation values of several watersheds; and (4) identifying additional unoccupied areas that the CHARTs determined may be essential for the conservation of an ESU (but require additional analyses to determine whether they warrant designation as critical habitat).

During this phase the CHARTs were also asked to determine how well their conservation value ratings corresponded to the benefit of designation (i.e., as it pertains to the ESA's balancing of designation/exclusion benefits in section 4(b)(2)). We recognized that the "benefit of designation" needed to take into account not only the CHARTs' conservation ratings but also the likelihood of a section 7 consultation occurring in that area and the degree to which a consultation would yield conservation benefits for the species. To address this concern, we developed a profile for a watershed that would have "low leverage" in the context of section 7. The "low leverage" profile included watersheds with: less than 25 percent of the land area in federal ownership, no hydropower dams, and no consultations likely to occur on instream work (see Appendix N). We chose these attributes because federal lands, dams and instream work all have a high likelihood of consultation and activities undergoing consultation have a potential to significantly affect the physical and biological features of salmon and steelhead habitat.

We then asked the CHARTs to confirm whether they would conclude that the watersheds matching this profile did in fact have low leverage. To make this determination the CHARTs relied on the agency's recent consultation history (e.g., using data from the NOAA Fisheries Public Consultation Tracking System), detailed topographic maps and GIS data for each watershed, as well as their own knowledge of actions taking place in the watershed that may warrant ESA section 7 consultation. In several cases the CHART affirmed that a watershed was likely to be "low leverage." In these cases we diminished the watershed's benefit of designation[5] for the purposes of conducting the ESA 4(b)(2) analysis. Where appropriate, we have adjusted our consideration of these "low leverage watersheds" in the agency's final 4(b)(2) analysis (which is reported in a separate agency document (NMFS, 2005b) and incorporates the CHARTs' response as to whether excluding a watershed would significantly impede the conservation of an ESU).

As a final step, we also asked the CHARTs to determine if any low value watersheds not previously considered for exclusion might warrant exclusion due to low leverage. In such "low-value/low-leverage" cases we further reduced the economic threshold in the agency's ESA 4(b)(2) process to better address the few cases where the benefits of designation were clearly minimal (NMFS, 2005b).

[5] The benefit of designation was diminished somewhat but not completely, since the educational benefits of designation would still be more important the higher the conservation value of an area, and since we cannot predict with complete accuracy all of the section 7 consultations that are likely to occur in a particular area.

Table 1. Factors and Associated Criteria Considered by several CHARTs to Determine the Conservation Value of Occupied HUC5s

Factors	**Criteria**
Factor 1. PCE Quantity Considers the total stream area or number of reaches in the HUC5 where PCEs are found and compares them relative to other HUC5s and their probable historical quantity in the HUC5.	3 = High number of stream reaches with PCEs in the HUC5. 2 = Moderate number of stream reaches with PCEs in the HUC5, near or reduced from historic levels. 1 = Low number of stream reaches with PCEs are in the HUC5, likely reduced from historic potential. 0 = Low number of stream reaches with PCEs are in the HUC5, likely near historic potential.
Factor 2. PCE Quality – Current Condition Considers the existing condition of the quality of PCEs in the HUC5.	3 = PCEs in the HUC5 are in good to excellent condition. 2 = PCEs in the HUC5 are in fair to good condition. 1 = PCEs in the HUC5 are in fair to poor condition. 0 = PCEs in the HUC5 are in poor condition.
Factor 3. PCE Quality – Potential Condition Considers the likelihood of achieving PCE potential in the HUC5, either naturally or through active conservation/restoration, given known limiting factors, likely biophysical responses, and feasibility.	3 = PCEs in the HUC5 are highly functioning and are at their historic potential. 2 = PCEs in the HUC5 are reduced, but have high improvement potential. 1 = PCEs in the HUC5 may have some improvement potential. 0 = PCEs in the HUC5 have little or no improvement potential.
Factor 4. PCE Quality – Support of Rarity/Importance Considers the PCE support of rare genetic or life history characteristics or rare/important habitat types in the HUC5	3 = Highly likely that PCEs in the HUC5 support a rare genetic or life history type or include a rare/important habitat type (e.g., seeps, coldwater refuges, side channels, lakes). 2 = Possible that PCEs in the HUC5 support a rare genetic or life history type or include a rare/important habitat type. 1 = Unknown whether PCEs in the HUC5 support a rare genetic or life history type or include a rare/important habitat type. 0 = Unlikely that PCEs in the HUC5 probablysupport a rare genetic or life history type or include a rare/important type.
Factor 5. PCE Quality – Support of Abundant Populations Considers the PCE support of variable-sized populations relative to other HUC5s and the probable historical levels in the HUC5	3 = PCEs in the HUC5 currently support a large population. 2 = PCEs in the HUC5 historically supported a large population that is currently small. 1 = PCEs in the HUC5 currently and/or historically supported a small population. 0 = PCEs in the HUC5 support a population whose abundance is unknown or it is unlikely that it is or was significant.
Factor 6. PCE Quality – Support of Spawning/Rearing Considers the PCE support of spawning or rearing of varying numbers of populations.	3 = PCEs in the HUC5 support (currently or historically) spawning or rearing of multiple populations or life history types, or support the only extant spawning habitat for a single population. 2 = PCEs in the HUC5 related to spawning or rearing are found in two or more HUC5s that support a single population. 1 = Uncertain but possible that the PCEs in the HUC5 support spawning or rearing for at least one population. 0 = Unlikely that there are PCEs in the HUC5 that support spawning/rearing for at least one population.

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Appendix A
CHART Assessment for the
Puget Sound Chinook Salmon ESU

CHART Participants

The CHART for this ESU consisted of the following NOAA Fisheries biologists: DeeAnn Kirkpatrick (CHART Leader), Steve Fransen, Tom Hooper, Steve Keller, Mike Parton, and Tim Tynan. Steve Ralph (Environmental Protection Agency) is another Federal biologist who served on this CHART.

The following biologists working for NOAA Fisheries provided valuable expertise to the CHART, but were not part of the deliberations or formal scoring/rating process: Bill Graeber (NOAA Fisheries) and Tom Sibley (NOAA Fisheries). This CHART assessment also benefitted from review and comments by staff from the Nooksack Indian Tribe, Point No Point Treaty Council, and Washington Department of Fish and Wildlife.

ESU Description

The Puget Sound Chinook ESU was listed as a threatened species in 1999 (64 FR 14308; March 24, 1999). The ESU includes all naturally spawned populations of Chinook salmon from rivers and streams flowing into Puget Sound including the Strait of Juan de Fuca from the Elwha River, eastward, including rivers and streams flowing into Hood Canal, South Sound, North Sound and the Strait of Georgia in Washington). The agency recently conducted a review to update the ESU's status, taking into account new information and considering the net contribution of hatchery efforts in the ESU. We recently published the results of this review and concluded that Puget Sound Chinook salmon (including 26 hatchery programs) should remain listed as threatened (70 FR 37160; June 28, 2005).

The following life history descriptions are taken from the NOAA Fisheries status review of Chinook salmon (Myers et al. 1998). Adult spring-run Chinook salmon in the Puget Sound typically return to freshwater in April and May and spawn in August and September (Orrell 1976, WDFW et al. 1993). Adults migrate to the upper portions of their respective river systems and hold in pools until they mature. In contrast, summer-run fish begin their freshwater migration in June and July and spawn in September, while summer/fall-run Chinook salmon begin to return in August and spawn from late September through January (WDF et al. 1993). In rivers with an overlap in spawning time, temporal runs on the same river system maintain a certain amount of reproductive isolation through geographic separation.

The majority of Puget Sound fish emigrate to the ocean as subyearlings. Many of the rivers have well-developed estuaries that are important rearing areas for emigrating ocean-type smolts. In contrast, the Suiattle and South Fork Nooksack Rivers have been characterized as producing a majority of yearling smolts (Marshall et al. 1995). Glacially influenced conditions on the Suiattle River may be responsible for limiting juvenile growth, delaying smolting, and producing a higher proportion of 4- and 5-year-olds compared to other Chinook salmon stocks in Puget Sound, which mature predominantly as 3- and 4-year-olds. Puget Sound stocks exhibit a similarity in marine distribution based on coded wire tag recoveries in ocean fisheries. Tagged fish have been primarily captured in Canadian coastal and Puget Sound waters.

Myers et al. (1998) also noted that anthropogenic activities have limited the access to historical spawning grounds and altered downstream flow and thermal conditions. Water diversion and hydroelectric dams have prevented access to portions of several rivers. Watershed development and activities throughout Puget Sound, Hood Canal, and Strait of Juan de Fuca regions have resulted in increased sedimentation, higher water temperatures, decreased large woody debris recruitment, decreased gravel recruitment, a reduction in river pools and spawning areas, and a loss of estuarine rearing areas (Bishop and Morgan 1996). These impacts on the spawning and rearing environment may also have had an impact on the expression of many life-history traits and masked or exaggerated the distinctiveness of many stocks.

Juvenile Chinook salmon in freshwater feed on a variety of terrestrial and aquatic insects and crustaceans, while subadults feed on similar items as well as larger prey including fishes, shrimp, and squid (Scott and Crossman, 1973). One study noted that adults in marine waters forage on a large array of fish species, especially herring and sand lance (Pritchard and Tester 1944 as cited in Scott and Crossman 1973).

Recovery Planning Status

A Technical Recovery Team (TRT) was formed in 2000 to assist recovery planning efforts in Puget Sound. In 2001 and 2002, the Puget Sound TRT released technical reports describing independent populations of Chinook salmon in Puget Sound (Ruckelshaus et al. 2001, 2002). The Puget Sound TRT identified 22 independent Chinook populations: the North Fork Nooksack River, South Fork Nooksack River, Lower Skagit River, Upper Skagit River, Lower Sauk River, Suiattle River, Upper Sauk River, Cascade River, North Fork Stillaguamish River, South Fork Stillaguamish River, Skykomish River, Snoqualmie River, North Lake Washington, Cedar River, Green/Duwamish River, Puyallup River, White River, Nisqually River, Skokomish

River, Dosewallips River, Dungeness River, and Elwha River. Some naturally spawning aggregations of Chinook were not recognized as part of these populations (e.g., the Deschutes River in South Puget Sound). The TRT concluded that Chinook salmon using smaller streams in south and central Puget Sound probably did not occur there in large numbers historically and were not independent populations. It is not clear whether these smaller streams are occupied due to recent hatchery releases or whether historically they supported small satellite "sink" populations that were dependent on larger independent "source" populations (Ruckelshaus et al. 2002; B. Graeber, NMFS, personal communication).

The Puget Sound TRT identified five geographic regions of diversity and correlated risk in Puget Sound that are intended to assist in evaluating ESU-wide recovery planning (Ruckelshaus et al. 2002). The regions are based on similarities in hydrographic, biogeographic, geologic, and catastrophic risk characteristics and where groups of populations have evolved in common (Ruckelshaus et al. 2002). The Puget Sound Chinook salmon ESU occupies all of these regions. Recovery planning will likely emphasize the need for a geographical distribution of viable populations across the range of such regions (Ruckelshaus et al. 2002, McElhany et al. 2003). From 2003 through early 2005, local planning groups in Puget Sound developed watershed assessments and specific recovery action plans for each watershed. The CHART considered the TRT products in rating each watershed, but did not have the benefit of all watershed plans. We anticipate that, as recovery planning proceeds, we will have better information and may revise our recommendations regarding critical habitat designation.

CHART Area Assessments

The CHART assessment for this ESU addressed 18 subbasins containing 61 occupied watersheds as well as 19 nearshore marine zones. As part of its assessment the CHART considered the conservation value of each watershed in the context of the populations within the five geographic regions of diversity and correlated risk in Puget Sound identified by the Puget Sound TRT (Ruckelshaus et al. 2002). Information is presented below by USGS subbasin because they present a convenient and systematic way to organize the CHART's watershed assessments for this ESU and their names are generally more recognizable because they typically identify major river systems.

Strait of Georgia Subbasin (HUC4# 17110002)

The Strait of Georgia subbasin is located in northern Puget Sound (near the U.S. Canada border) and contained in Skagit and Whatcom counties, Washington. The subbasin contains three watersheds occupied by this ESU and these watersheds encompass approximately 428 mi^2. Fish distribution and habitat use data from WDFW identify approximately 71 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). However, Ruckelshaus et al. (2001, 2004) did not identify any historically independent populations in this subbasin. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A1 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Nooksack Subbasin (HUC4# 17110004)

The Nooksack subbasin is located in northern Puget Sound and contained in Skagit and Whatcom counties, Washington. The subbasin contains five watersheds occupied by this ESU these watersheds encompass approximately 795 mi^2. Fish distribution and habitat use data from WDFW identify approximately 268 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). Ruckelshaus et al. (2001, 2004) identified two historically independent populations in this subbasin: North Fork Nooksack River and South Fork Nooksack River. Occupied reaches in one HUC5 (Upper North Fork Nooksack River) overlap with a FEMAT key watershed for at-risk anadromous salmonids (FEMAT 1994). The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A2 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Upper Skagit Subbasin (HUC4# 17110005)

The Upper Skagit subbasin is located in northern Puget Sound and contained in Skagit and Whatcom counties, Washington. The subbasin contains five watersheds occupied by this ESU and these watersheds encompass approximately 999 mi^2. Fish distribution and habitat use data from WDFW identify approximately 105 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). Ruckelshaus et al. (2001, 2004) identified six historically independent populations in this subbasin: Lower Skagit River, Upper Skagit River, Cascade River, Lower Sauk River, Suiattle River, and Upper Sauk River. The CHART concluded that all of the occupied areas contained one or more

PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A3 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Sauk Subbasin (HUC4# 17110006)

The Sauk subbasin is located in northern Puget Sound and contained in Skagit and Snohomish counties, Washington. The subbasin contains four watersheds occupied by this ESU and these watersheds encompass approximately 741 mi^2 and 2,234 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 118 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). Ruckelshaus et al. (2001, 2004) identified three historically independent populations in this subbasin: Lower Sauk River, Suiattle River, and Upper Sauk River. Occupied reaches in four HUC5s (Upper Suiattle River, Lower Suiattle River, Upper Sauk River, and Lower Sauk River) overlap with FEMAT key watersheds for at-risk anadromous salmonids (FEMAT 1994). The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A4 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Lower Skagit Subbasin (HUC4# 17110007)

The Lower Skagit subbasin is located in northern Puget Sound and contained in Skagit and Snohomish counties, Washington. The subbasin contains two watersheds occupied by this ESU and these watersheds encompass approximately 447 mi^2 and 1,592 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 149 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). Ruckelshaus et al. (2001, 2004) identified six historically independent populations in this subbasin: Lower Skagit River, Upper Skagit River, Cascade River, Lower Sauk River, Suiattle River, and Upper Sauk River. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A5 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Stillaguamish Subbasin (HUC4# 17110008)

The Stillaguamish subbasin is located in north-central Puget Sound and contained in Skagit and Snohomish counties, Washington. The subbasin contains three watersheds occupied by this ESU and these watersheds encompass approximately 704 mi^2 and 2,302 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 179 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). Ruckelshaus et al. (2001, 2004) identified two historically independent populations in this subbasin: North Fork Stillaguamish River and South Fork Stillaguamish River. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A6 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Skykomish Subbasin (HUC4# 17110009)

The Skykomish subbasin is located in north-central Puget Sound and contained in King and Snohomish counties, Washington. The subbasin contains five watersheds occupied by this ESU and these watersheds encompass approximately 853 mi^2 and 2,861 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 153 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). Ruckelshaus et al. (2001, 2004) identified one historically independent population (Skykomish River) in this subbasin. Occupied reaches in two HUC5s (Tye and Beckler Rivers, and Skykomish River Forks) overlap with a FEMAT key watershed for at-risk anadromous salmonids (FEMAT 1994). The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A7 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Snoqualmie Subbasin (HUC4# 17110010)

The Snoqualmie subbasin is located in north-central Puget Sound and contained in King and Snohomish counties, Washington. The subbasin contains two watersheds occupied by this ESU and these watersheds encompass approximately 504 mi^2 and 1,525 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 84 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). Ruckelshaus et al. (2001, 2004) identified one historically independent population (Snoqualmie River) in this subbasin. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A8 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Snohomish Subbasin (HUC4# 17110011)

The Snohomish subbasin is located in north-central Puget Sound and contained entirely in Snohomish County, Washington. The subbasin contains two watersheds occupied by this ESU and these watersheds encompass approximately 278 mi^2 and 823 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 101 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). Ruckelshaus et al. (2001, 2004) identified two historically independent populations in this subbasin: Skykomish River and Snoqualmie River. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A9 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Lake Washington Subbasin (HUC4# 17110012)

The Lake Washington subbasin is located in south Puget Sound and contained in King and Snohomish counties, Washington. Lake Washington is a dominant feature in this subbasin. The subbasin contains four watersheds occupied by this ESU and these watersheds encompass approximately 619 mi^2 and 1,087 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 206 miles of occupied riverine/estuarine habitat in these watersheds. Lake Washington contains approximately 40 mi^2 of lake habitat in these watersheds. Ruckelshaus et al. (2001,

2004) identified two historically independent populations in this subbasin: Sammamish River and Cedar River. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. The CHART also determined that, based on a report by Tabor et al. (2004), low gradient reaches near the mouth of the Cedar River (Taylor Creek, Kennydale Creek, and Johns Creek) were also occupied and contained PCEs for this ESU. The CHART determined that these streams as well as that portion of May Creek with gradients <2% were important occupied rearing areas for the Cedar River population of Chinook salmon. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A10 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Duwamish Subbasin (HUC4# 17110013)

The Duwamish subbasin is located in south Puget Sound and contained in King County, Washington. The subbasin contains three watersheds occupied by this ESU and these watersheds encompass approximately 487 mi^2 and 1,433 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 171 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). Ruckelshaus et al. (2001, 2004) identified one historically independent population (Green River) in this subbasin. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A11 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Puyallup Subbasin (HUC4# 17110014)

The Puyallup subbasin is located in south Puget Sound and contained in King and Pierce counties, Washington. The subbasin contains five watersheds occupied by this ESU and these watersheds encompass approximately 996 mi^2 and 3,094 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 243 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). Ruckelshaus et al. (2001, 2004) identified two historically independent populations in this subbasin: Puyallup River and White River. Occupied reaches in one HUC5 (Upper White River) overlap with a FEMAT key watershed for at-risk anadromous salmonids (FEMAT 1994). The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A12 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Nisqually Subbasin (HUC4# 17110015)

The Nisqually subbasin is located in south Puget Sound and contained in Pierce, Thurston, and Lewis counties, Washington (although the latter is not occupied by this ESU). The subbasin contains two watersheds occupied by this ESU and these watersheds encompass approximately 472 mi^2 and 1,215 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 82 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). Ruckelshaus et al. (2001, 2004) identified one historically independent population (Nisqually River) in this subbasin. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A13 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Deschutes Subbasin (HUC4# 17110016)

The Deschutes subbasin is located at the southern end of Puget Sound, and most of it is in Thurston County, Washington (although small portions of the subbasin – unoccupied by this ESU – also extend into Lewis County, Washington). The subbasin contains two watersheds occupied by this ESU and these encompass approximately 168 mi^2 and 529 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 54 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). Ruckelshaus et al. (2001, 2004) did not identify any historically independent populations in this subbasin. The CHART concluded that all of these occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watershed. Map A14 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Skokomish Subbasin (HUC4# 17110017)

The Skokomish subbasin is located at the southern end of Hood Canal, and most of it is in Mason County, Washington (although small portions of the subbasin – unoccupied by this ESU – also extend into Grays Harbor and Jefferson counties, Washington). The subbasin contains a single watershed (Skokomish River HUC5# - 1711001701) and encompasses approximately 248 mi^2 and 951 miles of streams. The Skokomish River population is the only population documented in this subbasin/watershed by Ruckelshaus et al. (2001, 2002, 2004). Fish distribution and habitat use data from WDFW identify approximately 72 miles of occupied riverine/estuarine habitat in the watershed (WDFW 2003). The CHART concluded that all of these occupied areas contained one or more PCEs for this ESU, noted that this watershed contains the largest intact estuary in Hood Canal, and and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watershed. Map A15 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Hood Canal Subbasin (HUC4# 17110018)

The Hood Canal subbasin includes most of the drainages of Hood Canal proper, including those of the western Kitsap Peninsula. The subbasin includes portions of the following Washington counties: Clallam, Jefferson, Kitsap, and Mason. The subbasin contains six watersheds occupied by this ESU and encompasses approximately 605 mi^2 and 2,766 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 58 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). Occupied reaches in two HUC5s (Dosewallips River and Duckabush River) overlap with FEMAT key watersheds for at-risk anadromous salmonids (FEMAT 1994). The Mid-Hood Canal population is the only historically independent population documented in this subbasin by Ruckelshaus et al. (2001, 2002, 2004). The CHART concluded that all of these occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A16 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Kitsap Subbasin (HUC4# 17110019)

The Kitsap subbasin includes drainages of eastern Kitsap Peninsula as well as small, frontal drainages of southern and eastern Puget Sound up to Whidbey Island. The subbasin includes portions of the following Washington counties: Island, Jefferson, King, Kitsap, Mason, Pierce, Snohomish, and Thurston counties. The subbasin contains four watersheds occupied by this ESU and these encompass approximately 721 mi^2 and 1,747 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 56 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). However, Ruckelshaus et al. (2001, 2004) did not identify any historically independent populations in this subbasin. The CHART concluded that nearly all of these occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Possible exceptions were streams in the Puget Sound/East Passage HUC5 (e.g., in Pipers Creek, north of Shilshole Bay) where the CHART questioned whether or not listed Chinook salmon occur in this watershed. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A17 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Dungeness/Elwha Subbasin (HUC4# 17110020)

The Dungeness/Elwha subbasin includes drainages to the eastern Strait of Juan de Fuca and includes portions of Clallam and Jefferson counties, Washington. The subbasin contains three occupied watersheds and encompasses approximately 695 mi^2 and 2,700 miles of streams. Ruckelshaus et al. (2001, 2004) identified the following historically independent populations in this subbasin: Dungeness River and Elwha River. Chinook salmon in the Port Angeles Harbor HUC5 are not currently assigned to a historically independent population for this ESU. Fish distribution and habitat use data from WDFW identify approximately 47 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). The CHART concluded that all of these occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Occupied reaches in one HUC5 (Dungeness River) overlap with a FEMAT key watershed for at-risk anadromous salmonids (FEMAT 1994). Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A18 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Marine Areas

In addition to the freshwater and estuarine areas described above, the CHART also evaluated nearshore marine areas for this ESU. In keeping with the watershed-based approach used for freshwater and estuarine habitat areas, the Team based their assessment on 19 nearshore zones corresponding to Washington's Water Resource Inventory Areas (see Map A19). The nearshore marine area considered by the Team includes that zone from extreme high water out to a depth of 30 meters and adjacent to watersheds occupied by the ESU. The Team assessment focused on this area because it generally encompasses photic zone habitats supporting plant cover (e.g., eelgrass and kelp) important for rearing, migrating, and maturing Chinook salmon and their prey. Also, PCEs that may require special management considerations or protection are more readily identified in this zone (e.g., destruction of vegetative cover due to docks and bulkheads). Deeper waters are occupied by subadult and maturing fish, but it is unclear if these areas contain PCEs that require special management considerations or protection. The Team concluded that habitat areas in all 19 nearshore zones of Puget Sound (including areas adjacent to islands), Hood Canal, and the Strait of Juan de Fuca (to the mouth of the Elwha River) warrant a high rating for conservation value to the ESU. These habitat areas are found along approximately 2,376 miles of shoreline within the range of this ESU.

Changes to the CHART's Initial Assessments

The CHART reviewed the public and peer reviewer comments received on the Team's initial findings for this ESU as well as new information relevant to evaluating habitat areas for this ESU. As a result, the CHART did not change conservation value ratings for any watershed or nearshore zone within the geographical area occupied by this ESU, but did identify changes to the delineation of occupied habitat areas in several watersheds. The proposed critical habitat designation (69 FR 74572, December 14, 2004) summarizes the comments and responses pertaining to the CHART's initial determinations for this ESU. And Tables A1 and A2 reflect the final CHART assessments, including the following changes in habitat area delineations:

Subbasin	Watershed code	Watershed/Area name	Changes from Initial CHART Assessment

Nooksack	1711000402	Middle Fork Nooksack	Added 12 miles (19.2 km) of occupied habitat areas.
Stillaguamish	1711000802	South Fork Stillaguamish	Added 47 miles (75.6 km) of occupied habitat areas.
Snoqualmie	1711001004	Lower Snoqualmie River	Removed 6 miles (9.6 km) of unoccupied stream reaches.
Lake Washington	1711001201	Cedar River	Added 12 miles (19.2 km) of occupied habitat areas.

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Table A1. Summary of Occupied Areas, PCEs, and Management Activities Affecting PCEs for the Puget Sound Chinook Salmon ESU

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs) Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*	Estuarine and Nearshore Marine Shoreline (mi)	Unoccupied but may be essential** (mi)	Management Activities***
	Strait of Georgia	Bellingham Bay	1711000201	4.4	0.8	6.0	0		C, I, U
	Strait of Georgia	Samish River	1711000202	16.2	4.3	20.4	0		A, C, U
	Strait of Georgia	Birch Bay	1711000204	5.5	0.0	13.7[a]	0		F, U
	Nooksack	Upper North Fork Nooksack River	1711000401	15.9	4.4	5.8	0		F, R
	Nooksack	Middle Fork Nooksack River	1711000402	7.9	0.0	16.9	0		F, I, R
	Nooksack	South Fork Nooksack River	1711000403	35.8	1.5	10.7	0		C, F, R
	Nooksack	Lower North Fork Nooksack River	1711000404	52.5	<0.1	15.3	0		A, F, G
	Nooksack	Nooksack River	1711000405	46.2	20.5[b]	34.1	0		A, C, F
	Upper Skagit	Skagit River/ Gorge Lake	1711000504	0.0	0.0	2.8	0		D, F, R
	Upper Skagit	Skagit River/ Diobsud Creek	1711000505	21.4	0.0	2.7	0		F, R
	Upper Skagit	Cascade River	1711000506	16.2	0.0	5.3	0		F
	Upper Skagit	Skagit River/ Illabot Creek	1711000507	32.9	0.0	1.1	0		F, R
	Upper Skagit	Baker River	1711000508	<0.1	0.0	22.4	0		D, F, R
	Sauk	Upper Sauk River	1711000601	25.9	1.1	0.2	0		F, R
	Sauk	Upper Suiattle River	1711000602	8.1	0.0	0.1	0		F, R
	Sauk	Lower Suiattle River	1711000603	25.5	8.4	3.5	0		F, R

[a] A small portion of these PCEs in lower Dakota Creek overlap with estuarine and nearshore marine PCEs within Nearshore Marine Area N01.
[b] A small portion of these PCEs in the lower Nooksack River overlap with estuarine and nearshore marine PCEs within Nearshore Marine Area N01.

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs) Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*	Estuarine and Nearshore Marine Shoreline (mi)	Unoccupied but may be essential** (mi)	Management Activities***
	Sauk	Lower Sauk River	1711000604	31.5	10.2	3.9	0		F
	Lower Skagit	Middle Skagit River/ Finney Creek	1711000701	59.7	1.2	25.1	0		A
	Lower Skagit	Lower Skagit River/ Nookachamps Creek	1711000702	1.3	35.9[c]	26.1[d]	0		A, C, W, U
	Stillaguamish	North Fork Stillaguamish River	1711000801	47.2	0.1	7.6	0		F, R
	Stillaguamish	South Fork Stillaguamish River	1711000802	71.0	1.5	9.9	0		F, R
	Stillaguamish	Lower Stillaguamish River	1711000803	24.0	0.8	16.6[e]	0		F, U, W
	Skykomish	Tye And Beckler Rivers	1711000901	0.0	0.0	27.5	0		F, R
	Skykomish	Skykomish River Forks	1711000902	28.6	0.0	12.9	0		A, F, U
	Skykomish	Skykomish River/ Wallace River	1711000903	24.9	0.0	9.3	0		A, F
	Skykomish	Sultan River	1711000904	9.8	0.0	0.0	0		D, F, U
	Skykomish	Skykomish River/ Woods Creek	1711000905	24.5	0.0	15.0	0		A, F, G
	Snoqualmie	Middle Fork Snoqualmie River	1711001003	24.4	0.4	10.4	0		A, F
	Snoqualmie	Lower Snoqualmie River	1711001004	16.4	21.1	11.6	0		A, F
	Snohomish	Pilchuck River	1711001101	16.5	9.8	9.5	0		A, D, F, S

[c] A small portion of these PCEs in the lower Skagit River overlap with estuarine and nearshore marine PCEs within Nearshore Marine Area N03.

[d] A small portion of these PCEs in the lower Skagit River overlap with estuarine and nearshore marine PCEs within Nearshore Marine Area N03.

[e] A small portion of these PCEs in the lower Stillaguamish River overlap with estuarine and nearshore marine PCEs within Nearshore Marine Area N04.

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs)				Unoccupied but may be essential** (mi)	Management Activities***
				Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*	Estuarine and Nearshore Marine Shoreline (mi)		
	Snohomish	Snohomish River	1711001102	20.5[f]	0.1	44.3[g]	0		C, F, U
	Lake Washington	Cedar River	1711001201	34.8	1.0	1.6	0		C, D, F, I, U
	Lake Washington	Lake Sammamish	1711001202	23.5	1.0	12.2	0		F, U
	Lake Washington	Lake Washington	1711001203	5.7	4.9	57.0	0		F, U
	Lake Washington	Sammamish River	1711001204	54.7	0.5	8.7	0		F, U
	Duwamish	Upper Green River	1711001301	0.0	0.0	27.0	0		D, F
	Duwamish	Middle Green River	1711001302	12.1	0.0	31.3	0		A, D, U
	Duwamish	Lower Green River	1711001303	43.1	19.0	38.1	0		C, I, U
	Puyallup	Upper White River	1711001401	7.3	8.0	25.5	0		D, F, I
	Puyallup	Lower White River	1711001402	8.4	47.1	6.9	0		A, D, I, U
	Puyallup	Carbon River	1711001403	28.2	3.8	24.3	0		A, F
	Puyallup	Upper Puyallup River	1711001404	8.1	11.2	32.5	0		D, F
	Puyallup	Lower Puyallup River	1711001405	4.2	17.5[h]	10.3	0		C, U
	Nisqually	Mashel/ Ohop	1711001502	32.9	4.7	1.3	0		A, D, U
	Nisqually	Lowland	1711001503	32.5	3.4[i]	6.9[j]	0		A, U
	Deschutes	Prairie1	1711001601	14.8	0.1	9.8	0		A, F, G
	Deschutes	Prairie2	1711001602	21.4	1.4	6.2[k]	0		A, F, G

[f] A small portion of these PCEs in lower Quilceda Creek overlap with estuarine and nearshore marine PCEs within Nearshore Marine Area N06.

[g] A small portion of these PCEs in the lower Skykomish River overlap with estuarine and nearshore marine PCEs within Nearshore Marine Area N06.

[h] A small portion of these PCEs in the lower Puyallup River overlap with estuarine and nearshore marine PCEs within Nearshore Marine Area N09.

[i] A small portion of these PCEs in lower McAllister Creek overlap with estuarine and nearshore marine PCEs within Nearshore Marine Area N10.

[j] A small portion of these PCEs in the lower Nisqually River overlap with estuarine and nearshore marine PCEs within Nearshore Marine Area N10.

[k] A small portion of these PCEs in the lower Deschutes River and lower Indian Creek overlap with estuarine and nearshore marine PCEs within Nearshore Marine Area N12.

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs) Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*	Estuarine and Nearshore Marine Shoreline (mi)	Unoccupied but may be essential** (mi)	Management Activities***
	Skokomish	Skokomish River	1711001701	37.7	3.7	30.5[l]	0		C, D, F, U
	Hood Canal	Lower West Hood Canal Frontal	1711001802	0.7	0.1	0.5	0		C, F, R, U
	Hood Canal	Hamma Hamma River	1711001803	3.8	0.0	<0.1	0		C, F
	Hood Canal	Duckabush River	1711001804	6.4	0.1	1.6	0		C, F
	Hood Canal	Dosewallips River	1711001805	13.0	0.5	0.3	0		C, F, R
	Hood Canal	Big Quilcene River	1711001806	2.2	0.5	0.2	0		C, F
	Hood Canal	West Kitsap	1711001808	21.9	3.1	4.5	0		A, F, U
	Kitsap	Kennedy/ Goldsborough	1711001900	0.0	0.0	12.1	0		A, F, U
	Kitsap	Puget	1711001901	8.4	0.3	19.2	0		A, G, U
	Kitsap	Prairie3	1711001902	0.0	0.0	14.5[m]	0		G, U
	Kitsap	Puget Sound/ East Passage	1711001904	0.0	0.0	1.2	0		C, U
	Dungeness/ Elwha	Dungeness River	1711002003	30.2	0.1	1.2	0		C, F, I, R, S, U
	Dungeness/ Elwha	Port Angeles Harbor	1711002004	4.7	0.0	4.8	0		F, U
	Dungeness/ Elwha	Elwha River	1711002007	5.1[n]	1.2	<0.1	0	45.4[o]	D, F
		Nearshore Marine Area	N01	0	0	0	154.9		C, H, U
		Nearshore Marine Area	N02	0	0	0	407.9		C, H, T
		Nearshore Marine Area	N03	0	0	0	225.2		C, H, T
		Nearshore Marine Area	N04	0	0	0	36		C, H
		Nearshore Marine Area	N05	0	0	0	212.5		C, H, T, U

[l] A small portion of these PCEs in the lower Skokomish River overlap with estuarine and nearshore marine PCEs within Nearshore Marine Area N17.

[m] A small portion of these PCEs in lower Mclane Creek and lower Woodland Creek overlap with estuarine and nearshore marine PCEs within Nearshore Marine Area N12.

[n] A small portion of these PCEs in the lower Elwha River overlap with estuarine and nearshore marine PCEs within Nearshore Marine Area N19.

[o] Watershed contains unoccupied habitat above Elwha and Glines Canyon dams that may be essential for conservation.

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs)				Unoccupied but may be essential** (mi)	Management Activities***
				Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*	Estuarine and Nearshore Marine Shoreline (mi)		
		Nearshore Marine Area	N06	0	0	0	77.7		C, H, T
		Nearshore Marine Area	N07	0	0	0	38.1		C, H, T
		Nearshore Marine Area	N08	0	0	0	45.1		C, H, T
		Nearshore Marine Area	N09	0	0	0	36.4		C, H, T
		Nearshore Marine Area	N10	0	0	0	10.5		C, H
		Nearshore Marine Area	N11	0	0	0	29.7		C, H, T, U
		Nearshore Marine Area	N12	0	0	0	77.5		C, H
		Nearshore Marine Area	N13	0	0	0	174		C, H
		Nearshore Marine Area	N14	0	0	0	419.1		C, H, T, U
		Nearshore Marine Area	N15	0	0	0	101.8		C, H, T, U
		Nearshore Marine Area	N16	0	0	0	16.3		C, H
		Nearshore Marine Area	N17	0	0	0	45.1		C, H, S
		Nearshore Marine Area	N18	0	0	0	213.5		C, H, T
		Nearshore Marine Area	N19	0	0	0	55.2		C, H

* Some streams classified as “Migration/ Presence PCEs” may also include rearing or spawning PCEs, but the GIS data are still undergoing review to confirm additional habitat use types.

** These watersheds contain unoccupied habitat that historically supported spawning and rearing PCEs. The CHART determined that these habitat areas/watersheds may be essential for conservation of the ESU.

*** This list is not exhaustive. It is intended to highlight key management activities affecting PCEs in each watershed. Activities identified are based on the general categories described by Spence et al. (1996) and summarized previously in the “Special Management Considerations or Protection” section of this report. Coding is as follows: F= forestry, G = grazing, A = agriculture, C = channel/bank modifications such as boat ramps, bulkheads, rip rap, diking and/or dredging, R = road building/maintenance, U = urbanization, S = sand and gravel mining, M = mineral mining, D = hydroelectric dams, I = irrigation impoundments and withdrawals, T = river, estuary, and ocean traffic, W = wetland loss/removal, B = beaver removal, X = exotic/invasive species introductions, H = forage fish/species harvest. Primary sources for this information were the CHART and reports by Berry et al (2001), Kerwin (1999a), Kerwin (1999b), WSCC (1999), WSCC (2000), Kerwin (2001), Beamer et al. (2000), Washington State Department of Natural Resources (2001), Haring (2002), Smith (2002), Kuttel (2003), and Fresh et al. (2004).

Table A2. Summary of CHART Scores and Ratings of Conservation Value for Habitat Areas in HUC5 Watersheds Occupied by the Puget Sound Chinook Salmon ESU

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors) 1	2	3	4	5	6	Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
	Strait of Georgia	Bellingham Bay	1711000201	0	1	1	1	1	0	4	Low HUC5 score; not identified as supporting a historically independent population	Low
	Strait of Georgia	Samish River	1711000202	1	1	2	1	1	1	7	Moderate HUC5 score; not identified as supporting a historically independent population; lost connectivity to Skagit River system a key CHART concern for this HUC5	Low
	Strait of Georgia	Birch Bay	1711000204	1	1	1	1	1	0	5	Low HUC5 score; not identified as supporting a historically independent population	Low
	Nooksack	Upper North Fork Nooksack River	1711000401	2	1	2	3	2	3	13	High HUC5 score; PCEs support one of only two populations in the North Sound region; PCEs in FEMAT key watershed	High
	Nooksack	Middle Fork Nooksack River	1711000402	1	1	2	2	1	2	9	Moderate HUC5 score; PCEs support one of only two populations in the North Sound region; PCEs are more limited in this HUC5 relative to other HUC5s in this region	Medium
	Nooksack	South Fork Nooksack River	1711000403	3	1	2	3	2	3	14	High HUC5 score; PCEs support one of only two populations in the North Sound region	High
	Nooksack	Lower North Fork Nooksack River	1711000404	3	1	2	3	2	3	14	High HUC5 score; PCEs support both populations in the North Sound region	High
	Nooksack	Nooksack River	1711000405	3	1	2	3	2	3	14	High HUC5 score; PCEs support both populations in the North Sound region	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Upper Skagit	Skagit River/Gorge Lake	1711000504	1	3	3	3	3	3	16	High HUC5 score; PCEs support one of ten populations in the Central Sound region which is the primary production region for this ESU	High
	Upper Skagit	Skagit River/ Diobsud Creek	1711000505	2	2	3	3	3	3	16	High HUC5 score; PCEs support one of ten populations in the Central Sound region which is the primary production region for this ESU	High
	Upper Skagit	Cascade River	1711000506	2	3	3	3	2	3	16	High HUC5 score; PCEs support one of ten populations in the Central Sound region which is the primary production region for this ESU	High
	Upper Skagit	Skagit River/Illabot Creek	1711000507	3	2	3	3	3	3	17	High HUC5 score; PCEs support six of ten populations in the Central Sound region which is the primary production region for this ESU	High
	Upper Skagit	Baker River	1711000508	1	1	1	2	1	3	9	Moderate HUC5 score; PCEs support one of ten populations in the Central Sound region which is the primary production region for this ESU; PCEs are much more limited in this HUC5 (due to dams) relative to other HUC5s in this region	Medium
	Sauk	Upper Sauk River	1711000601	3	3	3	3	2	3	17	High HUC5 score; PCEs support one of ten populations in the Central Sound region which is the primary production region for this ESU; PCEs in FEMAT key watershed	High
	Sauk	Upper Suiattle River	1711000602	3	2	1	3	2	3	14	High HUC5 score; PCEs support two of ten populations in the Central Sound region which is the primary production region for this ESU; PCEs in FEMAT key watershed	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Sauk	Lower Suiattle River	1711000603	3	2	1	3	2	3	14	High HUC5 score; PCEs support one of ten populations in the Central Sound region which is the primary production region for this ESU; PCEs in FEMAT key watershed	High
	Sauk	Lower Sauk River	1711000604	3	2	1	3	2	3	14	High HUC5 score; PCEs support three of ten populations in the Central Sound region which is the primary production region for this ESU; PCEs in FEMAT key watershed	High
	Lower Skagit	Middle Skagit River/Finney Creek	1711000701	3	2	3	3	3	3	17	High HUC5 score; PCEs support six of ten populations in the Central Sound region which is the primary production region for this ESU	High
	Lower Skagit	Lower Skagit River/ Nookachamps Creek	1711000702	3	1	2	3	3	3	15	High HUC5 score; PCEs support six of ten populations in the Central Sound region which is the primary production region for this ESU	High
	Stillaguamish	North Fork Stillaguamish River	1711000801	1	1	2	3	2	3	12	High HUC5 score; PCEs support one of ten populations in the Central Sound region which is the primary production region for this ESU	High
	Stillaguamish	South Fork Stillaguamish River	1711000802	2	2	1	2	2	2	11	High HUC5 score; PCEs support two of ten populations in the Central Sound region which is the primary production region for this ESU	High
	Stillaguamish	Lower Stillaguamish River	1711000803	2	1	2	3	2	3	13	High HUC5 score; PCEs support two of ten populations in the Central Sound region which is the primary production region for this ESU	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Skykomish	Tye And Beckler Rivers	1711000901	2	3	3	3	2	3	16	High HUC5 score; PCEs support one of ten populations in the Central Sound region which is the primary production region for this ESU; PCEs in FEMAT key watershed	High
	Skykomish	Skykomish River Forks	1711000902	2	3	1	3	2	3	14	High HUC5 score; PCEs support one of ten populations in the Central Sound region which is the primary production region for this ESU; PCEs in FEMAT key watershed	High
	Skykomish	Skykomish River/Wallace River	1711000903	2	2	2	3	2	3	14	High HUC5 score; PCEs support one of ten populations in the Central Sound region which is the primary production region for this ESU	High
	Skykomish	Sultan River	1711000904	1	2	3	3	2	2	13	High HUC5 score; PCEs support one of ten populations in the Central Sound region which is the primary production region for this ESU	High
	Skykomish	Skykomish River/Woods Creek	1711000905	2	2	2	3	2	3	14	High HUC5 score; PCEs support one of ten populations in the Central Sound region which is the primary production region for this ESU	High
	Snoqualmie	Middle Fork Snoqualmie River	1711001003	2	2	1	3	2	3	13	High HUC5 score; PCEs support two of ten populations in the Central Sound region which is the primary production region for this ESU	High
	Snoqualmie	Lower Snoqualmie River	1711001004	3	2	2	3	2	3	15	High HUC5 score; PCEs support two of ten populations in the Central Sound region which is the primary production region for this ESU	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Snohomish	Pilchuck River	1711001101	1	1	2	1	2	2	9	Moderate HUC5 score; PCEs are more limited in this HUC5 relative to other HUC5s in this region	Medium
	Snohomish	Snohomish River	1711001102	2	2	2	3	2	3	14	High HUC5 score; PCEs support two of ten populations in the Central Sound region which is the primary production region for this ESU	High
	Lake Washington	Cedar River	1711001201	2	2	1	1	1	2	9	Moderate HUC5 score but PCEs support entire spawning range for the Cedar River population.	High
	Lake Washington	Lake Sammamish	1711001202	2	2	1	0	1	2	8	Moderate HUC5 score; PCEs supporting spawning for the Sammamish River population are found in two HUC5s	Medium
	Lake Washington	Lake Washington	1711001203	1	1	1	2	1	2	8	Moderate HUC5 score; supports two populations in this region	Medium
	Lake Washington	Sammamish River	1711001204	1	1	1	1	1	2	7	Moderate HUC5 score; PCEs supporting spawning for the Sammamish River population are found in two HUC5s	Medium
	Duwamish	Upper Green River	1711001301	1	1	2	0	1	2	7	Moderate HUC5 score; PCEs support fish that are trapped and hauled into this HUC5; PCEs in downstream (and naturally accessible) HUC5s likely to be of higher conservation value for the Green/Duwamish River population	Medium
	Duwamish	Middle Green River	1711001302	1	2	1	2	2	2	10	Moderate HUC5 score; PCEs support one of six populations in the South Sound region for this ESU; this HUC5 likely to be emphasized for access above Howard Hanson Dam	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors) 1	2	3	4	5	6	Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
	Duwamish	Lower Green River	1711001303	3	1	1	1	2	2	10	Moderate HUC5 score; PCEs support one of six populations in the South Sound region for this ESU; PCEs may be most abundant in this HUC5 relative to other HUC5s in this region of the ESU	High
	Puyallup	Upper White River	1711001401	3	2	2	3	2	3	15	High HUC5 score; PCEs support one of six populations in the South Sound region for this ESU	High
	Puyallup	Lower White River	1711001402	3	1	2	3	2	3	14	High HUC5 score; PCEs support one of six populations in the South Sound region for this ESU	High
	Puyallup	Carbon River	1711001403	2	2	2	2	2	3	13	High HUC5 score; PCEs support one of six populations in the South Sound region for this ESU	High
	Puyallup	Upper Puyallup River	1711001404	2	1	2	3	2	3	13	High HUC5 score; PCEs support one of six populations in the South Sound region for this ESU	High
	Puyallup	Lower Puyallup River	1711001405	1	0	2	3	2	3	11	Moderate HUC5 score but PCEs support two of six populations in the South Sound region for this ESU	High
	Nisqually	Mashel/Ohop	1711001502	1	1	2	2	2	2	10	Moderate HUC5 score; important and diverse habitat types (including different ecoregion – southern Puget prairies – from other populations); PCEs support one of six populations in the South Sound region for this ESU	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Nisqually	Lowland	1711001503	2	2	1	2	2	2	11	Moderate HUC5 score; important and diverse habitat types (including different ecoregion – southern Puget prairies – from other populations); PCEs support one of six populations in the South Sound region for this ESU	High
	Deschutes	Prairie1	1711001601	1	1	1	0	0	1	4	Low HUC5 score; not identified as supporting a historically independent population	Low
	Deschutes	Prairie2	1711001602	1	1	1	0	0	1	4	Low HUC5 score; not identified as supporting a historically independent population	Low
	Skokomish	Skokomish River	1711001701	1	1	2	2	2	3	11	PCEs support one of two historically independent populations identified in Hood Canal region; largest intact estuary in Hood Canal; PCEs in FEMAT key watershed	High
	Hood Canal	Lower West Hood Canal Frontal	1711001802	0	0	0	0	0	0	0	Lowest possible HUC5 score; not identified as supporting a historically independent population; CHART questioned ESU presence here	Low
	Hood Canal	Hamma Hamma River	1711001803	0	1	1	0	1	2	5	Moderate score for a HUC5 in a region that only contains two historically independent populations; more limited distribution here than Duckabush and Dosewallip Rivers	Medium
	Hood Canal	Duckabush River	1711001804	1	1	2	1	1	2	8	Relatively high score for a HUC5 in a region that only contains two historically independent populations; PCEs in FEMAT key watershed	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Hood Canal	Dosewallips River	1711001805	1	2	1	1	1	2	8	Relatively high score for a HUC5; PCEs support one of two historically independent populations identified in Hood Canal region; PCEs in FEMAT key watershed	High
	Hood Canal	Big Quilcene River	1711001806	1	1	1	0	0	1	4	Low HUC5 score; not identified as supporting a historically independent population; CHART questioned ESU presence here	Low
	Hood Canal	West Kitsap	1711001808	1	1	1	0	0	1	4	Low HUC5 score; not identified as supporting a historically independent population	Low
	Kitsap	Kennedy/ Goldsborough	1711001900	0	2	1	0	0	1	4	Low HUC5 score; not identified as supporting a historically independent population; other larger subbasins in this region are likely of greater conservation value to this ESU	Low
	Kitsap	Puget	1711001901	0	0	1	0	0	1	2	Low HUC5 score; not identified as supporting a historically independent population; other larger subbasins in this region are likely of greater conservation value to this ESU	Low
	Kitsap	Prairie3	1711001902	0	1	1	0	0	1	3	Low HUC5 score; not identified as supporting a historically independent population; other larger subbasins in this region are likely of greater conservation value to this ESU	Low

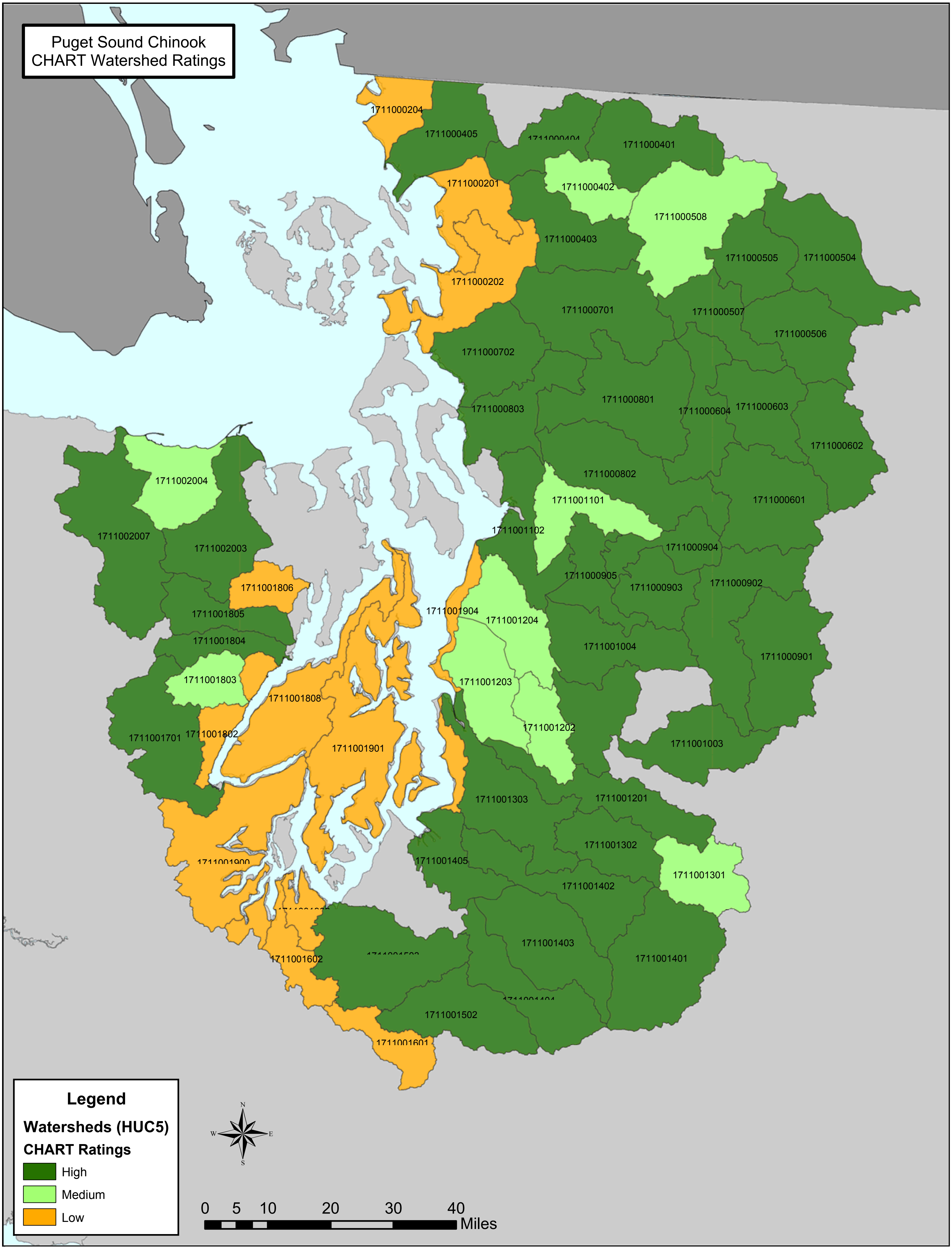
Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Kitsap	Puget Sound/East Passage	1711001904	0	0	0	0	0	0	0	Lowest possible HUC5 score; not identified as supporting a historically independent population; other larger subbasins in this region are likely of greater conservation value to this ESU. Also, CHART questioned ESU presence here	Low
	Dungeness/ Elwha	Dungeness River	1711002003	2	1	2	3	2	3	13	High HUC5 score; supports one of only two extant populations in the Strait of Juan de Fuca region; PCEs in FEMAT key watershed	High
	Dungeness/ Elwha	Port Angeles Harbor	1711002004	1	1	1	1	0	1	5	Low HUC5 score; not identified as supporting a historically independent population; however only one of three occupied HUC5s in the Strait of Juan de Fuca region	Medium
	Dungeness/ Elwha	Elwha River	1711002007	1	1	2	3	2	3	12	High HUC5 score; supports one of only two extant populations in the Strait of Juan de Fuca region. Watershed contains unoccupied habitat above Elwha and Glines Canyon dams that may be essential for conservation.	High
	NA	Nearshore Marine Area	N01							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N02							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High

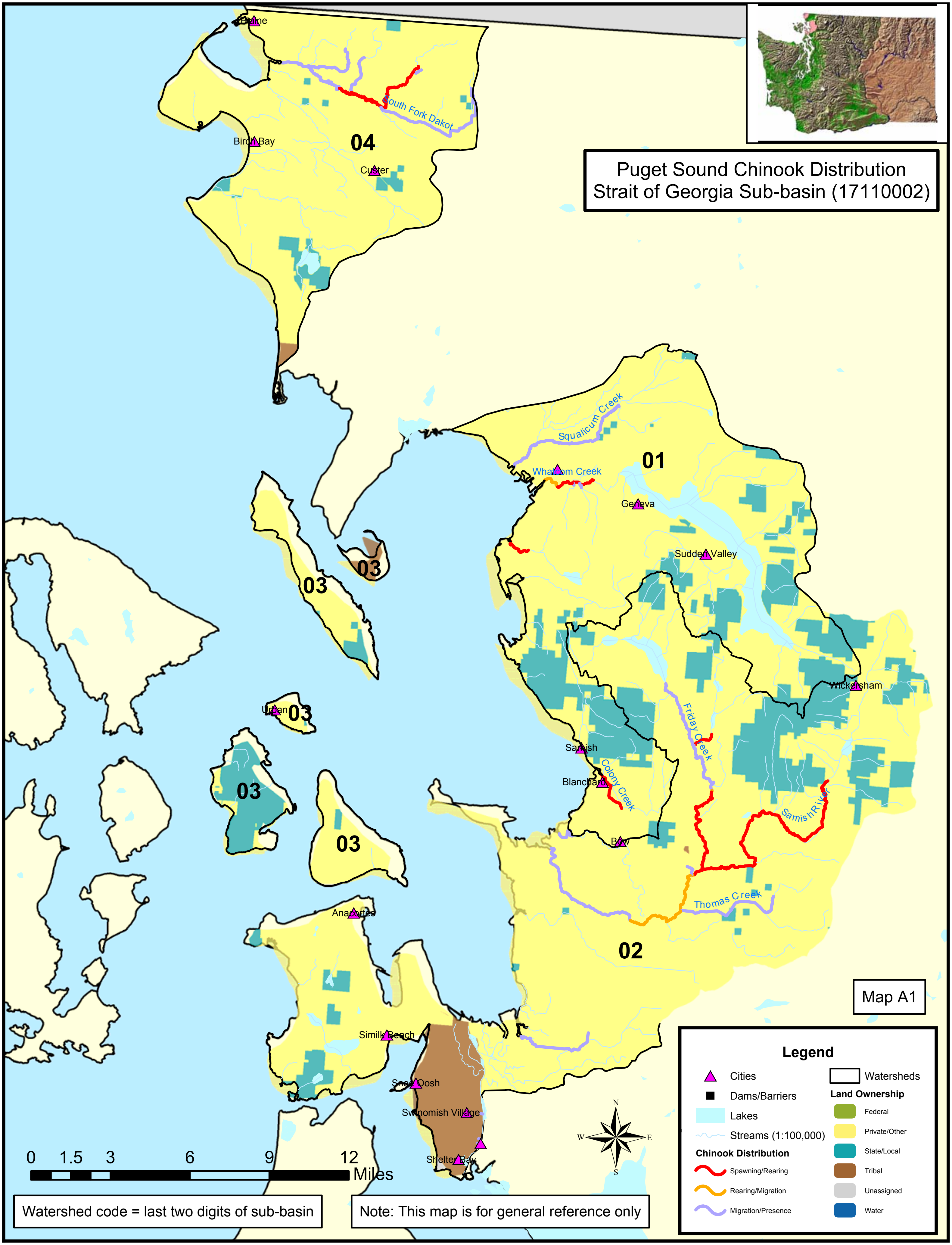
Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	NA	Nearshore Marine Area	N03							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N04							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N05							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N06							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N07							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N08							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N09							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	NA	Nearshore Marine Area	N10							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N11							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N12							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N13							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N14							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N15							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N16							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	NA	Nearshore Marine Area	N17							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N18							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N19							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High

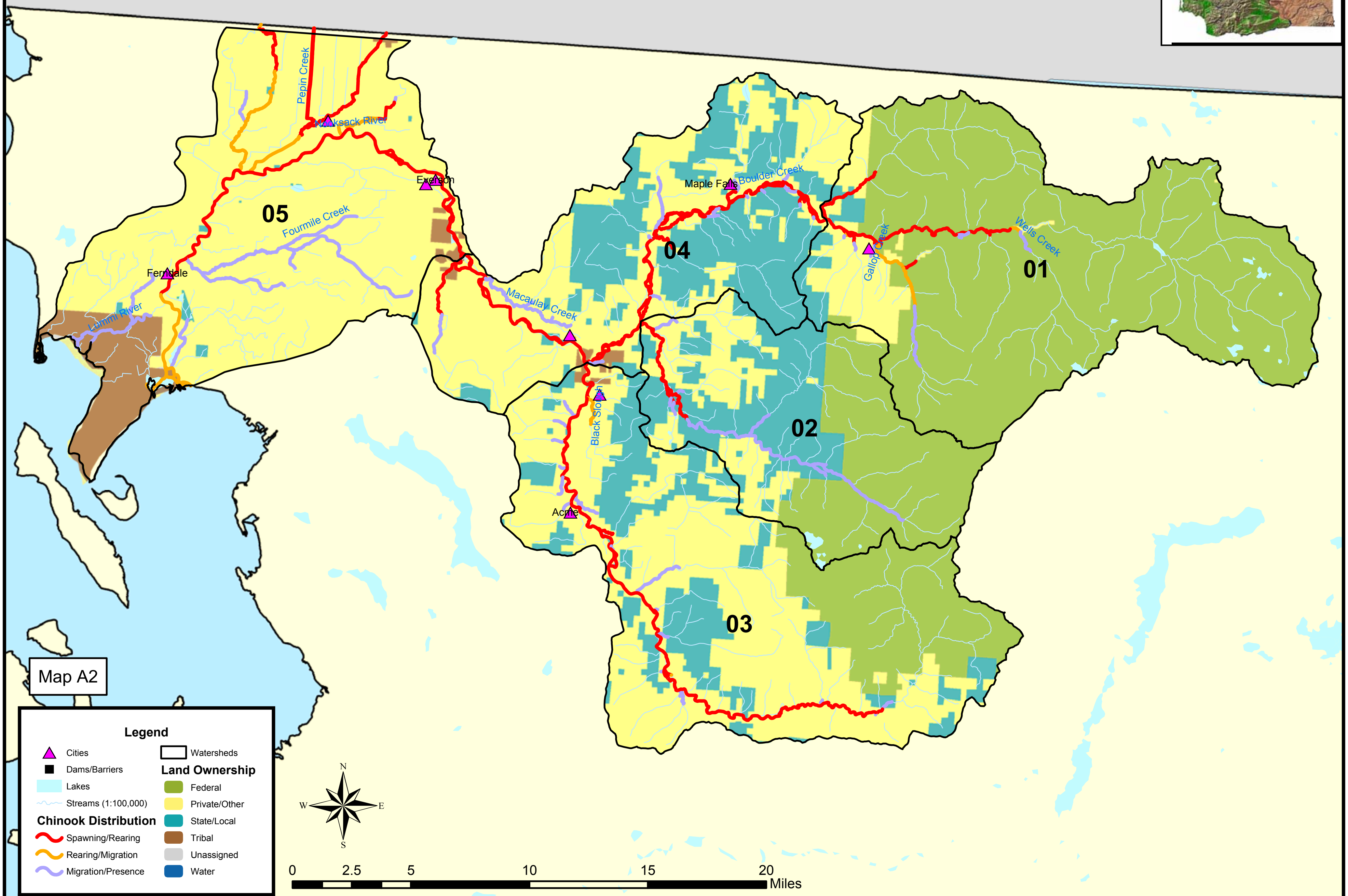
Figure A1. CHART Ratings of Conservation Value for Habitat Areas in HUC5 Watersheds Occupied by the Puget Sound Chinook Salmon ESU


Puget Sound Chinook
CHART Watershed Ratings
1711000204
1711000405
1711000401
1711000201
1711000402
1711000508
1711000403
1711000505
1711000504
1711000202
1711000701
1711000507
1711000506
1711000702
1711000801
1711000803
1711000604
1711000603
1711000602
1711000802
1711002004
1711001101
1711000601
1711002007
1711001102
1711002003
1711000904
1711000905
1711001806
1711000903
1711000902
1711001904
1711001204
1711001805
1711001004
1711001804
1711000901
1711001803
1711001203
1711001808
1711001202
1711001701
1711001802
1711001901
1711001003
1711001303
1711001201
1711001302
1711001405
1711001301
1711001402
1711001403
1711001401
1711001602
1711001502
1711001601
Legend
Watersheds (HUC5)
CHART Ratings
High
Medium
Low
N
W
E
S
0
5
10
20
30
40
Miles



Puget Sound Chinook Distribution
Strait of Georgia Sub-basin (17110002)
Map A1
Blaine
Birch Bay
Custer
04
South Fork Dakota
Squalicum Creek
Whatcom Creek
01
Geneva
Sudden Valley
03
Urban
Samish
Blanchard
Colony Creek
Friday Creek
Wickersham
Samish River
Bow
Thomas Creek
02
Anacortes
Similk Beach
Snee Oosh
Swinomish Village
Shelter Bay
0 1.5 3 6 9 12
Miles
N
S
E
W
Legend
Cities
Dams/Barriers
Lakes
Streams (1:100,000)
Chinook Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Watershed code = last two digits of sub-basin
Note: This map is for general reference only

Puget Sound Chinook Distribution
Nooksack Sub-basin (17110004)



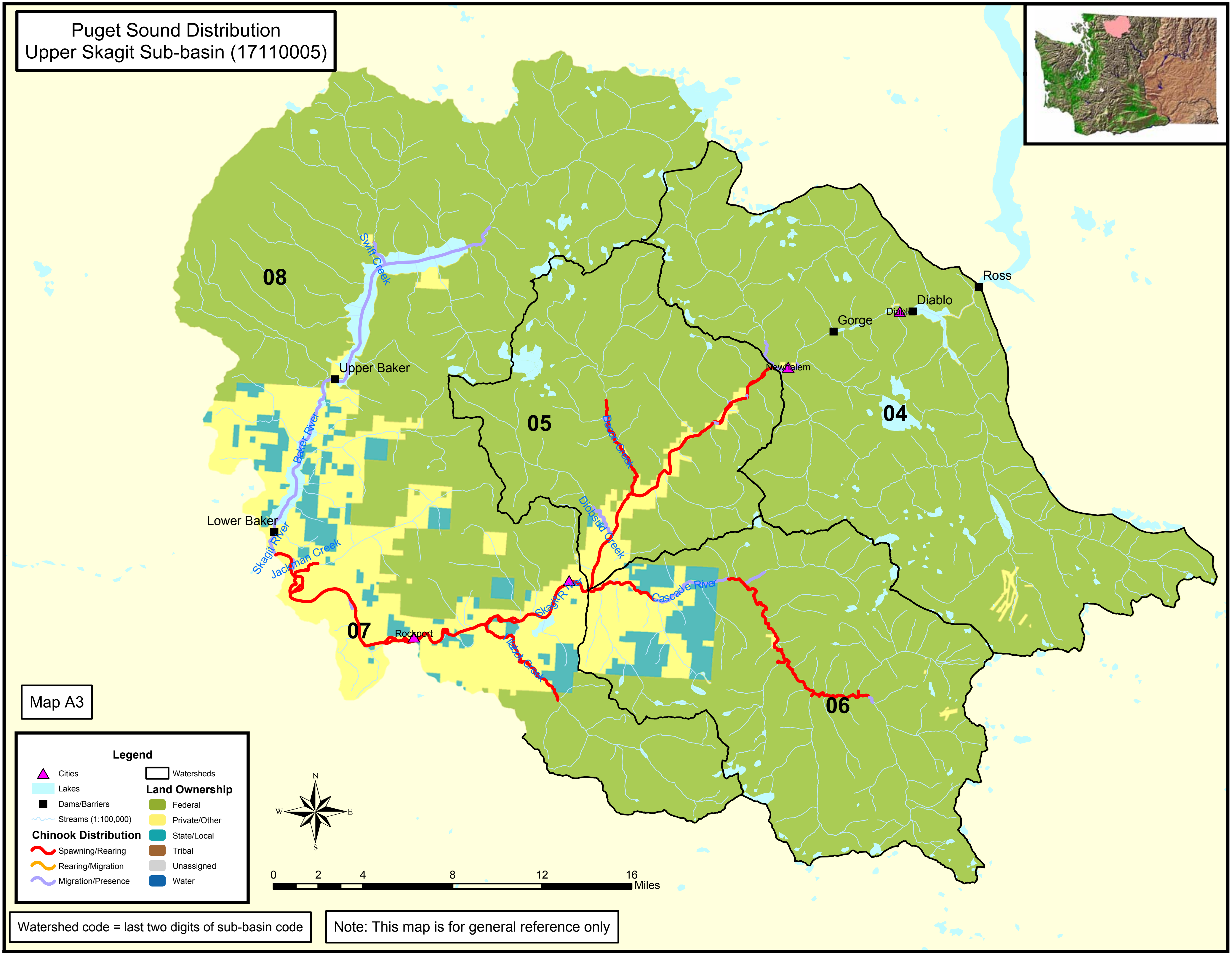
Map A2

Legend

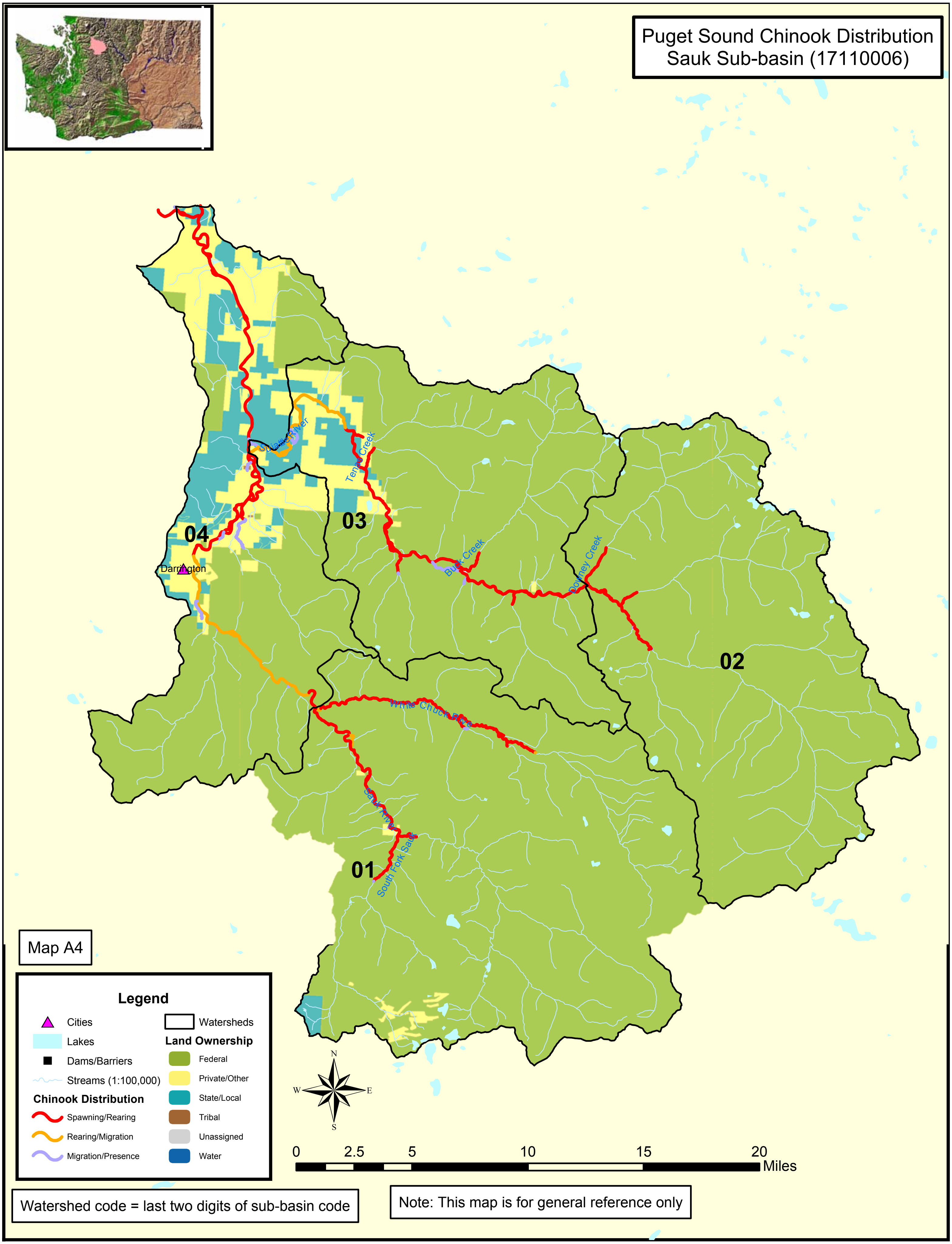
Cities	Watersheds
Dams/Barriers	**Land Ownership**
Lakes	Federal
Streams (1:100,000)	Private/Other
Chinook Distribution	State/Local
Spawning/Rearing	Tribal
Rearing/Migration	Unassigned
Migration/Presence	Water

Watershed code = last two digits of sub-basin code

Note: This map is for general reference only

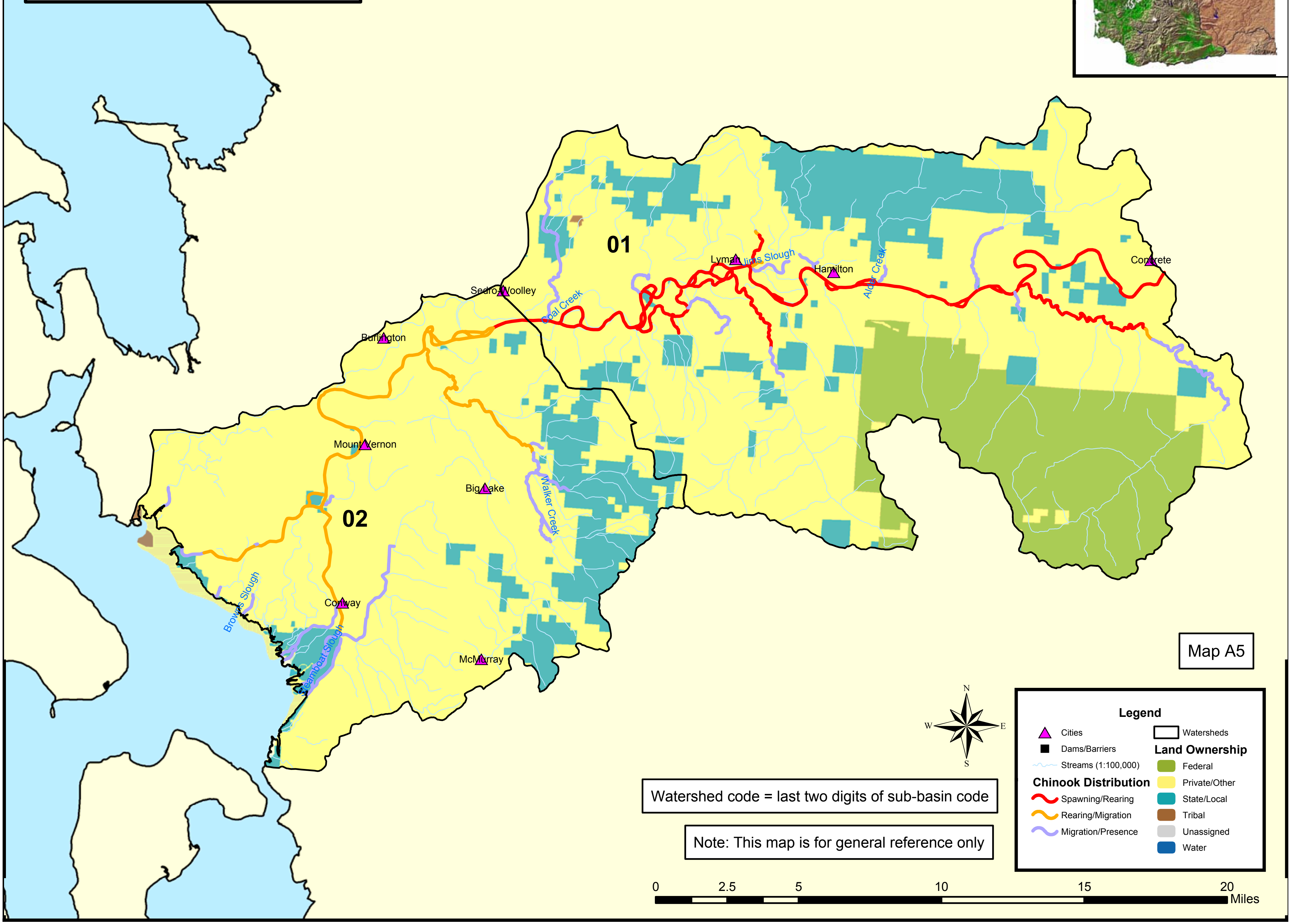


Puget Sound Distribution
Upper Skagit Sub-basin (17110005)
08
05
04
07
06
Swift Creek
Upper Baker
Baker River
Lower Baker
Skagit River
Jackman Creek
Rockport
Diobsud Creek
Cascade River
Newhalem
Gorge
Diablo
Ross
Map A3
Legend
Cities
Lakes
Dams/Barriers
Streams (1:100,000)
Chinook Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
0
2
4
8
12
16
Miles
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only



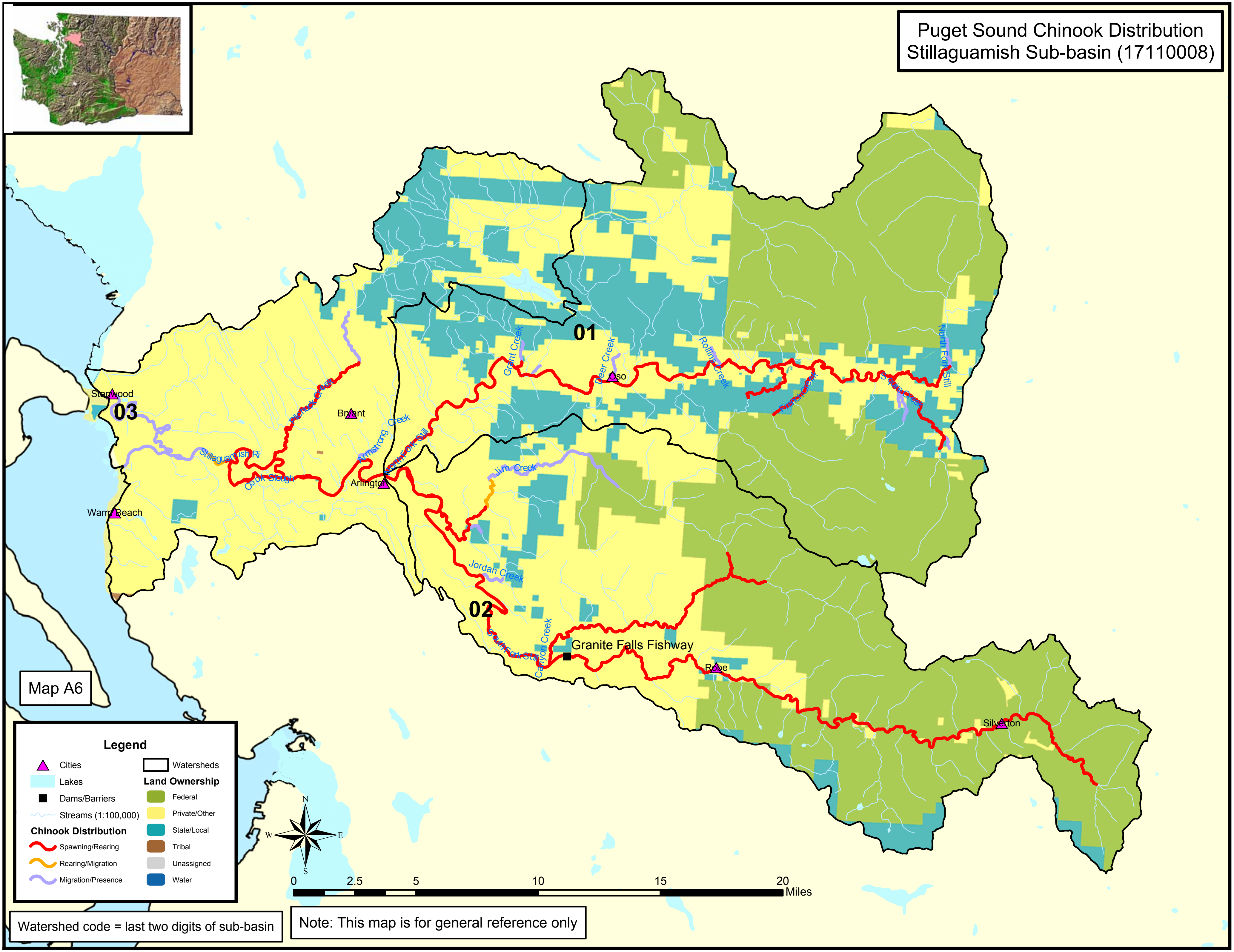
Puget Sound Chinook Distribution
Sauk Sub-basin (17110006)
Map A4
01
02
03
04
Darrington
Tenas Creek
Buck Creek
Downey Creek
White Chuck River
Sauk River
South Fork Sauk
Suiattle River
Legend
Cities
Lakes
Dams/Barriers
Streams (1:100,000)
Chinook Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
0
2.5
5
10
15
20
Miles
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only

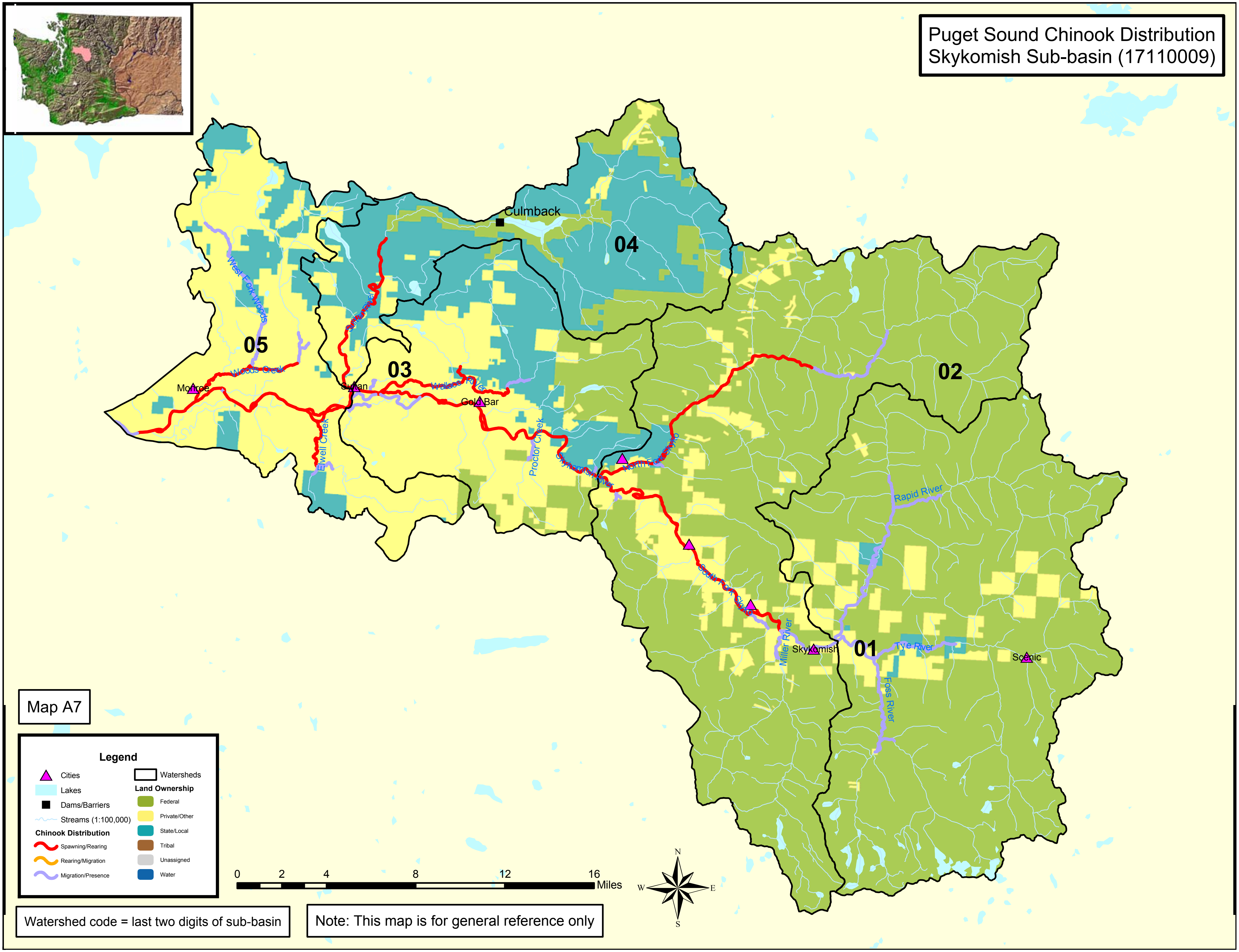
Puget Sound Chinook Distribution
Lower Skagit Sub-basin (17110007)

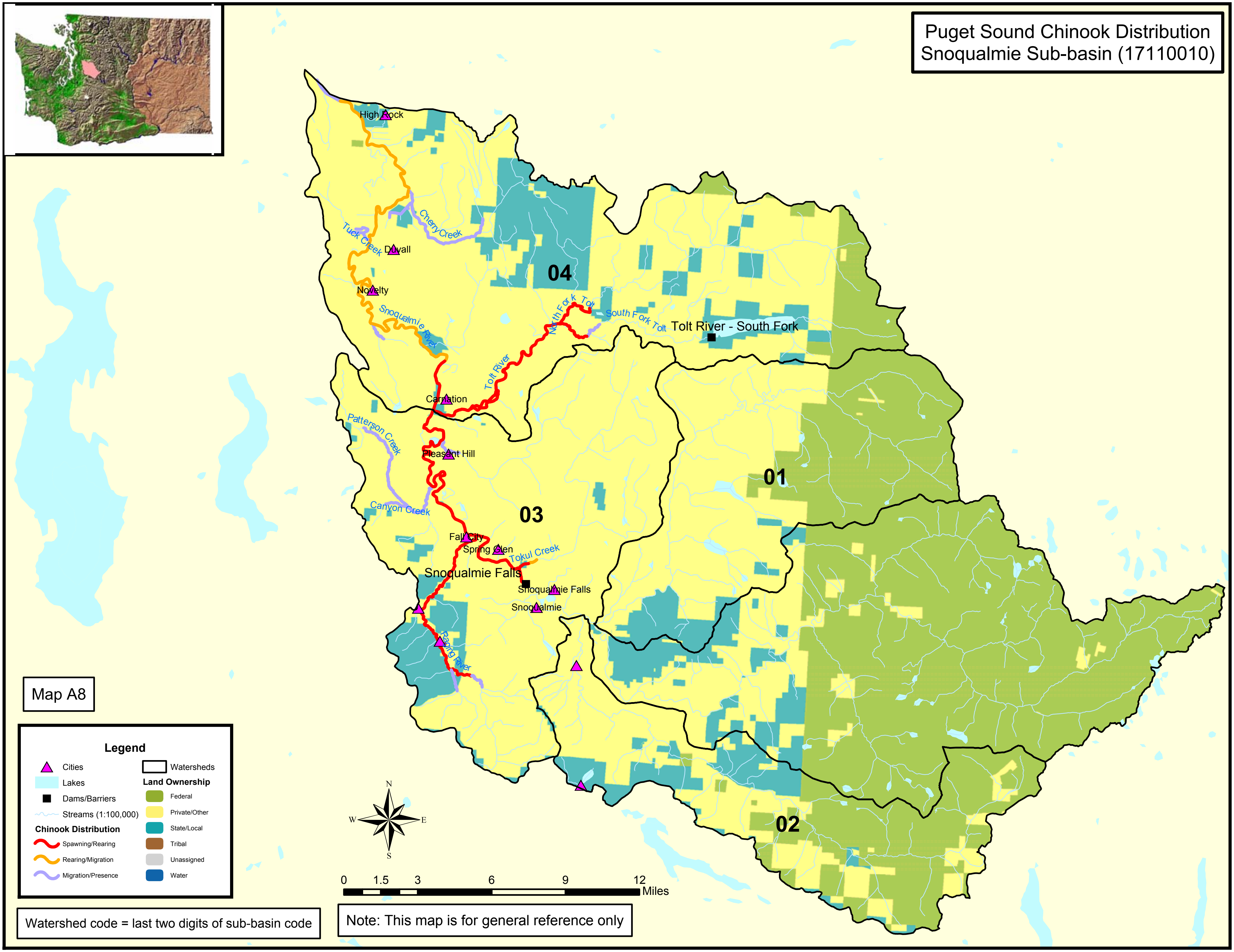


Watershed code = last two digits of sub-basin code

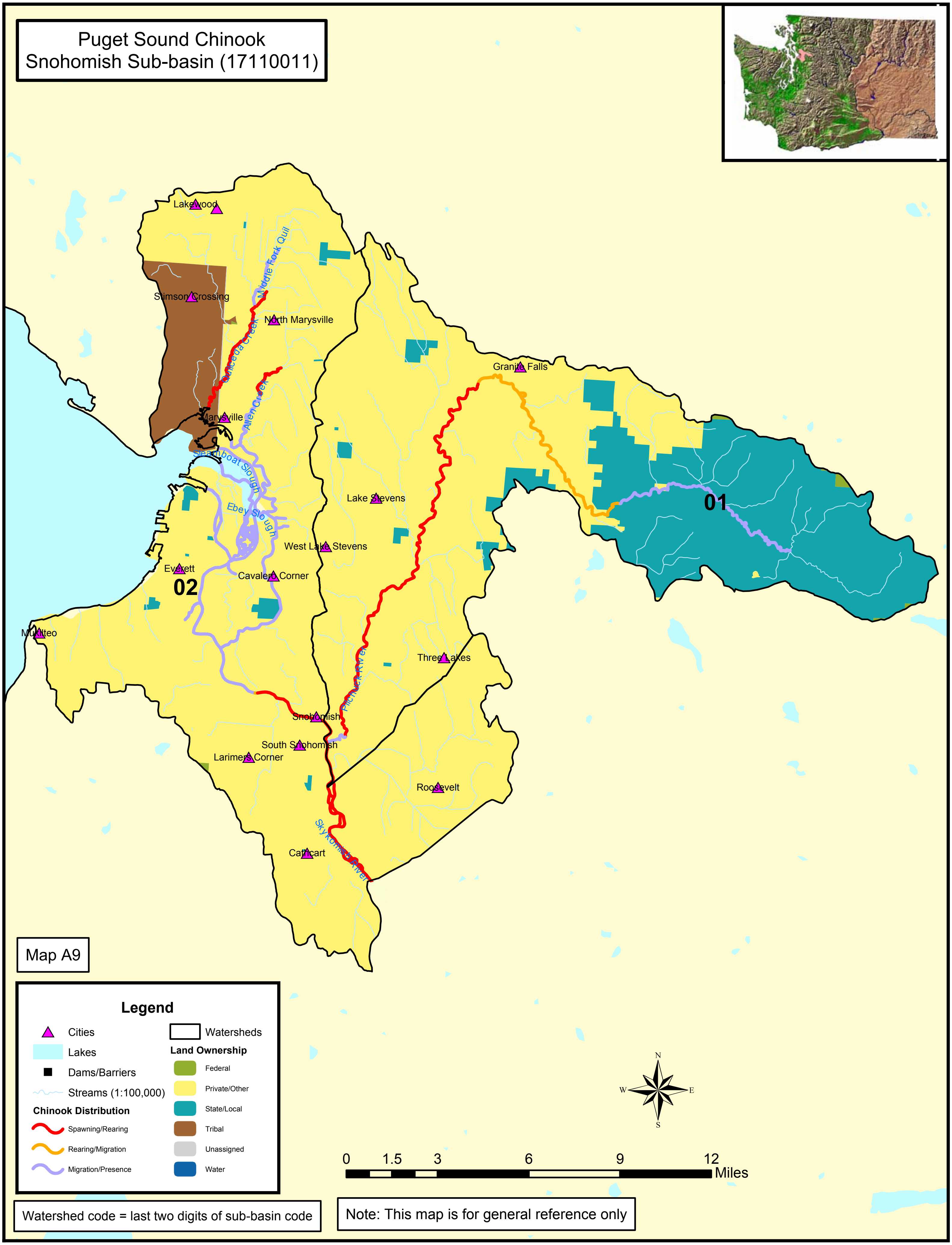
Note: This map is for general reference only

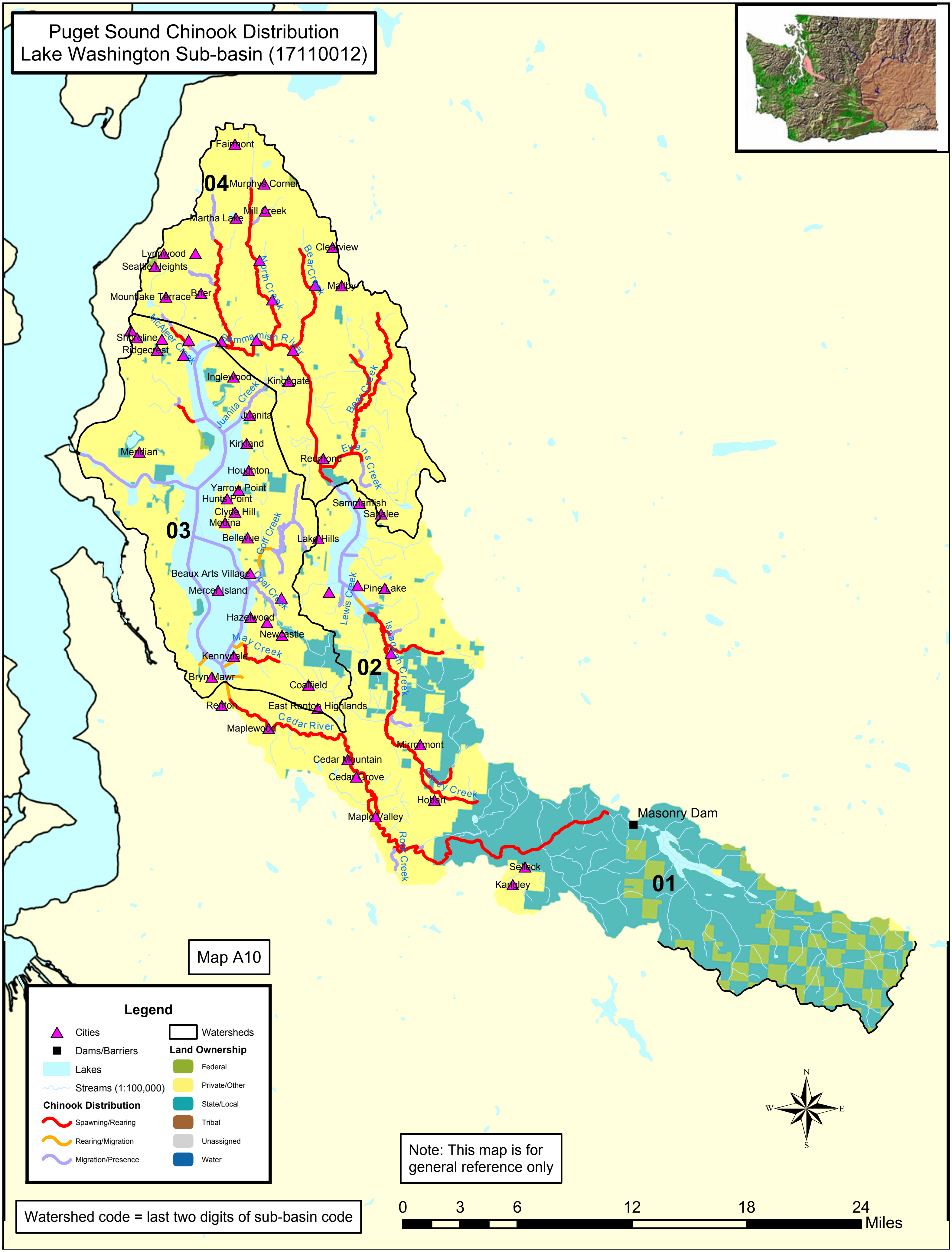

Puget Sound Chinook Distribution
Stillaguamish Sub-basin (17110008)
Map A6
01
02
03
Stanwood
Bryant
Arlington
Warm Beach
Oso
Robe
Silverton
Granite Falls Fishway
Stillaguamish Ri
Cook Slough
Armstrong Creek
North Fork Still
Grant Creek
Deer Creek
Rollins Creek
North Fork Still
Jim Creek
Jordan Creek
Canyon Creek
South Fork Still
Legend
Cities
Lakes
Dams/Barriers
Streams (1:100,000)
Chinook Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
0
2.5
5
10
15
20
Miles
Watershed code = last two digits of sub-basin
Note: This map is for general reference only


Puget Sound Chinook Distribution
Skykomish Sub-basin (17110009)
Culmback
04
05
03
02
01
Monroe
Sultan
Gold Bar
Skykomish
Scenic
West Fork Woods
Woods Creek
Elwell Creek
Proctor Creek
Rapid River
Tye River
Foss River
Miller River
Map A7
Legend
Cities
Lakes
Dams/Barriers
Streams (1:100,000)
Chinook Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
0
2
4
8
12
16
Miles
N
S
E
W
Watershed code = last two digits of sub-basin
Note: This map is for general reference only

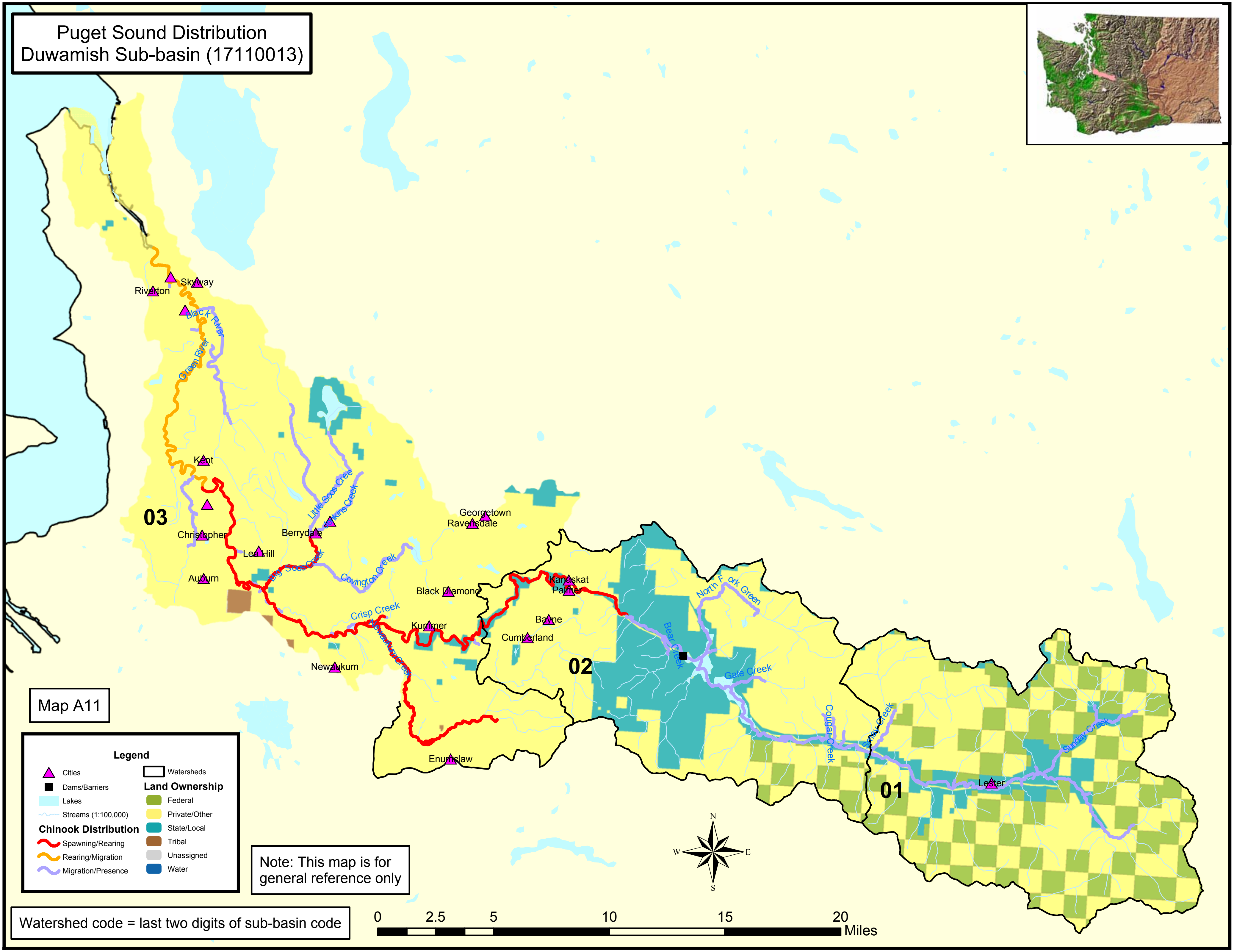


Puget Sound Chinook Distribution
Snoqualmie Sub-basin (17110010)
High Rock
Cherry Creek
Tuck Creek
Duvall
04
Novelty
Snoqualmie River
North Fork Tolt
South Fork Tolt
Tolt River - South Fork
Tolt River
Carnation
Patterson Creek
Pleasant Hill
01
Canyon Creek
03
Fall City
Spring Glen
Tokul Creek
Snoqualmie Falls
Snoqualmie Falls
Snoqualmie
Raging River
02
Map A8
Legend
Cities
Lakes
Dams/Barriers
Streams (1:100,000)
Chinook Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
W
E
S
0
1.5
3
6
9
12
Miles
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only

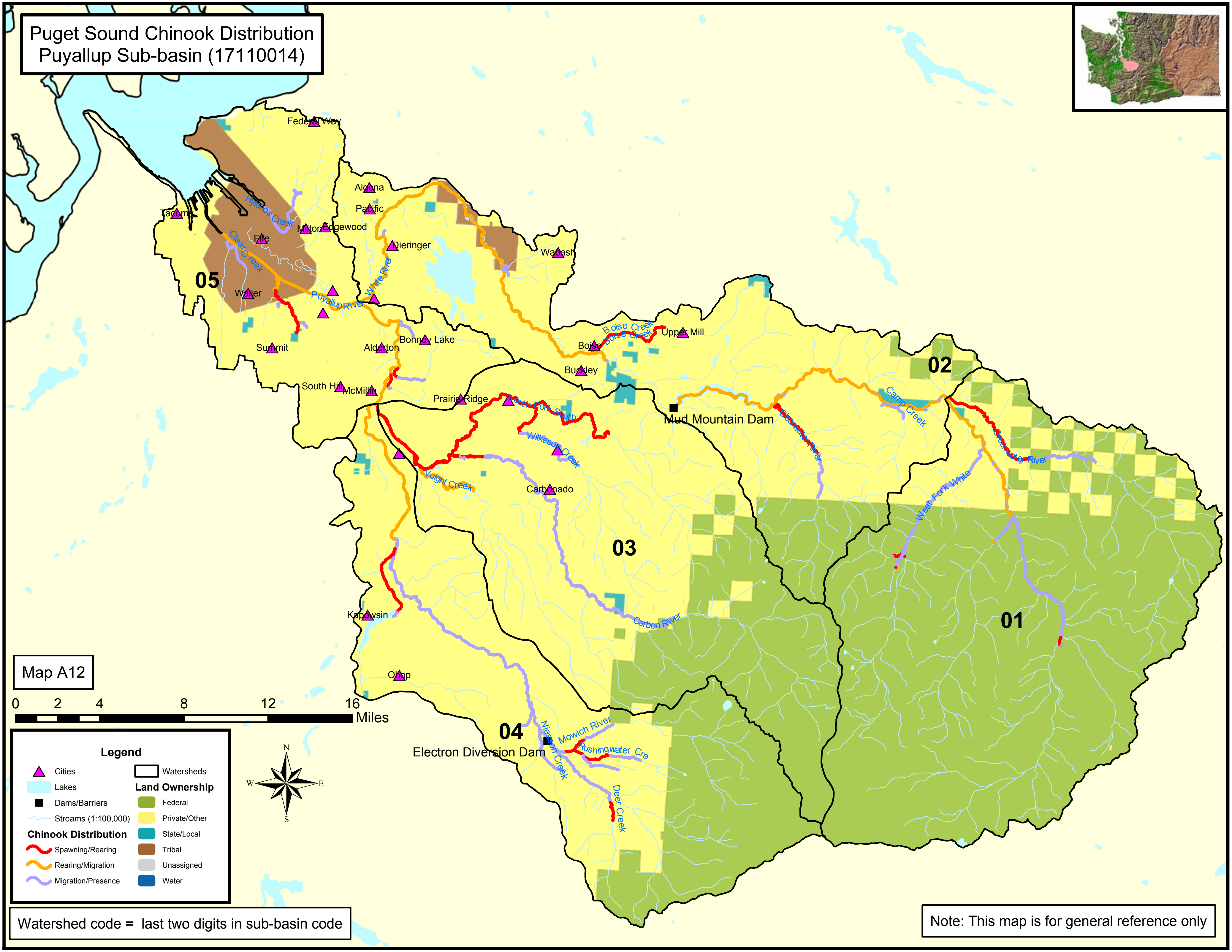

Puget Sound Chinook
Snohomish Sub-basin (17110011)
Lakewood
Stimson Crossing
North Marysville
Marysville
Granite Falls
Middle Fork Quil
Quilceda Creek
Allen Creek
Steamboat Slough
Ebey Slough
Lake Stevens
West Lake Stevens
Everett
Cavalero Corner
Mukilteo
01
02
Three Lakes
Pilchuck River
Snohomish
South Snohomish
Larimers Corner
Roosevelt
Skykomish River
Cathcart
Map A9
Legend
Cities
Lakes
Dams/Barriers
Streams (1:100,000)
Chinook Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
W
E
S
0
1.5
3
6
9
12
Miles
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only

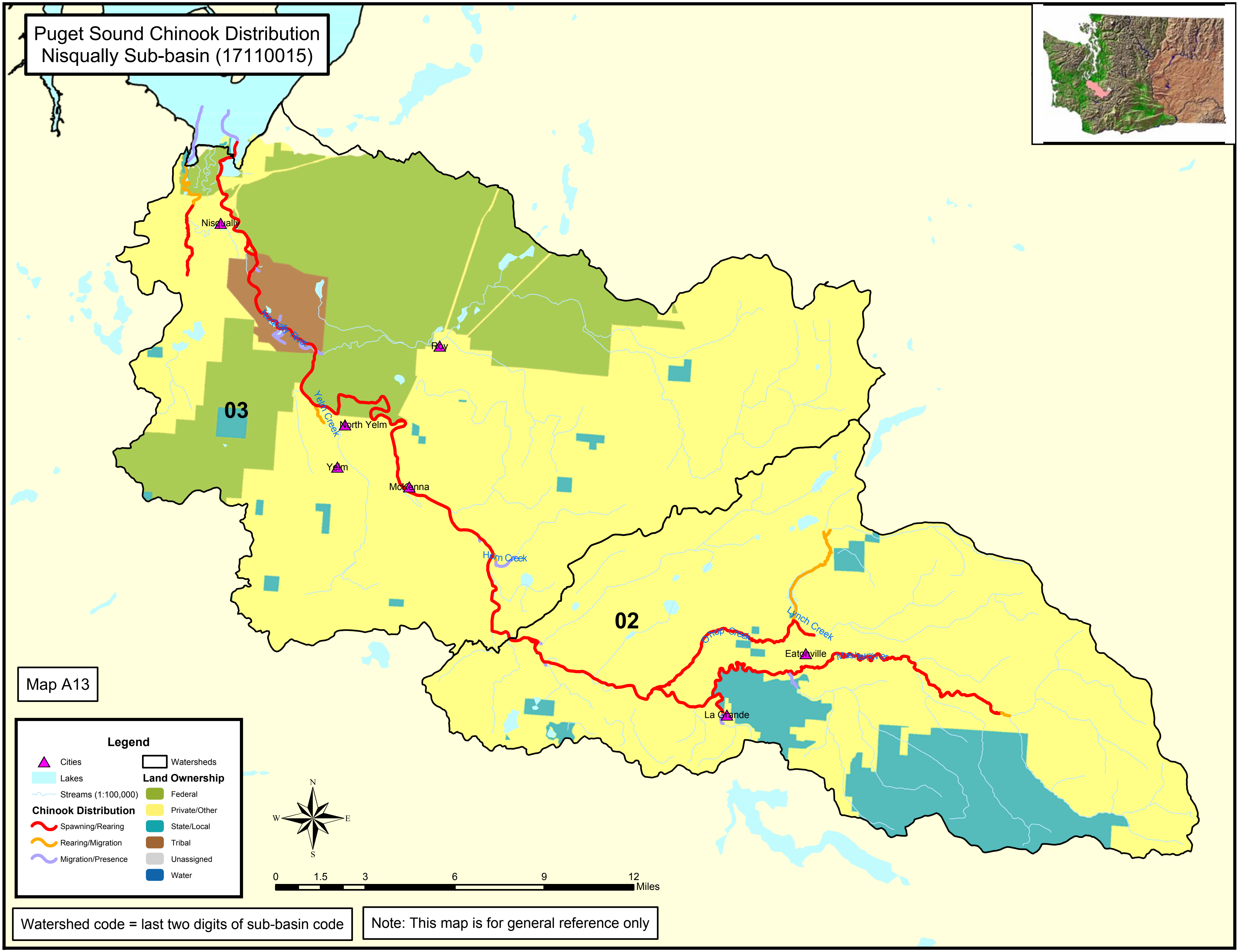


Puget Sound Chinook Distribution
Lake Washington Sub-basin (17110012)
04
03
02
01
Fairmont
Murphys Corner
Mill Creek
Martha Lake
Clearview
Lynnwood
Seattle Heights
Maltby
Mountlake Terrace
Brier
Shoreline
Ridgecrest
Inglewood
Kingsgate
Juanita
Kirkland
Meridian
Redmond
Houghton
Yarrow Point
Hunts Point
Clyde Hill
Medina
Sammamish
Sahalee
Bellevue
Lake Hills
Beaux Arts Village
Mercer Island
Pine Lake
Hazelwood
Newcastle
Kennydale
Bryn Mawr
Coalfield
Renton
East Renton Highlands
Maplewood
Mirrormont
Cedar Mountain
Cedar Grove
Hobart
Maple Valley
Masonry Dam
Selleck
Kangley
North Creek
Bear Creek
McAleer Creek
Sammamish River
Juanita Creek
Evans Creek
Goff Creek
Coal Creek
Lewis Creek
Issaquah Creek
May Creek
Cedar River
Rock Creek
Map A10
Legend
Cities
Dams/Barriers
Lakes
Streams (1:100,000)
Chinook Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Note: This map is for general reference only
0
3
6
12
18
24
Miles
N
S
E
W
Watershed code = last two digits of sub-basin code

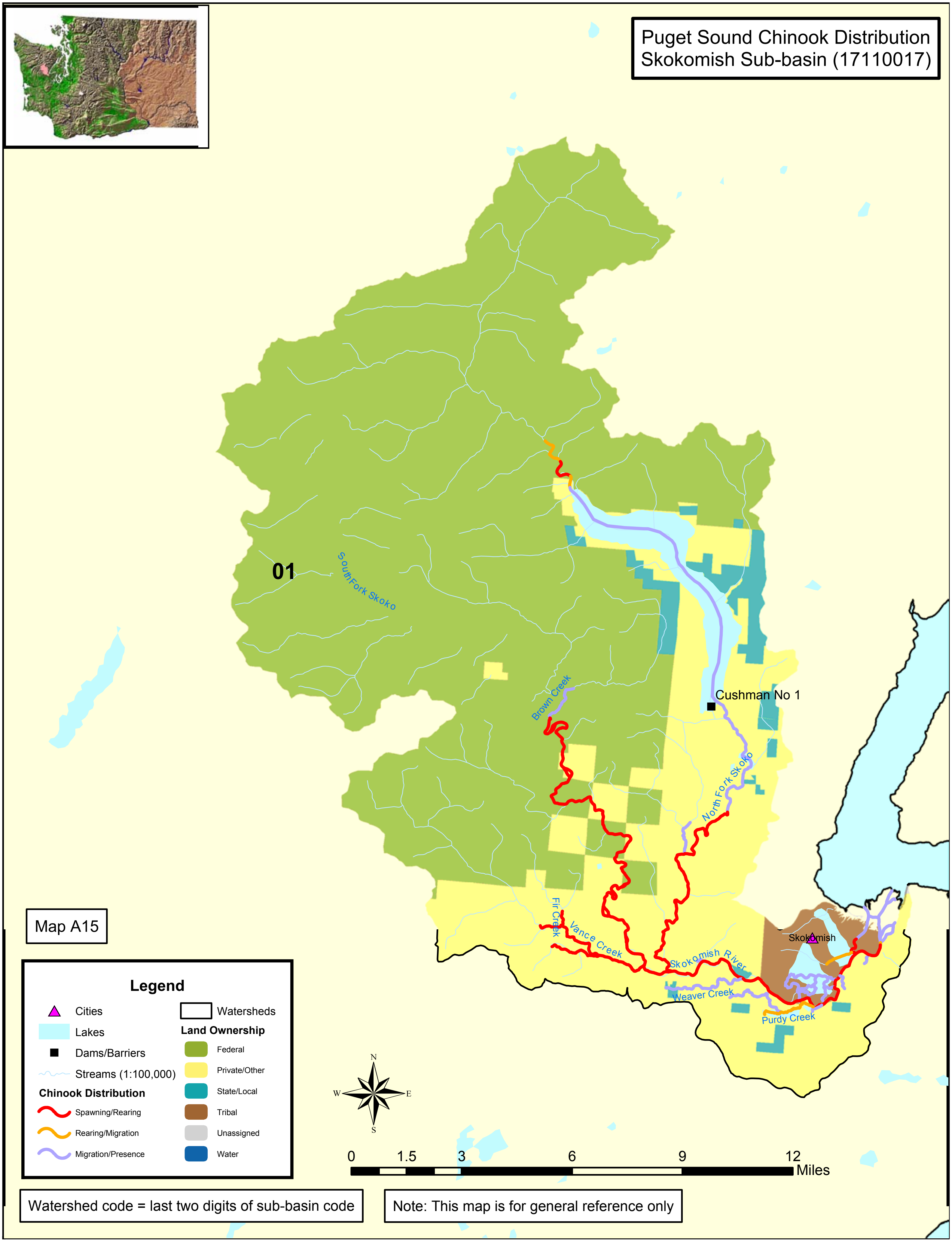


Puget Sound Distribution
Duwamish Sub-basin (17110013)
Riverton
Skyway
Black River
Green River
Kent
03
Christopher
Lea Hill
Auburn
Berrydale
Little Soos Creek
Jenkins Creek
Big Soos Creek
Covington Creek
Georgetown
Ravensdale
Black Diamond
Crisp Creek
Newaukum Creek
Kummer
Newaukum
Enumclaw
Kanaskat
Palmer
Bayne
Cumberland
02
Bear Creek
North Fork Green
Gale Creek
Cougar Creek
Sunday Creek
Lester
01
Map A11
Legend
Cities
Dams/Barriers
Lakes
Streams (1:100,000)
Chinook Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Note: This map is for general reference only
N
W
E
S
0
2.5
5
10
15
20
Miles
Watershed code = last two digits of sub-basin code

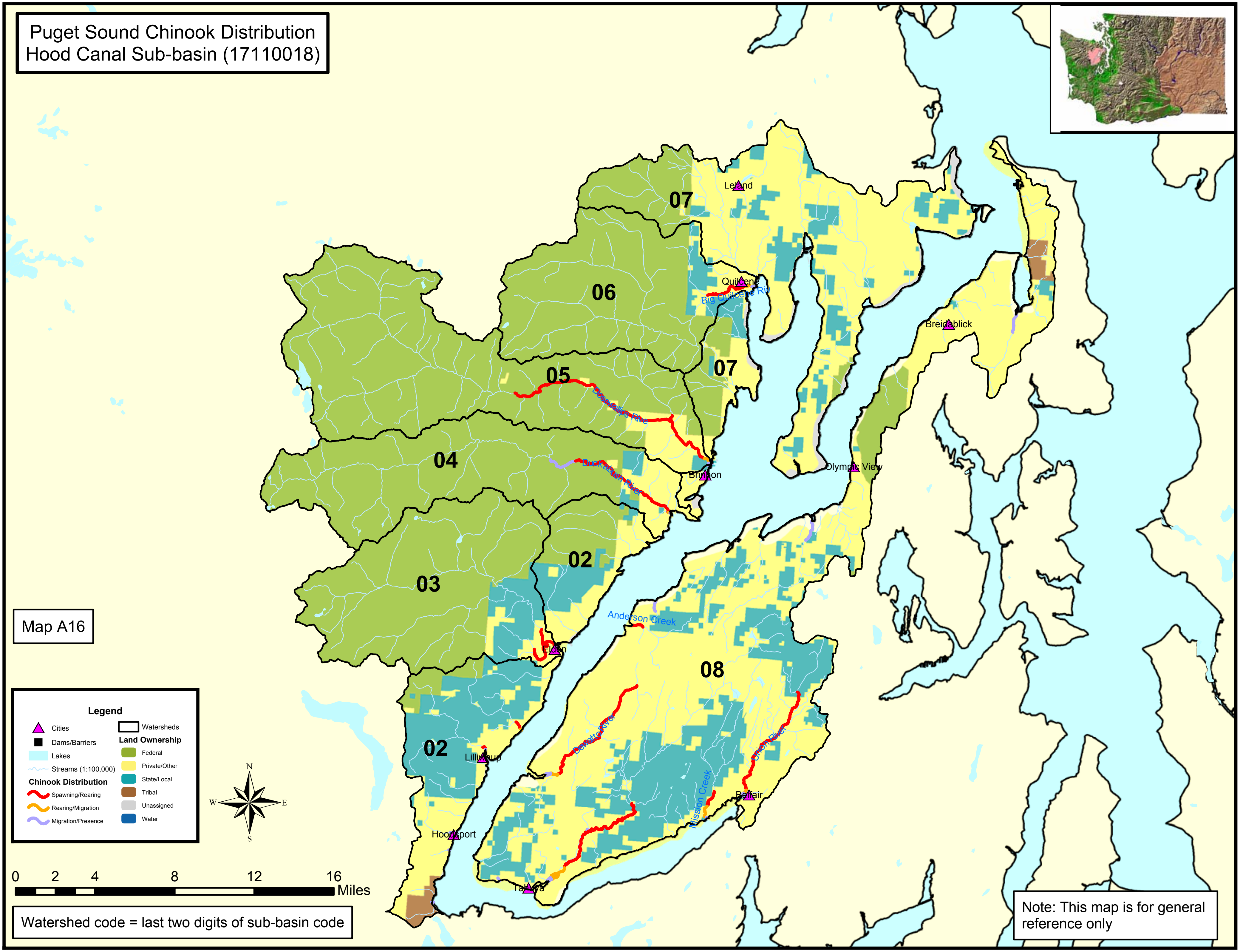

Puget Sound Chinook Distribution
Puyallup Sub-basin (17110014)
Map A12
0 2 4 8 12 16 Miles
Legend
Cities
Lakes
Dams/Barriers
Streams (1:100,000)
Chinook Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
Watershed code = last two digits in sub-basin code
Note: This map is for general reference only
01
02
03
04
05
Federal Way
Algona
Pacific
Tacoma
Milton
Edgewood
Fife
Dieringer
Wabash
Waller
Puyallup River
White River
Hylebos Creek
Clear Creek
Summit
Alderton
Bonney Lake
South Hill
McMillin
Prairie Ridge
Boise
Boise Creek
Upper Mill
Buckley
Mud Mountain Dam
Camp Creek
Greenwater River
West Fork White
Wilkeson Creek
Voight Creek
Carbonado
Carbon River
Kapowsin
Ohop
Electron Diversion Dam
Mowich River
Rushingwater Cre
Nielson Creek
Deer Creek


Puget Sound Chinook Distribution
Nisqually Sub-basin (17110015)
Map A13
03
02
Nisqually
Roy
North Yelm
Yelm
McKenna
Yelm Creek
Horn Creek
Lynch Creek
Ohop Creek
Eatonville
La Grande
Legend
Cities
Lakes
Streams (1:100,000)
Chinook Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
0
1.5
3
6
9
12
Miles
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only

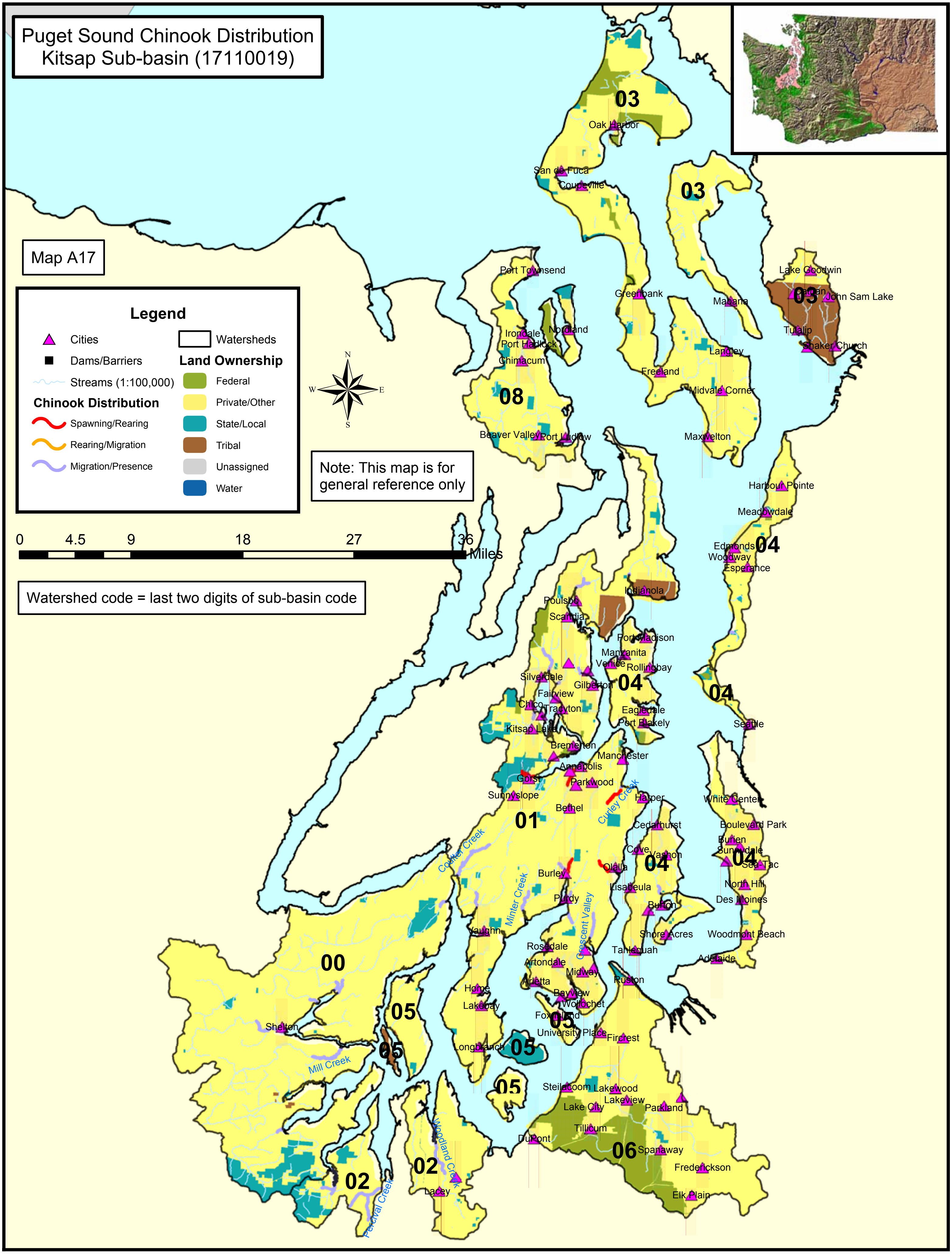
Puget Sound Chinook Distribution
Deschutes Sub-basin (17110016)
Olympia
Indian Creek
Tumwater
East Olympia
02
Rainier
Deschutes River
01
Map A14
Legend
Cities
Dams/Barriers
Lakes
Streams (1:100,000)
Chinook Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Note: This map is for general reference only
Watershed code = last two digits of sub-basin code
0
2
4
8
12
16
Miles
N
S
E
W

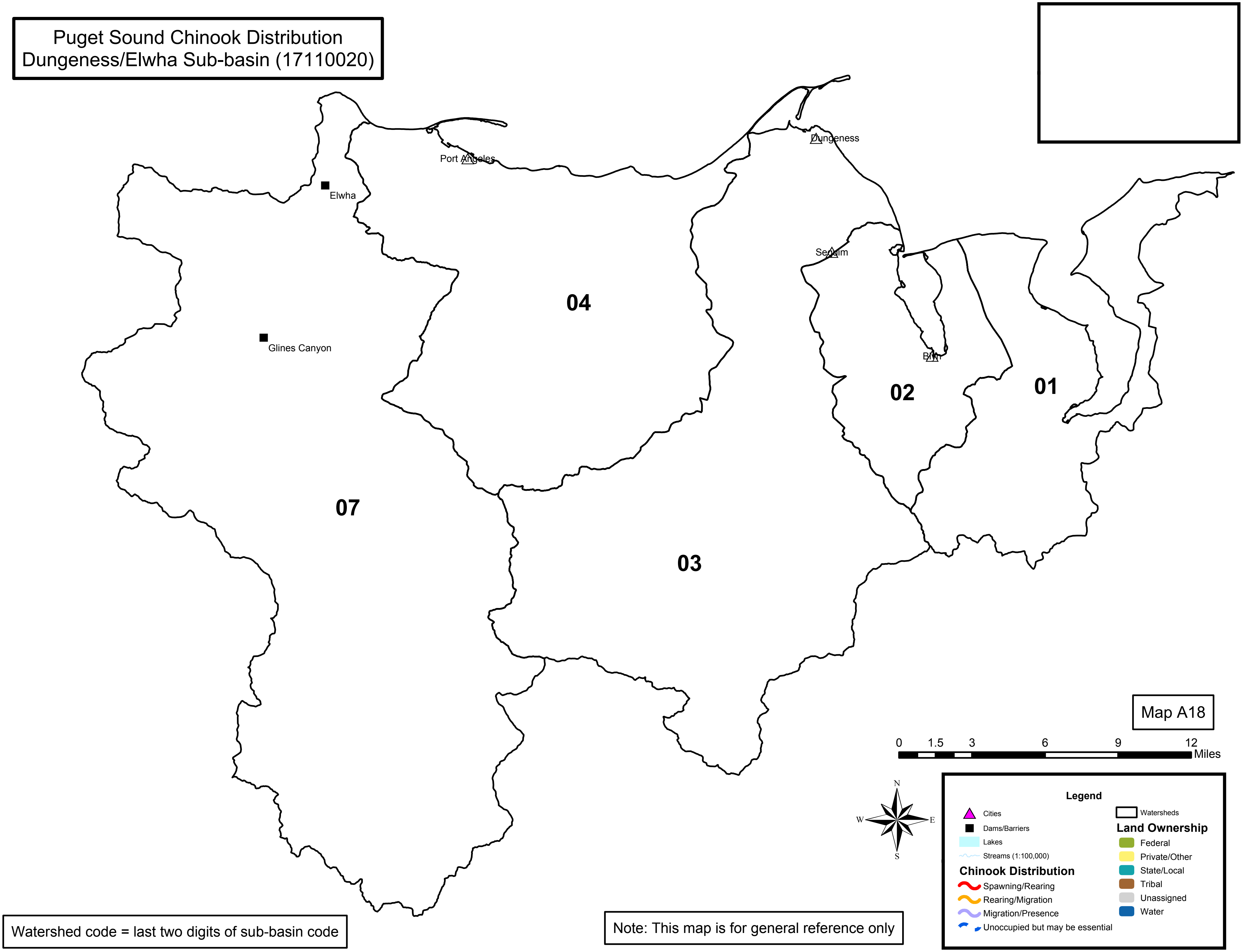


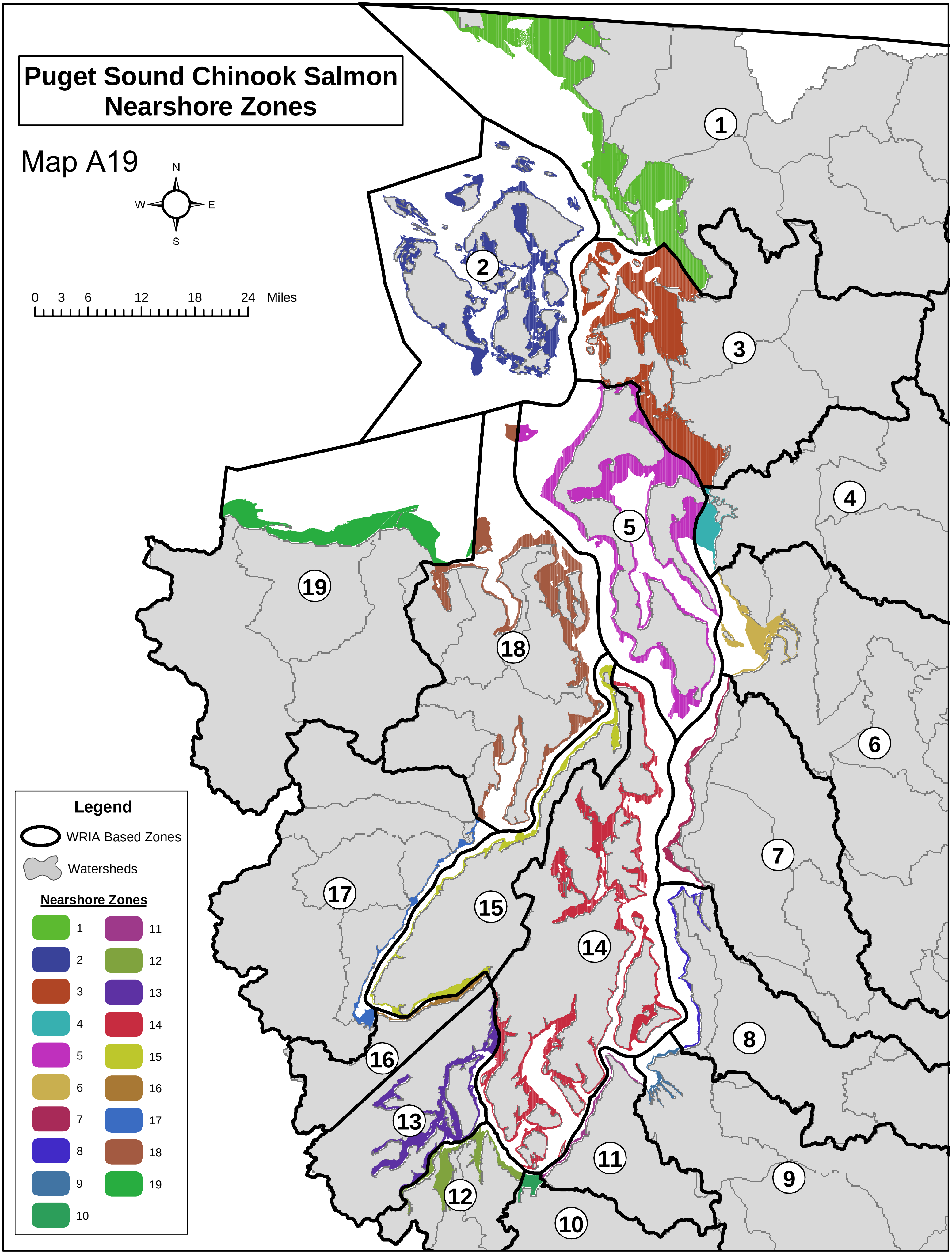
Puget Sound Chinook Distribution
Skokomish Sub-basin (17110017)
01
South Fork Skoko
Cushman No 1
Brown Creek
North Fork Skoko
Fir Creek
Vance Creek
Skokomish River
Weaver Creek
Purdy Creek
Skokomish
Map A15
Legend
Cities
Lakes
Dams/Barriers
Streams (1:100,000)
Chinook Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
W
E
S
0
1.5
3
6
9
12
Miles
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only



Puget Sound Chinook Distribution
Hood Canal Sub-basin (17110018)
Map A16
07
06
05
04
03
02
02
07
08
Leland
Quilcene
Big Quilcene Riv
Breidablick
Brinnon
Olympic View
Duckabush River
Anderson Creek
Eldon
Dewatto River
Union River
Mission Creek
Lilliwaup
Belfair
Hoodsport
Tahuya
Legend
Cities
Dams/Barriers
Lakes
Streams (1:100,000)
Chinook Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
0 2 4 8 12 16
Miles
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only


Puget Sound Chinook Distribution
Kitsap Sub-basin (17110019)
Map A17
Legend
Cities
Dams/Barriers
Streams (1:100,000)
Chinook Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
E
S
W
Note: This map is for general reference only
0
4.5
9
18
27
36
Miles
Watershed code = last two digits of sub-basin code
03
Oak Harbor
San de Fuca
Coupeville
03
Lake Goodwin
John Sam Lake
Tulalip
Shaker Church
Port Townsend
Greenbank
Mabana
Irondale
Port Hadlock
Nordland
Chimacum
Langley
Freeland
Midvale Corner
08
Beaver Valley
Port Ludlow
Maxwelton
Harbour Pointe
Meadowdale
Edmonds
Woodway
Esperance
04
Indianola
Poulsbo
Scandia
Port Madison
Manzanita
Venice
Rollingbay
Silverdale
Gilberton
04
04
Fairview
Chico
Tracyton
Eagledale
Port Blakely
Seattle
Kitsap Lake
Bremerton
Manchester
Annapolis
Gorst
Parkwood
Sunnyslope
Curley Creek
Harper
White Center
Bethel
01
Cedarhurst
Boulevard Park
Coulter Creek
Burien
Sunnydale
Cove
Vashon
04
Sea-Tac
Burley
Olalla
Minter Creek
Lisabeula
North Hill
Des Moines
Purdy
Crescent Valley
Burton
Vaughn
Shore Acres
Woodmont Beach
Rosedale
Tahlequah
00
Artondale
Adelaide
Midway
Arletta
Ruston
Home
Bayview
Wollochet
Lakebay
Fox Island
05
05
Shelton
University Place
Fircrest
Longbranch
05
Mill Creek
05
05
Steilacoom
Lakewood
Lakeview
Lake City
Parkland
Tillicum
DuPont
Woodland Creek
06
Spanaway
02
02
Frederickson
Lacey
Percival Creek
Elk Plain


Puget Sound Chinook Distribution
Dungeness/Elwha Sub-basin (17110020)
Port Angeles
Dungeness
Elwha
Sequim
Glines Canyon
Blyn
04
07
03
02
01
Map A18
0
1.5
3
6
9
12
Miles
N
S
E
W
Legend
Cities
Dams/Barriers
Lakes
Streams (1:100,000)
Chinook Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Unoccupied but may be essential
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only


Puget Sound Chinook Salmon
Nearshore Zones
Map A19
N
W
E
S
0 3 6 12 18 24 Miles
Legend
WRIA Based Zones
Watersheds
Nearshore Zones
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19

Appendix B
CHART Assessment for the
Lower Columbia River Chinook Salmon ESU

CHART Participants

The CHART for this ESU consisted of the following NOAA Fisheries biologists: Ben Meyer (CHART Leader), Michelle Day, Patty Dornbusch, Dan Guy, Lynne Krasnow, Lance Kruzic, Nancy Munn, Mindy Simmons, Cathy Tortorici, and Rich Turner. This CHART assessment also benefitted from review and comments from the Oregon and Washington Departments of Fish and Wildlife (ODFW).

ESU Description

The Lower Columbia River Chinook ESU was listed as a threatened species in 1999. The ESU includes all naturally spawned populations of Chinook salmon from the Columbia River and its tributaries from its mouth at the Pacific Ocean upstream to a transitional point between Washington and Oregon east of the Hood River and the White Salmon River, and includes the Willamette River to Willamette Falls, Oregon, exclusive of spring-run Chinook salmon in the Clackamas River (64 FR 14308; March 24, 1999). The agency recently conducted a review to update the ESU's status, taking into account new information and considering the net contribution of artificial propagation efforts in the ESU. We recently published the results of this review and concluded that Lower Columbia River Chinook salmon (including 17 hatchery programs) should remain listed as threatened (70 FR 37160; June 28, 2005).

The following brief description is based largely on life history information and excerpts from the report of the Lower Columbia Fish Recovery Board (LCFRB 2003) and the Willamette/Lower Columbia River Technical Recovery Team's (TRT) recent review of historical population structure for this ESU (Myers et al. 2003).

Of the Pacific salmon, Chinook salmon exhibit the most diverse and complex life history strategies. Chinook salmon follow one of two general freshwater cycles: stream or ocean type. After emerging from the gravel, stream-type Chinook salmon reside in fresh water for a year or more before migrating to the ocean. Ocean-type Chinook salmon migrate to the ocean within their first year. These two types of Chinook salmon have different life history traits, geographic distribution, and genetic characteristics. Chinook in the lower Columbia River generally follow an ocean-type life history cycle.

Runs are designated on the basis of when adults enter freshwater; however, distinct runs may also differ in the degree of maturation at river entry and time of spawning. Early, spring-run (stream-maturing) Chinook salmon tend to enter freshwater as immature or bright fish, migrate upriver (holding in suitable thermal refuges for several months), and finally spawn in late summer and early autumn. Late, fall-run (ocean maturing) Chinook salmon enter freshwater at an advanced stage of maturity, move rapidly to their spawning areas on the main stem or lower tributaries of the rivers, and spawn within a few days or weeks of freshwater entry. Fall Chinook dominate Chinook salmon runs in this ESU. Today, the once abundant natural runs of fall and spring Chinook have been largely replaced by hatchery production. Large Chinook runs continue to return to many of their natal streams, but there are few sustained native, naturally reproducing populations.

Adult spring Chinook return to the Columbia River at 4 to 5 years of age. They enter the Columbia River in March and April and generally enter natal basins from March through June, well in advance of spawning in August and September. Spring Chinook typically spawn in headwater areas where higher gradient habitat exists. Successful spawning depends on sufficient clean gravel of the right size, in addition to the constant need of adequate flows and water quality. Fall Chinook return to the Columbia River at 3 to 4 years of age, although 5-year olds are common in some populations. They enter fresh water from August to September and spawning generally occurs from late September to November, with peak spawning activity in mid-October. Bright fall Chinook adults enter the Columbia River August to October; dominant age class varies by population and brood year, but is typically age 4. Spawning occurs in November to January, with peak spawning in mid November.

Chinook salmon eggs incubate throughout the autumn and winter months. As with other salmonids, water temperature controls incubation time and affects survival. During incubation, clean, well-oxygenated water flow is critical. Floods/scouring, dewatering, and sedimentation can result in high egg mortality. In the lower Columbia River, spring Chinook fry emerge from the gravel from November through March; peak emergence time is likely December and January. Fall Chinook fry generally emerge from the gravel in April, depending on the time of egg deposition and incubation water temperature. The emerging fry quickly migrate to quiet waters and off-stream areas where they can find food and protection from predators.

After emerging from the gravel in the spring, most fall Chinook fry rear in the freshwater habitat for 1 to 4 months before emigrating to the ocean as subyearlings. A few fall Chinook remain in fresh water until their second spring and emigrate as yearlings. Conversely, spring Chinook emerge from the gravel earlier than fall Chinook, generally in the late winter/early spring. Normally, spring Chinook spend one full year in fresh water and emigrate to sea in their second spring. After emergence fry generally search for suitable rearing habitat within side sloughs, side channels, spring-fed seep areas and along the outer edges of the stream. These quiet-water side margin and off-channel slough areas are vital for early juvenile habitat. The presence of woody debris and overhead cover aid in food and nutrient inputs, and provide protection from predators during early freshwater residence.

Juvenile Chinook salmon in freshwater feed on a variety of terrestrial and aquatic insects and crustaceans, while subadults feed on similar items as well as larger prey including fishes, shrimp, and squid (Scott and Crossman, 1973). One study noted that adults in marine waters forage on a large array of fish species, especially herring and sand lance (Pritchard and Tester 1944 as cited in Scott and Crossman 1973).

Recovery Planning Status

The Willamette/Lower Columbia TRT identified 31 historical demographically independent Chinook salmon populations in this ESU (Myers et al. 2003). It is estimated that eight to ten historical populations in the ESU have been extirpated or nearly so. The TRT has grouped populations within the ESU into three life-history types (spring-, fall-, and late fall-run) and three ecological spawning zones (Coast Range, Cascade, and Columbia Gorge) (McElhany et al. 2002). Recovery planning will likely emphasize the need for a geographical distribution of viable populations across the range of life-history types and ecological zones (Ruckelshaus et al. 2002, McElhany et al. 2003). A draft recovery plan for the Washington management unit of this ESU was completed by the Lower Columbia Fish Recovery Board (LCFRB 2004) and released by NMFS for public comment in April 2005. NMFS expects to use this plan as an interim regional recovery plan until a plan for the whole ESU is completed. A preliminary draft plan for Oregon areas of the ESU is expected by the end of 2005. The CHART considered the LCFRB plan and the TRT products in rating each habitat area, but did not have the benefit of regional recovery plans throughout the range of this ESU. We anticipate that, as recovery planning proceeds, we will have better information and may revise our recommendations regarding critical habitat designation.

CHART Area Assessments

The CHART assessment for this ESU addressed 10 subbasins containing 47 occupied watersheds, as well as the lower Columbia River rearing/migration corridor. As part of its assessment the CHART considered the conservation value of each watershed in the context of the populations within the strata identified by the TRT (McElhany et al. 2002). Information is presented below by USGS subbasin because they present a convenient and systematic way to organize the CHART's watershed assessments for this ESU and their names are generally more recognizable because they typically identify major river systems.

Middle Columbia/Hood Subbasin (HUC4# 17070105)

The Middle Columbia/Hood subbasin is located in the eastern portion of the Columbia River gorge of Oregon and Washington. Occupied watersheds in this subbasin are contained in Hood River, Multnomah, and Wasco counties in Oregon, and Klickitat and Skamania counties in Washington. The subbasin contains 13 watersheds, 8 of which are occupied by this ESU. Occupied watersheds encompass approximately 1,370 mi^2 and 1,494 miles of streams. Fish distribution and habitat use data from the Oregon Department of Fish and Wildlife (ODFW) and Washington Department of Fish and Wildlife (WDFW) identify approximately 145 miles of occupied riverine habitat in the watersheds, including a 23-mile segment of the Columbia River (ODFW 2003a,b; WDFW 2003). Myers et al. (2003) identified a single ecological zone (Columbia Gorge) containing four fall-run (Lower Gorge tributaries, Upper Gorge tributaries, Big White Salmon River, and Hood River) and two spring-run (Big White Salmon River and Hood River) historical demographically independent populations in this subbasin. The Upper Gorge tributaries fall-run and Big White Salmon fall- and spring-run populations have been classified by the TRT as "core" populations, i.e., historically abundant and "may offer the most likely path to recovery" (McElhany et al. 2003). Native spring-run Chinook salmon are believed to be extirpated in this subbasin, although efforts are underway to reestablish these fish.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table B1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map B1 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART also determined that the occupied HUC5 watersheds in this subbasin were of either high or medium conservation value to the ESU. Of the eight HUC5s reviewed, six were rated as having high and two were rated as having medium conservation value. The CHART noted that two HUC5s (Middle Columbia/Eagle Creek and Middle Columbia/Grays Creek) contain a high value rearing and migration corridor in the Columbia River connecting high value upstream watersheds with downstream reaches and the ocean. Table B2 summarizes the

CHART's PCE/watershed scores and conservation value ratings, and Figure B1 shows the overall distribution of ratings by HUC5 watershed.

The CHART also considered whether blocked historical habitats above Condit Dam (on the White Salmon River) may be essential for conservation of the ESU. The Team determined that accessing this habitat would likely provide a benefit to the ESU, especially for spring-run Chinook salmon of which there are only two historical populations in the Gorge region. However, the CHART concluded that it was unclear whether the areas above Condit Dam are essential for conservation of the entire ESU, especially in comparison to other, more extensive, historical habitats that may be of greater potential benefit to the ESU (e.g., areas in the Upper Lewis River).

Lower Columbia/Sandy Subbasin (HUC4# 17080001)

The Lower Columbia/Sandy subbasin is located in the western portion of the Columbia River gorge of Oregon and Washington. Occupied watersheds in this subbasin are contained in Clackamas, Columbia, and Multnomah counties in Oregon, and Clark and Skamania counties in Washington. The subbasin contains nine watersheds, all of which are occupied by this ESU. Occupied watersheds encompass approximately 1,076 mi^2 and 1,316 miles of streams. Fish distribution and habitat use data from the Oregon Department of Fish and Wildlife (ODFW) and Washington Department of Fish and Wildlife (WDFW) identify approximately 217 miles of occupied riverine habitat in the watersheds, including a 26-mile segment of the Columbia River (ODFW 2003a,b; WDFW 2003). Myers et al. (2003) identified two ecological zones (Cascade and Columbia Gorge) containing five fall-run (Lower Gorge tributaries, Sandy River early fall, Sandy River late fall, Washougal River, and Salmon Creek/Lewis River) and one spring-run (Sandy River) historical demographically independent populations in this subbasin. The Sandy River late fall- and spring-run Chinook salmon have been classified by the TRT as "core" populations, i.e., historically abundant and "may offer the most likely path to recovery" (McElhany et al. 2003). Also, the TRT classified the Sandy River spring- and late fall-runs and the Salmon Creek/Lewis River fall-run as genetic legacy populations, i.e., some of "the most intact representatives of the genetic character of the ESU" (McElhany et al. 2003).

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table B1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map B2 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART also determined that the occupied HUC5 watersheds in this subbasin ranged from high to low conservation value to the ESU. Of the nine HUC5s reviewed, seven were rated as having high, one was rated as having medium, and one was rated as having low conservation value. The CHART also noted that one HUC5 (Columbia Gorge Tributaries) contains a high value rearing and migration corridor in the Columbia River connecting high value upstream watersheds with downstream reaches and the ocean. Table B2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure B1 shows the overall distribution of ratings by HUC5 watershed.

The CHART also concluded that inaccessible reaches above the Bull Run Dam complex in the Bull Run River HUC5 may be essential to the conservation of the ESU. The CHART concluded that these unoccupied areas may be essential because (1) they once supported TRT core and genetic legacy populations (Sandy River spring- and late fall-runs) and (2) they contain non-inundated habitats that are likely in good to excellent condition (i.e., the watershed provides domestic drinking water for the City of Portland and may have been some of the better spawning areas) (Sieglitz 2002, McElhany et al. 2003). The CHART noted that NOAA Fisheries' status review of this ESU stated that habitat loss due to "extensive hydropower development projects" posed a serious threat to this ESU (NOAA Fisheries 2003). This report also expressed serious concerns associated with dramatic declines in the spring-run life history type (which inhabits this watershed). Therefore, the CHART concluded that the ESU would likely benefit if the extant population of spring-run fish had access to spawning/rearing habitat upstream and that these areas may warrant consideration as critical habitat. However, the Team also considered historical areas in the upper Lewis River basin (see below) to have greater conservation potential than areas above the Bull Run Dam complex.

Lewis Subbasin (HUC4# 17080002)

The Lewis subbasin is located in southwest Washington and contained in Clark, Cowlitz, and Skamania counties (a very small and unoccupied portion in the uppermost watershed is contained in Yakima County). The subbasin contains six watersheds, two of which are currently occupied by this ESU and the remaining four are now blocked by Merwin Dam and others upstream. Occupied watersheds encompass approximately 456 mi^2 and 561 miles of streams. Fish distribution and habitat use data from the Washington Department of Fish and Wildlife (WDFW) identify approximately 68 miles of occupied riverine habitat in the watersheds (WDFW 2003). Myers et al. (2003) identified a single ecological zone (Cascade) containing one spring-run (Lewis River), one fall-run (Salmon

Creek/Lewis River) and one late fall-run (Lewis River) historical demographically independent populations in this subbasin. The TRT has classified the Lewis River spring- and late fall-run populations as "core" populations (historically abundant and "may offer the most likely path to recovery") and the Lewis River late fall-run and Salmon Creek/Lewis River fall-run populations as genetic legacy populations (some of "the most intact representatives of the genetic character of the ESU") (McElhany et al. 2003).

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table B1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map B3 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART also determined that both of the occupied HUC5 watersheds in this subbasin were of high conservation value to the ESU. Table B2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure B1 shows the overall distribution of ratings by HUC5 watershed.

The CHART also concluded that inaccessible reaches above Merwin, Yale and Swift dams may be essential to the conservation of the ESU. The CHART believed that these unoccupied areas may be essential because (1) they once supported TRT core and genetic legacy populations and (2) they contain non-inundated habitats that are likely in good condition relative to other more urbanized watersheds in the Cascade region (Lower Columbia River Fish Recovery Board 2003, McElhany et al. 2003). The CHART noted that NOAA Fisheries' status review of this ESU stated that habitat loss due to "extensive hydropower development projects" posed a serious threat to this ESU (NOAA Fisheries 2003). This report also expressed serious concerns associated with dramatic declines in the spring-run life history type (which inhabits this watershed). Therefore, the CHART concluded that the ESU would likely benefit if the extant population of spring-run fish had access to spawning/rearing habitat upstream and that these areas may warrant consideration as critical habitat.

Lower Columbia/Clatskanie Subbasin (HUC4# 17080003)

The Lower Columbia/Clatskanie subbasin is located in southwest Washington and northwest Oregon. Occupied watersheds in this subbasin are contained in Clatsop and Columbia counties in Oregon, and Cowlitz, Lewis, Skamania, and Wahkiakum counties in Washington. The subbasin contains six watersheds, all of which are occupied by this

ESU. Occupied watersheds encompass approximately 841 mi^2 and 977 miles of streams. Fish distribution and habitat use data from the Oregon Department of Fish and Wildlife (ODFW) and Washington Department of Fish and Wildlife (WDFW) identify approximately 168 miles of occupied riverine habitat in the watersheds (ODFW 2003a,b; WDFW 2003). Myers et al. (2003) identified two ecological zones (Coast Range and Cascade) containing five fall-run (Elochoman River, Mill Creek, Kalama River, Clatskanie River, and Scappoose River) and one spring-run (Kalama River) historical demographically independent populations in this subbasin. The Elochoman River fall-run population has been classified by the TRT as a "core" population, i.e., historically abundant and "may offer the most likely path to recovery" (McElhany et al. 2003).

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table B1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map B4 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART also determined that the occupied HUC5 watersheds in this subbasin ranged from high to low conservation value to the ESU. Of the six HUC5s reviewed, two were rated as having high, three were rated as having medium conservation value, and one was rated as having low conservation value to the ESU. Table B2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure B1 shows the overall distribution of ratings by HUC5 watershed.

Upper Cowlitz Subbasin (HUC4# 17080004)

The Upper Cowlitz subbasin is located in southwest Washington and contained in Lewis, Pierce, Skamania, and Yakima counties. The subbasin contains five watersheds, all of which are occupied by this ESU. Occupied watersheds encompass approximately 1,030 mi^2 and 1,282 miles of streams. Fish distribution and habitat use data from the Washington Department of Fish and Wildlife (WDFW) identify approximately 104 miles of occupied riverine habitat in the watersheds (WDFW 2003). All of this habitat is located upstream of impassable dams (Mayfield and Mossyrock) and only accessible to anadromous fish via trap and haul operations. Myers et al. (2003) identified one ecological zone (Cascade) containing one fall-run (Upper Cowlitz River) and two spring-run (Upper Cowlitz River and Cispus River) historical demographically independent populations in this subbasin. Both spring-run populations have been classified by the TRT as "core" populations, i.e., historically abundant and "may offer the most likely path to recovery" (McElhany et al. 2003). In addition, the TRT classified the Upper Cowlitz River spring-run population as a genetic legacy population, i.e., one of "the most intact representatives of the genetic character of the ESU." However, there are significant uncertainties about the remaining stock structure in this subbasin (Myers et al. 2003).

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table B1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map B5 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART also determined that the occupied HUC5 watersheds in this subbasin were all of high conservation value to the ESU. Table B2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure B1 shows the overall distribution of ratings by HUC5 watershed.

Lower Cowlitz Subbasin (HUC4# 17080005)

The Lower Cowlitz subbasin is located in southwest Washington and contained in Cowlitz, Lewis, and Skamania counties. The subbasin contains eight watersheds, all of which are occupied by this ESU. Occupied watersheds encompass approximately 1,460 mi^2 and 1,510 miles of streams. Fish distribution and habitat use data from the Washington Department of Fish and Wildlife (WDFW) identify approximately 350 miles of occupied riverine habitat in the (WDFW 2003). Habitat in two HUC5 watersheds – Tilton River and Riffe Reservoir – is located upstream of impassable dams (Mayfield and Mossyrock) and only accessible to anadromous fish via trap and haul operations. Data from WDFW identified very little Chinook salmon distribution in the Riffe Reservoir HUC5 watershed (and did not identify the Riffe and Mayfield lakes as occupied habitat). However, the CHART determined that these lakes are occupied and contain PCEs for rearing/migrating juveniles based on information regarding migrants described in Wade (2000) as well as their own knowledge of trap and haul operations in this subbasin. Myers et al. (2003) identified one ecological zone (Cascade) containing four fall-run (Coweeman River, Toutle River, Lower Cowlitz River, and Upper Cowlitz River) and four spring-run (Toutle River, Tilton River, Upper Cowlitz River, and Cispus River) historical demographically independent populations in this subbasin. The latter two spring-run populations as well as the Toutle River and Lower Cowlitz River fall-run populations have been classified by the TRT as "core" populations, i.e., historically abundant and "may offer the most likely path to recovery" (McElhany et al. 2003). In addition, the TRT classified the Upper Cowlitz River spring-run and Coweeman River fall-run as genetic legacy populations, i.e., some of "the most intact representatives of the genetic character of the ESU."

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table B1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map B6 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART determined that the occupied HUC5 watersheds in this subbasin were of high or medium conservation value to the ESU. Of the eight HUC5s reviewed, four were rated as having high and four were rated as having medium conservation value to the ESU. The CHART also noted that four HUC5s (Riffe Reservoir, Jackson Prairie, East Willapa, and Coweeman River) contained high value rearing and migration corridors connecting high value upstream watersheds with downstream reaches and the ocean. Table B2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure B1 shows the overall distribution of ratings by HUC5 watershed.

Lower Columbia Subbasin (HUC4# 17080006)

The Lower Columbia subbasin is located at the mouth of the Columbia River in southwest Washington and Northwest Oregon. Occupied watersheds in this subbasin are contained in Clatsop County, Oregon, and Lewis, Pacific, and Wahkiakum counties in Washington. The subbasin contains three watersheds, all of which are occupied by this ESU. Occupied watersheds encompass approximately 515 mi^2 and 638 miles of streams. Fish distribution and habitat use data from the Oregon Department of Fish and Wildlife (ODFW) and Washington Department of Fish and Wildlife (WDFW) identify approximately 122 miles of occupied riverine habitat in the watersheds (ODFW 2003a,b; WDFW 2003). Myers et al. (2003) identified a single ecological zone (Coast Range) containing three fall-run historical demographically independent populations in this subbasin (Grays River, Youngs Bay, and Big Creek). The Big Creek fall-run population has been classified by the TRT as a "core" population, i.e., historically abundant and "may offer the most likely path to recovery" (McElhany et al. 2003).

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table B1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map B7 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART also determined that the occupied HUC5 watersheds in this subbasin were of either high (Big Creek and Grays Bay) or medium (Youngs River) conservation value to the ESU. Table B2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure B1 shows the overall distribution of ratings by HUC5 watershed.

Middle Willamette Subbasin (HUC4# 17090007)

The portion of the Middle Willamette River subbasin occupied by this ESU is downstream of Willamette Falls and includes a single HUC5 watershed (Abernethy Creek) as well as a short segment (approximately 1 mile) of the Willamette River downstream of Willamette Falls. Occupied portions of this subbasin within the ESU's range are contained in Clackamas County, Oregon. The Abernethy Creek watershed encompasses approximately 134 mi^2 and 171 miles of streams. Fish distribution and habitat use data from the Oregon Department of Fish and Wildlife (ODFW) identify approximately 3 miles of occupied riverine habitat in the subbasin (ODFW 2003a,b). The occupied portions of the subbasin are in the Cascade ecological zone identified by Myers et al. (2003), but the TRT did not associate fish in this area with a historical demographically independent population (McElhany et al. 2003). However, the mouth of Abernethy Creek enters the Willamette upstream and in close proximity (less than 0.6 miles) to the mouth of the Clackamas River which does contain a fall-run population identified by the TRT.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in the Abernethy Creek watershed contain one or more PCEs for this ESU. Table B1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map B8 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART also determined that the Abernethy Creek HUC5 watershed was of low conservation value to the ESU. Table B2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure B1 shows the overall distribution of ratings by HUC5 watershed.

Clackamas Subbasin (HUC4# 17090011)

The Clackamas subbasin is a Cascade Range drainage of the lower Willamette River and is contained in Clackamas and Marion counties, Oregon. The subbasin contains six watersheds, two of which are occupied by this ESU (Lower Clackamas and Eagle Creek). Occupied watersheds encompass approximately 270 mi^2 and 339 miles of streams. Fish distribution and habitat use data from the Oregon Department of Fish and Wildlife (ODFW) identify approximately 55 miles of occupied riverine habitat in the watersheds (ODFW 2003a,b). Myers et al. (2003) identified a single ecological zone (Cascade) containing a single historical demographically independent population in this subbasin (Clackamas River fall-run). This fall-run population has been classified by the TRT as a "core" population, i.e., historically abundant and "may offer the most likely path to recovery" (McElhany et al. 2003).

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table B1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map B9 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART also determined that the occupied HUC5 watersheds in this subbasin were of high (Lower Clackamas River) and low (Eagle Creek) conservation value to the ESU. Table B2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure B1 shows the overall distribution of ratings by HUC5 watershed.

Lower Willamette Subbasin (HUC4# 17090012)

The Lower Willamette subbasin is located at the confluence of the Willamette and Columbia rivers in Northwest Oregon. Occupied watersheds in this subbasin are contained in Clackamas, Multnomah, and Washington counties, Oregon. The subbasin contains three watersheds, all of which are occupied by this ESU. Occupied watersheds encompass approximately 407 mi^2 and 448 miles of streams. Fish distribution and habitat use data from the Oregon Department of Fish and Wildlife (ODFW) identify approximately 88 miles of occupied riverine habitat in the watersheds (ODFW 2003a,b). Myers et al. (2003) identified a single ecological zone (Cascade) containing two fall-run historical demographically independent populations in this subbasin (Clackamas River and Scappoose River). The Clackamas River fall-run population has been classified by the TRT as a "core" population, i.e., historically abundant and "may offer the most likely path to recovery" (McElhany et al. 2003).

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table B1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map B10 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART also determined that the occupied HUC5 watersheds in this subbasin were of either high (Columbia Slough/Willamette) or medium (Johnson Creek and Scappoose Creek) conservation value to the ESU. The CHART also noted that Coulmbia Slough and Smith and Bybee Lakes may provide important rearing habitat for juvenile Chinook salmon. Table B2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure B1 shows the overall distribution of ratings by HUC5 watershed.

Lower Columbia River Corridor

The lower Columbia River rearing and migration corridor consists of that segment of the Columbia River from the confluences of the Sandy River (Oregon) and Washougal River (Washington) to the Pacific Ocean. This corridor overlaps with the following counties: Clatsop, Columbia, and Multnomah counties in Oregon, and Clark, Cowlitz, Pacific, and Wahkiakum counties in Washington. Fish distribution and habitat use data from ODFW and WDFW identify approximately 118 miles of occupied riverine and estuarine habitat in this corridor (ODFW 2003a,b; WDFW 2003). Table B1 summarizes the total number of occupied reaches in this corridor containing rearing or migration PCEs, as well as management activities that may affect the PCEs.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the lower Columbia River corridor was of high conservation value to the ESU. Other upstream reaches of the Columbia River corridor (within the Middle Columbia/Hood and Lower Columbia/Sandy Subbasin subbasins above) are also high value for rearing/migration. The CHART noted that the lower Columbia River corridor connects every watershed and population in this ESU with the ocean and is used by rearing/migrating juveniles and migrating adults. The Columbia River estuary is a particularly important area for this ESU as both juveniles and adults make the critical physiological transition between life in freshwater and marine habitats (ISAB 200, Marriott et al. 2002).

Marine Areas

NOAA Fisheries' analysis focused on freshwater and estuarine habitats upstream of the mouth of the Columbia River. While marine areas are occupied by this ESU, within this vast area the agency has not identified "specific areas within the geographical area occupied by the species . . . on which are found those physical or biological features . . . essential to the conservation of the species."

Changes to the CHART's Initial Assessments

The CHART reviewed the public and peer reviewer comments received on the Team's initial findings for this ESU as well as new information relevant to evaluating habitat areas for this ESU. As a result, the CHART did not change conservation value ratings for any watershed within the geographical area occupied by this ESU, and there were no changes to the delineation of occupied habitat areas (although the CHART did correct a mapping error in the North Fork Toutle River that resulted in only tributaries in this HUC5 being eligible for exclusion). The proposed critical habitat designation (69 FR 74572, December 14, 2004) summarizes the comments and responses pertaining to the CHART's initial determinations for this ESU and Tables B1 and B2 reflect the final CHART assessments.

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Table B1. Summary of Occupied Areas, PCEs, and Management Activities Affecting PCEs for the Lower Columbia River Chinook Salmon ESU

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs)			Unoccupied but may be essential (mi)**	Management Activities***
				Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*		
	Middle Columbia/ Hood	East Fork Hood River	1707010506	23.1	0	0		A, C, F, I, R
	Middle Columbia/ Hood	West Fork Hood River	1707010507	31.4	0	0		A, F, R
	Middle Columbia/ Hood	Hood River	1707010508	11.6	0	0.8		A, C, D, F, R, I, U
	Middle Columbia/ Hood	White Salmon River	1707010509	2.8	0.1	0.8	15.9[p]	A, C, D, F, R, U
	Middle Columbia/ Hood	Little White Salmon River	1707010510	0	0	1.6		D, F, R
	Middle Columbia/ Hood	Wind River	1707010511	19	6.2	17.1		F, R, U
	Middle Columbia/ Hood	Middle Columbia/ Grays Creek	1707010512	0.6	0.1	17.1		R, U
	Middle Columbia/ Hood	Middle Columbia/ Eagle Creek	1707010513	2	0.2	10.9		D, R, U
	Lower Columbia/ Sandy	Salmon River	1708000101	15.5	0	0		F, C, R
	Lower Columbia/ Sandy	Zigzag River	1708000102	11.6	0	4		F, C, R
	Lower Columbia/ Sandy	Upper Sandy River	1708000103	12.7	0	0		F, R
	Lower Columbia/ Sandy	Middle Sandy River	1708000104	26	0.3	0		D, R, U
	Lower Columbia/ Sandy	Bull Run River	1708000105	6.5	0	0		D, F, R
	Lower Columbia/ Sandy	Washougal River	1708000106	10.9	3.6	14.3		C, F, R, S, U, W
	Lower Columbia/ Sandy	Columbia Gorge Tributaries	1708000107	6.8	10.2	27.9		C, D, F, R, U, W
	Lower Columbia/ Sandy	Lower Sandy River	1708000108	20	4.2	2.4		A, C, F, R, U
	Lower Columbia/ Sandy	Salmon Creek	1708000109	0	0	40.3		A, C, F, R, U, W
	Lewis	Upper Lewis River	1708000201	0	0	0	[q]	
	Lewis	Muddy River	1708000202	0	0	0	[r]	
	Lewis	Swift Reservoir	1708000203	0	0	0	[s]	

[p] Watershed contains unoccupied habitat above Condit Dam that may be essential for conservation.

[q] The downstream dams Merwin, Yale, and Swift are barriers to fish distribution in this watershed. Unoccupied habitat areas above these dams may be essential to conservation.

[r] The downstream dams Merwin, Yale, and Swift are barriers to fish distribution in this watershed. Unoccupied habitat areas above these dams may be essential to conservation.

[s] Swift Dam, as well as the downstream dams Merwin and Yale, is currently a barrier to fish distribution in this watershed. Unoccupied habitat areas above these dams may be essential to conservation.

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs)			Unoccupied but may be essential (mi)**	Management Activities***
				Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*		
	Lewis	Yale Reservoir	1708000204	0	0	0	[t]	
	Lewis	East Fork Lewis River	1708000205	14.9	<0.1	7.4		A, C, F, R, S, U, W
	Lewis	Lower Lewis River	1708000206	19.2	18.3	8.1		A, C, D, F, R, U, W
	Lower Columbia/ Clatskanie	Kalama River	1708000301	40.1	0.2	13.2		C, F, R, U, W
	Lower Columbia/ Clatskanie	Beaver Creek/ Columbia River	1708000302	0	5.9	0		A, C, F, R, U, W
	Lower Columbia/ Clatskanie	Clatskanie River	1708000303	8.4	5	0		A, C, F, R, U, W
	Lower Columbia/ Clatskanie	Germany/ Abernathy	1708000304	11.5	0.1	37		A, C, F, R, U, W
	Lower Columbia/ Clatskanie	Skamokawa/ Elochoman	1708000305	11.4	0.4	26.1		A, C, F, R, W
	Lower Columbia/ Clatskanie	Plympton Creek	1708000306	1.6	7.2	0		A, C, F, R, W
	Upper Cowlitz	Headwaters Cowlitz River	1708000401	0	0	7.5		C, F, R
	Upper Cowlitz	Upper Cowlitz River	1708000402	0	0	13		C, F, R
	Upper Cowlitz	Cowlitz Valley Frontal	1708000403	0	0	34.9		A, F, R, U
	Upper Cowlitz	Upper Cispus River	1708000404	0	0	22.1		C, F, R
	Upper Cowlitz	Lower Cispus River	1708000405	0	0	26.8		C, F, R
	Lower Cowlitz	Tilton River	1708000501	0	0	24.6		C, D, F, R, U
	Lower Cowlitz	Riffe Reservoir	1708000502	0	0	30.7		A, C, D, F, R
	Lower Cowlitz	Jackson Prairie	1708000503	35.7	<0.1	21.9		A, C, D, F, R
	Lower Cowlitz	North Fork Toutle River	1708000504	0	0	0.9		F, R
	Lower Cowlitz	Green River	1708000505	26.6	0	3		F, R
	Lower Cowlitz	South Fork Toutle River	1708000506	7.6	0	17.7		F, R

[t] Yale Dam, as well as downstream Merwin Dam, is currently a barrier to fish distribution in this watershed. Unoccupied habitat areas above these dams may be essential to conservation.

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs)			Unoccupied but may be essential (mi)**	Management Activities***
				Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*		
	Lower Cowlitz	East Willapa	1708000507	8.8	0	112		A, C, F, R, U, W
	Lower Cowlitz	Coweeman	1708000508	14.3	0	46.6		A, C, F, R, U, W
	Lower Columbia	Youngs River	1708000601	15.3	28.6	0		A, C, F, I, R, U, W
	Lower Columbia	Big Creek	1708000602	9.8	6.4	0		A, C, F, I, R, W
	Lower Columbia	Grays Bay	1708000603	4.2	0.2	57.2		C, F, R, W
	Middle Willamette	Abernethy Creek	1709000704	0.6	2.6	0.1		A, C, D, R, U
	Clackamas	Eagle Creek	1709001105	13.8	3.2	0		A, F, R
	Clackamas	Lower Clackamas River	1709001106	34.8	2.7	0		A, C, D, I, R, U, W
	Lower Willamette	Johnson Creek	1709001201	1.2	8.9	0.1		A, C, I, R, U, W
	Lower Willamette	Scappoose Creek	1709001202	4.2	48.9	0		A, C, F, I, R, U, W
	Lower Willamette	Columbia Slough/ Willamette River	1709001203	0	25	0		A, C, R, U, W
	Multiple	Lower Columbia Corridor (Sandy/ Washougal to Ocean)	NA	0.1	17.4	163.9[u]		C, D, I, R, T, U, W

* Some streams classified as "Migration/Presence PCEs" may also include rearing or spawning PCEs, but the GIS data are still undergoing review to confirm additional habitat use types.
** These watersheds contain unoccupied habitat that historically supported spawning and rearing PCEs. The CHART determined that these habitat areas/watersheds may be essential for conservation of the ESU. Since these watersheds are unoccupied, the CHART did not identify management activities.
*** This list is not exhaustive. It is intended to highlight key management activities affecting PCEs in each watershed. Activities identified are based on the general categories described by Spence et al. (1996) and summarized previously in the "Special Management Considerations or Protection" section of this report. Coding is as follows: F= forestry, G = grazing, A = agriculture, C = channel modifications/diking, R = road building/maintenance, U = urbanization, S = sand and gravel mining, M = mineral mining, D = dams, I = irrigation impoundments and withdrawals, T = river, estuary, and ocean traffic, W = wetland loss/removal, B = beaver removal, X = exotic/invasive species introductions, H = forage fish/species harvest. Primary sources for this information were the CHART and reports by LCFRB (2003), Subbasin Summary Reports of the NWPPC, and land use/land cover GIS layers from the U.S. Geological Survey.

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[u] The Lower Columbia River from the ocean upstream approximately 46.5 miles is considered to contain estuarine PCEs, in addition to migration and rearing (ISAB, 2000).

Table B2. Summary of Initial CHART Scores and Ratings of Conservation Value for Habitat Areas Occupied by the Lower Columbia River Chinook Salmon ESU

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors) 1	2	3	4	5	6	Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
	Middle Columbia/Hood	East Fork Hood River	1707010506	1	2	2	1	1	3	10	Moderate HUC5 score; habitat relatively more extensive in this HUC5 than in other areas of the Gorge region; this HUC5 historically supported one of just two TRT historical spring-run populations in the Gorge region; area emphasized for supplementation efforts	High
	Middle Columbia/Hood	West Fork Hood River	1707010507	0	1	2	1	1	3	8	Moderate HUC5 score; habitat still available and this HUC5 historically supported one of just two TRT historical spring-run populations in the Gorge region; PCEs overlap with a FEMAT key watershed for at-risk anadromous salmonids	High
	Middle Columbia/Hood	Hood River	1707010508	1	1	2	1	1	3	9	Moderate HUC5 score; habitat relatively more extensive in this HUC5 than in other areas of the Gorge region; this HUC5 historically supported one of just two spring chinook populations in the Gorge region; HUC5 contains important connectivity reaches for upstream HUC5s (including one containing a FEMAT key watershed for at-risk anadromous salmonids)	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Middle Columbia/Hood	White Salmon River	1707010509	1	2	1	3	2	3	12	Moderate-high HUC5 score; PCEs limited by Condit Dam but do support a TRT fall-run core population; habitat used by nonnative spring-run fish in a watershed that historically supported one of only two spring chinook populations (including a TRT core population) in the Gorge region; Watershed contains unoccupied habitat above Condit Dam that may be essential for conservation.	High
	Middle Columbia/Hood	Little White Salmon River	1707010510	1	2	0	0	1	2	6	Low-moderate HUC5 score; limited PCEs not identified as supporting a demographically independent population, but may provide some spring-run chinook habitat that could promote conservation	Medium
	Middle Columbia/Hood	Wind River	1707010511	1	2	2	1	1	2	9	Moderate HUC5 score; habitat still available and this HUC5 supports one of four TRT historical fall-run populations (including a core population) in the Gorge region; passage over Shipherd Falls provides access to relatively extensive spring-run habitat for the Gorge region; PCEs overlap with a FEMAT key watershed for at-risk anadromous salmonids	High
	Middle Columbia/Hood	Middle Columbia/Grays Creek	1707010512	1	2	1	0	1	2	7	Moderate HUC5 score; PCEs limited in this HUC5 and likely always were due to gradient barriers and small drainage size; HUC5 supports a TRT historical core fall-run population but production likely low in this HUC5; mainstem Columbia River is high value connectivity corridor	Medium

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Middle Columbia/Hood	Middle Columbia/Eagle Creek	1707010513	1	2	1	1	1	2	8	Moderate HUC5 score; PCEs in tributary habitat in HUC5 supports two TRT historical core fall-run populations; mainstem Columbia River is high value connectivity corridor	High
	Lower Columbia/Sandy	Salmon River	1708000101	3	2	2	3	2	3	15	Highest HUC5 score for entire ESU; extensive PCEs support spring-, fall, and late fall-run populations; TRT identified spring- and late fall-runs as core and genetic legacy populations; PCEs overlap with a FEMAT key watershed for at-risk anadromous salmonids	High
	Lower Columbia/Sandy	Zigzag River	1708000102	3	2	2	3	2	3	15	Highest HUC5 score for entire ESU; extensive PCEs support spring-, fall, and late fall-run populations; TRT identified spring- and late fall-runs as core and genetic legacy populations	High
	Lower Columbia/Sandy	Upper Sandy River	1708000103	3	2	2	3	2	3	15	Highest HUC5 score for entire ESU; extensive PCEs support spring-, fall, and late fall-run populations; TRT identified spring- and late fall-runs as core and genetic legacy populations	High
	Lower Columbia/Sandy	Middle Sandy River	1708000104	3	1	2	3	2	3	14	High HUC5 score; extensive PCEs support spring-, fall, and late fall-run populations; TRT identified spring- and late fall-runs as core and genetic legacy populations; HUC5 contains important connectivity reaches for upstream HUC5s (including one containing a FEMAT key watershed for at-risk anadromous salmonids)	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Lower Columbia/Sandy	Bull Run River	1708000105	1	1	2	3	2	3	12	Moderate-high HUC5 score; PCEs more limited due to dams in this HUC5, but still support TRT core spring- and fall-run fish; the CHART also concluded that inaccessible reaches above the Bull Run Dam complex in this HUC5 may be essential to the conservation of the ESU.	High
	Lower Columbia/Sandy	Washougal River	1708000106	1	1	2	2	1	3	10	Moderate HUC5 score; not identified as a core or genetic legacy population by TRT; other HUC5s supporting fall-run fish likely to have higher conservation value in the Cascade region	Medium
	Lower Columbia/Sandy	Columbia Gorge Tributaries	1708000107	2	2	2	2	1	2	11	Moderate-high HUC5 score; tributary habitat in HUC5 supports at least one TRT historical core fall-run population and habitat in this HUC5 likely more important for this population than the upstream HUC5; mainstem Columbia River is high value connectivity corridor supporting all upstream populations.	High
	Lower Columbia/Sandy	Lower Sandy River	1708000108	1	1	2	3	2	3	12	Moderate-high HUC5 score; PCEs support spring-, fall, and late fall-run populations; TRT identified spring- and late fall-runs as core and genetic legacy populations; important connectivity reaches for all upstream HUC5s	High
	Lower Columbia/Sandy	Salmon Creek	1708000109	1	1	1	2	1	2	8	Moderate HUC5 score; PCEs limited and degraded in this HUC5; not identified as a core population; TRT genetic legacy classification not likely attributable to fish in this HUC5; other HUC5s supporting fall-run fish likely to have higher conservation value in the Cascade region	Low

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Lewis	Upper Lewis River	1708000201							*	Unoccupied HUC5, but population expansion into this HUC5 possibly essential for conservation; The downstream dams Merwin, Yale, and Swift are barriers to fish distribution in this watershed; Unoccupied habitat areas above these dams may be essential to conservation; nearly the entire area is a FEMAT key watershed for at-risk anadromous salmonids	Possibly High
	Lewis	Muddy River	1708000202							*	Unoccupied HUC5, but population expansion into this HUC5 possibly essential for conservation; The downstream dams Merwin, Yale, and Swift are barriers to fish distribution in this watershed; Unoccupied habitat areas above these dams may be essential to conservation; nearly the entire area is a FEMAT key watershed for at-risk anadromous salmonids	Possibly High
	Lewis	Swift Reservoir	1708000203							*	Unoccupied HUC5, but population expansion into this HUC5 possibly essential for conservation; Swift Dam, as well as downstream dams Merwin and Yale, is currently a barrier to fish distribution; Unoccupied habitat areas above these dams may be essential to conservation; HUC5 contains connectivity reaches to upstream to upstream areas that are FEMAT key watersheds for at-risk anadromous salmonids	Possibly High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Lewis	Yale Reservoir	1708000204							*	Unoccupied HUC5, but population expansion into this HUC5 possibly essential for conservation; Yale Dam, as well as downstream Merwin Dam, is currently a barrier to fish distribution; Unoccupied habitat areas above these dams may be essential to conservation; HUC5 contains connectivity reaches to upstream to upstream areas that are FEMAT key watersheds for at-risk anadromous salmonids	Possibly High
	Lewis	East Fork Lewis River	1708000205	2	1	2	3	2	3	13	Moderate-high HUC5 score; PCEs support fall-run fish and TRT identified HUC5 as supporting a genetic legacy population; some of best remaining habitat of three HUC5s supporting this population; uppermost areas are a FEMAT key watershed for at-risk anadromous salmonids	High
	Lewis	Lower Lewis River	1708000206	1	1	2	3	2	3	12	Moderate-high HUC5 score; PCEs support all run types in this ESU (spring-, fall-, and late fall-run fish); TRT identified HUC5 as supporting core and genetic legacy populations; conservation of these PCEs will be especially important if historical habitats upstream are made accessible. Watershed contains unoccupied habitat areas above Merwin Dam that may be essential for conservation.	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Lower Columbia/ Clatskanie	Kalama River	1708000301	2	1	2	1	2	3	11	Moderate-high HUC5 score; supports spring- and fall-run populations; not identified as a core or genetic legacy population by TRT; CHART uncertain of rarity/importance in this HUC5 but believed that other HUC5s may have higher conservation value in the Cascade region	Medium
	Lower Columbia/ Clatskanie	Beaver Creek/Columbia River	1708000302	1	0	1	0	1	1	4	Low-moderate HUC5 score but lowest in Coast Range region; TRT identified two historical fall-run populations in this HUC5 but present distribution limited to Clatskanie River population's historic range; PCEs are extremely limited in this HUC5 relative to others in the Coast Range region and may have very limited potential for improvement	Low
	Lower Columbia/ Clatskanie	Clatskanie River	1708000303	2	1	2	1	2	2	10	Moderate HUC5 score; PCE's support a TRT fall-run population but it is neither a core nor legacy population	Medium
	Lower Columbia/ Clatskanie	Germany/Abernathy	1708000304	2	1	2	1	1	3	10	Moderate HUC5 score; PCEs support entire range of a TRT fall-run population but it is neither a core nor legacy population; other HUC5s supporting fall-run fish likely to have higher conservation value in the Coast Range region	Medium
	Lower Columbia/ Clatskanie	Skamokawa/ Elochoman	1708000305	2	2	2	1	2	3	12	Moderate-high HUC5 score, highest in Coast Range region; PCEs support entire range of a TRT fall-run and core population	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Lower Columbia/ Clatskanie	Plympton Creek	1708000306	1	2	2	1	2	2	10	Moderate HUC5 score; PCE's support a fall-run TRT population (but neither a core nor legacy population); may have best potential for PCE improvement of the three HUC5s supporting this population	High
	Upper Cowlitz	Headwaters Cowlitz River	1708000401	0	2	1	3	2	3	11	Moderate-high HUC5 score; PCEs support spring- and fall-run fish via trap and haul; CHART believed it was important to emphasize conservation value of upper Cowlitz/Cispus HUC5s due to their historic importance and potential to promote conservation of the ESU (i.e., Upper Cowlitz River identified by TRT as a core and genetic legacy spring-run population)	High
	Upper Cowlitz	Upper Cowlitz River	1708000402	2	1	2	3	2	3	13	Moderate-high HUC5 score; PCEs support spring- and fall-run fish via trap and haul; CHART believed it was important to emphasize conservation value of upper Cowlitz/Cispus HUC5s due to their historic importance and potential to promote conservation of the ESU (i.e., Upper Cowlitz River identified by TRT as a core and genetic legacy spring-run population); HUC5 includes a FEMAT key watershed for at-risk anadromous salmonids	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Upper Cowlitz	Cowlitz Valley Frontal	1708000403	2	1	2	3	2	3	13	Moderate-high HUC5 score; PCEs support spring- and fall-run fish via trap and haul; CHART believed it was important to emphasize conservation value of upper Cowlitz/Cispus HUC5s due to their historic importance and potential to promote conservation of the ESU (i.e., Upper Cowlitz River identified by TRT as a core and genetic legacy spring-run population)	High
	Upper Cowlitz	Upper Cispus River	1708000404	2	2	2	3	2	2	13	Moderate-high HUC5 score; PCEs support spring- and fall-run fish via trap and haul; CHART believed it was important to emphasize conservation value of upper Cowlitz/Cispus HUC5s due to their historic importance and potential to promote conservation of the ESU (i.e., Cispus River identified by TRT as a core spring-run population)	High
	Upper Cowlitz	Lower Cispus River	1708000405	2	2	2	3	2	3	14	High HUC5 score; PCEs support spring- and fall-run fish via trap and haul; CHART believed it was important to emphasize conservation value of upper Cowlitz/Cispus HUC5s due to their historic importance and potential to promote conservation of the ESU (i.e., Cispus River identified by TRT as a core spring-run population)	High
	Lower Cowlitz	Tilton River	1708000501	1	1	2	1	2	3	10	Moderate HUC5 score; PCEs support spring- and fall-run fish via trap and haul; HUC5 is only habitat for a TRT historical spring-run population	Medium

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Lower Cowlitz	Riffe Reservoir	1708000502	1	1	1	3	2	3	11	Moderate-high HUC5 score; PCEs support spring- and fall-run fish via trap and haul; PCEs degraded due to inundation; HUC5 primarily important as rearing/migration corridor for upstream populations	High
	Lower Cowlitz	Jackson Prairie	1708000503	2	1	1	2	2	3	11	Moderate-high HUC5 score; PCEs support fall- and spring-run TRT populations (both core and legacy); some spawning PCEs in this HUC5; important as a high value rearing/migration corridor connecting upstream HUC5s/populations with the ocean	Medium
	Lower Cowlitz	North Fork Toutle River	1708000504	1	1	2	2	1	3	10	Moderate HUC5 score; PCEs support a spring- and fall-run TRT population (and the latter is a core population); PCEs in this HUC5 are very limited relative to the other three HUC5s supporting these populations; CHART noted recolonization of area despite volcano-related impacts on PCEs	Medium
	Lower Cowlitz	Green River	1708000505	2	1	2	2	2	3	12	Moderate-high HUC5 score; PCEs support a spring- and fall-run TRT population (and the latter is a core population); most of the spawning PCEs for this population may be in this HUC5; CHART noted recolonization of area despite volcano-related impacts on PCEs	High
	Lower Cowlitz	South Fork Toutle River	1708000506	2	1	2	2	2	3	12	Moderate-high HUC5 score; PCEs support a spring- and fall-run TRT population (and the latter is a core population); extensive spawning PCEs for this population in this HUC5; CHART noted recolonization of area despite volcano-related impacts on PCEs	High

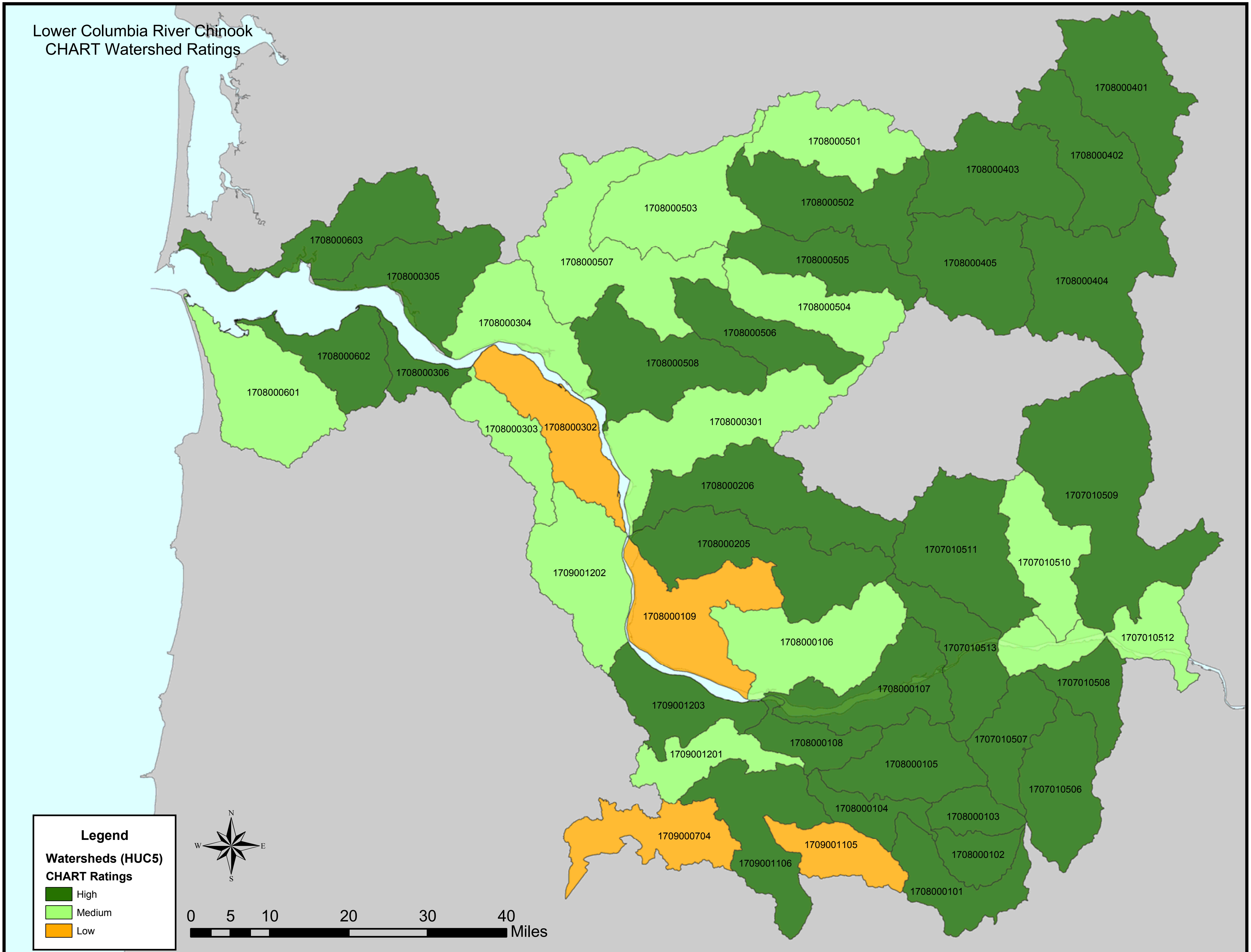
Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Lower Cowlitz	East Willapa	1708000507	2	1	1	2	2	3	11	Moderate-high HUC5 score; PCEs support fall- and spring-run TRT populations (both core and legacy); some spawning PCEs and important as a high value rearing/migration corridor connecting upstream HUC5s/populations with the ocean	Medium
	Lower Cowlitz	Coweeman	1708000508	2	2	2	3	2	3	14	High HUC5 score; PCEs support a TRT genetic legacy fall-run population as well as rearing/migration for all upriver populations (fall- and spring-run) in the Cowlitz River; one of few remaining populations in ESU sustained through natural production	High
	Lower Columbia	Youngs River	1708000601	2	1	2	1	2	3	11	Moderate-high HUC5 score; PCEs support entire range of a TRT fall-run population but it is neither a core nor legacy population; CHART noted extensive releases of out-of-ESU fish in this HUC5 and believed that other HUC5s supporting fall-run fish are likely to have higher conservation value in the Coast Range region	Medium
	Lower Columbia	Big Creek	1708000602	1	2	2	1	1	3	10	Moderate HUC5 score; PCEs support entire range of a TRT fall-run and core population	High
	Lower Columbia	Grays Bay	1708000603	2	1	2	1	2	3	11	Moderate-high HUC5 score; PCEs support entire range of a TRT fall-run population but it is neither a core nor legacy population; CHART noted that relatively extensive PCEs in this HUC5 may be indicative of higher conservation value in the Coast Range region	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Middle Willamette	Abernethy Creek	1709000704	1	0	1	3	1	2	8	Moderate HUC5 score; extremely limited PCEs and HUC5 not associated with a TRT population (but possibly the Clackamas River fall-run)	Low
	Clackamas	Eagle Creek	1709001105	0	2	1	1	2	2	8	Moderate HUC5 score; PCEs support a TRT fall-run and core population but are very limited in this HUC5	Low
	Clackamas	Lower Clackamas River	1709001106	3	1	2	1	2	2	11	Moderate-high HUC5 score; PCEs support a TRT fall-run and core population; this HUC5 is the primary production area for this population	High
	Lower Willamette	Johnson Creek	1709001201	1	0	2	3	2	2	10	Moderate HUC5 score; PCEs support a TRT fall-run and core population; PCE quality degraded but CHART noted that HUC5 may provide important refuge habitat for Clackamas River population and may warrant consideration for unique adaptations; Willamette River is a high value rearing/migration corridor	Medium
	Lower Willamette	Scappoose Creek	1709001202	1	1	2	1	1	3	9	Moderate HUC5 score; PCEs support at least two populations, including a TRT fall-run and core population; PCE quality degraded but CHART noted that HUC5 may provide important refuge habitat for Clackamas River population and may warrant consideration for unique adaptations; Willamette River (Multnomah Channel) is a high value rearing/migration corridor	Medium

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Lower Willamette	Columbia Slough/Willamette River	1709001203	1	0	2	3	2	3	11	Moderate-high HUC5 score; PCEs support a TRT fall-run and core population and likely support rearing/migration for other Columbia River populaions in the ESU; PCE quality degraded but CHART noted that HUC5 may provide important refuge habitat for Clackamas River population and may warrant consideration for unique adaptations; Willamette River is a high value rearing/migration corridor	High
	Multiple	Lower Columbia Corridor (Sandy/ Washougal to Ocean)	NA							NS	Area not scored since many reaches are outside HUC5 boundaries. However, the CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation	High

* Rated by CHART although HUC5 is currently blocked and unoccupied.

Figure B1. CHART Ratings of Conservation Value for Habitat Areas in HUC5 Watersheds Occupied by the Lower Columbia River Chinook Salmon ESU


Lower Columbia River Chinook
CHART Watershed Ratings
1708000401
1708000501
1708000402
1708000403
1708000503
1708000502
1708000603
1708000507
1708000505
1708000405
1708000305
1708000404
1708000504
1708000304
1708000506
1708000602
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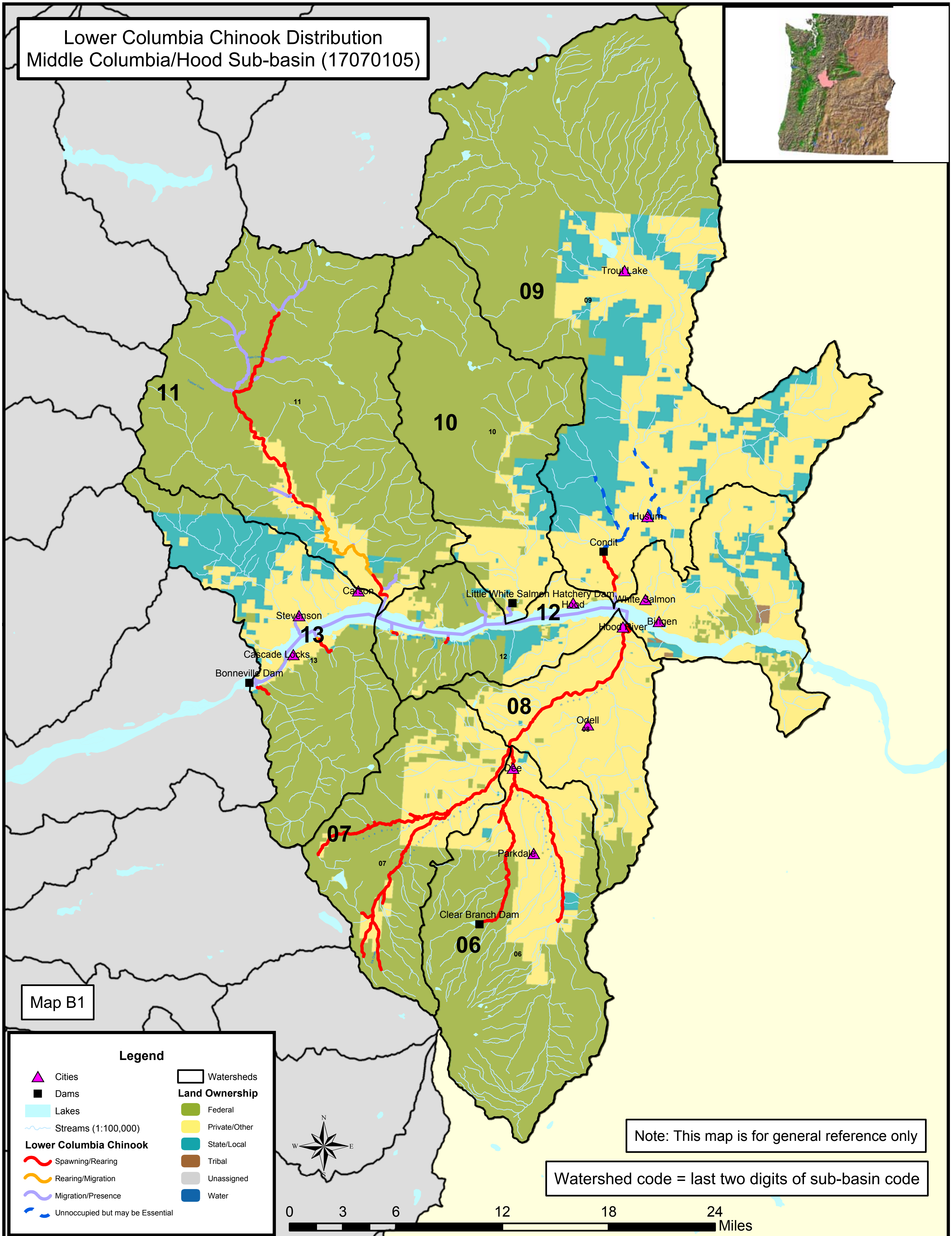
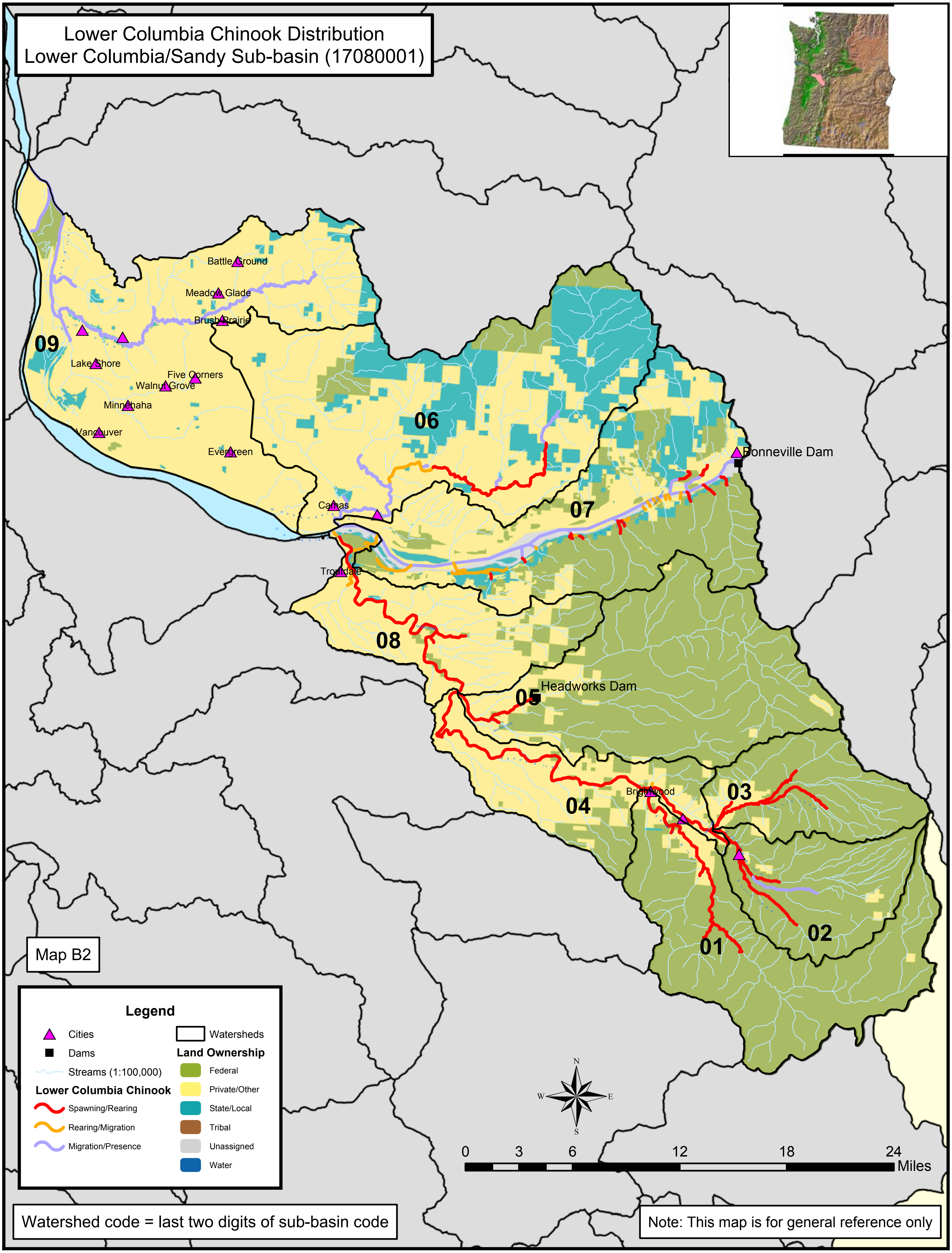
1708000105
1707010506
1708000104
1708000103
1709000704
1709001105
1708000102
1709001106
1708000101
Legend
Watersheds (HUC5)
CHART Ratings
High
Medium
Low
N
W
E
S
0
5
10
20
30
40
Miles

Lower Columbia Chinook Distribution
Middle Columbia/Hood Sub-basin (17070105)

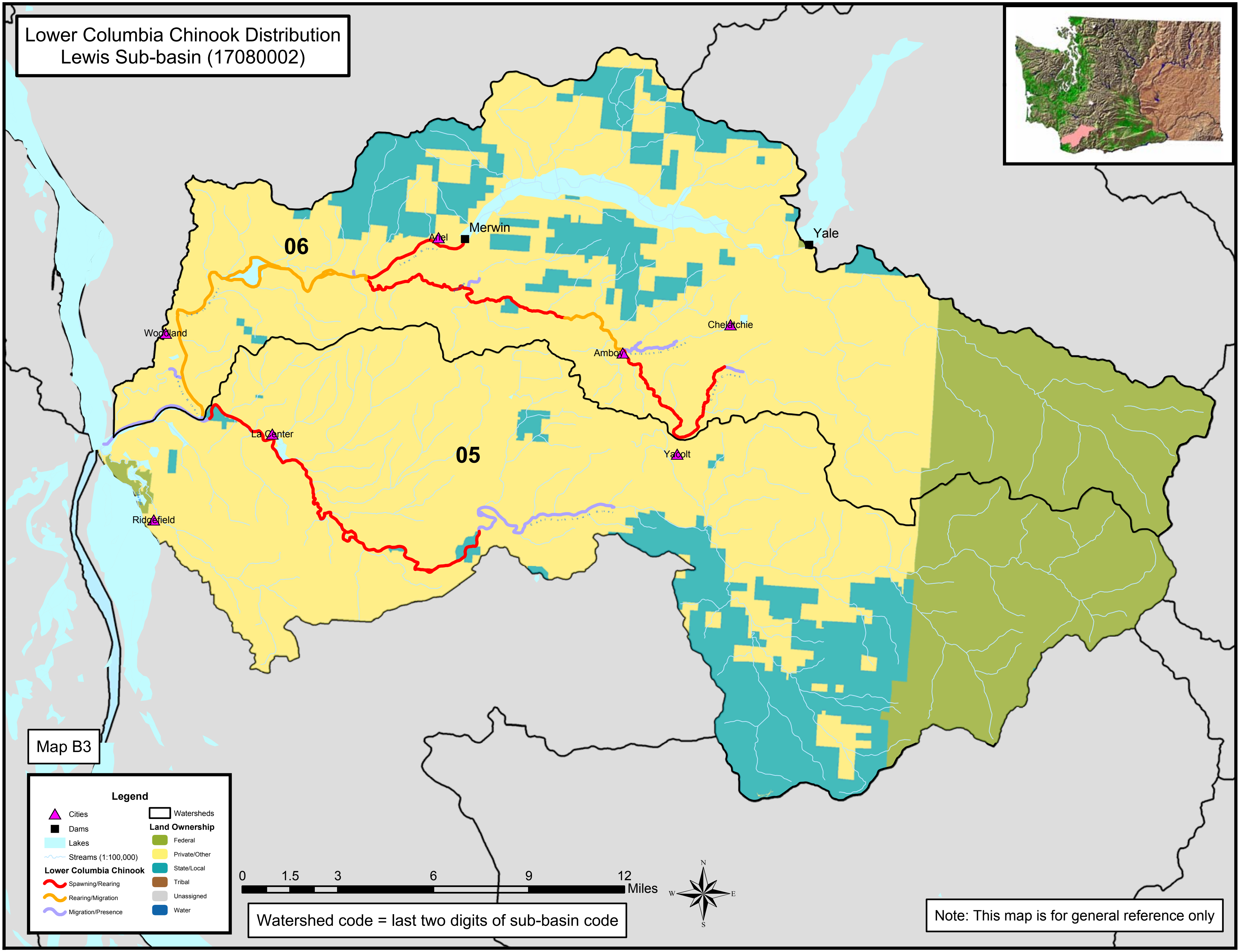


Note: This map is for general reference only

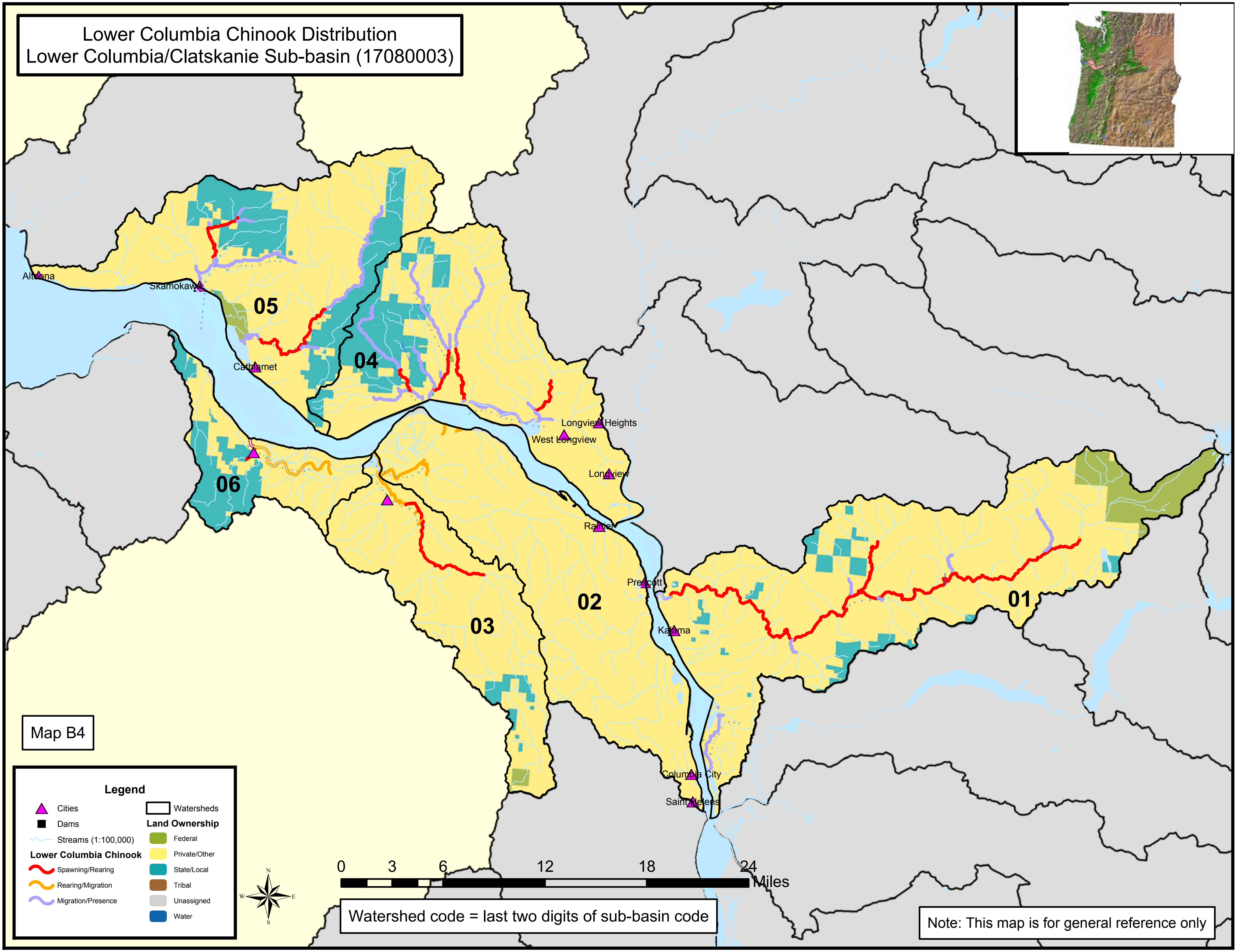
Watershed code = last two digits of sub-basin code



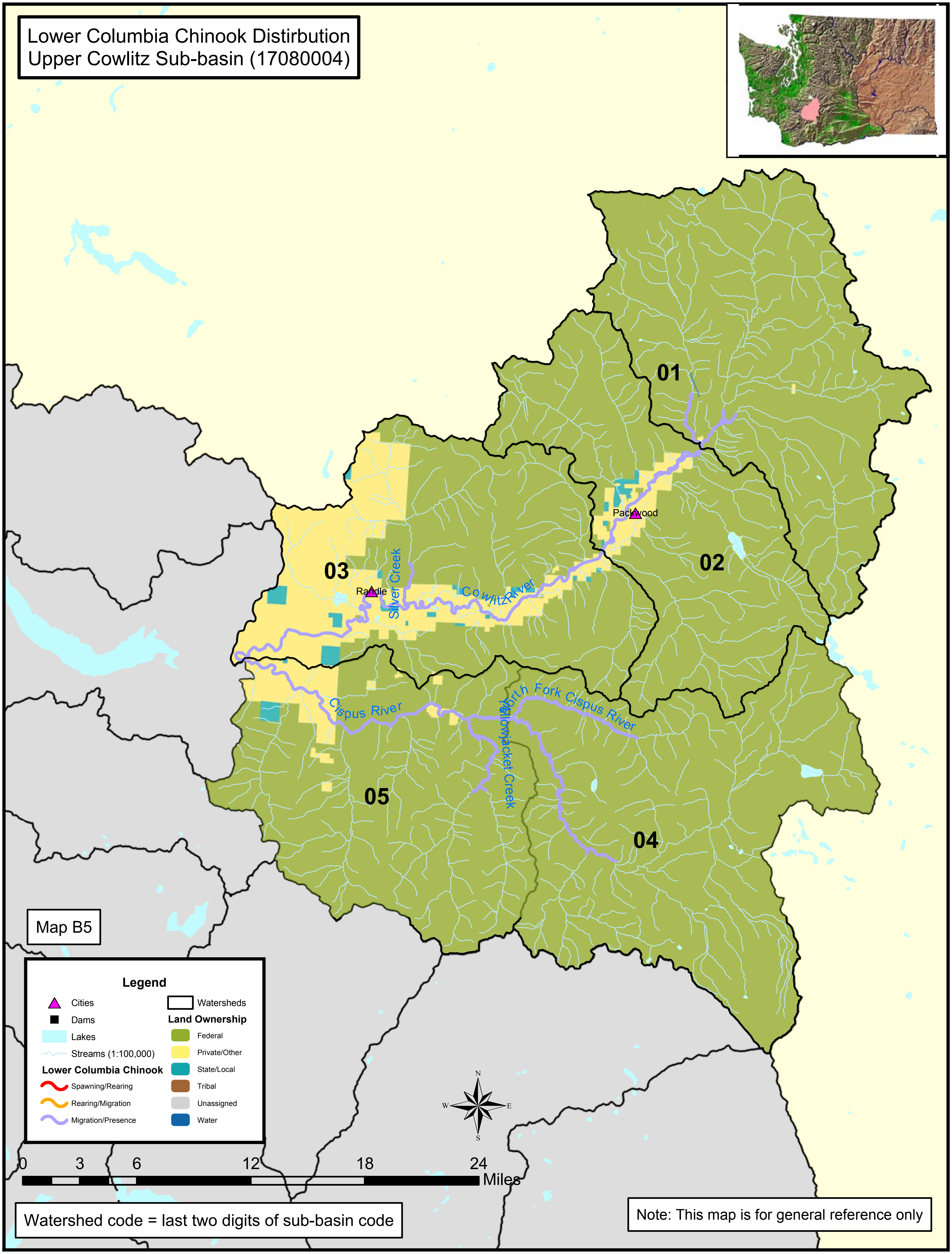
Lower Columbia Chinook Distribution
Lower Columbia/Sandy Sub-basin (17080001)
Battle Ground
Meadow Glade
Brush Prairie
Lake Shore
Five Corners
Walnut Grove
Minnehaha
Vancouver
Evergreen
Camas
Troutdale
Bonneville Dam
Headworks Dam
Brightwood
09
06
07
08
05
04
03
02
01
Map B2
Legend
Cities
Dams
Streams (1:100,000)
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Lower Columbia Chinook
Spawning/Rearing
Rearing/Migration
Migration/Presence
N
S
E
W
0 3 6 12 18 24
Miles
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only



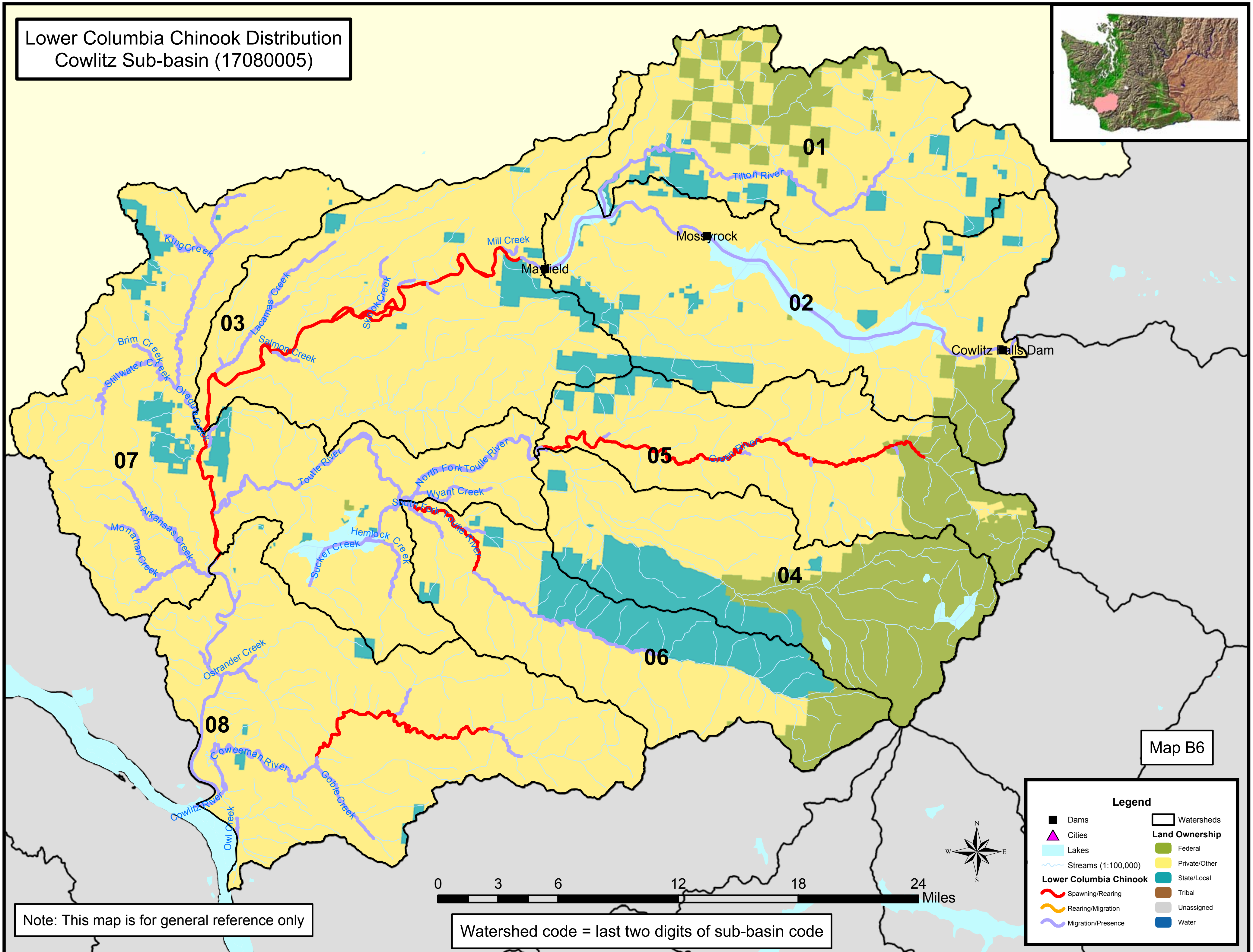
Lower Columbia Chinook Distribution
Lewis Sub-basin (17080002)
06
05
Merwin
Yale
Ariel
Woodland
Chelatchie
Amboy
La Center
Yacolt
Ridgefield
Map B3
Legend
Cities
Dams
Lakes
Streams (1:100,000)
Lower Columbia Chinook
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
0 1.5 3 6 9 12 Miles
N S E W
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only

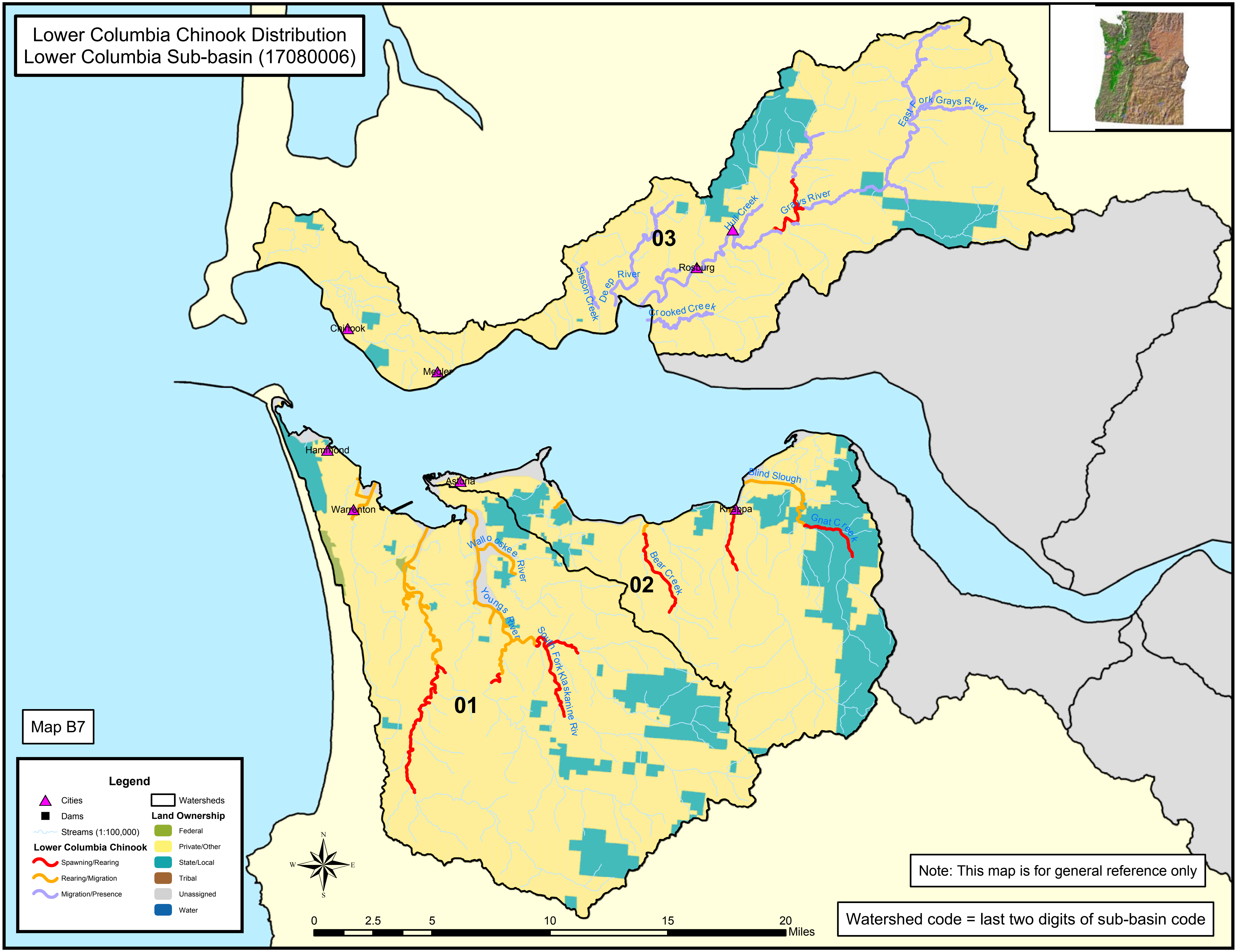


Lower Columbia Chinook Distribution
Lower Columbia/Clatskanie Sub-basin (17080003)
Altoona
Skamokawa
Cathlamet
Longview Heights
West Longview
Longview
Rainier
Prescott
Kalama
Columbia City
Saint Helens
05
04
06
03
02
01
Map B4
Legend
Cities
Dams
Streams (1:100,000)
Lower Columbia Chinook
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
0
3
6
12
18
24
Miles
N
S
E
W
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only

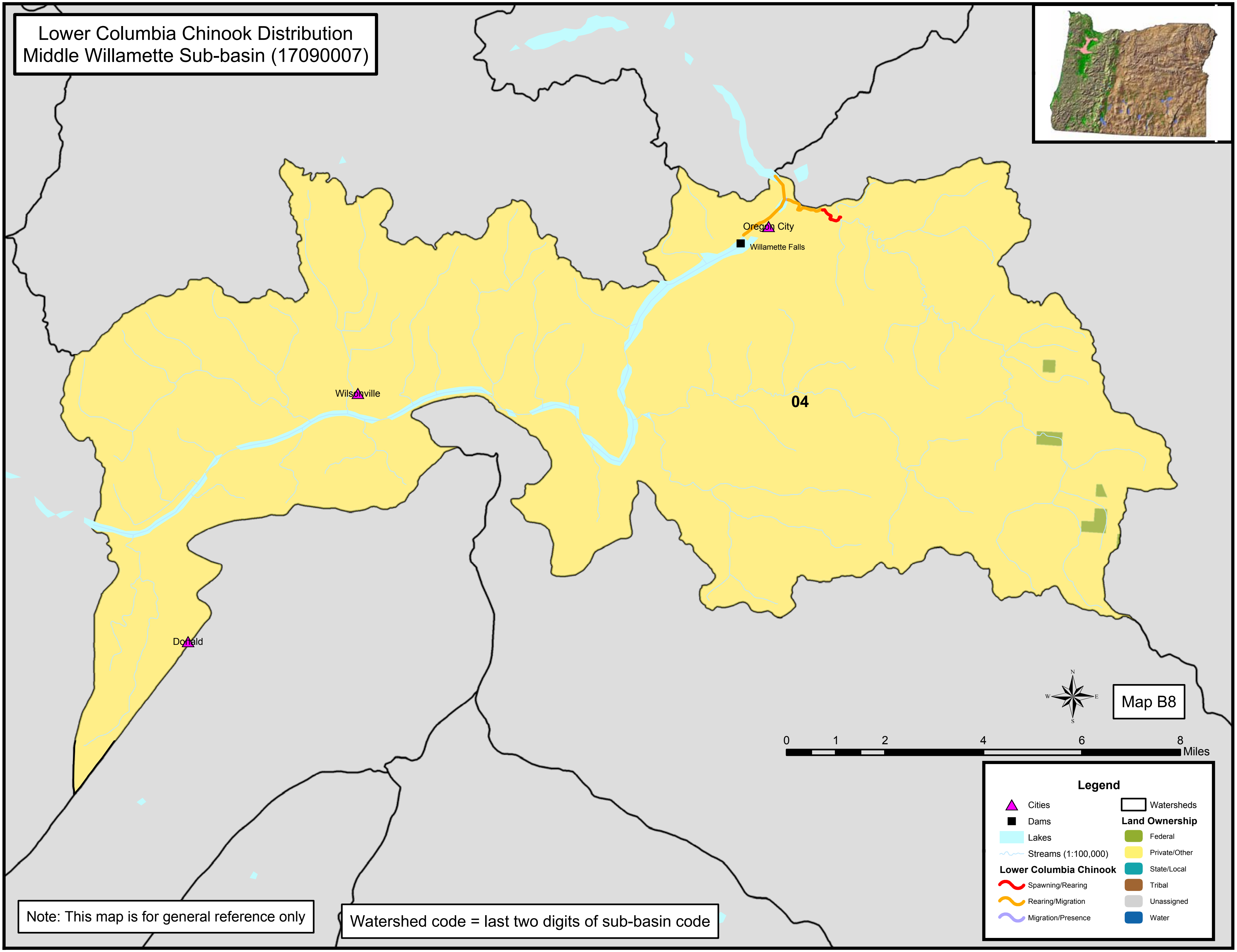


Lower Columbia Chinook Distirbution
Upper Cowlitz Sub-basin (17080004)
01
02
03
04
05
Packwood
Randle
Silver Creek
Cowlitz River
Cispus River
North Fork Cispus River
Yellowjacket Creek
Map B5
Legend
Cities
Dams
Lakes
Streams (1:100,000)
Lower Columbia Chinook
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
0
3
6
12
18
24
Miles
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only

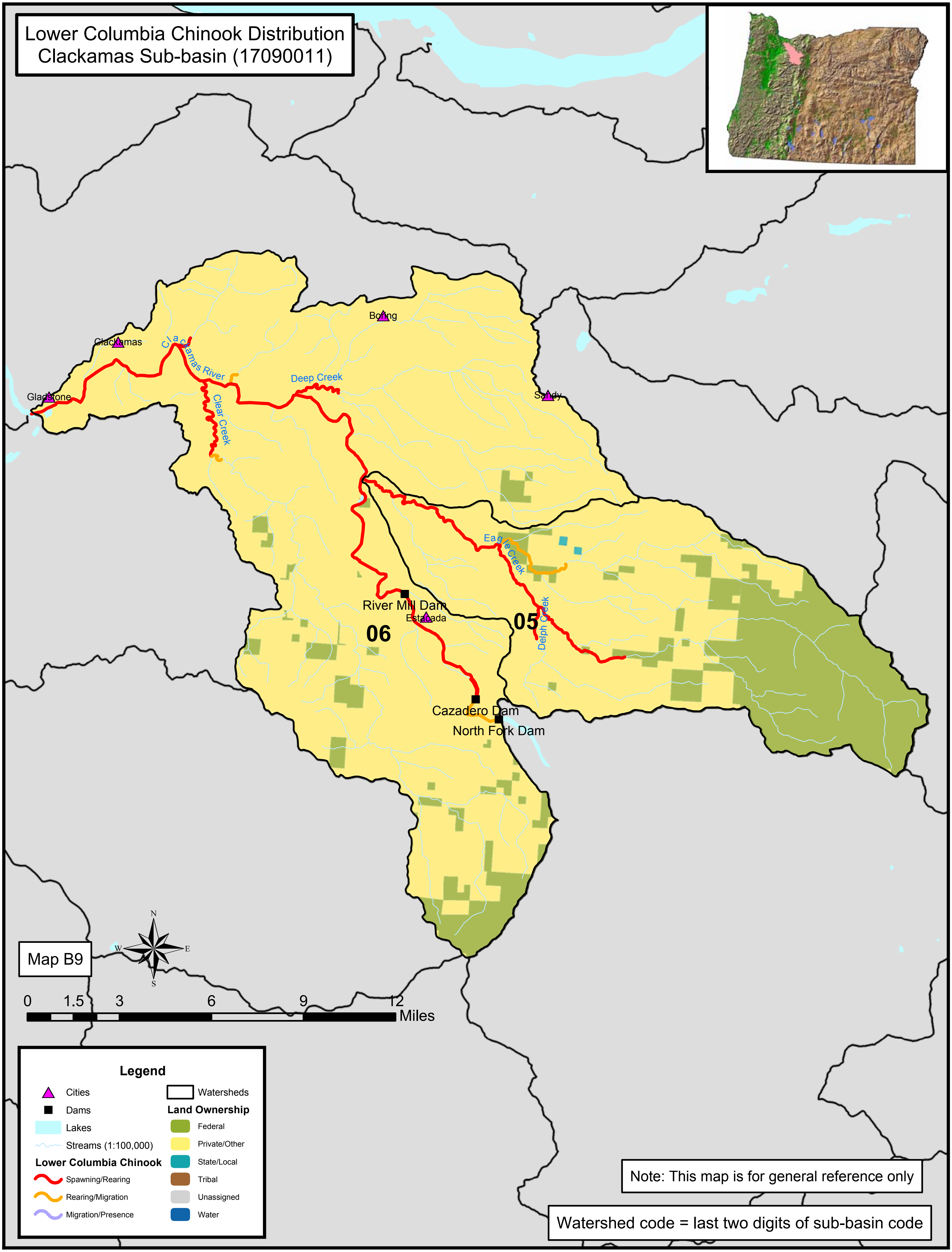

Lower Columbia Chinook Distribution
Cowlitz Sub-basin (17080005)
01
02
03
04
05
06
07
08
Tilton River
Mossyrock
Mayfield
Mill Creek
Cowlitz Falls Dam
King Creek
Lacamas Creek
Salmon Creek
Brim Creek
Stillwater Creek
Olequa Creek
Toutle River
North Fork Toutle River
Wyant Creek
South Fork Toutle River
Green River
Hemlock Creek
Sucker Creek
Arkansas Creek
Monahan Creek
Ostrander Creek
Coweeman River
Goble Creek
Cowlitz River
Owl Creek
Map B6
Legend
Dams
Cities
Lakes
Streams (1:100,000)
Lower Columbia Chinook
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
0 3 6 12 18 24
Miles
Note: This map is for general reference only
Watershed code = last two digits of sub-basin code



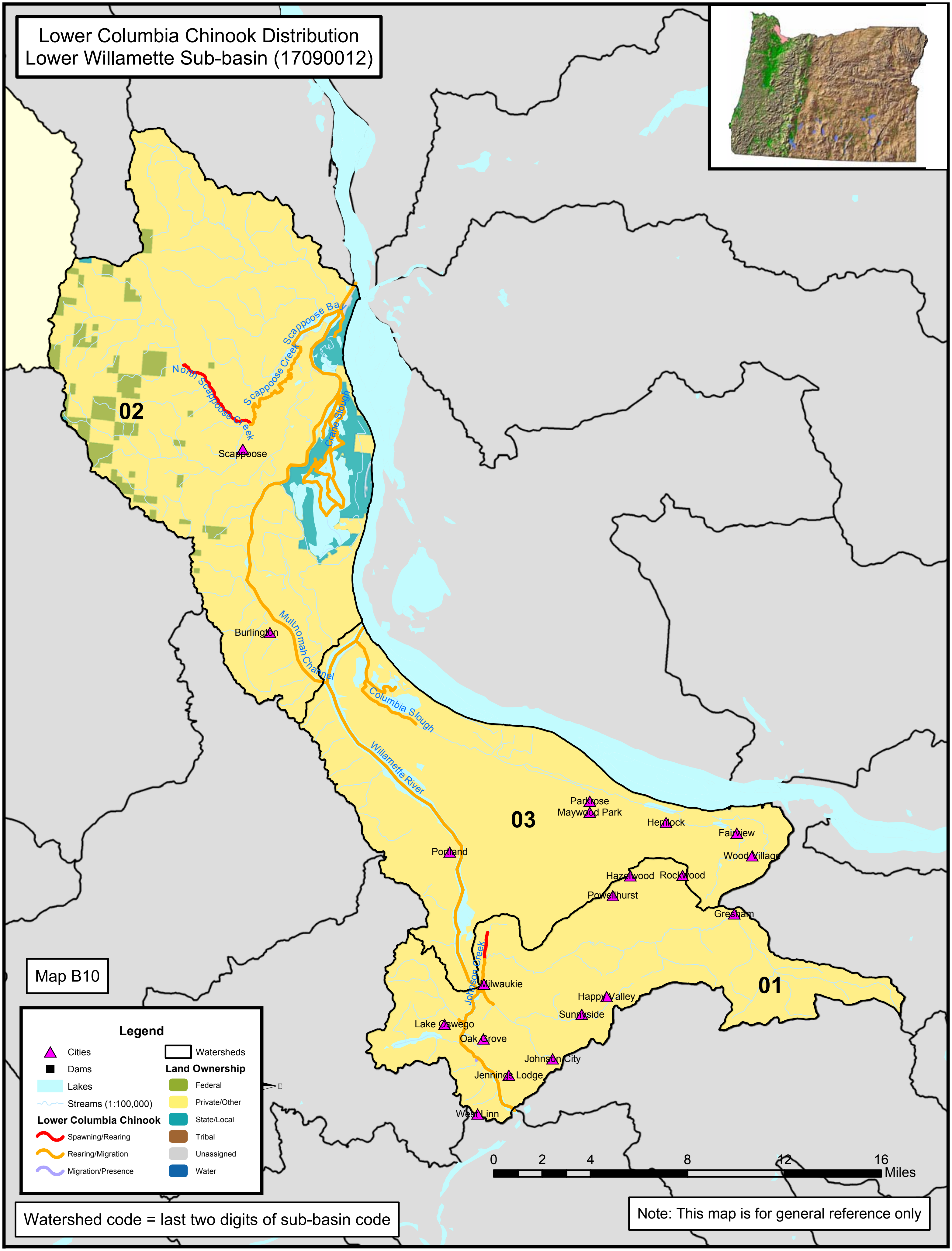
Lower Columbia Chinook Distribution
Lower Columbia Sub-basin (17080006)
01
02
03
Chinook
Megler
Rosburg
Hammond
Astoria
Warrenton
Knappa
Sisson Creek
Deep River
Crooked Creek
Hull Creek
Grays River
East Fork Grays River
Blind Slough
Gnat Creek
Bear Creek
Wallooskee River
Youngs River
South Fork Klaskanine Riv
Map B7
Legend
Cities
Dams
Streams (1:100,000)
Lower Columbia Chinook
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
0
2.5
5
10
15
20
Miles
Note: This map is for general reference only
Watershed code = last two digits of sub-basin code



Lower Columbia Chinook Distribution
Middle Willamette Sub-basin (17090007)
Oregon City
Willamette Falls
Wilsonville
Donald
04
Map B8
0
1
2
4
6
8
Miles
Legend
Cities
Dams
Lakes
Streams (1:100,000)
Lower Columbia Chinook
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Note: This map is for general reference only
Watershed code = last two digits of sub-basin code


Lower Columbia Chinook Distribution
Clackamas Sub-basin (17090011)
Boring
Clackamas
Clackamas River
Gladstone
Deep Creek
Clear Creek
Sandy
Eagle Creek
River Mill Dam
Estacada
06
05
Delph Creek
Cazadero Dam
North Fork Dam
Map B9
N
S
W
E
0 1.5 3 6 9 12
Miles
Legend
Cities
Dams
Lakes
Streams (1:100,000)
Lower Columbia Chinook
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Note: This map is for general reference only
Watershed code = last two digits of sub-basin code

Lower Columbia Chinook Distribution
Lower Willamette Sub-basin (17090012)



Watershed code = last two digits of sub-basin code

Note: This map is for general reference only

Appendix C
CHART Assessment for the
Upper Willamette River Chinook Salmon ESU

CHART Participants

The CHART for this ESU consisted of the following NOAA Fisheries biologists: Ben Meyer (CHART Leader), Michelle Day, Patty Dornbusch, Dan Guy, Lynne Krasnow, Lance Kruzic, Nancy Munn, Mindy Simmons, Cathy Tortorici, and Rich Turner. This CHART assessment also benefitted from review and comments by the Oregon Department of Fish and Wildlife.

ESU Description

The Upper Willamette River Chinook ESU was listed as a threatened species in 1999 (64 FR 14308; March 24, 1999). The ESU includes all naturally spawned populations of spring-run Chinook salmon in the Clackamas River and in the Willamette River, and its tributaries, above Willamette Falls, Oregon. The agency recently conducted a review to update the ESU's status, taking into account new information and considering the net contribution of artificial propagation efforts in the ESU. We recently published the results of this review and concluded that Upper Willamette River Chinook salmon (including seven hatchery programs) should remain listed as threatened (70 FR 37160; June 28, 2005). The following description is based largely on excerpts from the Willamette/Lower Columbia River Technical Recovery Team's (TRT) recent review of historical population structure for this ESU (Myers et al. 2003).

Historically, the Willamette River basin provided sufficient spawning and rearing habitat for large numbers of spring-run Chinook salmon. The predominant tributaries to the Willamette River that historically supported spring-run Chinook salmon all drain the Cascade Range. The TRT has identified each of these drainages as a historically demographically independent population: Clackamas, Molalla, North Santiam, South Santiam, Calapooia, McKenzie, and Middle Fork Willamette rivers. The TRT also noted that reports of "Chinook salmon in westside tributaries have continued to the present; however it is unlikely the abundance of spawners in any of these tributaries constitutes a [demographically independent population]."

Spring-run Chinook salmon populations in the upper Willamette River basin and Clackamas River have been strongly influenced by extensive hatchery transfers of fish throughout the ESU for nearly 100 years as well as the introduction of fall-run Chinook salmon. Prior to the laddering of Willamette Falls, passage by returning adult salmonids (just upstream of the confluence of the Clackamas and Willamette rivers) was only possible during winter and spring high-flow periods. Low flows during the summer and autumn months prevented fall-run salmon from accessing the upper Willamette River basin. This isolation has provided the potential for significant local adaptation relative to other Columbia River populations. Also, spring-run fish returning to the upper Willamette River basin historically may have strayed into the Clackamas River when conditions at Willamette Falls prevented upstream passage. Therefore, similarities between Clackamas River and upper Willamette River spring-run fish may reflect an historical/evolutionary association between the two groups.

The early run-timing of adult Willamette River spring-run Chinook salmon relative to other lower Columbia River spring-run populations is viewed as an adaptation to flow conditions at Willamette Falls. Chinook salmon begin appearing in the Lower Willamette River in February, but the majority of the run ascends Willamette Falls in April and May, with a peak in mid May. Currently, the migration of adult spring-run Chinook salmon over Willamette Falls extends into July and August. Historically, passage over the falls may have been marginal in June, due to diminishing flows, and only larger fish would have been able to ascend.

Adults spawn in both mainstem and tributary habitats of eastside drainages to the Willamette River typically from late July to October. The juvenile life-history characteristics of upper Willamette River spring-run salmon appear to be highly variable. Fry emerge from February to March, although sometimes as late as June. Juveniles appear to emigrate continuously out of the tributaries and into the mainstem Willamette River as fry (late winter to early spring), fingerlings (fall to early winter) and yearlings (late winter to spring). Most juveniles enter the ocean as yearlings after overwintering and rearing in the mainstem Willamette and Columbia rivers. In general, the majority of spring Chinook salmon returning to the upper Willamette River basin currently mature at 4 and 5 years old.

Recovery Planning Status

The Willamette/Lower Columbia TRT has identified seven historically demographically independent populations with a single run-type (spring-run fish) and a single ecological spawning zone (the Willamette River) (McElhany et al. 2002). The populations include: Clackamas, Molalla, North Santiam, South Santiam, Calapooia, McKenzie, and Middle Fork Willamette rivers. The TRT also noted that reports of "Chinook salmon in westside tributaries have continued to the present; however it is unlikely the abundance of spawners in any of these tributaries constitutes a [demographically independent population]." Recovery planning will likely emphasize the need for a geographical distribution of viable populations across the range of the ESU (Ruckelshaus et al. 2002, McElhany et al. 2003). A preliminary draft recovery plan for this ESU is expected by the end of 2005. This plan will be based on the Willamette subbasin plan, which was completed in May 2004. The CHART considered the TRT products in rating each watershed, but did not have the benefit of a recovery plan. We anticipate that, as recovery planning proceeds, we will have better information and may revise our recommendations regarding critical habitat designation.

CHART Area Assessments

The CHART assessment for this ESU addressed 10 subbasins containing 56 occupied watersheds, as well as the lower Willamette/Columbia River rearing/migration corridor The Willamette/Lower Columbia Technical Recovery Team (TRT) has identified groups of populations in this recovery planning domain into "strata" intended to assist in evaluating ESU-wide recovery scenarios (McElhany et al. 2002). The strata are based on major life history characteristics (e.g., species run types) and ecological zones. The upper Willamette River Chinook salmon ESU consists of a single stratum due to it being a single run type (spring-run fish) that spawns within a single ecological zone (Willamette River). Recovery planning will likely emphasize the need for a geographical distribution of viable populations across the range of such strata/regions in an ESU (Ruckelshaus et al. 2002, McElhany et al. 2003). Therefore, as part of its assessment the CHART considered the conservation value of each HUC5 in the context of the populations within this stratum. Information is presented below by USGS subbasin because they present a convenient and systematic way to organize the CHART's watershed assessments for this ESU and their names are generally more recognizable because they typically identify major river systems.

Middle Fork Willamette Subbasin (HUC4# 17090001)

The Middle Fork Willamette subbasin is the southernmost drainage in the Willamette River Valley and contained in Douglas and Lane counties, Oregon. The subbasin contains 10 watersheds occupied by this ESU and these watersheds encompass approximately 1,367 mi^2 and 1,382 miles of streams. Fish distribution and habitat use data from the Oregon Department of Fish and Wildlife (ODFW) identify approximately 273 miles of occupied riverine habitat in the watersheds (ODFW 2003a,b). Myers et al. (2003) identified one demographically independent population (Middle Fork Willamette River) in this subbasin. These authors also noted that Nicholas (1995) concluded that the native spring-run population was extinct, although some spawning by hatchery-origin fish may occur. The CHART concluded that, despite uncertainties about the origin of the fish occupying these watersheds today, all of the occupied areas likely contain one or more PCEs for this ESU. Table C1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map C1 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watersheds in this subbasin were of either high or medium conservation value to the ESU. Of the 10 HUC5s reviewed, four were rated as having high and six were rated as having medium conservation value. The CHART also concluded that the HUC5s with medium overall ratings contained a high value rearing and migration corridor connecting high value upstream watersheds with downstream reaches and the ocean. Table C2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure C1 shows the overall distribution of ratings by HUC5 watershed. Among the key considerations identified in Table C2, the CHART noted that the TRT has classified the Middle Fork Willamette River Chinook salmon as a core population (historically abundant and "may offer the most likely path to recovery") (McElhany et al. 2003).

Coast Fork Willamette Subbasin (HUC4# 17090002)

The Coast Fork Willamette subbasin is in the upper Willamette River drainage and contained Douglas and Lane counties, Oregon. The subbasin contains four watersheds occupied by this ESU and these watersheds encompass approximately 664 mi^2 and 699 miles of streams. Fish distribution and habitat use data from ODFW identify approximately 44 miles of occupied riverine habitat in the watersheds (ODFW 2003a,b). Myers et al. (2003) did not identify a demographically independent population in this subbasin, and Kostow (1995) characterized them as extinct. Myers et al. (2003) noted that reports of "Chinook salmon in westside tributaries have continued to the present; however it is unlikely the abundance of spawners in any of these tributaries constitutes a [demographically independent population]. Table C1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration reaches, as well as management activities that may affect these reaches in the watersheds. Map C2 depicts the specific areas in this subbasin occupied by the ESU, but is unclear whether all of these areas qualify for consideration as critical habitat for this ESU.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the four occupied HUC5 watersheds in this subbasin were of low conservation value to the ESU. Table C2 summarizes the CHART scores and conservation value ratings, and Figure A1 shows the overall distribution of ratings by HUC5 watershed. Among the key considerations identified in Table C2, the CHART noted that the TRT had not identified a demographically independent population in these watersheds (Myers et al. 2003) as well as the very limited habitat in the subbasin.

Upper Willamette Subbasin (HUC4# 17090003)

The Upper Willamette subbasin contains both eastside and westside drainages as well as the mainstem Willamette River upstream of its confluence with the Santiam River. The subbasin is contained in the following Oregon counties: Benton, Lane, Lincoln, Linn, and Polk. The subbasin contains six watersheds occupied by this ESU and these watersheds encompass approximately 1,872 mi^2 and 2,140 miles of streams. Fish distribution and habitat use data from ODFW identify approximately 225 miles of occupied riverine habitat in the watersheds (ODFW 2003a,b). Myers et al. (2003) identified possibly four demographically independent populations in this subbasin but only one with spawning habitat (Calapooia River). Myers et al. (2003) also noted that reports of "Chinook salmon in westside tributaries have continued to the present; however it is unlikely the abundance of spawners in any of these tributaries constitutes a [demographically independent population]." The CHART concluded that, despite uncertainties about the origin of the fish occupying some of these watersheds today and in light of recent comments from ODFW about the importance of rearing habitats in these areas, the occupied areas likely contain one or more PCEs for this ESU. Table C1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map C3 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watersheds in this subbasin were of either medium or low conservation value to the ESU. Of the six HUC5s reviewed, three were rated as having low and three were rated as having medium conservation value. These ratings reflect increases (from Low to Medium) in *preliminary* conservation value ratings for the Mary's and Luckiamute River watersheds as a result of comments provided by ODFW about the importance of some westside tributaries for rearing Chinook salmon. The CHART also concluded that all reaches of the Willamette River within this subbasin (including watersheds with a low overall rating) constitute a high value rearing and migration corridor connecting upstream populations (e.g., those in the McKenzie, Middle Fork Willamette, and Calapooia Rivers) and high value HUC5s with downstream reaches and the ocean. Table C2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure C1 shows the overall distribution of ratings by HUC5 watershed. Among the key considerations identified in Table C2, the CHART noted that the Calapooia River HUC5 was the only one identified as having spawning habitat for this subbasin as well as the demographically independent population identified therein.

McKenzie River Subbasin (HUC4# 17090004)

The McKenzie River subbasin is a Cascade Range drainage of the Upper Willamette River and contained in Lane and Linn counties, Oregon. The subbasin contains seven watersheds occupied by this ESU and these watersheds encompass approximately 1,339 mi^2 and 1,251 miles of streams. Fish distribution and habitat use data from ODFW identify approximately 268 miles of occupied riverine habitat in the watersheds (ODFW 2003a,b). Myers et al. (2003) identified one demographically independent population (McKenzie River) in this subbasin. This is probably the only self-sustaining population above Willamette Falls, and possibly in the entire ESU (Myers et al. 2003, NOAA Fisheries 2003). The CHART concluded that all of the occupied areas likely contain one or more PCEs for this ESU. Table C1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map C4 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watersheds in this subbasin were of either high or medium conservation value to the ESU. Of the seven HUC5s reviewed, five were rated as having high and two were rated as having medium conservation value. Table C2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure C1 shows the overall distribution of ratings by HUC5 watershed. Among the key considerations identified in Table C2, the CHART noted that the TRT has classified the McKenzie River Chinook salmon as both a core population (historically abundant and "may offer the most likely path to recovery") as well as a genetic legacy population (one of the "the most intact representatives of the genetic character of the ESU") (McElhany et al. 2003). Likewise, ODFW considered the McKenzie River as essential habitat for spring Chinook salmon (ODFW 1993 as cited in Bastasch et al. 2003). Also, occupied reaches in several HUC5s overlap with FEMAT key watersheds for at-risk anadromous salmonids (FEMAT 1994).

North Santiam River Subbasin (HUC4# 17090005)

The North Santiam River subbasin is a Cascade Range drainage of the Upper Willamette River and contained in Clackamas, Linn, and Marion counties, Oregon. The subbasin contains six watersheds, three of which are occupied by this ESU and encompass approximately 315 mi^2 and 340 miles of streams. Fish distribution and habitat use data from ODFW identify approximately 125 miles of occupied riverine habitat in these watersheds (ODFW 2003A,B). Myers et al. (2003) identified one demographically independent population (North Santiam River) in this subbasin. Historically accessible areas in the three uppermost watersheds of this subbasin are now blocked by Big Cliff and Detroit dams. These dams block access to approximately 70% of the historic spawning area in this subbasin (Myers et al. 2003). The CHART concluded that all of the occupied areas likely contain one or more PCEs for this ESU. Table C1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map C5 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watersheds in this subbasin were of either high or medium conservation value to the ESU. Of the three HUC5s reviewed, two were rated as having high and one was rated as having medium conservation value. Table C2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure C1 shows the overall distribution of ratings by HUC5 watershed. Among the key considerations identified in Table C2, the CHART noted that the TRT has classified the North Santiam River Chinook salmon as a core population (historically abundant and "may offer the most likely path to recovery") (McElhany et al. 2003). Likewise, ODFW considered the North Santiam River and Little North Santiam River as essential habitat for spring Chinook salmon (ODFW 1993 as cited in Bastasch et al. 2003). Also, occupied reaches in Little North Santiam HUC5 overlap with a FEMAT key watershed for at-risk anadromous salmonids (FEMAT 1994).

The CHART also concluded that the three inaccessible HUC5s (Upper North Santiam, North Fork Breitenbush River, and Detroit Reservoir/Blowout Divide Creek) may be essential to the conservation of the ESU. All three HUC5s are presently occupied by non-listed hatchery Chinook salmon which are trapped downstream and released into these HUC5s. The team determined that the Detroit Reservoir/Blowout Divide Creek HUC5 would have a lower overall conservation value due to the large areas inundated by Detroit Reservoir. The CHART concluded that these unoccupied areas may be essential because: (1) they once supported a TRT core population; (2) they contain non-inundated habitats that are still relatively abundant and in fair to good condition and improving; (3) there is evidence that the areas can support significant natural production; and (3) the naturally-reproducing population below Big Cliff Dam has limited spawning PCEs and appears to suffer from high mortality rates (Willamette National Forest [WNF] 1994, WNF 1995, WNF 1996, WNF 1997, Ziller et al. 2002, McElhany et al. 2003). The CHART noted that NOAA Fisheries' status review of this ESU stated "the declines in spring Chinook salmon in the Upper Willamette River ESU can be attributed in large part to the extensive habitat blockages caused by dam construction." In addition, the CHART also noted that providing passage at dams and diversions has been identified as a key potential conservation measure for Willamette River salmon and steelhead (Martin et al. 1998, Bastasch et al. 2002). Therefore, the CHART concluded that the ESU would likely benefit if the extant population had access to spawning/rearing habitat upstream and that these areas may warrant consideration as critical habitat.

South Santiam River Subbasin (HUC4# 17090006)

The South Santiam River subbasin is a Cascade Range drainage of the Upper Willamette River and contained in Linn County, Oregon. The subbasin contains eight watersheds, six of which are occupied by this ESU and encompass approximately 766 mi^2 and 860 miles of streams. Fish distribution and habitat use data from ODFW identify approximately 169 miles of occupied riverine habitat in these watersheds (ODFW 2003A,B). Two watersheds in the upper Middle Santiam River (Quartzville Creek and Middle Santiam River) are blocked by Green Peter Dam. Myers et al. (2003) identified one historically independent population (South Santiam River) in this subbasin. The CHART concluded that all of the occupied areas likely contain one or more PCEs for this ESU. Table C1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map C6 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watersheds in this subbasin were of either high or medium conservation value to the ESU. Of the six HUC5s reviewed, three were rated as having high and three were rated as having medium conservation value. Table C2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure C1 shows the overall distribution of ratings by HUC5 watershed. Among the key considerations identified in

Table C2, the CHART noted the relatively large amount of potential current habitat (NOAA Fisheries 2003) and the relatively high density of redds observed in recent spawner surveys as compared to other subbasins. (Schroeder et al. 2002 and 2003). While the majority of these spawners were likely of hatchery origin, the CHART believed that these data may be indicative of the availability of abundant spawning PCEs and high production potential in portions of this subbasin.

Middle Willamette River Subbasin (HUC4# 17090007)

The Middle Willamette River subbasin encompasses most of the valley floor reaches of the Willamette River upstream of Willamette Falls and is contained in the following Oregon counties: Clackamas, Marion, Polk, Yamhill, and Washington. The subbasin consists of four watersheds, all of which are occupied by this ESU and encompass approximately 712 mi^2 and 922 miles of streams. Fish distribution and habitat use data from ODFW identify approximately 158 miles of occupied riverine habitat (all rearing/migration) in these watersheds (ODFW 2003A,B). Myers et al. (2003) identified only a small portion of the spawning range of one demographically independent population (North Santiam River) in this subbasin, although six populations use this subbasin for rearing/migration. The CHART concluded that all of the occupied areas likely contain one or more PCEs for this ESU. Table C1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map C7 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watersheds in this subbasin were of low conservation value to the ESU. However, that assessment pertained solely to the tributary streams in these watersheds (e.g., Ash, Rickreall, and Harvey creeks), not the mainstem Willamette River. The CHART concluded that all reaches of the Willamette River within this subbasin constitute a high value rearing and migration corridor. These high value reaches connect nearly all populations and HUC5s in this ESU (except those in the Clackamas River; Myers et al. 2003) with downstream reaches and the ocean. Table C2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure C1 shows the overall distribution of ratings by HUC5 watershed.

Yamhill River Subbasin (HUC4# 17090008)

The Yamhill River subbasin is a Coast Range drainage of the middle Willamette River and is contained primarily in Polk and Yamhill counties, Oregon (with very small and unoccupied portions in Lincoln, Tillamook, and Washington counties as well). The subbasin contains seven watersheds, four of which are occupied by this ESU and encompass approximately 495 mi^2 and 605 miles of streams. Fish distribution and habitat use data from ODFW identify approximately 71 miles of occupied riverine habitat (all rearing/migration) in these watersheds (ODFW 2003Aa,b). Myers et al. (2003) did not identify a demographically independent population in this subbasin. Myers et al. (2003) noted that reports of "Chinook salmon in westside tributaries have continued to the present; however it is unlikely the abundance of spawners in any of these tributaries constitutes a [demographically independent population]." The CHART concluded that, despite uncertainties about the origin of the fish occupying some of these watersheds today and in light of recent comments from ODFW about the importance of rearing habitats in these areas, the occupied areas likely contain one or more PCEs for this ESU. Table C1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration reaches, as well as management activities that may affect these reaches in the watersheds. Map C8 depicts the specific areas in this subbasin occupied by the ESU, but is unclear whether all of these areas qualify for consideration as critical habitat for this ESU.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the four occupied HUC5 watersheds in this subbasin were of low conservation value to the ESU. Table C2 summarizes the CHART scores and conservation value ratings, and Figure A1 shows the overall distribution of ratings by HUC5 watershed. Among the key considerations identified in Table C2, the CHART noted that there were no spawning PCEs in these west-side tributaries and the fact that these watersheds were not identified as part of a historical, demographically independent population (Myers et al. 2003). However, The CHART noted that the lowermost reaches of the Yamhill River watershed (those near the confluence with the Willamette River) may provide important juvenile rearing habitat for eastside Willamette River populations upstream.

Molalla/Pudding River Subbasin (HUC4# 17090009)

The Molalla/Pudding River subbasin is an eastside drainage of the middle Willamette River and contained in Clackamas and Marion counties, Oregon. The subbasin contains six watersheds occupied by this ESU and encompasses approximately 875 mi^2 and 1,057 miles of streams. Fish distribution and habitat use data from ODFW identify approximately 181 miles of occupied riverine habitat in these watersheds (ODFW 2003a,b). The CHART concluded that all of the occupied areas likely contain one or more PCEs for this ESU. Table C1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map C9 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watersheds in this subbasin were of either medium or low conservation value to the ESU. Of the six HUC5s reviewed, three were rated as having medium and three were rated as having low conservation value. The CHART elevated the Abiqua Creek/Pudding River HUC5 from a Low to Medium conservation value, noting that recent data from a watershed assessment indicate that this HUC5 has some of the highest-quality habitat in the Pudding River subbasin (M. Simmons, NOAA Fisheries, pers. com). Table C2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure C1 shows the overall distribution of ratings by HUC5 watershed. Among the key considerations identified in Table C2, the CHART noted that this particular subbasin has relatively low abundance and distribution objectives identified by ODFW for spring Chinook (ODFW 2001 as cited in Bastasch et al. 2002).

Clackamas River Subbasin (HUC4# 17090011)

The Clackamas River subbasin is a Cascade Range drainage of the lower Willamette River and the only subbasin with spawning habitat for this ESU below Willamette Falls. The subbasin contains six watersheds, all of which are occupied by this ESU and encompass approximately 942 mi^2 and 1,109 miles of streams. Fish distribution and habitat use data from ODFW identify approximately 137 miles of occupied riverine habitat in these watersheds (ODFW 2003A,B). Myers et al. (2003) identified one demographically independent population (Clackamas River) in this subbasin. The CHART concluded that all of the occupied areas likely contain one or more PCEs for this ESU. Table C1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map C10 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watersheds in this subbasin were of either high or low conservation value to the ESU. Of the six HUC5s reviewed, all but one (Eagle Creek HUC5) were rated as having high conservation value. Table C2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure C1 shows the overall distribution of ratings by HUC5 watershed. Among the key considerations identified in Table C2, the CHART noted that the TRT has classified the Clackamas River Chinook salmon as a core population (historically abundant and "may offer the most likely path to recovery") (McElhany et al. 2003). Likewise, ODFW considered the Clackamas River (above North Fork Dam) as essential habitat for spring Chinook salmon (ODFW 1993 as cited in Bastasch et al. 2003). Also, occupied reaches in the uppermost HUC5s overlap with FEMAT key watersheds for at-risk anadromous salmonids (FEMAT 1994).

Lower Willamette/Columbia River Corridor

The lower Willamette/Columbia River rearing and migration corridor consists of that segment from the confluence of the Willamette and Clackamas rivers to the Pacific Ocean. This corridor also includes the Multnomah Channel portion of the Lower Willamette River. Watersheds downstream of the Clackamas River subbasin (Johnson Creek and Columbia Slough/Willamette River HUC5s) are outside the spawning range of this ESU and likely used in a limited way as juvenile rearing habitat for this ESU. Fish distribution and habitat use data from ODFW identify approximately 137 miles of occupied riverine and estuarine habitat in this corridor (ODFW 2003a,b).

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the lower Willamette/Columbia River corridor was of high conservation value to the ESU. The CHART noted that this corridor connects every watershed and population in this ESU with the ocean and is used by rearing/migrating juveniles and migrating adults. The Columbia River estuary is a particularly important area for this ESU as both juveniles and adults make the critical physiological transition between life in freshwater and marine habitats (ISAB 2000, Marriott et al. 2002).

Marine Areas

NOAA Fisheries' analysis focused on freshwater and estuarine habitats upstream of the mouth of the Columbia River. While marine areas are occupied by this ESU, within this vast area the agency has not identified "specific areas within the geographical area occupied by the species . . . on which are found those physical or biological features . . . essential to the conservation of the species."

Comments and New Information Regarding the CHART's Initial Assessments

The CHART reviewed the public and peer reviewer comments received on the Team's initial findings for this ESU as well as new information relevant to evaluating habitat areas for this ESU. As a result, the CHART changed the conservation value rating for one watershed (Abiqua Creek/Pudding HUC5) within the geographical area occupied by this ESU, but there were no changes to the delineation of occupied habitat areas. The proposed critical habitat designation (69 FR 74572, December 14, 2004) summarizes the comments and responses pertaining to the CHART's initial determinations for this ESU and Tables C1 and C2 reflect the final CHART assessments.

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Table C1. Summary of Occupied Areas, PCEs, and Management Activities Affecting PCEs for the Upper Willamette River Chinook Salmon ESU

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs)			Unoccupied but may be essential (mi)**	Management Activities***
				Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*		
	Middle Fork Willamette	Upper Middle Fork Willamette River	1709000101	16.3	5.3	0.3		F
	Middle Fork Willamette	Hills Creek	1709000102	2.5	2.3	0		D, F, R, U
	Middle Fork Willamette	Salt Creek/ Willamette River	1709000103	19	1.6	0		F, R
	Middle Fork Willamette	Salmon Creek	1709000104	2.8	0	0		C, F
	Middle Fork Willamette	Hills Creek Reservoir	1709000105	19.1	24.5	0		D, F
	Middle Fork Willamette	North Fork Of Middle Fork Willamette River	1709000106	37	1.4	0		F, R
	Middle Fork Willamette	Middle Fork Willamette/ Lookout Point	1709000107	20	34.2	0		D, F, R
	Middle Fork Willamette	Little Fall Creek	1709000108	15.5	3.5	0		A, F
	Middle Fork Willamette	Fall Creek	1709000109	24.2	14.1	5.1		A, D, R
	Middle Fork Willamette	Lower Middle Fork Of Willamette River	1709000110	12.5	11.9	0		A, D, F, R, U
	Coast Fork Willamette	Row River	1709000201	0	7.4	0		D, R, U
	Coast Fork Willamette	Mosby Creek	1709000202	11.6	3	0		A, F, R
	Coast Fork Willamette	Upper Coast Fork Willamette River	1709000203	0	2.3	0		D, C, M, R, U
	Coast Fork Willamette	Lower Coast Fork Willamette River	1709000205	0	19.8	0		A, C, D, R, U
	Upper Willamette	Long Tom River	1709000301	0	6.9	0		A, R
	Upper Willamette	Muddy Creek	1709000302	0	80.1	0		A, C, R, U, W
	Upper Willamette	Calapooia River	1709000303	36.4	24.9	0		A, F, R, U
	Upper Willamette	Oak Creek	1709000304	0	34.3	0		A, R, U
	Upper Willamette	Marys River	1709000305	0	29.2	0		A, R, U
	Upper Willamette	Luckiamute River	1709000306	0	13.4	0		A

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs) Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*	Unoccupied but may be essential (mi)**	Management Activities***
	Mckenzie	Upper Mckenzie River	1709000401	21.4	5	0		A, D, F
	Mckenzie	Horse Creek	1709000402	18.7	1.4	0		A, F
	Mckenzie	South Fork Mckenzie River	1709000403	22.5	18.8	0.8		D, F
	Mckenzie	Blue River	1709000404	1.4	0.1	0		D, F
	Mckenzie	Mckenzie River/ Quartz Creek	1709000405	17.1	9.6	0		D, F, R
	Mckenzie	Mohawk River	1709000406	7.4	45.3	4.4		A, F
	Mckenzie	Lower Mckenzie River	1709000407	58.9	33.5	2		A, C, D, F, R, U
	North Santiam	Upper North Santiam River	1709000501	0	0	0	17.3[a]	
	North Santiam	North Fork Breitenbush River	1709000502	0	0	0	11.1 [a]	
	North Santiam	Detroit Reservoir/ Blow Out Divide Creek	1709000503	0	0	0	10.4 [a]	
	North Santiam	Middle North Santiam River	1709000504	23.5	0.5	0		A, D, F, R
	North Santiam	Little North Santiam River	1709000505	19.5	1.3	0		A, F, M
	North Santiam	Lower North Santiam River	1709000506	37.1	43.5	0		A, D, F, I, S, U
	South Santiam	Hamilton Creek/ South Santiam River	1709000601	16.5	40.7	0		A, C, D, F, I, R, U
	South Santiam	Crabtree Creek	1709000602	15.6	20.6	0		A, C, F, R
	South Santiam	Thomas Creek	1709000603	13.3	23.4	0		A, D, F, R
	South Santiam	Quartzville Creek	1709000604	0	0	0	29.9 [b]	
	South Santiam	Middle Santiam River	1709000605	0	0	0	8.4 [b]	
	South Santiam	South Santiam River	1709000606	11.4	0.1	0		D, F
	South Santiam	South Santiam River/ Foster Reservoir	1709000607	14	4.6	0		D, F
	South Santiam	Wiley Creek	1709000608	8.5	0	0		F
	Middle Willamette	Mill Creek/ Willamette River	1709000701	0	27.4	0		A, C, I, R, U
	Middle Willamette	Rickreall Creek	1709000702	0	38.4	0		A, R, U

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs)			Unoccupied but may be essential (mi)**	Management Activities***
				Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*		
	Middle Willamette	Willamette River/ Chehalem Creek	1709000703	0	70.5	0		A, C, R, U, W
	Middle Willamette	Abernethy Creek	1709000704	0	22	0		A, C, R, U, W
	Yamhill	Lower South Yamhill River	1709000804	0	10.9	0		A, C, R, U
	Yamhill	Salt Creek/ South Yamhill River	1709000805	0	7.9	0		A
	Yamhill	North Yamhill River	1709000806	0	10.7	0		A, U
	Yamhill	Yamhill River	1709000807	0	41.3	0		A, R, U
	Molalla/ Pudding	Abiqua Creek/ Pudding River	1709000901	15.7	21.3	0		A, F, R
	Molalla/ Pudding	Butte Creek/ Pudding River	1709000902	7	36	0		A, F, R
	Molalla/ Pudding	Rock Creek/ Pudding River	1709000903	0	8.5	0		A, I, R
	Molalla/ Pudding	Senecal Creek/ Mill Creek	1709000904	0	17	0		A, U
	Molalla/ Pudding	Upper Molalla River	1709000905	38	0	0		A, F, R
	Molalla/ Pudding	Lower Molalla River	1709000906	4	33.1	0		A, C, F, R, U
	Clackamas	Collawash River	1709001101	16.9	0.2	0		F
	Clackamas	Upper Clackamas River	1709001102	23.7	1.8	0		F
	Clackamas	Oak Grove Fork Clackamas River	1709001103	4	0	0		D, F
	Clackamas	Middle Clackamas River	1709001104	33.9	3.3	0		D, F
	Clackamas	Eagle Creek	1709001105	13.8	3.2	0		A, F, U
	Clackamas	Lower Clackamas River	1709001106	22.9	13.4	0		A, C, D, F, R, S, U
	Lower Willamette	Johnson Creek	1709001201	0	6.4	0		A, C, I, R, U, W
	Lower Willamette	Scappoose Creek	1709001202	0	21.7	0		A, C, F, I, R, U, W
	Lower Willamette	Columbia Slough/ Willamette River	1709001203	0	18.4	0		A, C, R, U, W
	Multiple	Lower Columbia Corridor (Willamette to Ocean)	NA	0	0	98.2 [c]		C, D, I, R, T, U, W

[a] Big Cliff and Detroit dams are a barrier to fish distribution in this watershed. Unoccupied habitat areas above these dams may be essential to conservation.
[b] Green Peter Dam is a barrier to fish distribution in this watershed. Unoccupied habitat areas above these dams may be essential to conservation.
[c] The Lower Columbia River from the ocean upstream approximately 46.5 miles is considered to contain estuarine PCEs, in addition to migration and rearing (ISAB 2000).
* Some streams classified as "Migration/Presence PCEs" may also include rearing or spawning PCEs, but the GIS data are still undergoing review to confirm additional habitat use types.
** These watersheds contain unoccupied habitat that historically supported spawning and rearing PCEs. The CHART determined that these habitat areas/watersheds may be essential for conservation of the ESU. Since these watersheds are unoccupied, the CHART did not identify management activities.
*** This list is not exhaustive. It is intended to highlight key management activities affecting PCEs in each watershed. Activities identified are based on the general categories described by Spence et al. (1996) and summarized previously in the "Special Management Considerations or Protection" section of this report. Coding is as follows: F= forestry, G = grazing, A = agriculture, C = channel modifications/diking, R = road building/maintenance, U = urbanization, S = sand and gravel mining, M = mineral mining, D = dams, I = irrigation impoundments and withdrawals, T = river, estuary, and ocean traffic, W = wetland loss/removal, B = beaver removal, X = exotic/invasive species introductions, H = forage fish/species harvest. Primary sources for this information were the CHART and reports by Bastasch et al. (2003), Hulse et al. (2002), Pearson (2003), ODFW (1990a-f, 1992), and land use/land cover GIS layers from the U.S. Geological Survey.

Table C2. Summary of Initial CHART Scores and Ratings of Conservation Value for Habitat Areas in HUC5 Watersheds Occupied by the Upper Willamette River Chinook Salmon ESU

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors) 1	2	3	4	5	6Total HUC5 Score (0-15)[1]	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
	Middle Fork Willamette	Upper Middle Fork Willamette River	1709000101	3	2	1	2	2	10	Moderate-high HUC5 score; PCEs support a TRT core population and may be some of best remaining in subbasin; CHART concluded that uppermost watersheds likely have highest value in this subbasin	High
	Middle Fork Willamette	Hills Creek	1709000102	3	1	1	2	2	9	Moderate HUC5 score; PCEs support a TRT core population, but are limited in this HUC5	Medium
	Middle Fork Willamette	Salt Creek/Willamette River	1709000103	3	1	1	2	2	9	Moderate HUC5 score; PCEs support a TRT core population; CHART concluded that this and other uppermost watersheds likely have highest value in this subbasin	High
	Middle Fork Willamette	Salmon Creek	1709000104	2	1	1	2	2	8	Moderate HUC5 score; PCEs support a TRT core population, but are very limited in this HUC5	Medium
	Middle Fork Willamette	Hills Creek Reservoir	1709000105	3	1	1	2	2	9	Moderate HUC5 score; PCEs support a TRT core population but are more limited due to inundated habitats; high value connectivity reaches for upstream HUC5s	Medium

[1] PCE/watershed scores were derived using the CHART scoring process described in the introduction to this report. The CHART employed an earlier 5-factor version of the scoring matrix for three ESUs (Columbia River chum salmon and Upper Willamette River chinook salmon and steelhead) therefore the maximum possible score for these ESUs was 15 points.

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)					6Total HUC5 Score (0-15)[1]	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5			
	Middle Fork Willamette	North Fork Of Middle Fork Willamette River	1709000106	3	2	1	2	2	10	Moderate-high HUC5 score; PCEs support a TRT core population population and may be some of best remaining in subbasin; CHART concluded that this and other uppermost watersheds likely have highest value in this subbasin	High
	Middle Fork Willamette	Middle Fork Willamette/Lookout Point	1709000107	3	1	1	2	2	9	Moderate HUC5 score; PCEs support a TRT core population population but are more limited due to inundated habitats; high value connectivity reaches for upstream HUC5s	Medium
	Middle Fork Willamette	Little Fall Creek	1709000108	3	1	1	1	2	8	Moderate HUC5 score; PCEs support a TRT core population, but CHART concluded this relatively small HUC5 probably had more limited production than upstream HUC5s	Medium
	Middle Fork Willamette	Fall Creek	1709000109	3	1	1	1	2	8	Moderate HUC5 score; PCEs support a TRT core population; CHART concluded that this and other uppermost watersheds likely have highest value in this subbasin	High
	Middle Fork Willamette	Lower Middle Fork of Willamette River	1709000110	3	1	1	2	2	9	Moderate HUC5 score; PCEs support a TRT core population but are more degraded in this lowermost HUC5; high value connectivity reaches for upstream HUC5s	Medium
	Coast Fork Willamette	Row River	1709000201	2	1	0	0	2	5	Not identified as supporting a demographically independent population; limited habitat/distribution	Low
	Coast Fork Willamette	Mosby Creek	1709000202	3	1	0	0	2	6	Not identified as supporting a demographically independent population; limited habitat/distribution	Low

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)					6Total HUC5 Score (0-15)[1]	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5			
	Coast Fork Willamette	Upper Coast Fork Willamette River	1709000203	3	1	0	0	1	5	Not identified as supporting a demographically independent population; limited habitat/distribution	Low
	Coast Fork Willamette	Lower Coast Fork Willamette River	1709000205	3	1	0	0	2	6	Not identified as supporting a demographically independent population; limited habitat/distribution	Low
	Upper Willamette	Long Tom River	1709000301	1	1	1	0	1	4	Low HUC5 score; not identified as supporting a demographically independent population; very limited PCEs	Low
	Upper Willamette	Muddy Creek	1709000302	3	1	0	1	3	8	Moderate HUC5 score; CHART concluded that tributaries are low value relative to other HUC5s, but rearing/migration PCEs in Willamette corridor are highly essential for upstream HUC5s/populations	Low
	Upper Willamette	Calapooia River	1709000303	3	1	0	1	3	8	Moderate HUC5 score; HUC5 contains all spawning PCEs for a demographically independent population	Medium
	Upper Willamette	Oak Creek	1709000304	3	1	0	1	3	8	Moderate HUC5 score; CHART concluded that tributaries are low value relative to other HUC5s, but rearing/migration PCEs in Willamette corridor are highly essential for upstream HUC5s/populations	Low
	Upper Willamette	Marys River	1709000305	1	1	1	0	1	4	Low HUC5 score; not identified as supporting a demographically independent population; limited PCEs, however CHART concluded (based on recent information from ODFW) that this watershed may be important for rearing chinook	Medium

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)					6Total HUC5 Score (0-15)[1]	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5			
	Upper Willamette	Luckiamute River	1709000306	1	1	1	0	1	4	Low HUC5 score; not identified as supporting a demographically independent population; limited PCEs, however CHART concluded (based on recent information from ODFW) that this watershed may be important for rearing chinook	Medium
	Mckenzie	Upper Mckenzie River	1709000401	3	3	3	2	2	13	High HUC5 score; PCEs support a TRT core and legacy population; ODFW considers McKenzie River as essential habitat for spring chinook; PCEs are in a FEMAT key watershed	High
	Mckenzie	Horse Creek	1709000402	2	3	3	2	2	12	High HUC5 score; PCEs support a TRT core and legacy population; ODFW considers McKenzie River as essential habitat for spring chinook; PCEs are in a FEMAT key watershed	High
	Mckenzie	South Fork Mckenzie River	1709000403	2	3	3	2	2	12	High HUC5 score; PCEs support a TRT core and legacy population; ODFW considers McKenzie River as essential habitat for spring chinook; PCEs are in a FEMAT key watershed	High
	Mckenzie	Blue River	1709000404	1	2	1	1	2	7	Low- moderate HUC5 score; PCEs support a TRT core and legacy population; ODFW considers McKenzie River as essential habitat for spring chinook; however very limited PCEs and dam-related impacts reduce the value of this HUC5	Medium

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)					6Total HUC5 Score (0-15)[1]	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5			
	Mckenzie	Mckenzie River/Quartz Creek	1709000405	3	3	3	3	2	14	High HUC5 score; PCEs support a TRT core and legacy population; ODFW considers McKenzie River as essential habitat for spring chinook; high value connectivity reaches for upstream HUC5s	High
	Mckenzie	Mohawk River	1709000406	3	1	1	1	2	8	Moderate HUC5 score; PCEs support a TRT core and legacy population; ODFW considers McKenzie River as essential habitat for spring chinook; lower quality PCEs in this HUC5 relative to upstream HUC5s	Medium
	Mckenzie	Lower Mckenzie River	1709000407	3	2	3	3	2	13	High HUC5 score; PCEs support a TRT core and legacy population; ODFW considers McKenzie River as essential habitat for spring chinook; mixed PCE conditions due to dam impacts; high value connectivity reaches for upstream HUC5s; some PCEs in a FEMAT key watershed	High
	North Santiam	Upper North Santiam River	1709000501						*	Unoccupied HUC5, but population expansion into this HUC5 possibly essential for conservation; High HUC5 score	Possibly High
	North Santiam	North Fork Breitenbush River	1709000502						*	Unoccupied HUC5, but population expansion into this HUC5 possibly essential for conservation; High HUC5 score	Possibly High
	North Santiam	Detroit Reservoir/Blowout Divide Creek	1709000503						*	Unoccupied HUC5, but population expansion into this HUC5 possibly essential for conservation; moderate HUC5 score (lower than others in this portion of the subbasin due to inundated habitat)	Possibly Medium

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)					6Total HUC5 Score (0-15)[1]	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5			
	North Santiam	Middle North Santiam River	1709000504	3	1	1	2	2	9	Moderate HUC5 score; PCEs support a TRT core population and ODFW considers North Santiam as essential habitat for spring chinook; CHART emphasized importance of expanding population into habitats upstream of this HUC5	High
	North Santiam	Little North Santiam River	1709000505	3	1	3	2	2	11	High HUC5 score; PCEs support a TRT core population and ODFW considers North Santiam as essential habitat for spring chinook; PCEs are in a FEMAT key watershed	High
	North Santiam	Lower North Santiam River	1709000506	3	1	1	2	3	10	Moderate HUC5 score; PCEs support a TRT core population and ODFW considers North Santiam as essential habitat for spring chinook; spawning PCEs in other upstream HUC5s in this subbasin are likely of higher conservation value; high value connectivity reaches for upstream HUC5s	Medium
	South Santiam	Hamilton Creek/South Santiam River	1709000601	3	1	1	2	2	9	Moderate HUC5 score; PCEs support a TRT demographically independent population; recent high density of redds may be indicative of high production potential; high value connectivity reaches for all HUC5s in this subbasin	High
	South Santiam	Crabtree Creek	1709000602	3	1	0	1	2	7	Low-moderate HUC5 score; PCEs support a TRT demographically independent population; PCEs are likely of lower quality than other HUC5s in subbasin	Medium

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)					6Total HUC5 Score (0-15)[1]	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5			
	South Santiam	Thomas Creek	1709000603	3	1	0	1	2	7	Low-moderate HUC5 score; PCEs support a TRT demographically independent population; PCEs are likely of lower quality than other HUC5s in subbasin	Medium
	South Santiam	Quartzville Creek	1709000604						**	Unoccupied HUC5, but population expansion into this HUC5 possibly essential for conservation; Green Peter Dam is a barrier to fish distribution in this watershed; High HUC5 score	Possibly High
	South Santiam	Middle Santiam River	1709000605						**	Unoccupied HUC5, but population expansion into this HUC5 possibly essential for conservation; Green Peter Dam is a barrier to fish distribution in this watershed; High HUC5 score	Possibly High
	South Santiam	South Santiam River	1709000606	3	2	1	2	2	10	Moderate HUC5 score; PCEs support a TRT demographically independent population; PCEs are likely some of the best for this population despite inundated habitat	High
	South Santiam	South Santiam River / Foster Reservoir	1709000607	3	2	1	2	2	10	Moderate HUC5 score; PCEs support a TRT demographically independent population; PCEs likely some of the best for this population despite inundated habitat; high value connectivity reaches for upstream HUC5	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)					6Total HUC5 Score (0-15)[1]	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5			
	South Santiam	Wiley Creek	1709000608	2	1	1	1	2	7	Low-moderate HUC5 score; PCEs support a TRT demographically independent population; recent high density of redds may be indicative of high production potential but PCEs in this HUC5 are more limited and likely of lower quality than other HUC5s in subbasin	Medium
	Middle Willamette	Mill Creek/Willamette River	1709000701	1	1	1	0	2	5	Low HUC5 score; PCEs support one TRT population; rearing/migration PCEs in tributaries probably not as important as those for high value connectivity reaches for upstream HUC5s (North Santiam subbasin)	Low
	Middle Willamette	Rickreall Creek	1709000702	3	1	0	1	3	8	Moderate HUC5 score; PCEs in Willamette corridor are highly essential and support several TRT populations but no spawning PCEs in this HUC5 and CHART concluded that rearing/migration PCEs in westside tributaries are low value	Low
	Middle Willamette	Willamette River/Chehalem Creek	1709000703	3	1	1	1	3	8	Moderate HUC5 score; no spawning PCEs in HUC5 and CHART concluded that tributaries are low value, but the Willamette corridor is highly essential	Low
	Middle Willamette	Abernethy Creek	1709000704	2	1	1	1	3	7	Low-moderate HUC5 score; no spawning PCEs in HUC5 and CHART concluded that tributaries are low value, but the Willamette corridor is highly essential	Low
	Yamhill	Lower South Yamhill River	1709000804	1	1	1	1	1	5	Not identified as supporting a demographically independent population; no spawning in westside HUC5s and very limited rearing PCEs	Low

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)					6Total HUC5 Score (0-15)[1]	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5			
	Yamhill	Salt Creek/South Yamhill River	1709000805	1	1	1	1	1	5	Not identified as supporting a demographically independent population; no spawning in westside HUC5s and very limited rearing PCEs	Low
	Yamhill	North Yamhill River	1709000806	1	1	1	1	1	5	Not identified as supporting a demographically independent population; no spawning in westside HUC5s and very limited rearing PCEs	Low
	Yamhill	Yamhill River	1709000807	3	1	1	1	1	7	Not identified as supporting a demographically independent population; no spawning in westside HUC5s; reaches near confluence with Willamette may be provide important rearing for eastside populations upstream	Low
	Molalla/Pudding	Abiqua Creek/Pudding River	1709000901	3	1	0	1	2	7	Moderate HUC5 score; PCEs support a TRT demographically independent population but subbasin has relatively low abundance and distribution objectives identified by ODFW; PCE quality relatively low. CHART elevated this HUC5 from a Low to Medium coonservation value, noting that recent data from a watershed assessment indicate that this HUC5 has some of the highest-quality habitat in the Pudding River subbasin.	Medium
	Molalla/Pudding	Butte Creek/Pudding River	1709000902	3	1	0	1	2	7	Low-moderate HUC5 score; PCEs support a TRT demographically independent population but subbasin has relatively low abundance and distribution objectives identified by ODFW; PCE quality relatively low	Low

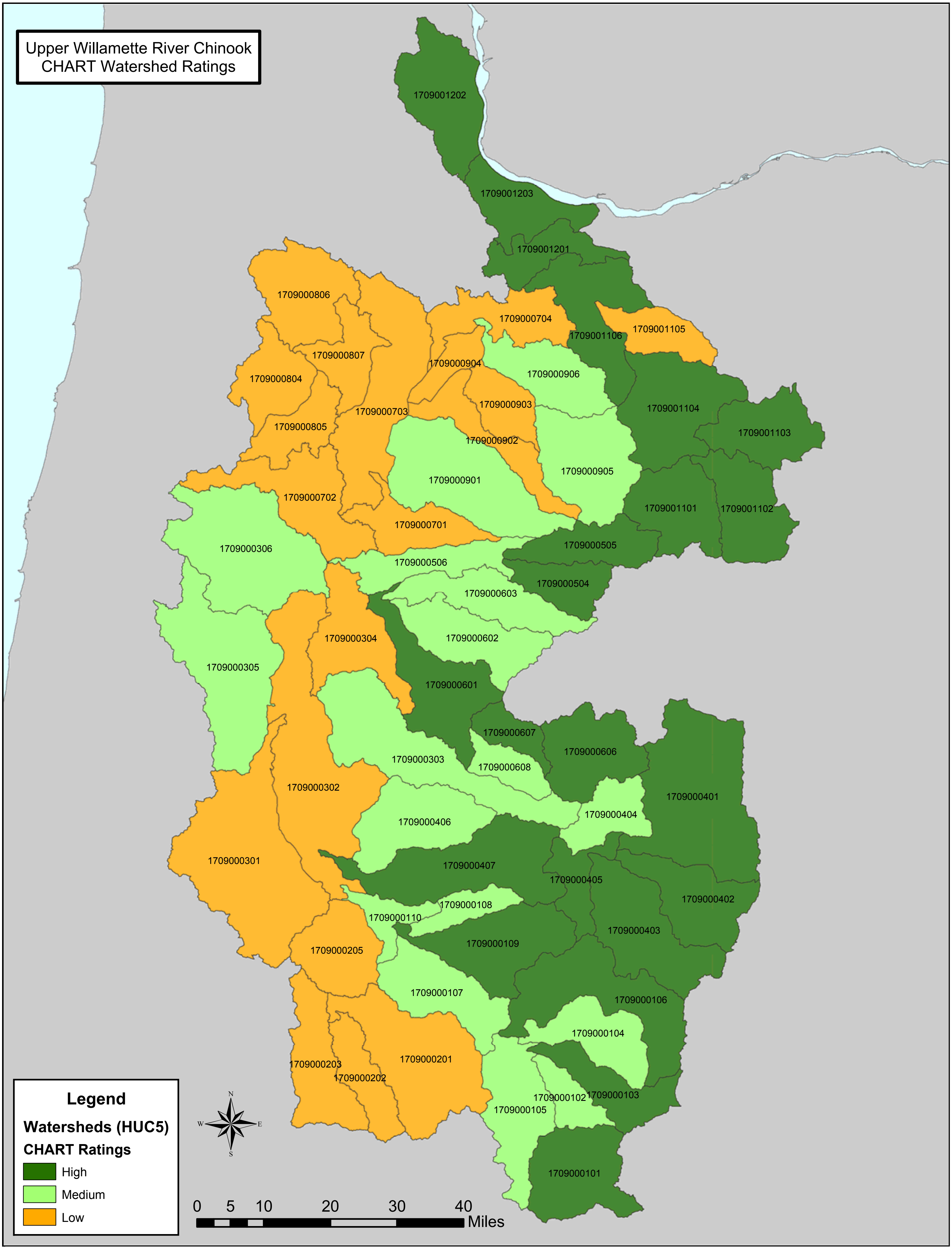
Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)					6Total HUC5 Score (0-15)[1]	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5			
	Molalla/Pudding	Rock Creek/Pudding River	1709000903	3	1	0	1	2	7	Low-moderate HUC5 score; PCEs support a TRT demographically independent population but subbasin has relatively low abundance and distribution objectives identified by ODFW; PCE quality relatively low	Low
	Molalla/Pudding	Senecal Creek/Mill Creek	1709000904	3	1	0	1	2	7	Low-moderate HUC5 score; PCEs support a TRT demographically independent population but subbasin has relatively low abundance and distribution objectives identified by ODFW; PCE quality relatively low	Low
	Molalla/Pudding	Upper Molalla River	1709000905	3	1	1	1	2	8	Moderate HUC5 score; PCEs support a TRT demographically independent population but subbasin has relatively low abundance and distribution objectives identified by ODFW; most of spawning PCEs for this population probably in this HUC5 although of relatively low quality	Medium
	Molalla/Pudding	Lower Molalla River	1709000906	3	1	1	1	2	8	Moderate HUC5 score; PCEs support a TRT demographically independent population but subbasin has relatively low abundance and distribution objectives identified by ODFW; PCE quality relatively low yet important connectivity reaches for the upstream HUC5	Medium
	Clackamas	Collawash River	1709001101	3	2	3	2	2	12	High HUC5 score; PCEs support a TRT core population and the only population downstream of Willamette Falls; ODFW considers Clackamas as essential habitat for spring chinook; PCEs are in a FEMAT key watershed and HUC5 is one of few remaining high elevation/gradient areas for ESU	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)					6Total HUC5 Score (0-15)[1]	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5			
	Clackamas	Upper Clackamas River	1709001102	3	2	3	2	2	12	High HUC5 score; PCEs support a TRT core population and the only population downstream of Willamette Falls; ODFW considers Clackamas as essential habitat for spring chinook; PCEs are in a FEMAT key watershed and HUC5 is one of few remaining high elevation/gradient areas for ESU	High
	Clackamas	Oak Grove Fork Clackamas River	1709001103	3	2	3	1	2	11	High HUC5 score; PCEs support a TRT core population and the only population downstream of Willamette Falls; ODFW considers Clackamas as essential habitat for spring chinook; PCEs are in a FEMAT key watershed; PCEs very limited here but HUC5 is one of few remaining high elevation/gradient areas for ESU	High
	Clackamas	Middle Clackamas River	1709001104	3	2	3	2	2	12	High HUC5 score; PCEs support a TRT core population and the only population downstream of Willamette Falls; ODFW considers Clackamas as essential habitat for spring chinook; PCEs are in a FEMAT key watershed	High
	Clackamas	Eagle Creek	1709001105	3	2	0	0	0	5	Low HUC5 score; PCEs support a TRT core population and the only population downstream of Willamette Falls; ODFW considers Clackamas as essential habitat for spring chinook, but CHART noted very limited production in this HUC5	Low

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)					6Total HUC5 Score (0-15)[1]	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5			
	Clackamas	Lower Clackamas River	1709001106	3	1	3	2	2	11	High HUC5 score; PCEs support a TRT core population and the only population downstream of Willamette Falls; ODFW considers Clackamas as essential habitat for spring chinook; PCEs in HUC5 likely lowest quality in subbasin but HUC5 has high value connectivity reaches for upstream HUC5s	High
	Lower Willamette	Johnson Creek	1709001201						NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Lower Willamette	Scappoose Creek	1709001202						NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Lower Willamette	Columbia Slough/Willamette River	1709001203						NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Multiple	Columbia River Corridor (Willamette to Ocean)	NA						NS	Area not scored since many reaches are outside HUC5 boundaries. However, the CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation	High

* Scored by CHART although HUC5 is currently blocked and occupied (via trap and haul) only by non-listed hatchery chinook salmon.
** Rated by CHART although HUC5 is currently blocked and unoccupied.

Figure C1. CHART Ratings of Conservation Value for Habitat Areas in HUC5 Watersheds Occupied by the Upper Willamette River Chinook Salmon ESU


Upper Willamette River Chinook
CHART Watershed Ratings
1709001202
1709001203
1709001201
1709000806
1709000704
1709001106
1709001105
1709000807
1709000904
1709000804
1709000906
1709000903
1709000703
1709001104
1709000805
1709000902
1709001103
1709000901
1709000905
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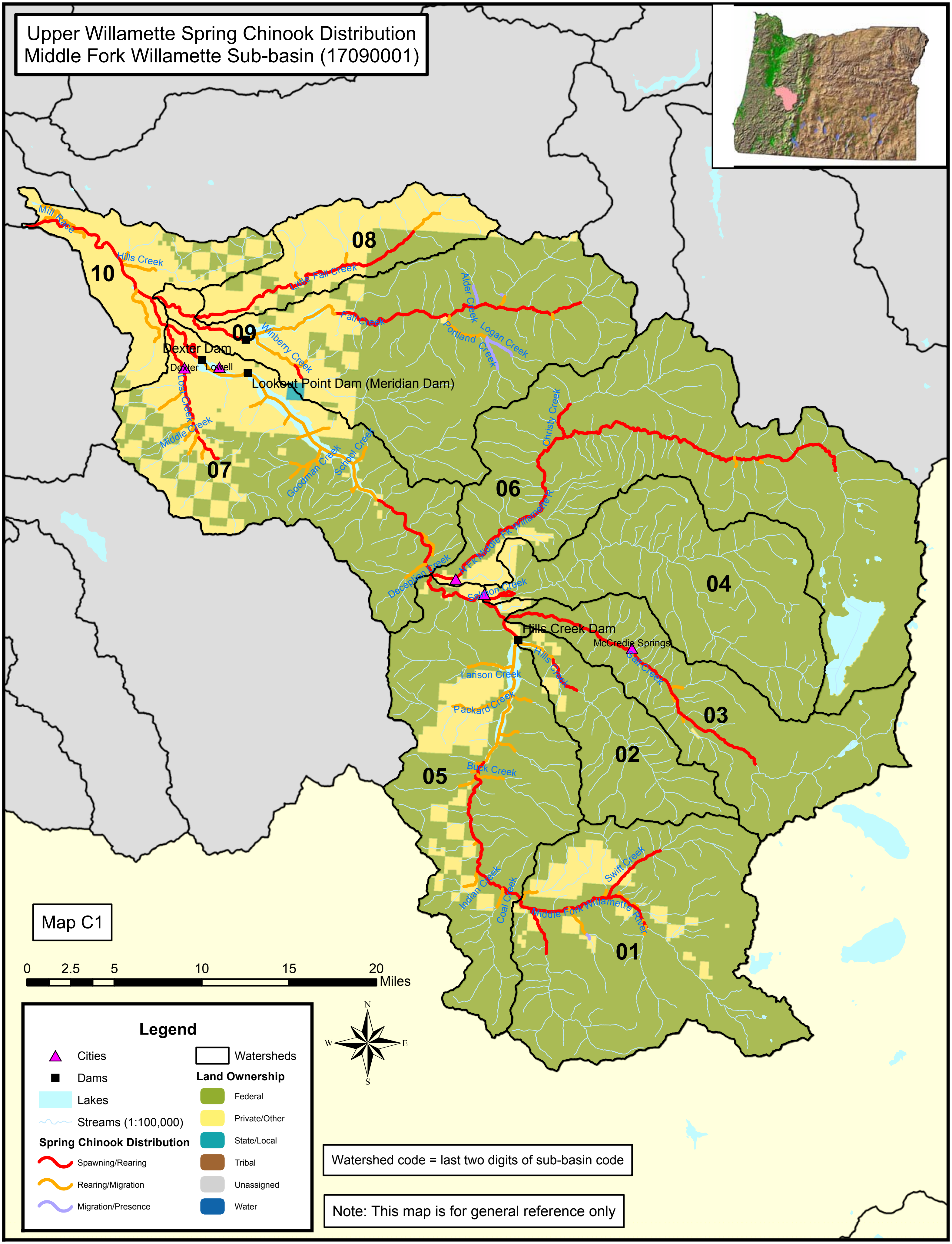
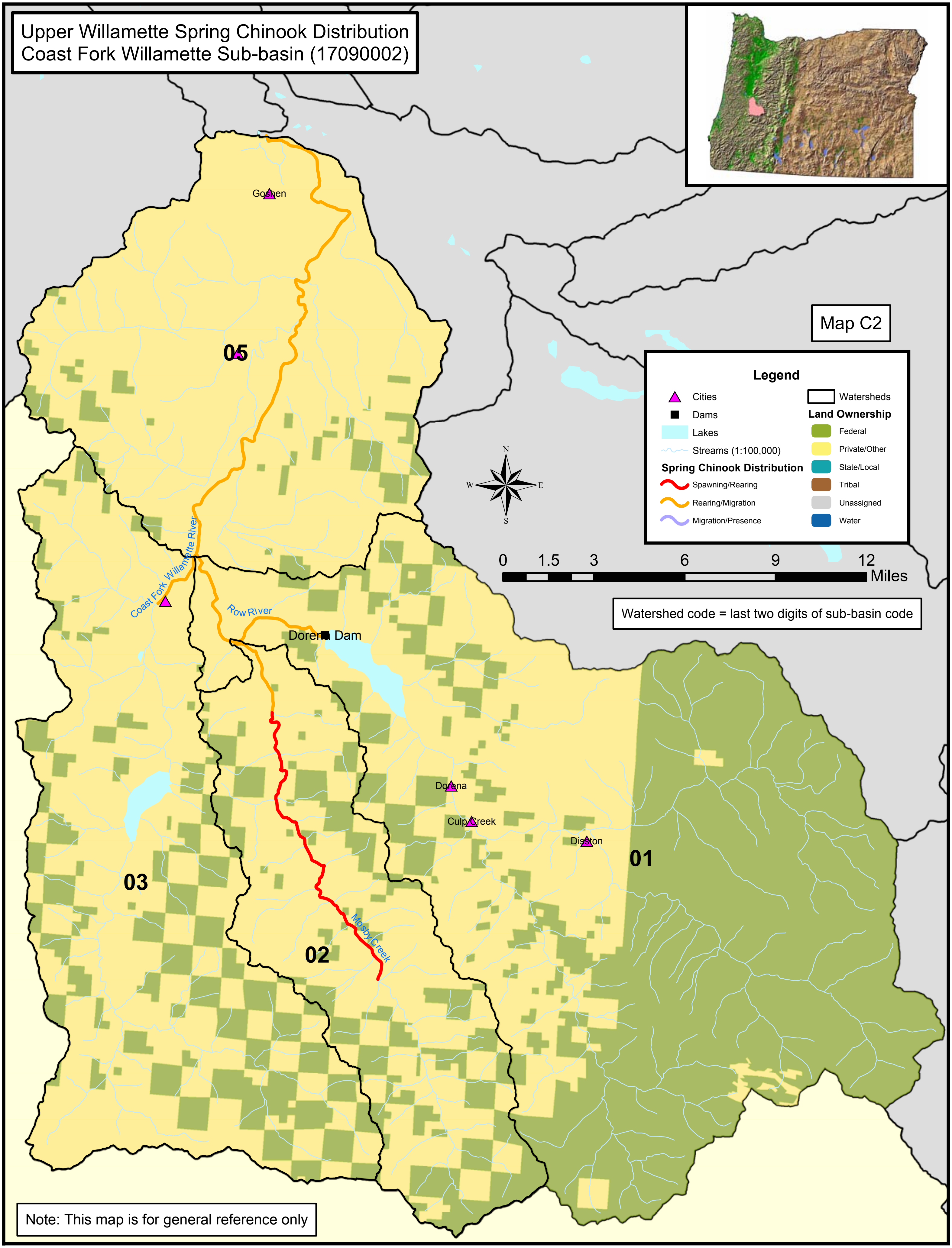
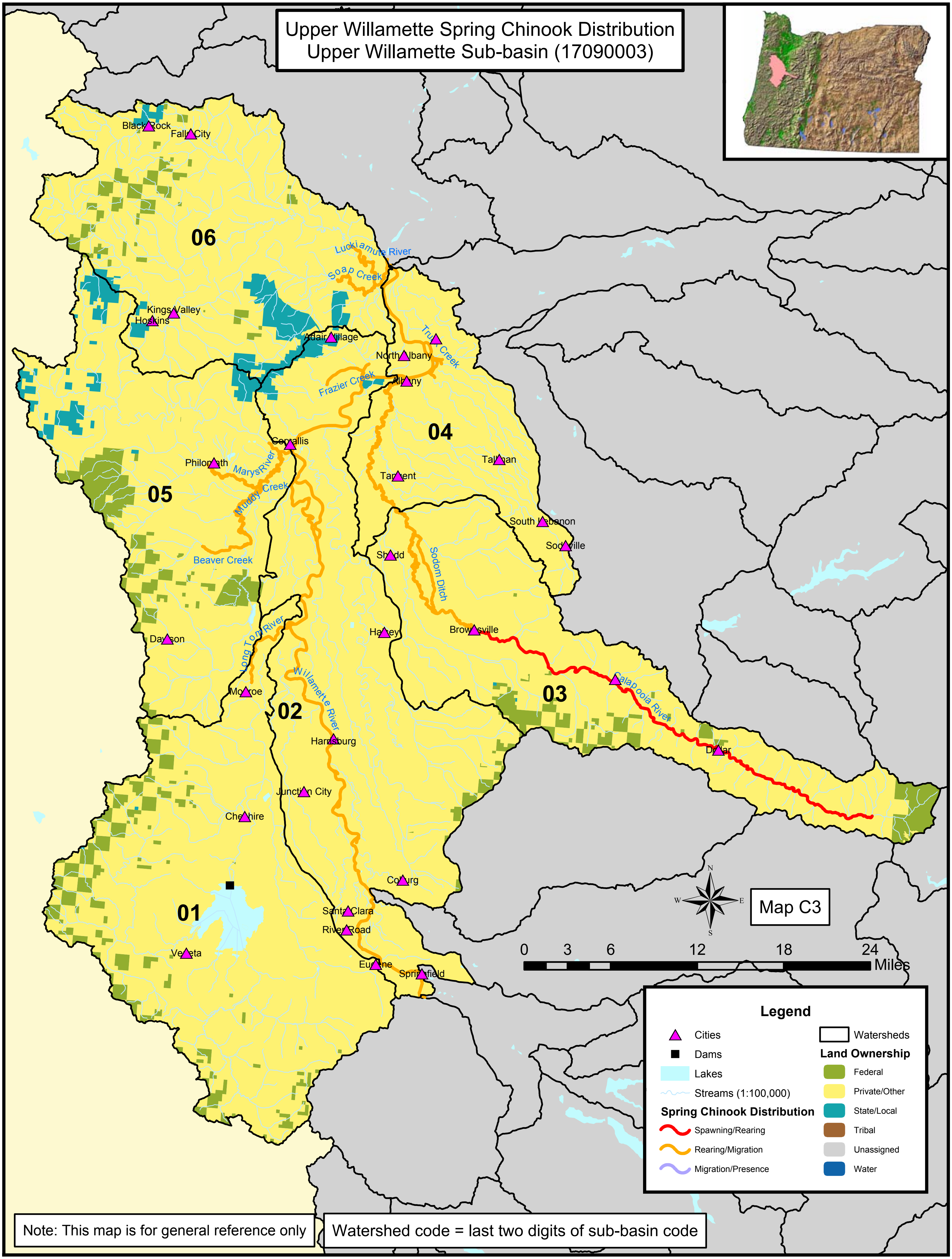
1709000403
1709000109
1709000205
1709000107
1709000106
1709000104
1709000201
1709000203
1709000202
1709000103
1709000102
1709000105
1709000101
Legend
Watersheds (HUC5)
CHART Ratings
High
Medium
Low
N
W
E
S
0
5
10
20
30
40
Miles

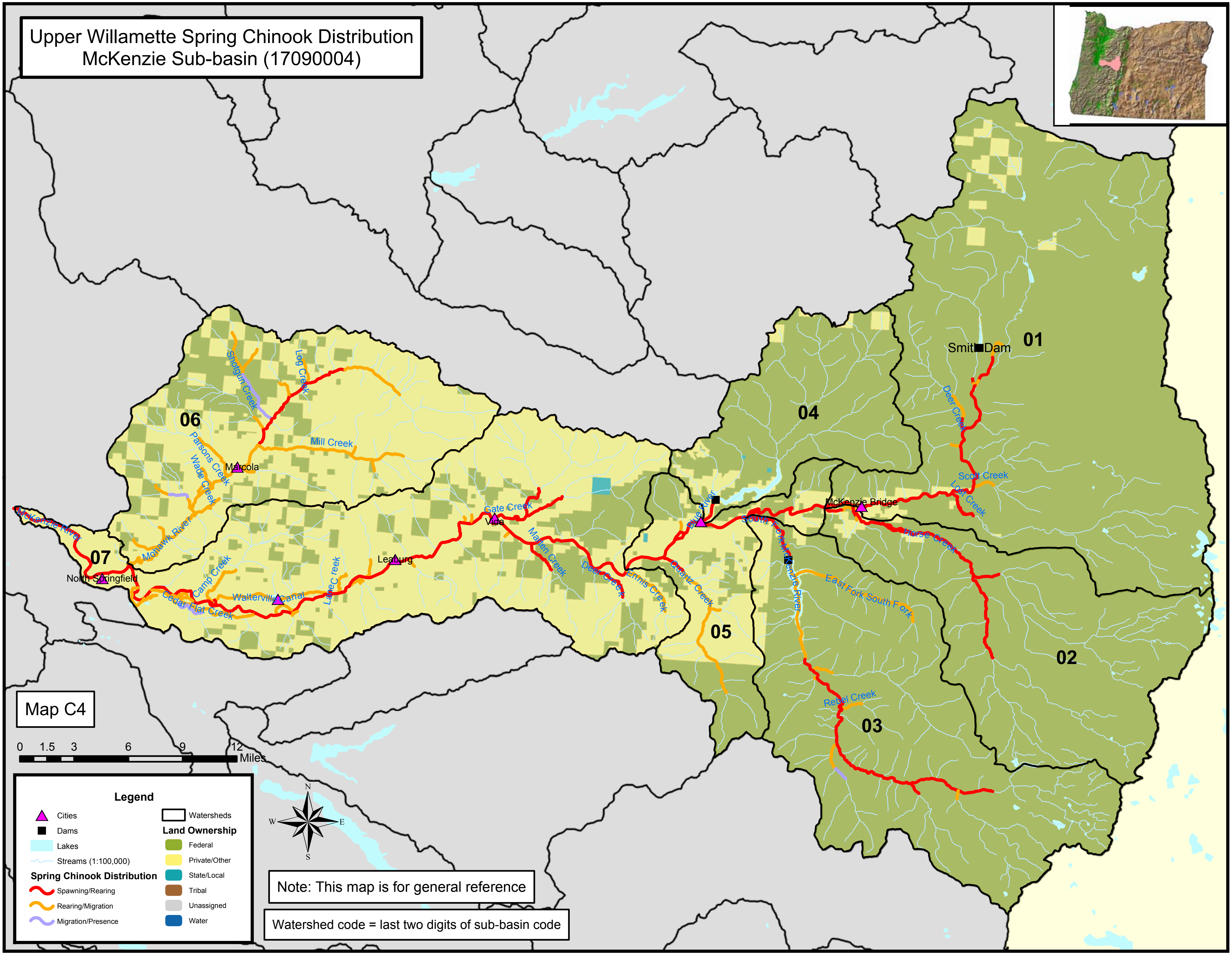


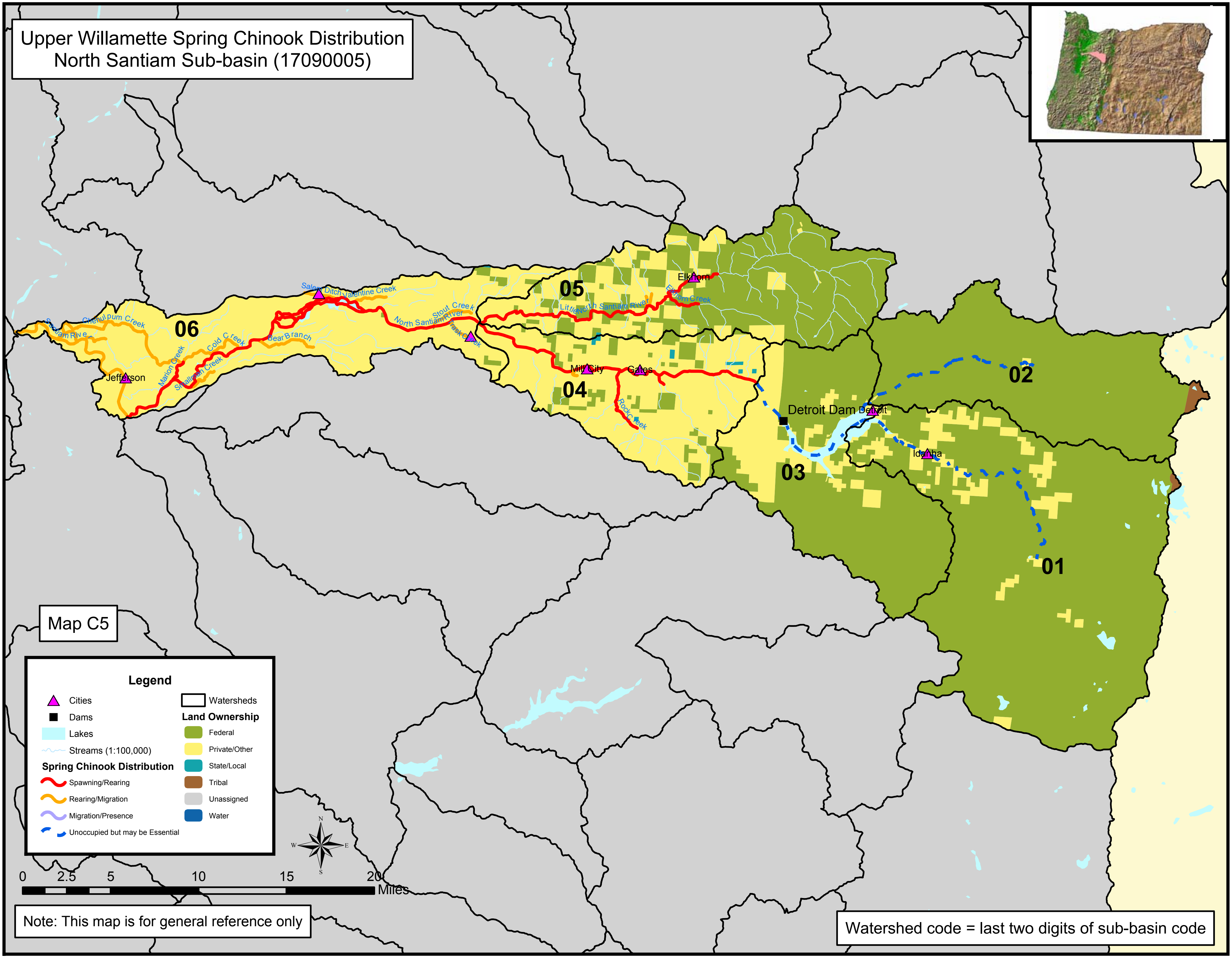
Upper Willamette Spring Chinook Distribution
Middle Fork Willamette Sub-basin (17090001)
Mill Race
Hills Creek
10
08
Little Fall Creek
Fall Creek
Alder Creek
Logan Creek
Portland Creek
09
Winberry Creek
Dexter Dam
Dexter
Lowell
Lookout Point Dam (Meridian Dam)
Lost Creek
Middle Creek
07
Goodman Creek
School Creek
Christy Creek
06
N FK Middle Fk Willamette R
Deception Creek
Salmon Creek
04
Hills Creek Dam
McCredie Springs
Hills Creek
Salt Creek
Larison Creek
Packard Creek
03
02
05
Buck Creek
Swift Creek
Indian Creek
Coal Creek
Middle Fork Willamette River
01
Map C1
0 2.5 5 10 15 20 Miles
N
W
E
S
Legend
Cities
Dams
Lakes
Streams (1:100,000)
Spring Chinook Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only


Upper Willamette Spring Chinook Distribution
Coast Fork Willamette Sub-basin (17090002)
Map C2
Legend
Cities
Dams
Lakes
Streams (1:100,000)
Spring Chinook Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
0 1.5 3 6 9 12
Miles
Watershed code = last two digits of sub-basin code
Goshen
05
03
02
01
Coast Fork Willamette River
Row River
Dorena Dam
Dorena
Culp Creek
Disston
Mosby Creek
Note: This map is for general reference only

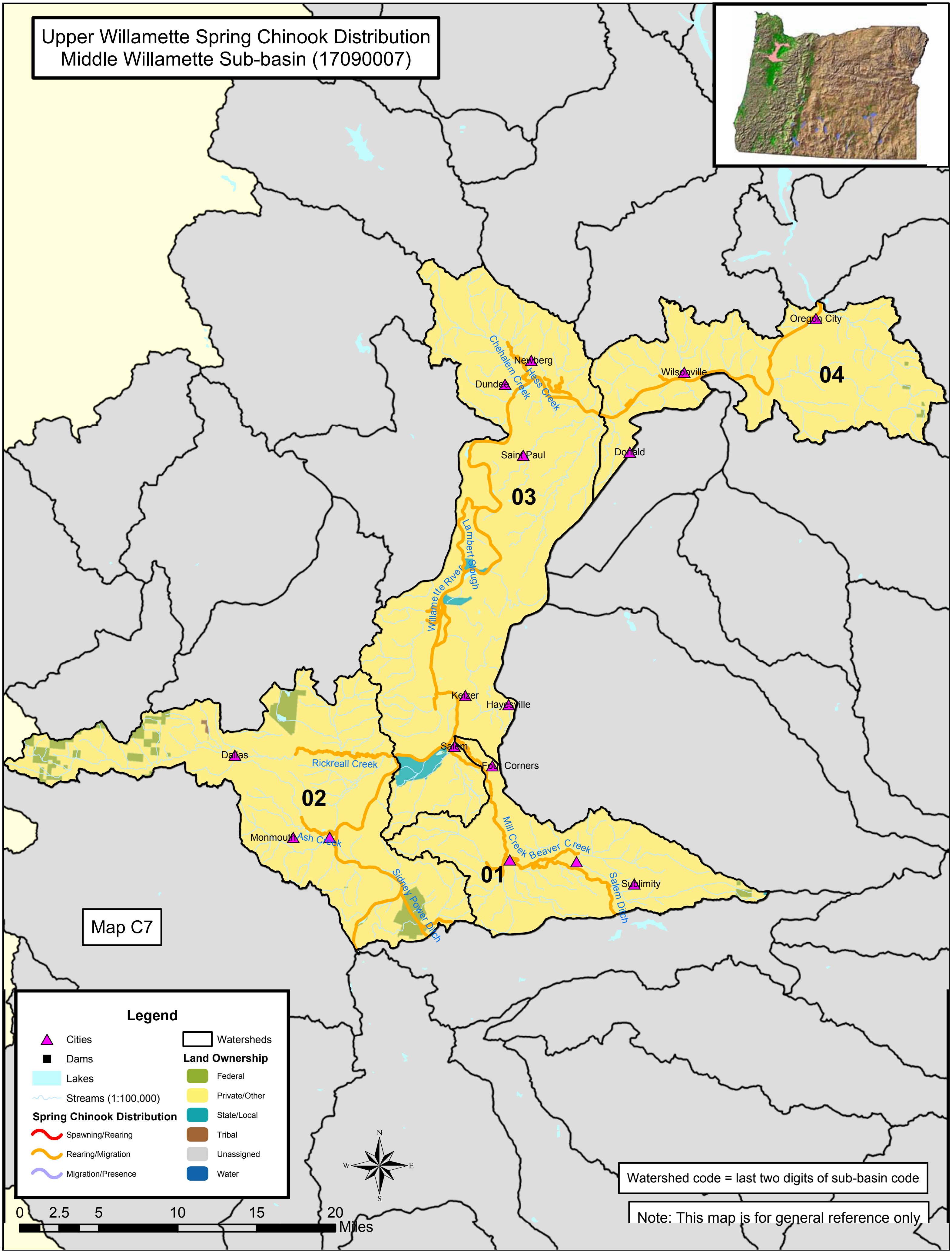


Upper Willamette Spring Chinook Distribution
Upper Willamette Sub-basin (17090003)
06
05
04
03
02
01
Black Rock
Falls City
Luckiamute River
Soap Creek
Kings Valley
Hoskins
Adair Village
North Albany
Truax Creek
Frazier Creek
Albany
Corvallis
Philomath
Marys River
Muddy Creek
Tallman
Tangent
South Lebanon
Sodaville
Shedd
Sodom Ditch
Beaver Creek
Long Tom River
Halsey
Brownsville
Dawson
Calapooia River
Monroe
Willamette River
Harrisburg
Holley
Junction City
Cheshire
Coburg
Santa Clara
River Road
Veneta
Eugene
Springfield
Map C3
0 3 6 12 18 24 Miles
Legend
Cities
Dams
Lakes
Streams (1:100,000)
Spring Chinook Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Note: This map is for general reference only
Watershed code = last two digits of sub-basin code

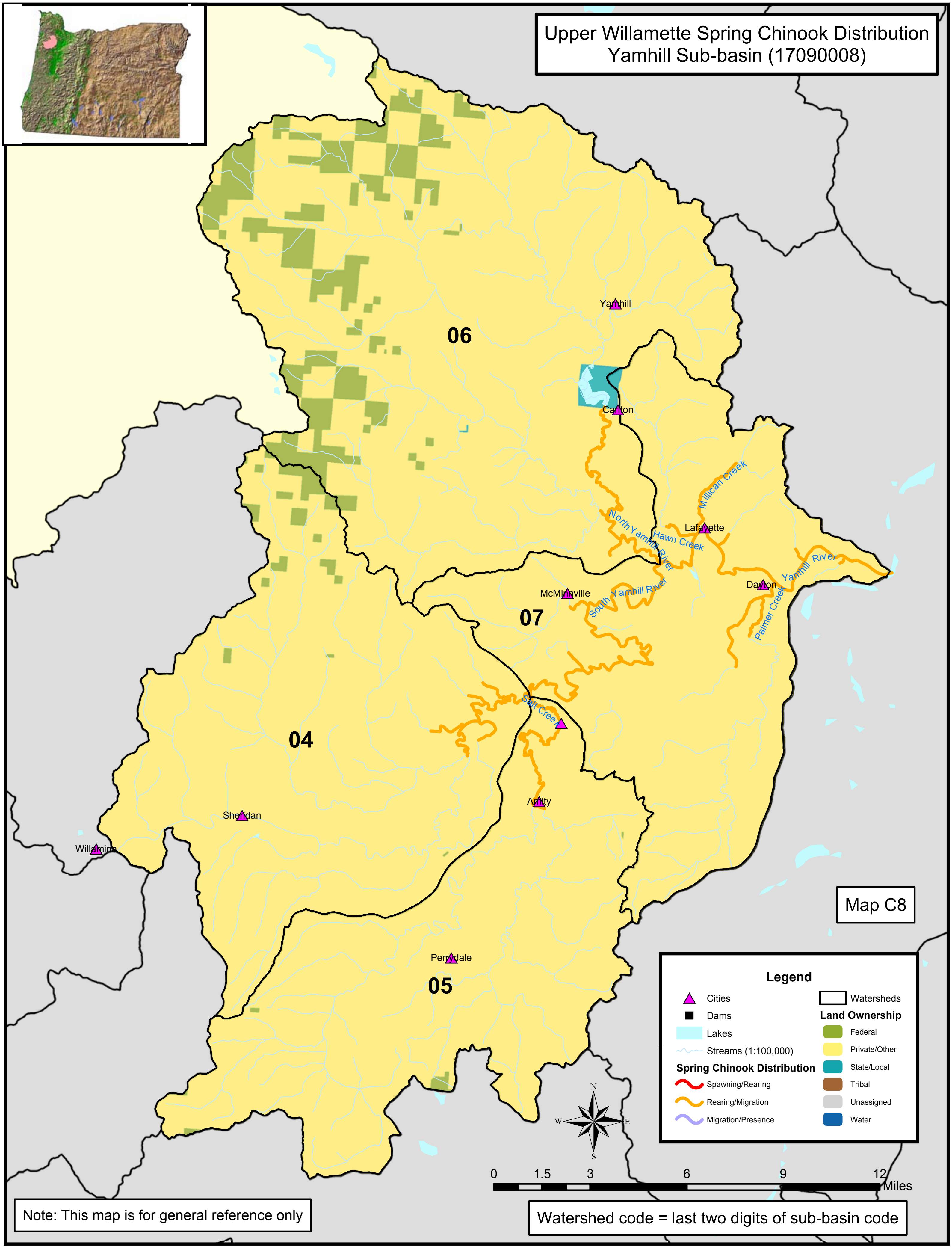

Upper Willamette Spring Chinook Distribution
McKenzie Sub-basin (17090004)
Map C4
01
02
03
04
05
06
07
Smith Dam
Deer Creek
Scott Creek
Lost Creek
McKenzie Bridge
Horse Creek
East Fork South Fork
Rebel Creek
South Fork McKenzie River
Blue River
Quartz Creek
Ennis Creek
Deer Creek
Marten Creek
Gate Creek
Vida
Leaburg
Lake Creek
Walterville Canal
Camp Creek
Cedar Flat Creek
North Springfield
McKenzie River
Mohawk River
Wade Creek
Parsons Creek
Marcola
Mill Creek
Shotgun Creek
Log Creek
0 1.5 3 6 9 12 Miles
N
S
E
W
Legend
Cities
Dams
Lakes
Streams (1:100,000)
Spring Chinook Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Note: This map is for general reference
Watershed code = last two digits of sub-basin code


Upper Willamette Spring Chinook Distribution
North Santiam Sub-basin (17090005)
Map C5
Legend
Cities
Dams
Lakes
Streams (1:100,000)
Spring Chinook Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Unoccupied but may be Essential
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
0
2.5
5
10
15
20
Miles
N
S
E
W
Note: This map is for general reference only
Watershed code = last two digits of sub-basin code
01
02
03
04
05
06
Detroit Dam
Detroit
Idanha
Gates
Mill City
Elkhorn
Jefferson
Chehulpum Creek
Santiam River
Marion Creek
Cold Creek
Bear Branch
Valentine Creek
Stout Creek
North Santiam River
Trask Creek
Little North Santiam River
Elkhorn Creek
Rock Creek

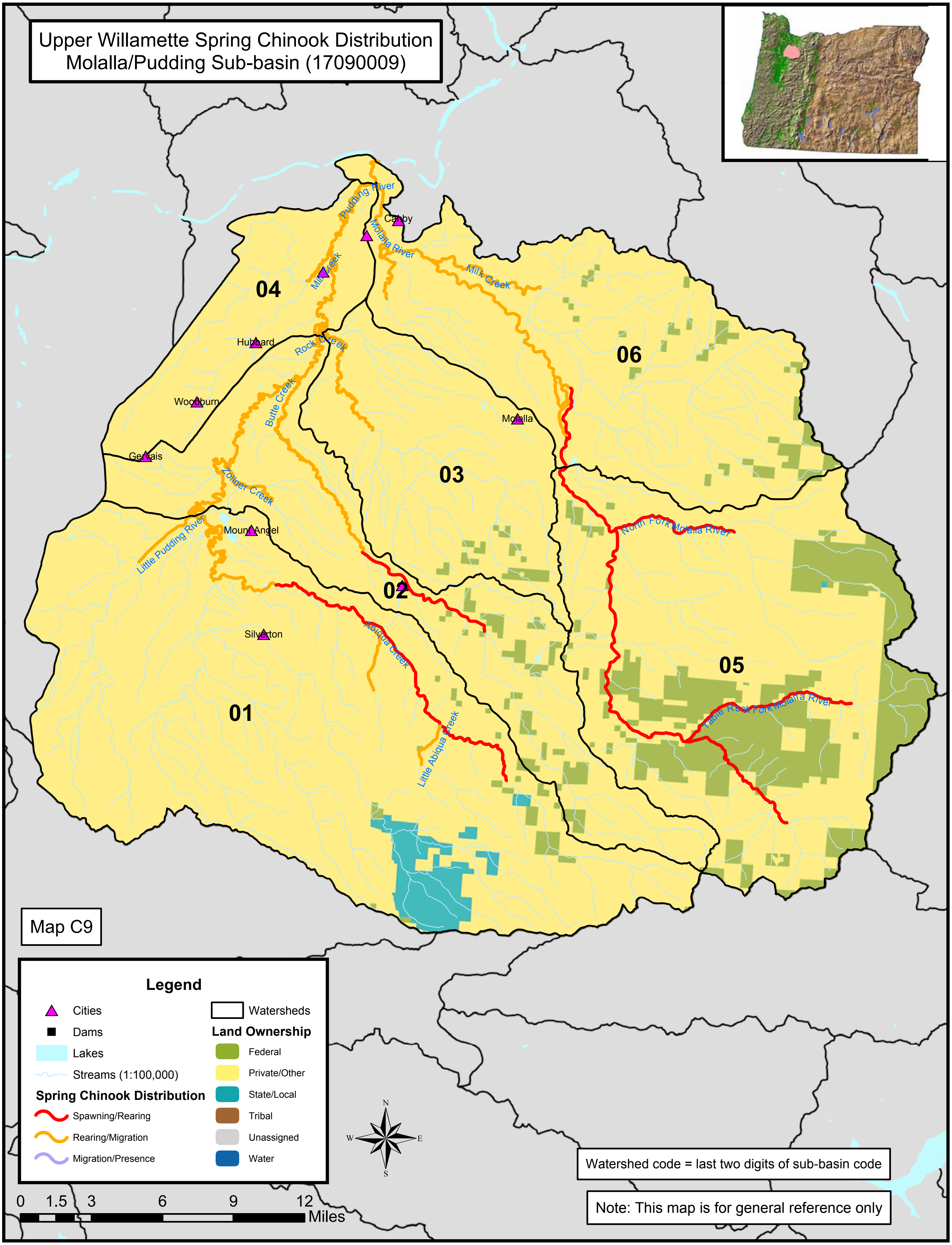

Upper Willamette Spring Chinook Distribution
South Santiam Sub-basin (17090006)
Jordan Creek
Thomas Creek
Scio
03
South Santiam River
Beaver Creek
Crabtree
Crabtree Creek
02
04
Albany - Santiam Canal
Lebanon
Hamilton Creek
Waterloo
01
05
McDowell Creek
Green Peter Dam
Middle Santiam River
Foster Dam
Sweet Home
07
Cascadia
Wiley Creek
06
08
Map C6
Legend
Cities
Dams
Lakes
Streams (1:100,000)
Spring Chinook Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Unoccupied but may be Essential
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only
0 2 4 8 12 16
Miles
N
S
E
W



Upper Willamette Spring Chinook Distribution
Middle Willamette Sub-basin (17090007)
Oregon City
Newberg
Wilsonville
04
Dundee
Chehalem Creek
Hess Creek
Saint Paul
Donald
03
Lambert Slough
Willamette River
Keizer
Hayesville
Salem
Four Corners
Dallas
Rickreall Creek
02
Monmouth
Ash Creek
Mill Creek
Beaver Creek
Sidney Power Ditch
01
Sublimity
Salem Ditch
Map C7
Legend
Cities
Dams
Lakes
Streams (1:100,000)
Spring Chinook Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
W
E
0
2.5
5
10
15
20
Miles
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only

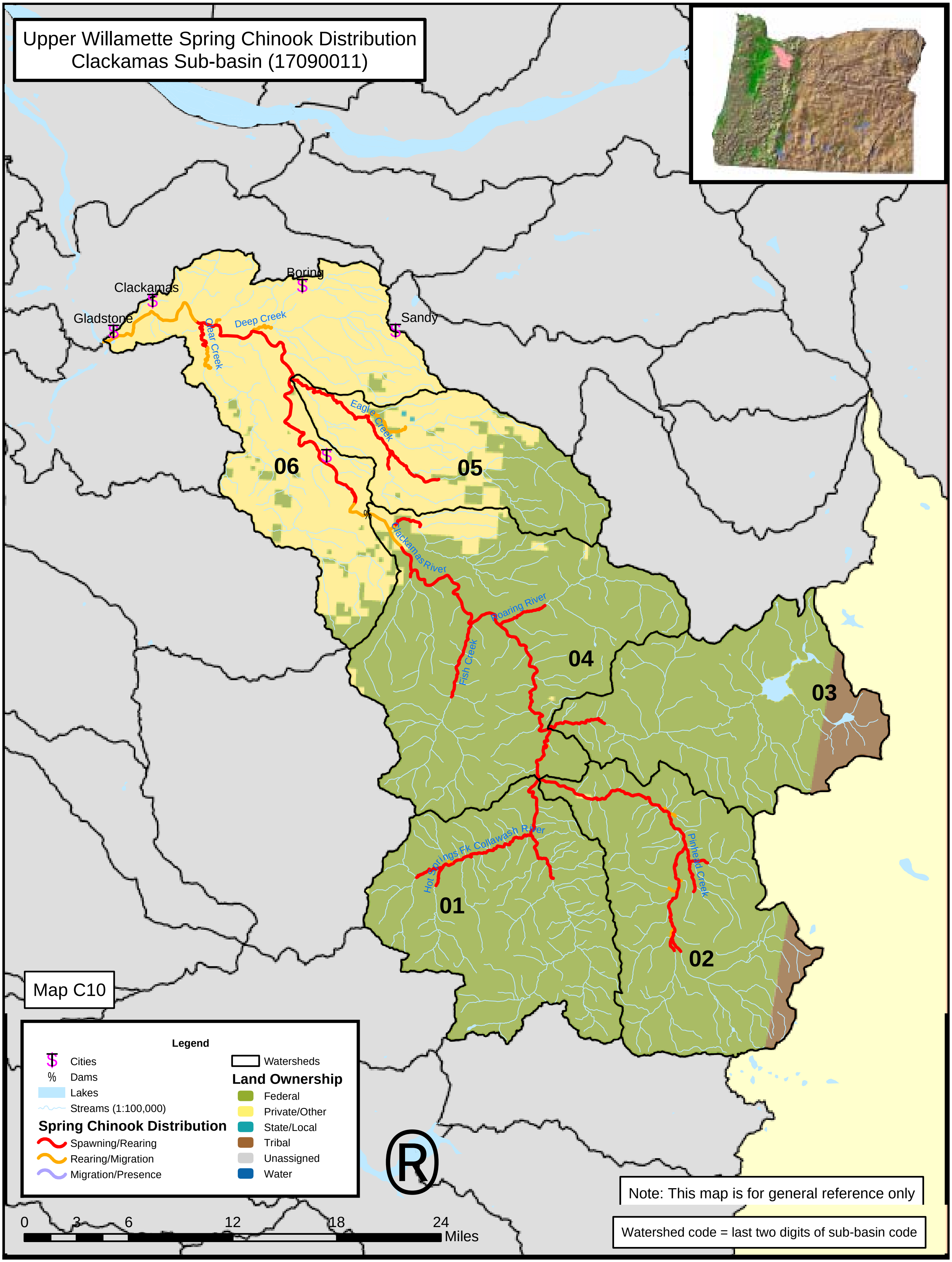


Upper Willamette Spring Chinook Distribution
Yamhill Sub-basin (17090008)
Map C8
06
07
04
05
Yamhill
Carlton
Lafayette
Dayton
McMinnville
Amity
Sheridan
Willamina
Perrydale
Millican Creek
North Yamhill River
Hawn Creek
South Yamhill River
Yamhill River
Palmer Creek
Salt Creek
Legend
Cities
Dams
Lakes
Streams (1:100,000)
Spring Chinook Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
0 1.5 3 6 9 12
Miles
Note: This map is for general reference only
Watershed code = last two digits of sub-basin code



Upper Willamette Spring Chinook Distribution
Molalla/Pudding Sub-basin (17090009)
Pudding River
Molalla River
Canby
Milk Creek
Milk Creek
04
06
03
02
05
01
Hubbard
Rock Creek
Butte Creek
Woodburn
Molalla
Gervais
Zollner Creek
Little Pudding River
Mount Angel
North Fork Molalla River
Silverton
Abiqua Creek
Little Abiqua Creek
Table Rock Fork Molalla River
Map C9
Legend
Cities
Dams
Lakes
Streams (1:100,000)
Spring Chinook Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
W
E
S
0 1.5 3 6 9 12
Miles
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only

Upper Willamette Spring Chinook Distribution
Clackamas Sub-basin (17090011)



Appendix D
CHART Assessment for the
Upper Columbia River Spring-run Chinook Salmon ESU

CHART Participants

The CHART for this ESU consisted of the following NOAA Fisheries biologists: Dale Bambrick (CHART Leader), Dennis Carlson, Kale Gullett, and Lynn Hatcher. CHART members also included Ken McDonald from the U.S. Forest Service and Jim Craig from the U.S. Fish and Wildlife Service. This CHART assessment also benefitted from review and comments by the Colville Indian Tribe and the Washington Department of Fish and Wildlife.

ESU Description

The Upper Columbia River spring-run Chinook ESU was listed as an endangered species in 1999 (64 FR 14308; March 24, 1999). The ESU includes all naturally spawned populations of Chinook salmon in all river reaches accessible to Chinook salmon in Columbia River tributaries upstream of the Rock Island Dam and downstream of Chief Joseph Dam in Washington, excluding the Okanogan River. The agency recently conducted a review to update the ESU's status, taking into account new information and considering the net contribution of artificial propagation efforts in the ESU. We recently published the results of this review and concluded that Upper Columbia River Chinook salmon (including six hatchery programs) should remain listed as endangered (70 FR 37160; June 28, 2005).

Spring-run Chinook salmon in this ESU have a stream-type life history, which means that juveniles enter marine waters during their second year and return to fresh water as pre-adults, maturing during their upriver spawning run. Three independent populations of spring-run Chinook salmon are identified for the ESU: those that spawn in the Wenatchee, Entiat, and Methow River Basins. Adults returning to the Wenatchee River enter fresh water from late March through early May, those returning to the Entiat and Methow Rivers enter fresh water from late March through June. Their arrival times tend to be earlier in low flow years and later in high flow years. On their way upriver, the fish hold in deeper pools or under cover until the onset of spawning. They may spawn in the areas where they hold, or move further up into smaller tributaries. Peak spawning for all three populations occurs from August to September, though the timing is highly dependent upon water temperature. The egg incubation/alevin stage goes from August into December and emergence extends from that point into March. The juveniles typically spend one year in freshwater before migrating downstream—primarily in May and June. Most adults return after spending two years in the ocean, although 20 to 40 percent return after three years at sea.

Recovery Planning Status

Three extant demographically independent populations of naturally spawning spring-run Chinook salmon are identified for this ESU: the Wenatchee, Entiat, and Methow River Basin population. The Interior Columbia Basin Technical Recovery Team (ICBTRT 2003 and 2005) placed these populations into a single major population grouping based on life-history type and ecological spawning zone. Recovery planning will likely emphasize the need for a viable geographical distribution of the three populations comprising this ESU (Ruckelshaus et al. 2002, McElhany et al. 2003). Subbasin assessments and plans have been completed for each subbasin through the Northwest Power and Conservation Council. Recovery planners are now using those subbasin plans and TRT products to develop ESA recovery plans. Draft recovery plans are expected by the end of 2005. The CHART considered the available subbasin plans and TRT products in rating each watershed. We anticipate that, as recovery planning proceeds, we will have better information and may revise our recommendations regarding critical habitat designation.

CHART Area Assessments

The CHART assessment for this ESU addressed four subbasins containing 15 occupied watersheds, as well as the Columbia River rearing/migration corridor. Recovery planning will likely emphasize the need for a geographical distribution of viable populations across the range of population groupings (also called “strata”) in an ESU (Ruckelshaus et al. 2002, McElhany et al. 2003). The Interior Columbia Basin Technical Recovery Team (ICBTRT 2003,2005) did not identify separate major groupings/strata for this ESU due to the relatively small size of the area. Therefore, as part of its assessment the CHART considered the conservation value of each HUC5 in the context of a single population group. Information is presented below by USGS subbasin because they present a convenient and systematic way to organize the CHART’s watershed assessments for this ESU and their names are generally more recognizable because they typically identify major river systems.

Chief Joseph Subbasin (HUC4# 17020005)

The Chief Joseph subbasin is located in north-central Washington and contained in Chelan, Douglas and Okanogon counties, Washington. The subbasin contains five watersheds, three of which are occupied by the ESU. These watersheds encompass approximately 817 mi^2 and 1,476 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 42 miles of occupied riverine habitat in the watershed (WDFW 2003). "However, the CHART determined that approximately 11 miles of occupied reaches in two watersheds (Jordan/Tumwater and Foster Creek) did not contain PCEs for this ESU because these reaches are located upstream of the uppermost population in the ESU (Methow River) and in areas that were likely to be of very minimal conservation value to the ESU." The Interior Columbia Basin TRT (2003, 2005) identified one demographically independent population (Methow River) occupying this subbasin. Table D1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map D1 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that one of the occupied watersheds (Upper Columbia/Swamp) warranted a high overall rating because it contained a high value migration corridor for the Methow River population connecting upstream watersheds with downstream reaches and the ocean. The other two occupied watersheds were not believed to contain PCEs for this ESU. Table D2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure D1 shows the overall distribution of ratings by HUC5 watershed.

Methow Subbasin (HUC4# 17020008)

The Methow subbasin is located in north-central Washington adjacent to the U.S.-Canada border and contained entirely in Okanogon County, Washington. The subbasin contains seven watersheds, all of which are occupied by the ESU. This watershed encompasses approximately 1,823 mi^2 and 6,726 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 202 miles of occupied riverine habitat in the watershed (WDFW 2003). The Interior Columbia Basin TRT (2003, 2005) identified one demographically independent population (Methow River) occupying this subbasin. Table D1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map D2 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watersheds in this subbasin were of either high or medium conservation value to the ESU. Of the seven HUC5s reviewed, five were rated as having high and two were rated as having medium conservation value. The CHART also concluded that the HUC5s with medium overall ratings (Middle Methow River and Lower Methow River) contain a high value rearing and migration corridor connecting high value upstream watersheds with downstream reaches and the ocean. Table D2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure D1 shows the overall distribution of ratings by HUC5 watershed.

Upper Columbia/Entiat Subbasin (HUC4# 17020010)

The Upper Columbia/Entiat subbasin drains the eastern Cascade Range in central Washington. Occupied watersheds in this subbasin are contained in Chelan, Douglas, Grant and Kittitas counties in Washington. The subbasin contains four watersheds, all of which are occupied by the ESU (but two of these consist of a rearing/migration corridor downstream of Rock Island Dam - see Unit 5 below). The two watersheds in this subbasin with tributary habitat (i.e., tributaries to the Columbia River mainstem) encompass approximately 907 mi^2 and 3,124 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 150 miles of occupied riverine habitat in the subbasin (WDFW 2003). The Interior Columbia Basin TRT (2003, 2005) identified three demographically independent populations (Methow River, Entiat River, and Wenatchee River) occupying this subbasin. Table D1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map D3 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watersheds in this subbasin were of high (Entiat River as well as the rearing/migration corridor downstream of Rock Island Dam) and medium (Lake Entiat) conservation value to the ESU. The CHART also concluded that while the tributary habitats in the Lake Entiat HUC5 were of medium conservation value, the HUC5 still contains a high value rearing and migration corridor connecting high value upstream watersheds with downstream reaches and the ocean (see Unit 5 below). Table D2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure D1 shows the overall distribution of ratings by HUC5 watershed.

Wenatchee Subbasin (HUC4# 17020011)

The Wenatchee subbasin drains the eastern Cascade Range in central Washington and is contained in Chelan County, Washington. The subbasin contains five watersheds, all of which are occupied by the ESU. The subbasin encompasses approximately 1,328 mi^2 and

3,979 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 182 miles of occupied riverine habitat in the subbasin (WDFW 2003). The Interior Columbia Basin TRT (2003, 2005) identified one demographically independent population (Wenatchee River) occupying this subbasin. Table D1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map D4 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watersheds in this subbasin were of high and medium conservation value to the ESU. Of the five HUC5s reviewed, three were rated as having high and two were rated as having medium conservation value. Table D2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure D1 shows the overall distribution of ratings by HUC5 watershed.

Columbia River Corridor

The Columbia River rearing and migration corridor consists of that segment from Rock Island Dam downstream to the Pacific Ocean. Rock Island Dam is located near the downstream border of the Entiat River, HUC5 which was the furthest downstream HUC5 with spawning or tributary PCEs identified in the range of this ESU. Fish distribution and habitat use data from WDFW identify approximately 448 miles of occupied riverine and estuarine habitat in this corridor (WDFW 2003). This corridor overlaps with the following counties: Clatsop, Columbia, Gilliam, Hood River, Morrow, Multnomah, Sherman, Umatilla, and Wasco counties in Oregon, and Benton, Chelan, Clark, Cowlitz, Douglas, Franklin, Grant, Kittitas, Klickitat, Skamania, Wahkiakum, Walla Walla, and Yakima counties in Washington.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the Columbia River corridor was of high conservation value to the ESU. The CHART noted that this corridor connects every watershed and population in this ESU with the ocean and is used by rearing/migrating juveniles and migrating adults. The Columbia River estuary is a particularly important area for this ESU as both juveniles and adults make the critical physiological transition between life in freshwater and marine habitats (ISAB 2000, Marriott et al. 2002).

Marine Areas

NOAA Fisheries' analysis focused on freshwater and estuarine habitats upstream of the mouth of the Columbia River. While marine areas are occupied by this ESU, within this vast area the agency has not identified "specific areas within the geographical area occupied by the species . . . on which are found those physical or biological features . . . essential to the conservation of the species."

Changes to the CHART's Initial Assessments

The CHART reviewed the public and peer reviewer comments received on the Team's initial findings for this ESU as well as new information relevant to evaluating habitat areas for this ESU. As a result, the CHART changed the conservation value rating for one watershed (Upper Columbia/ Swamp Creek HUC5) within the geographical area occupied by this ESU to reflect the fact that there are no tributary habitats here but there is a high value connectivity corridor. There were no changes to the delineation of occupied habitat areas for this ESU. The proposed critical habitat designation (69 FR 74572, December 14, 2004) summarizes the comments and responses pertaining to the CHART's initial determinations for this ESU, and Tables D1 and D2 reflect the final CHART assessments.

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Table D1. Summary of Occupied Areas, PCEs, and Management Activities Affecting PCEs for the Upper Columbia River Spring-Run Chinook Salmon ESU

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs)			Occupied but lacking PCEs (mi)	Management Activities**
				Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*		
	Chief Joseph	Foster Creek	1702000503	0	0	0	0.9	A, D, Fi
	Chief Joseph	Jordan/Tumwater	1702000504	0	0	0	4.2	A, D, F, Fi, G, R
	Chief Joseph	Upper Columbia/ Swamp Creek	1702000505	0	<0.1	31.3	5.6	A, D, F, Fi, G, R
	Methow	Lost River	1702000801	4.1	0.4	3.3	0	F, Fi
	Methow	Upper Methow River	1702000802	16.9	0	4.5	0	F, Fi, G, I
	Methow	Upper Chewuch River	1702000803	19.4	0.5	0	0	F, Fi, R
	Methow	Lower Chewuch River	1702000804	25	3.9	<0.1	0	A, D, F, Fi, G, R, I
	Methow	Twisp River	1702000805	30.2	3.1	0	0	F, Fi, G, R, I
	Methow	Middle Methow River	1702000806	27.8	24.3	<0.1	0	A, D, F, Fi, G, M, R, I
	Methow	Lower Methow River	1702000807	5.2	29.4	4	0	D, F, Fi, G, M, R
	Upper Columbia/ Entiat	Entiat River	1702001001	17.4	18.4	10.8	0	F, Fi, G, R, I
	Upper Columbia/ Entiat	Lake Entiat	1702001002	0	1.1	53.8	0	A, D, F, Fi, G, M, R, U
	Upper Columbia/Entiat	Columbia River/Lynch Coulee	1702001003	0	0	29.2	0	A, D, F, Fi, G, M, R
	Upper Columbia/Entiat	Columbia River/Sand Hollow	1702001004	0	0	19.4	0	A, D, Fi, G, M
	Wenatchee	White River	1702001101	24	2.7	7.7	0	F, Fi
	Wenatchee	Chiwawa River	1702001102	37.9	11.4	1.7	0	F, Fi, R
	Wenatchee	Nason/Tumwater	1702001103	35.1	14.9	0	0	D,F, Fi, R
	Wenatchee	Icicle/Chumstick	1702001104	2.9	9	<0.1	0	A, D, F, Fi, G, M, R, U
	Wenatchee	Lower Wenatchee River	1702001105	4.2	28.8	1.2	0	A, D, F, Fi, G, I, M, R, U
	Moses Coulee	Rattlesnake Creek	1702001204	0	0	0.8	0	A, D, Fi, G, R
	Upper Columbia/Priest Rapids	Yakima River/Hanson Creek	1702001604	0	0	34.6	0	A, D, F, Fi, G, M

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs)			Occupied but lacking PCEs (mi)	Management Activities**
				Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*		
	Upper Columbia/Priest Rapids	Middle Columbia/Priest Rapids	1702001605	0	0	33.3	0	A, Fi, G
	Upper Columbia/Priest Rapids	Columbia River/Zintel Canyon	1702001606	0	0	48	0	A, D, Fi, R, U
	Middle Columbia/Lake Wallula	Upper Lake Wallula	1707010101	0	0	11.8	0	C, D, I, R, T, U, W
	Middle Columbia/Lake Wallula	Lower Lake Wallula	1707010102	0	0	21.7	0	A, D, Fi, R
	Middle Columbia/Lake Wallula	Upper Lake Umatilla	1707010106	0	0	20.2	0	A, D, Fi, R, U
	Middle Columbia/Lake Wallula	Middle Lake Umatilla	1707010109	0	0	17.3	0	A, D, Fi, R
	Middle Columbia/Lake Wallula	Lower Lake Umatilla	1707010114	0	0	42.3	0	A, D, Fi, R
	Middle Columbia/Hood	Upper Middle Columbia/Hood	1707010501	0	0	14.7	0	A, D, Fi, G, S, R, T
	Middle Columbia/Hood	Middle Columbia/Mill Creek	1707010504	0	0	24.6	0	A, D, F, Fi, G, R, T, I, U
	Middle Columbia/Hood	Middle Columbia/Grays Creek	1707010512	0	0	25.6	0	F, Fi, R, T
	Middle Columbia/Hood	Middle Columbia/Eagle Creek	1707010513	0	0	9.3	0	D, R, U
	Lower Columbia/Sandy	Columbia Gorge Tributaries	1708000107	0	0	25.8	0	C, D, F, R, U, W
	Multiple	Lower Columbia Corridor (Sandy/ Washougal to Ocean)	NA	0	0	117.4[v]	0	C, D, I, R, T, U, W

* Some streams classified as “Migration/Presence PCEs” may also include rearing or spawning PCEs, but the GIS data are still undergoing review to confirm additional habitat use types.
** This list is not exhaustive. It is intended to highlight key management activities affecting PCEs in each watershed. Activities identified are based on the general categories described by Spence et al. (1996) and summarized previously in the “Special Management Considerations or Protection” section of this report. Coding is as follows: F= forestry, Fi = fire activity and disturbance, G = grazing, A = agriculture, C = channel modifications/diking, R = road building/maintenance, U = urbanization, S = sand and gravel mining, M = mineral mining, D = dams, I = irrigation

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[v] The Lower Columbia River from the ocean upstream approximately 46.5 miles is considered to contain estuarine PCEs, in addition to migration and rearing (ISAB 2000).

Table D2. Summary of Initial CHART Scores and Ratings of Conservation Value for Habitat Areas in HUC5 Watersheds Occupied by the Upper Columbia River Spring-Run Chinook Salmon ESU

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Chief Joseph	Foster Creek	1702000503	1	1	1	1	0	1	5	Moderate HUC5 score; CHART questioned PCE presence here since these habitats are upstream of Methow River and habitat is likely to be of minimal conservation value	No PCEs
	Chief Joseph	Jordan/Tumwater	1702000504	1	1	1	1	0	1	5	Moderate HUC5 score; CHART questioned PCE presence here since these habitats are upstream of Methow River and habitat is likely to be of minimal conservation value	No PCEs
	Chief Joseph	Upper Columbia/Swamp Creek	1702000505	1	2	1	1	2	1	8	Moderate HUC5 score; CHART concluded that there were very few low conservation value HUC5s since ESU as a whole has only 3 TRT demographically independent populations and limited spawning/rearing PCEs; PCEs support one TRT demographically independent population; the medium HUC5 rating pertains to reaches upstream of the Methow/Columbia confluence – reaches downstream of this confluence are a high value rearing/migration corridor. CHART noted that this HUC5 does not have tributary habitats and thus warranted elevating to a High conservation value due to it's importance as a connectivity corridor.	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Methow	Lost River	1702000801	2	3	3	1	2	2	13	Moderate-high HUC5 score; CHART concluded that there were very few low conservation value HUC5s since ESU as a whole has only 3 TRT demographically independent populations and limited spawning/rearing PCEs; PCEs in this HUC5 support one population and overlap with FEMAT key watershed for at-risk anadromous salmonids; CHART determined that spawning/rearing PCEs in this and other uppermost watersheds were of high conservation value to the ESU	High
	Methow	Upper Methow River	1702000802	2	3	3	1	1	2	12	Moderate-high HUC5 score; CHART concluded that there were very few low conservation value HUC5s since ESU as a whole has only 3 TRT demographically independent populations and limited spawning/rearing PCEs; PCEs in this HUC5 support one population and overlap with FEMAT key watershed for at-risk anadromous salmonids; CHART determined that spawning/rearing PCEs in this and other uppermost watersheds were of high conservation value to the ESU; this HUC5 also contains a high value connectivity corridor for upstream HUC5	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Methow	Upper Chewuch River	1702000803	3	3	2	1	2	2	13	Moderate-high HUC5 score; CHART concluded that there were very few low conservation value HUC5s since ESU as a whole has only 3 TRT demographically independent populations and limited spawning/rearing PCEs; PCEs in this HUC5 support one population and overlap with FEMAT key watershed for at-risk anadromous salmonids; CHART determined that spawning/rearing PCEs in this and other uppermost watersheds were of high conservation value to the ESU	High
	Methow	Lower Chewuch River	1702000804	3	2	2	1	2	2	12	Moderate-high HUC5 score; CHART concluded that there were very few low conservation value HUC5s since ESU as a whole has only 3 TRT demographically independent populations and limited spawning/rearing PCEs; PCEs in this HUC5 support one population and overlap with FEMAT key watershed for at-risk anadromous salmonids; CHART determined that spawning/rearing PCEs in this and other uppermost watersheds were of high conservation value to the ESU; this HUC5 also contains a high value connectivity corridor for upstream HUC5	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Methow	Twisp River	1702000805	3	3	2	3	2	2	15	Moderate-high HUC5 score; CHART concluded that there were very few low conservation value HUC5s since ESU as a whole has only 3 TRT demographically independent populations and limited spawning/rearing PCEs; PCEs in this HUC5 support one population and overlap with FEMAT key watershed for at-risk anadromous salmonids; CHART determined that spawning/rearing PCEs in this and other uppermost watersheds were of high conservation value to the ESU	High
	Methow	Middle Methow River	1702000806	2	2	2	1	2	2	11	Moderate-high HUC5 score; CHART concluded that there were very few low conservation value HUC5s since ESU as a whole has only 3 TRT demographically independent populations and limited spawning/rearing PCEs; PCEs support one TRT demographically independent population and some reaches contain PCEs overlapping with FEMAT key watersheds for at-risk anadromous salmonids; this HUC5 also contains a high value connectivity corridor for upstream HUC5s	Medium

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors) 1	2	3	4	5	6	Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
	Methow	Lower Methow River	1702000807	2	2	2	1	2	2	11	Moderate-high HUC5 score; CHART concluded that there were very few low conservation value HUC5s since ESU as a whole has only 3 TRT demographically independent populations and limited spawning/rearing PCEs; PCEs support one TRT demographically independent population; this HUC5 has fewer spawning areas but contains a high value connectivity corridor for upstream HUC5s	Medium
	Upper Columbia/Entiat	Entiat River	1702001001	2	2	2	2	2	3	13	Moderate-high HUC5 score; CHART concluded that there were very few low conservation value HUC5s since ESU as a whole has only 3 TRT demographically independent populations and limited spawning/rearing PCEs; PCEs support entire spawning range of one TRT demographically independent population	High
	Upper Columbia/Entiat	Lake Entiat	1702001002	1	2	1	1	2	3	10	Moderate HUC5 score; CHART concluded that there were very few low conservation value HUC5s since ESU as a whole has only 3 TRT demographically independent populations and limited spawning/rearing PCEs; PCEs support all 3 TRT demographically independent populations; the medium rating pertains to the tributary reaches in this HUC5; the Columbia River mainstem reaches in this HUC5 downstream to Rock Island Dam are a high value rearing/migration corridor	Medium

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Wenatchee	White River	1702001101	3	3	3	2	1	2	14	High HUC5 score; CHART concluded that there were very few low conservation value HUC5s since ESU as a whole has only 3 TRT demographically independent populations and limited spawning/rearing PCEs; PCEs in this HUC5 support one population and overlap with FEMAT key watershed for at-risk anadromous salmonids; CHART determined that spawning/rearing PCEs in this and other uppermost watersheds were of high conservation value to the ESU	High
	Wenatchee	Chiwawa River	1702001102	3	3	3	2	2	2	15	Highest HUC5 score for entire ESU; CHART concluded that there were very few low conservation value HUC5s since ESU as a whole has only 3 TRT demographically independent populations and limited spawning/rearing PCEs; PCEs in this HUC5 support one population and overlap with FEMAT key watershed for at-risk anadromous salmonids; CHART determined that spawning/rearing PCEs in this and other uppermost watersheds were of high conservation value to the ESU	High

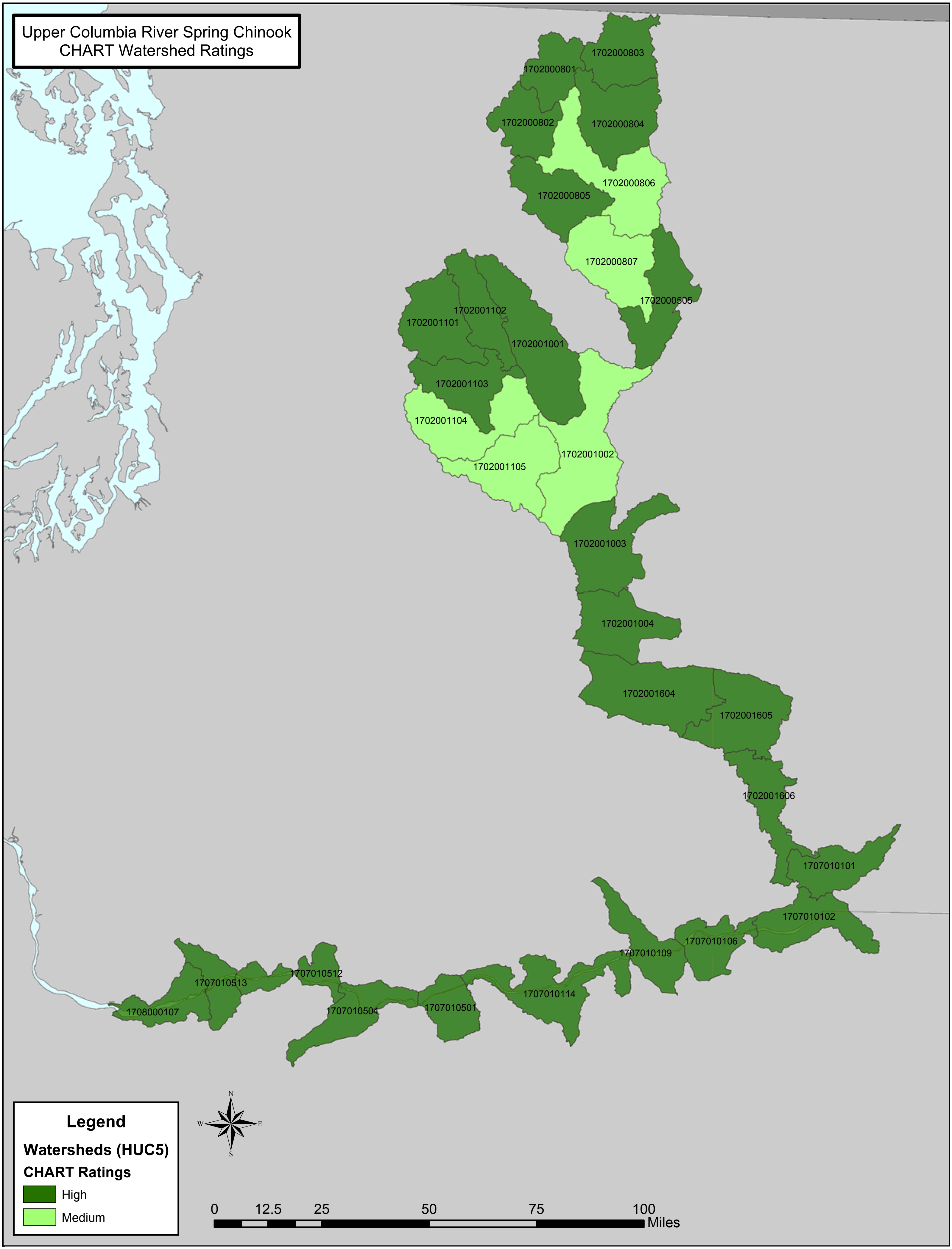
Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Wenatchee	Nason/Tumwater	1702001103	3	2	2	1	2	2	12	Moderate-high HUC5 score; CHART concluded that there were very few low conservation value HUC5s since ESU as a whole has only 3 TRT demographically independent populations and limited spawning/rearing PCEs; PCEs in this HUC5 support one population; CHART determined that spawning/rearing PCEs in this and other uppermost watersheds were of high conservation value to the ESU	High
	Wenatchee	Icicle/Chumstick	1702001104	2	1	2	1	2	2	10	Moderate HUC5 score; CHART concluded that there were very few low conservation value HUC5s since ESU as a whole has only 3 TRT demographically independent populations and limited spawning/rearing PCEs; PCEs support one TRT demographically independent population; this HUC5 has few spawning areas but contains a high value connectivity corridor for upstream HUC5s	Medium
	Wenatchee	Lower Wenatchee River	1702001105	2	2	2	1	2	2	11	Moderate HUC5 score; CHART concluded that there were very few low conservation value HUC5s since ESU as a whole has only 3 TRT demographically independent populations and limited spawning/rearing PCEs; PCEs support one TRT demographically independent population; this HUC5 has few spawning areas but contains a high value connectivity corridor for upstream HUC5s	Medium

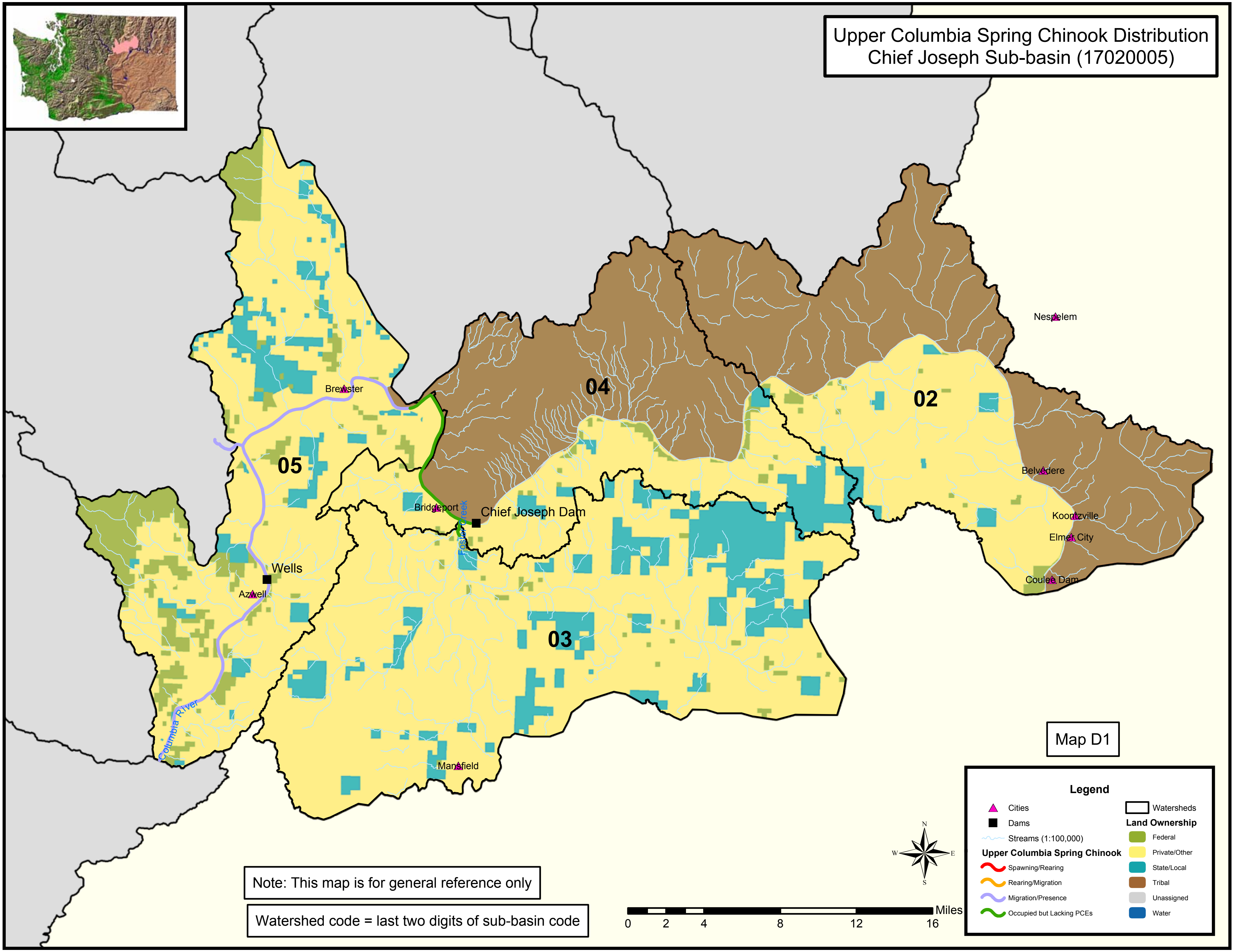
Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Upper Columbia/Entiat	Columbia River/Lynch Coulee	1702001003							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Upper Columbia/Entiat	Columbia River/Sand Hollow	1702001004							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Moses Coulee	Rattlesnake Creek	1702001204							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Upper Columbia/Priest Rapids	Yakima River/Hanson Creek	1702001604							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Upper Columbia/Priest Rapids	Middle Columbia/Priest Rapids	1702001605							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Upper Columbia/Priest Rapids	Columbia River/Zintel Canyon	1702001606							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Middle Columbia/Lake Wallula	Upper Lake Wallula	1707010101							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Middle Columbia/Lake Wallula	Lower Lake Wallula	1707010102							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Middle Columbia/Lake Wallula	Upper Lake Umatilla	1707010106							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Middle Columbia/Lake Wallula	Middle Lake Umatilla	1707010109							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Middle Columbia/Lake Wallula	Lower Lake Umatilla	1707010114							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Middle Columbia/Hood	Upper Middle Columbia/Hood	1707010501							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High

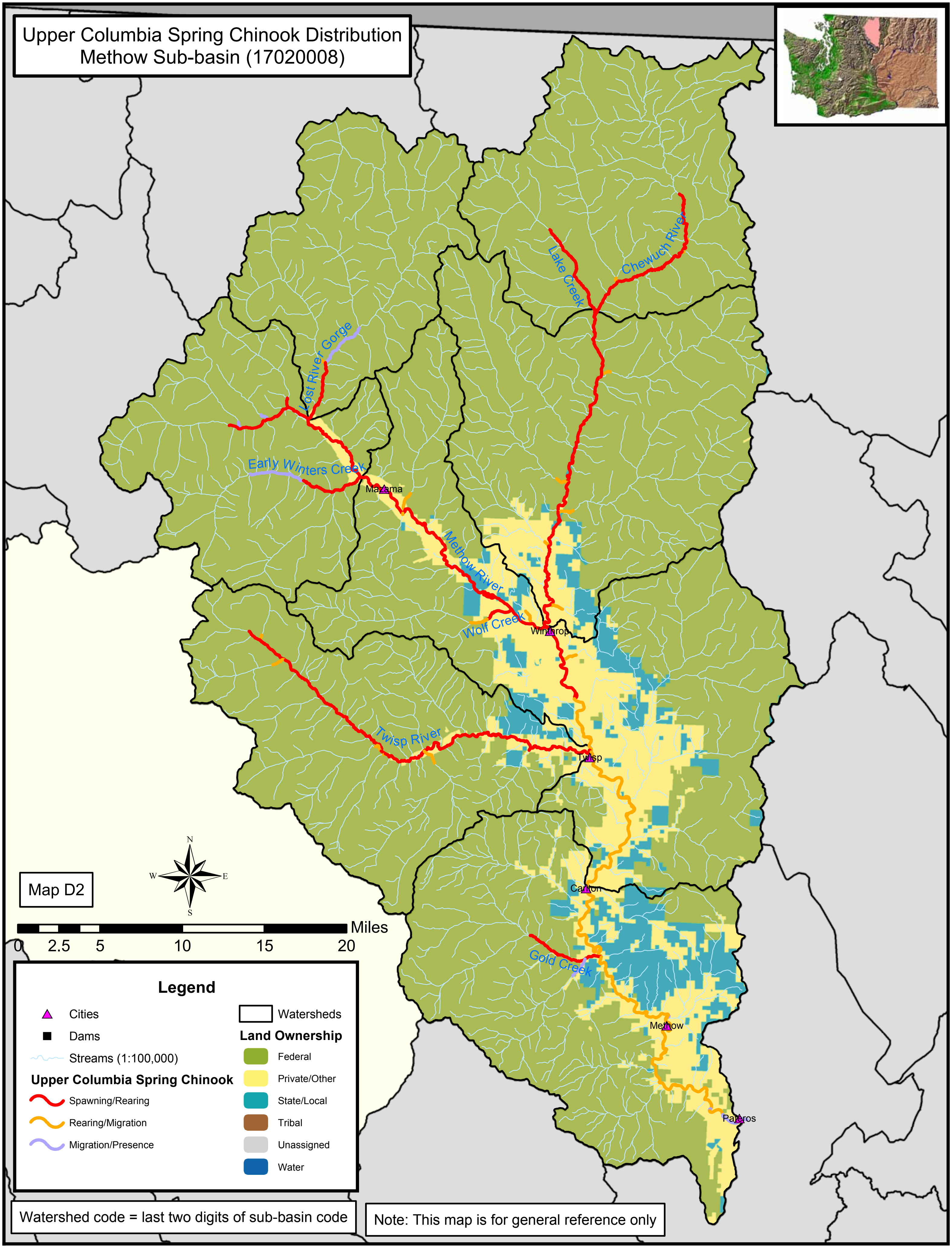
Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Middle Columbia/Hood	Middle Columbia/Mill Creek	1707010504							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Middle Columbia/Hood	Middle Columbia/Grays Creek	1707010512							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Middle Columbia/Hood	Middle Columbia/Eagle Creek	1707010513							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Lower Columbia/Sandy	Columbia Gorge Tributaries	1708000107							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Multiple	Lower Columbia Corridor (Sandy/ Washougal to Ocean)	NA							NS	Area not scored since CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation	High

Figure D1. CHART Ratings of Conservation Value for Habitat Areas in HUC5 Watersheds Occupied by the Upper Columbia River Spring-run Chinook Salmon ESU

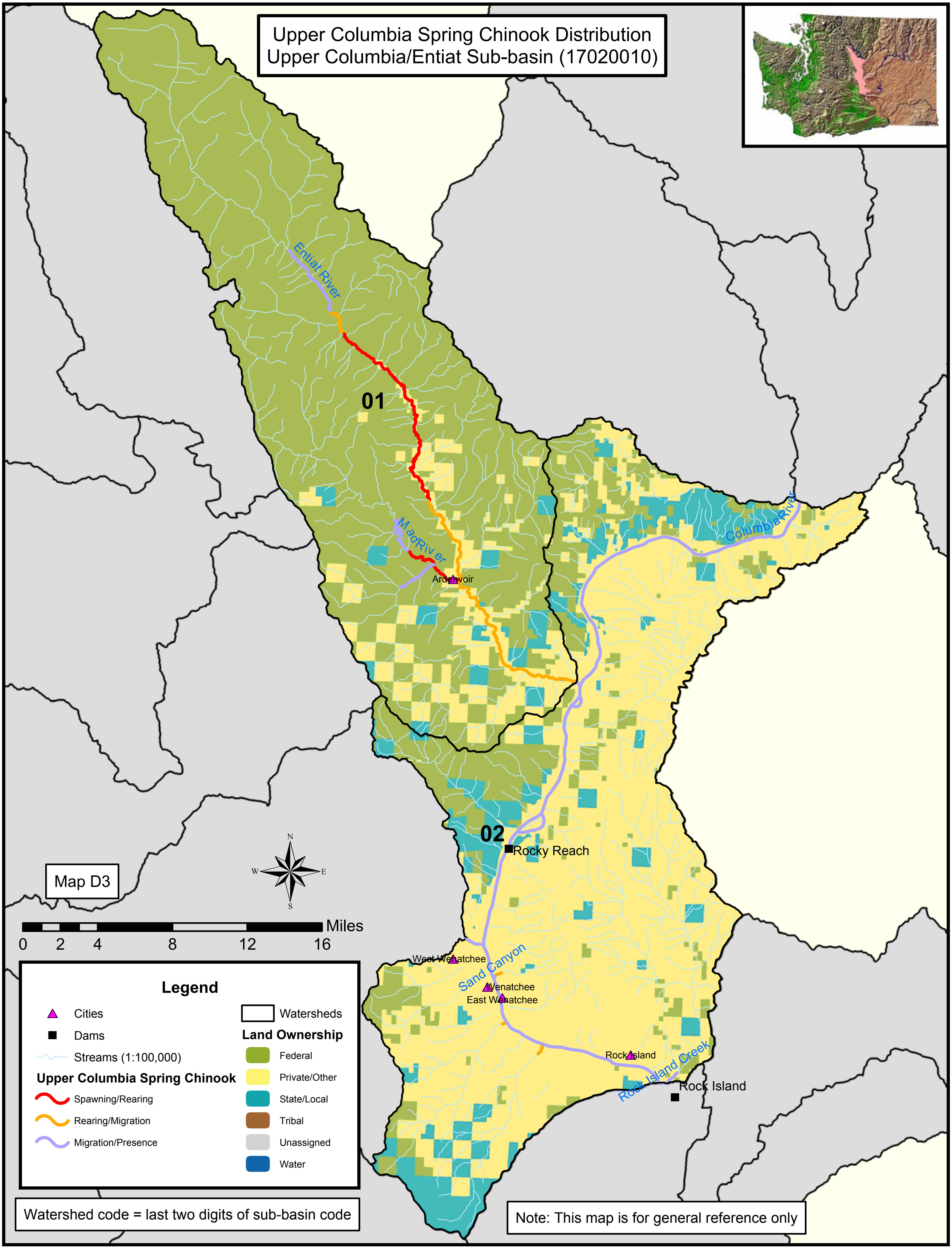

Upper Columbia River Spring Chinook
CHART Watershed Ratings
1702000803
1702000801
1702000802
1702000804
1702000806
1702000805
1702000807
1702000505
1702001102
1702001101
1702001001
1702001103
1702001104
1702001002
1702001105
1702001003
1702001004
1702001604
1702001605
1702001606
1707010101
1707010102
1707010106
1707010109
1707010114
1707010501
1707010504
1707010512
1707010513
1708000107
Legend
Watersheds (HUC5)
CHART Ratings
High
Medium
N
S
E
W
0
12.5
25
50
75
100
Miles



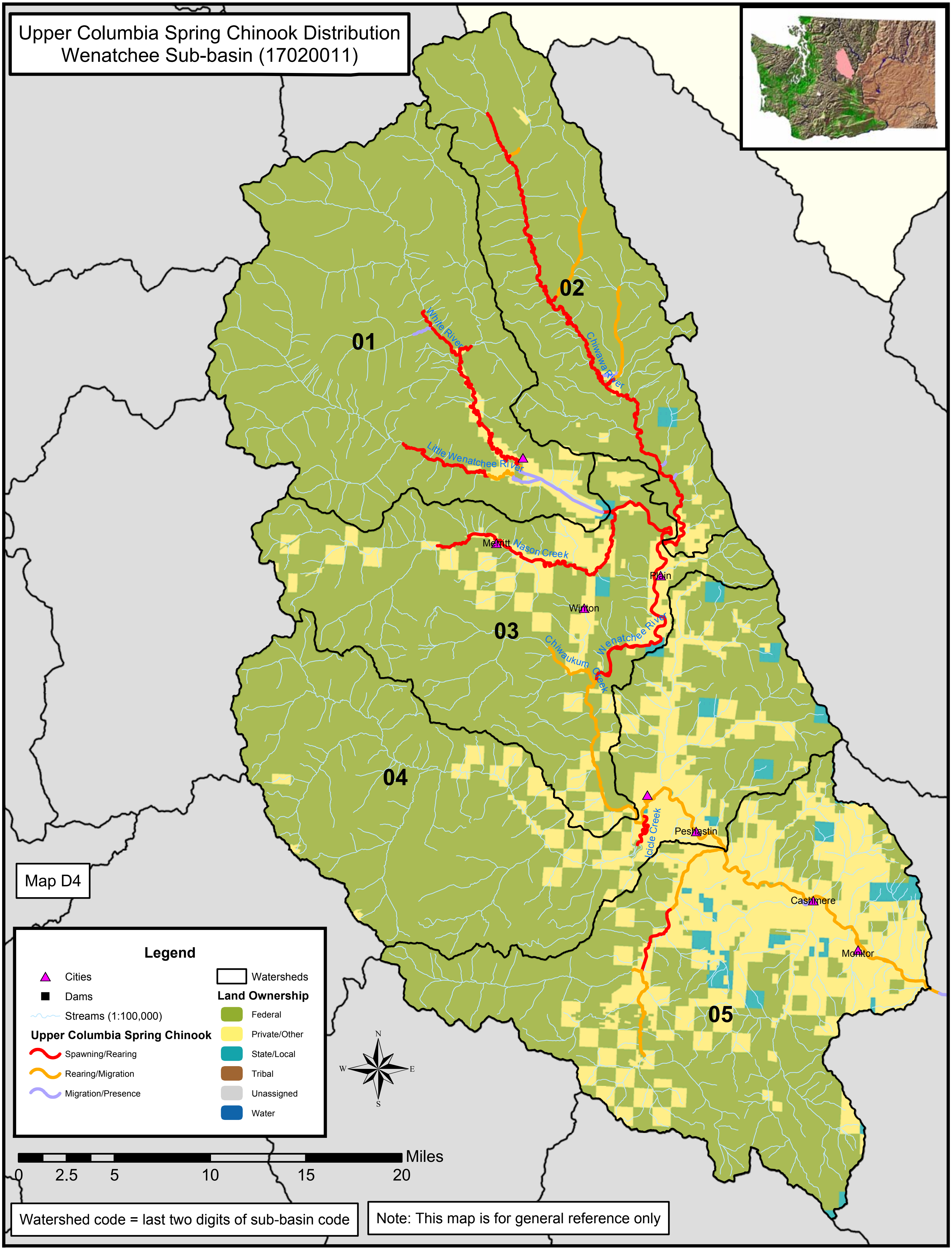
Upper Columbia Spring Chinook Distribution
Chief Joseph Sub-basin (17020005)
Nespelem
04
02
05
Brewster
Belvedere
Bridgeport
Chief Joseph Dam
Foster Creek
Koontzville
Elmer City
Wells
Azwell
Coulee Dam
03
Columbia River
Mansfield
Map D1
Legend
Cities
Dams
Streams (1:100,000)
Upper Columbia Spring Chinook
Spawning/Rearing
Rearing/Migration
Migration/Presence
Occupied but Lacking PCEs
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Note: This map is for general reference only
Watershed code = last two digits of sub-basin code
0 2 4 8 12 16
Miles
N
S
E
W



Upper Columbia Spring Chinook Distribution
Methow Sub-basin (17020008)
Lost River Gorge
Lake Creek
Chewuch River
Early Winters Creek
Mazama
Methow River
Wolf Creek
Winthrop
Twisp River
Twisp
Carlton
Gold Creek
Methow
Pateros
N
S
E
W
Map D2
Miles
0
2.5
5
10
15
20
Legend
Cities
Dams
Streams (1:100,000)
Upper Columbia Spring Chinook
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only



Upper Columbia Spring Chinook Distribution
Upper Columbia/Entiat Sub-basin (17020010)
Entiat River
Mad River
Ardenvoir
01
02
Columbia River
Rocky Reach
Sand Canyon
West Wenatchee
Wenatchee
East Wenatchee
Rock Island
Rock Island Creek
Rock Island
Map D3
N
W
E
S
Miles
0 2 4 8 12 16
Legend
Cities
Dams
Streams (1:100,000)
Upper Columbia Spring Chinook
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only



Upper Columbia Spring Chinook Distribution
Wenatchee Sub-basin (17020011)
01
02
03
04
05
White River
Little Wenatchee River
Chiwawa River
Nason Creek
Merritt
Plain
Winton
Wenatchee River
Chiwaukum Creek
Icicle Creek
Peshastin
Cashmere
Monitor
Map D4
Legend
Cities
Dams
Streams (1:100,000)
Upper Columbia Spring Chinook
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
0
2.5
5
10
15
20
Miles
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only

Appendix E
CHART Assessment for the Hood Canal Summer-run Chum Salmon ESU

CHART Participants

The CHART for this ESU consisted of the following NOAA Fisheries biologists: DeeAnn Kirkpatrick (CHART Leader), Steve Fransen, Tom Hooper, Steve Keller, Mike Parton, and Tim Tynan. Steve Ralph (Environmental Protection Agency) is another Federal biologist who served on this CHART.

The following biologists working for NOAA Fisheries provided valuable expertise to the CHART, but were not part of the deliberations or formal scoring/rating process: Bill Graeber (NOAA Fisheries) and Tom Sibley (NOAA Fisheries). This CHART assessment also benefitted from review and comments by staff from the Point No Point Treaty Council and Washington Department of Fish and Wildlife.

ESU Description

The Hood Canal summer-run chum salmon ESU was listed as a threatened species in 1999 (64 FR 14508; March 25, 1999). The ESU includes all naturally spawned populations of summer-run chum salmon in Hood Canal and its tributaries as well as populations in Olympic Peninsula rivers between Hood Canal and Dungeness Bay, Washington. Hood Canal summer-run chum are the southernmost occurrence of the summer-run life history for the species. The ESU appears to be uniquely adapted to the local habitat conditions, allowing this life-history to persist in what otherwise would be deemed an inhospitable environment. The agency recently conducted a review to update the ESU's status, taking into account new information and considering the net contribution of artificial propagation efforts in the ESU. We recently published the results of this review and concluded that Hood Canal summer-run chum salmon (including eight hatchery programs) should remain listed as threatened (70 FR 37160; June 28, 2005).

The Summer Chum Salmon Conservation Initiative (WDFW and PNPTT 2000) provides a comprehensive overview of this ESU and describes the following life history and habitat requirements. Migration to spawning grounds occurs from late August through late October. Adults generally spawn in low gradient, lower mainstem reaches of natal streams, typically in center channel areas due to the low flows encountered in the late summer and early fall. Eggs incubate in redds for five to six months and fry emerge between January and May. After hatching fry move rapidly downstream to subestuarine habitats. WDFW and PNPTT (2000) noted that successful incubation and rearing depends on a variety of conditions including: 1) the presence of adequate large woody debris to reduce scour of incubating eggs and moderate peak winter flow velocities, 2) the absence of excessive fines within spawning gravel, 3) stable channel configuration, and 4) access to floodplain and off-channel areas.

Subestuary deltas support a diverse array of habitats (tidal channels, mudflats, marshes, and eelgrass meadows) that provide essential rearing and transition environments for this ESU. Juveniles rear in these habitats for days to weeks before entering the ocean, and returning adults stage in subestuaries before ascending natal streams to spawn. Juveniles feed primarily on plankton and epibenthic organisms, while subadults feed on similar items as well as larger prey (including fishes and squid). Most adults mature and spawn as 3- and 4-year old fish (WDFW and PNPTT 2000).

Recovery Planning Status

Sixteen historical demographically independent populations of Hood Canal summer-run chum have been identified for this ESU: eight extant populations (the Union River, Lilliwaup Creek, Hamma Hamma River, Duckabush River, Dosewallips River, Big/Little Quilcene River, Snow and Salmon creeks, Jimmycomelately Creek populations), and eight extirpated or possibly extirpated populations (the Dungeness River, Big Beef Creek, Anderson Creek, Dewatto Creek, Tahuya River, Skokomish River, Finch Creek, and Chimacum Creek populations) (WDFW and Point No Point Treaty Tribes 2000). The Puget Sound TRT has identified 5 “geographic regions of diversity and correlated risk" in Puget Sound (Ruckelshaus et al. 2002). The regions are based on similarities in hydrographic, biogeographic, geologic, and catastrophic risk characteristics and where groups of populations have evolved in common (Ruckelshaus et al. 2002). The Hood Canal summer-run chum salmon ESU occupies two of these regions – the Strait of Juan de Fuca and Hood Canal. Recovery planning will likely emphasize the need for a geographical distribution of viable populations across the range of such regions in an ESU (Ruckelshaus et al. 2002, McElhany et al. 2003). Local recovery planners completed the Hood Canal and Strait of Juan de Fuca Summer Chum Recovery plan in late June of 2005. The CHART considered the available TRT products and a previously completed local recovery plan (WDFW and Point No Point Treaty Tribes 2000) in rating each watershed, but did not have the benefit of the more recent local recovery plan. We anticipate that, as recovery planning proceeds, we will have better information and may revise our recommendations regarding critical habitat designations.

CHART Area Assessments

The CHART assessment for this ESU addressed four subbasins containing 12 occupied watersheds. Therefore, as part of its assessment the CHART considered the conservation value of each HUC5 in the context of the populations within these two geographic regions. The CHART noted several streams for which WDFW's information on summer chum salmon presence appeared to be inconsistent with their own knowledge of these watersheds, as well as presence described in the Summer Chum Salmon Conservation Initiative (WDFW and PNPTT 2000). In particular, questions were raised with WDFW (B. McTeague, WDFW, personal communication) about the ESU's presence in Jorsted, Stavis, Seabeck, Big Anderson, and Mission creeks. Of these, only presence in Mission Creek was reconciled and removed from occupied status. (WDFW 2003) and the others are still being considered for inclusion/exclusion by WDFW. Information is presented below by USGS subbasin because they present a convenient and systematic way to organize the CHART's watershed assessments for this ESU and their names are generally more recognizable because they typically identify major river systems.

Skokomish Subbasin (HUC4# 17110017)

The Skokomish subbasin is located at the southern end of Hood Canal, and most of it is in Mason County, Washington (although small portions of the subbasin – unoccupied by this ESU – also extend into Grays Harbor and Jefferson counties, Washington). The subbasin contains a single watershed (Skokomish River HUC5# - 1711001701) and encompasses approximately 245 mi^2 and 951 miles of streams. The Skokomish River population is the only historic population documented in this subbasin/watershed (WDFW and PNPTT 2000)). Fish distribution and habitat use data from WDFW identify approximately 13 miles of occupied riverine/estuarine habitat in the subbasin/watershed (WDFW and PNPTT 2000)). The CHART concluded that all of these occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. The CHART noted that this watershed contains the largest intact estuary in Hood Canal. Table E1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watershed(s). Map E1 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Hood Canal Subbasin (HUC4# 17110018)

The Hood Canal subbasin includes most of the drainages of Hood Canal proper, including those of the western Kitsap Peninsula. The subbasin includes portions of the following Washington counties: Clallam, Jefferson, Kitsap, and Mason. The subbasin contains 7 of the 12 watersheds occupied by this ESU and encompasses approximately

715 mi^2 and 3,041 miles of streams. WDFW and PNPTT (2000) identified the following historic populations in this subbasin: Lilliwaup Creek, Hamma Hamma River, Duckabush River, Dosewallips River, Big/Little Quilcene River, Big Beef Creek, Anderson Creek, Dewatto Creek, Tahuya River, and Finch Creek. Fish distribution and habitat use data from WDFW identify approximately 48 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003) Occupied reaches in two HUC5s (Dosewallips River and Duckabush River) overlap with FEMAT key watersheds for at-risk anadromous salmonids (FEMAT 1994). The CHART concluded that all of these occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs . Table E1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watershed(s). Map E2 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

The CHART identified two streams (Finch Creek and Anderson Creek) and portions of Chimacum Creek that are unoccupied but essential for the conservation of the ESU. These streams historically supported independent populations of summer-run chum salmon (WDFW and PNPTT 2000) and are considered important areas for ESU expansion during recovery (NMFS 2003). The CHART believed that these areas are essential for conservation because they historically supported summer-run chum populations, are still accessible to summer-run chum, are adjacent to other occupied streams that may facilitate recolonization, and - due to the limited number of areas occupied by this ESU - contain habitat that is likely to be important for conservation as the ESU expands (in number of spawners and range) during recovery. The CHART recognized that WDFW and PNPTT did not rate these high due to limited habitat availability and production potential.

Kitsap Subbasin (HUC4# 17110019)

The Kitsap subbasin includes drainages at the northern entrance to Hood Canal. The portion of the subbasin inhabited by this ESU is wholly within Jefferson County, Washington. The subbasin contains a single occupied watershed (Port Ludlow/Chimacum Creek HUC5# - 1711001908) that encompasses approximately 82 mi^2 and 212 miles of streams. The Chimacum Creek population is the only historic population documented in this subbasin/watershed (WDFW and PNPTT 2000). Fish distribution and habitat use data from WDFW identify slightly more than 1 mile of occupied riverine/estuarine habitat in the watershed (WDFW 2003). The CHART concluded that all of these occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table E1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watershed(s). Map E3 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

The CHART also concluded that PCEs in this subbasin warrant a high rating for conservation value to the ESU (NOAA 2003). The CHART identified an additional 5-mile stream segment in Chimacum Creek that is currently unoccupied but essential for the conservation of the ESU. This stream segment historically supported the Chimacum Creek population of summer-run chum salmon (WDFW and PNPTT 2000) and, due to the limited number of areas occupied by this ESU, is likely to be an important area for ESU expansion during recovery (NMFS 2003).

Dungeness-Elwha Subbasin (HUC4# 17110020)

The Dungeness/Elwha subbasin includes drainages to the eastern Strait of Juan de Fuca and includes portions of Clallam and Jefferson counties, Washington. The subbasin contains three occupied watersheds and encompasses approximately 350 mi^2 and 1,233 miles of streams. WDFW and PNPTT (2000) identified the following historic populations in this subbasin: Dungeness River, Jimmycomelately Creek, and Snow/Salmon creeks. Fish distribution and habitat use data from WDFW identify approximately 19 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). The CHART concluded that all of these occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table E1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watershed(s). Map E4 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

CHART Conservation Value Rating

Freshwater Areas

After reviewing the best available scientific data regarding critical habitat for this ESU, the CHART concluded that all of the 12 occupied HUC 5 watersheds were either of high or medium conservation value to the ESU. None of the watersheds was considered to be of low conservation value, primarily because approximately half of the historical populations in this ESU have been extirpated, and the remaining populations occupy a very limited number of stream miles (approximately 60 miles total). The CHART also concluded that all of the occupied areas supported populations necessary to the conservation of the ESU. Table E2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure E1 shows the overall distribution of ratings by HUC5 watershed. The CHART concluded that it was important to have high value watersheds identified in each of the two TRT geographic regions (Hood Canal and Strait of Juan de Fuca) and their assessment reflects that conclusion. The CHART benefited from the considerable information contained in the Summer Chum Salmon Conservation Initiative (WDFW and PNPTT 2000) and that document's emphasis on particular stocks/areas for conservation. Some of these emphases are noted in Table E2 as they related to CHART assessments of conservation value for each HUC5.

Marine Areas

In addition to the freshwater and estuarine areas described above, the CHART also evaluated five nearshore marine areas for this ESU (see Map E5). The nearshore marine area considered by the Team includes that zone from extreme high water out to a depth of 30 m and adjacent to watersheds occupied by the ESU. The Team assessment focused on this area because it generally encompasses photic zone habitats supporting plant cover (e.g., eelgrass and kelp) important for rearing, migrating, and maturing chum salmon and their prey. Also, PCEs that may require special management considerations or protection are more readily identified in this zone (e.g., destruction of vegetative cover due to docks and bulkheads). Deeper waters are occupied by subadult and maturing fish, but it is unclear if these areas contain PCEs that require special management considerations or protection. The Team concluded that all nearshore habitat areas from the southern terminus of Hood Canal northeast to Dungeness Bay in the Strait of Juan de Fuca warrant a high conservation value to the ESU. These habitat areas are found along approximately 402 miles of shoreline within the range of this ESU.

Changes to the CHART's Initial Assessments

The CHART reviewed the public and peer reviewer comments received on the Team's initial findings for this ESU as well as new information relevant to evaluating habitat areas for this ESU. As a result, the CHART did not change conservation value ratings for any watershed or nearshore zone within the geographical area occupied by this ESU, and there were no changes to the delineation of occupied habitat areas. The proposed critical habitat designation (69 FR 74572, December 14, 2004) summarizes the comments and responses pertaining to the CHART's initial determinations for this ESU, and Tables E1 and E2 reflect the final CHART assessments.

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Table E1. Summary of Occupied Areas, PCEs, and Management Activities Affecting PCEs for the Hood Canal Summer-run Chum Salmon ESU

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs)				Unoccupied and essential for conservation (mi)**	Management Activities***
				Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*	Estuarine and Nearshore Marine Shoreline (mi)		
	Skokomish	Skokomish River	1711001701	6.1	<0.1	6.9[w]	0		C, D, F, U
	Hood Canal	Lower West Hood Canal Frontal	1711001802	1.4	0	1.3	0	1	C, F, R, U
	Hood Canal	Hamma Hamma River	1711001803	2.7	<0.1	<0.1	0		C, F, U
	Hood Canal	Duckabush River	1711001804	2.3	0	0	0		C, F, U
	Hood Canal	Dosewallips River	1711001805	3.3	0.1	0	0		C, F, R, U
	Hood Canal	Big Quilcene River	1711001806	2.4	0.4	<0.1	0		C, F, U
	Hood Canal	Upper West Hood Canal Frontal	1711001807	1.4	0.2	0	0		C, F, U
	Hood Canal	West Kitsap	1711001808	8.2	<0.1	23.8	0	1.7	A, F, U
	Kitsap	Port Ludlow/ Chimacum Creek	1711001908	1.1	0	0	0	5	A, B, F, U
	Dungeness/ Elwha	Discovery Bay	1711002001	3.7	0	0.4	0		A, C, F
	Dungeness/ Elwha	Sequim Bay	1711002002	0.8	<0.1	0	0		C, F, U
	Dungeness/ Elwha	Dungeness River	1711002003	3.2	0	10.7	0		C, F, R, S, U
		Nearshore Marine Area	N15	0	0	0	101.8		C, H, T, U
		Nearshore Marine Area	N16	0	0	0	16.3		C, H
		Nearshore Marine Area	N17	0	0	0	45.1		C, H, S
		Nearshore Marine Area	N18	0	0	0	213.5		C, H, T
		Nearshore Marine Area	N19	0	0	0	25		C, H

* Some streams classified as "Migration/Presence PCEs" may also include rearing or spawning PCEs, but the GIS data are still undergoing review to confirm additional habitat use types.

** These habitat areas are currently unoccupied. However, the CHART determined that these areas are essential for conservation of the ESU.

*** This list is not exhaustive. It is intended to highlight key management activities affecting PCEs in each watershed. Activities identified are based on the general categories described by Spence et al. (1996) and summarized previously in the "Special Management Considerations or Protection" section of this report. Coding is as follows: F= forestry, G = grazing, A = agriculture, C = channel modifications/diking, R = road building/maintenance, U = urbanization, S = sand and gravel mining, M = mineral mining, D = hydroelectric dams, I = irrigation impoundments and withdrawals, T = river, estuary, and ocean traffic, W = wetland loss/removal, B = beaver removal, X = exotic/invasive species introductions, H

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[w] A small portion of these PCEs in the lower Skokomish River overlap with estuarine and nearshore marine PCEs within Nearshore Marine Area N17.

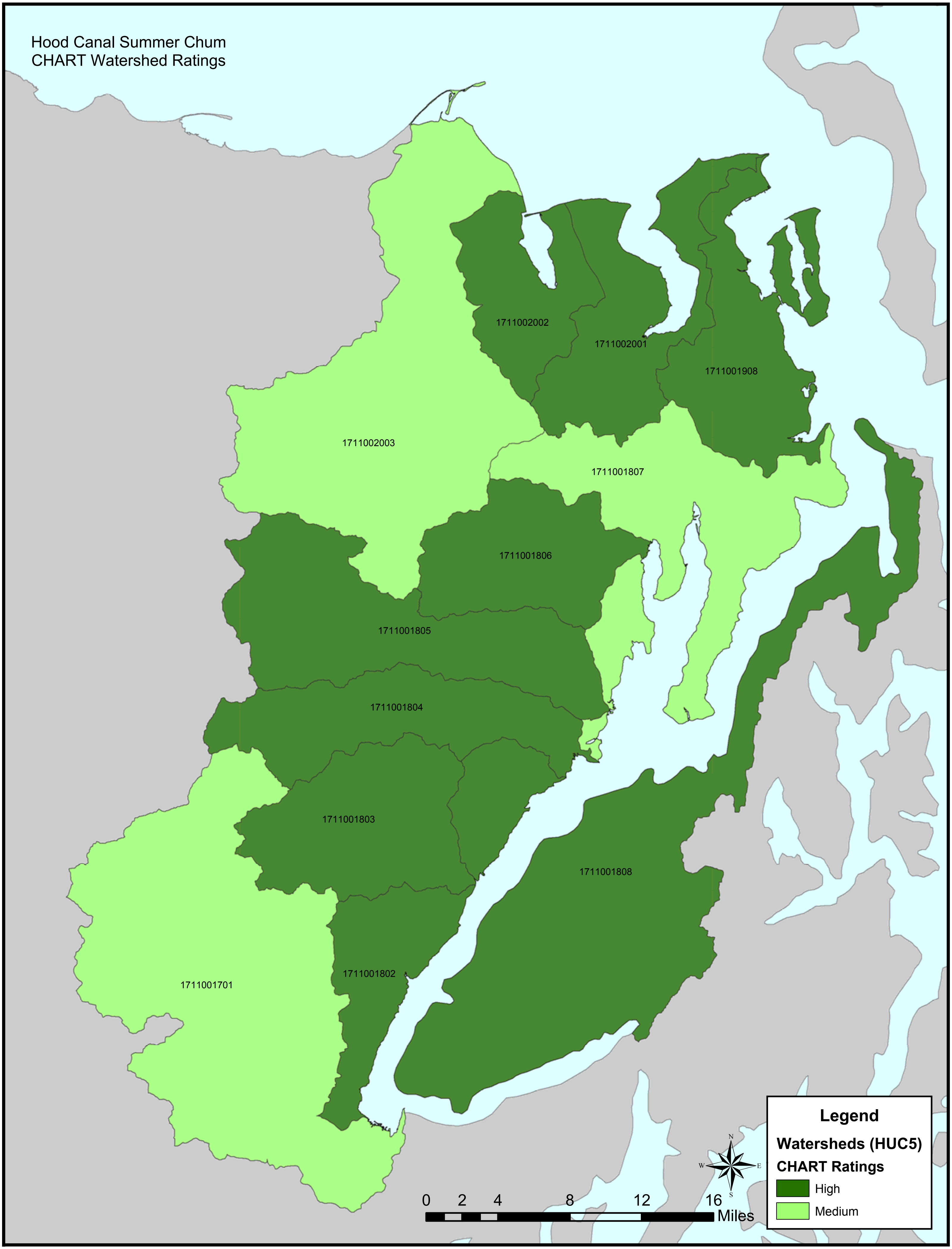
= forage fish/species harvest. Primary sources for this information were the CHART and reports by Ames (2000), Haring (2000), Washington State Department of Natural Resources (2001), Correa (2003), Kuttel (2003), and Fresh et al. (2004).

Table E2. Summary of Initial CHART Scores and Ratings of Conservation Value for Habitat Areas in HUC5 Watersheds Occupied by the Hood Canal Summer-run Chum Salmon ESU

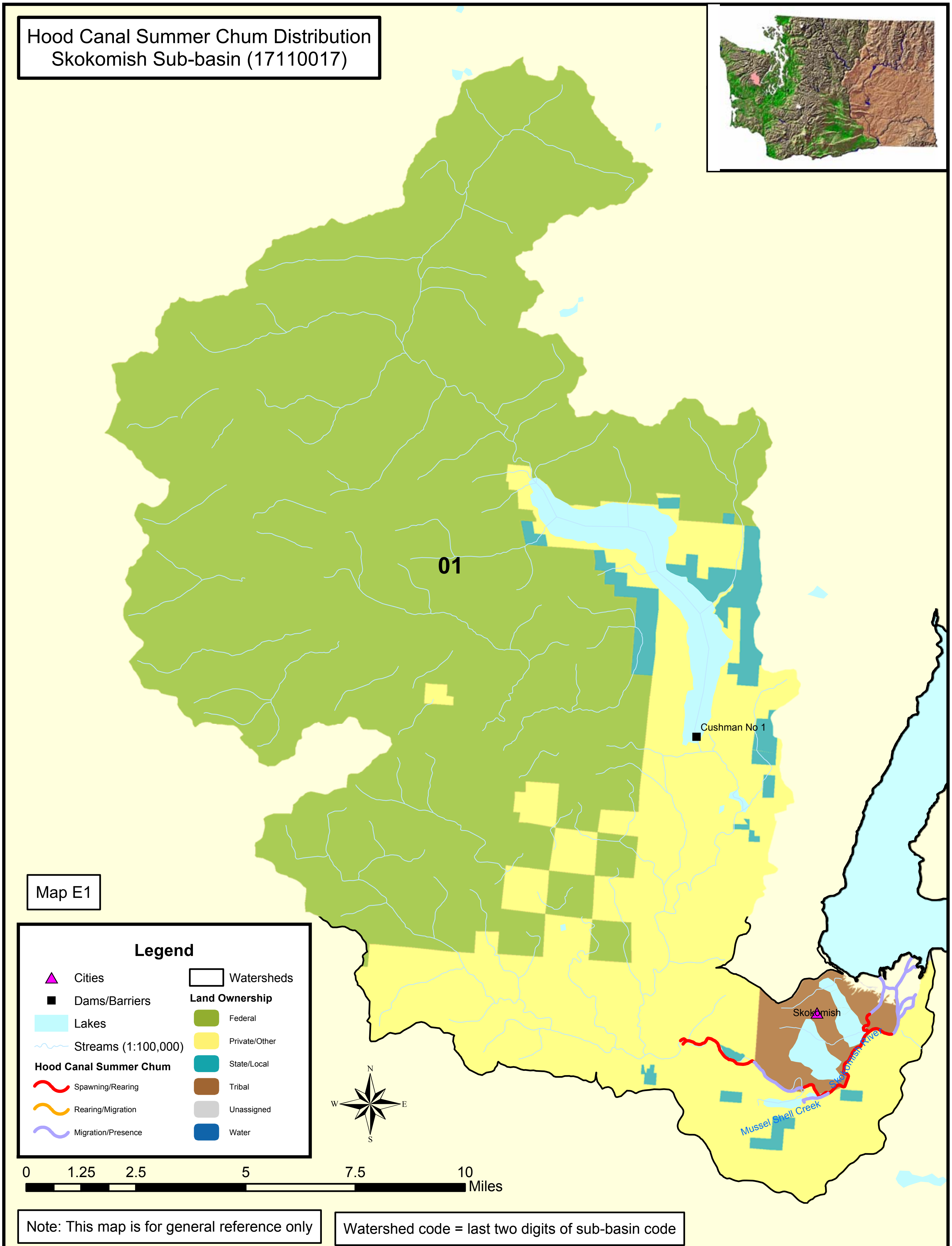
Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code							Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
	Skokomish	Skokomish River	1711001701	1	0	1	3	2	3	10	High HUC5 score but PCEs severely degraded, probably poorest of all HUC5s	Medium
	Hood Canal	Lower West Hood Canal Frontal	1711001802	2	2	1	3	1	3	12	High HUC5 score; genetic data indicate that Lilliwaup fish contain very unique alleles	High
	Hood Canal	Hamma Hamma River	1711001803	2	2	2	1	2	3	12	High HUC5 score; area recommended for supplementation; high potential production	High
	Hood Canal	Duckabush River	1711001804	1	1	2	1	2	3	10	High HUC5 score; population considered at low risk of extinction with high potential production; PCEs in FEMAT key watershed	High
	Hood Canal	Dosewallips River	1711001805	2	2	2	1	2	3	12	High HUC5 score; population considered at low risk of extinction with high potential production; PCEs in FEMAT key watershed	High
	Hood Canal	Big Quilcene River	1711001806	2	1	2	1	3	3	12	High HUC5 score; ongoing supplementation efforts	High
	Hood Canal	Upper West Hood Canal Frontal	1711001807	1	1	2	1	1	3	9	Moderate HUC5 score; limited distribution and small population size relative to other HUC5s in Hood Canal	Medium
	Hood Canal	West Kitsap	1711001808	3	1	1	3	2	3	13	High HUC5 score; approximately 1/3 of ESU distribution is in this HUC5; may be healthiest of runs in ESU	High
	Kitsap	Port Ludlow/ Chimacum Creek	1711001908	1	1	1	1	1	3	8	Moderate HUC5 score but ongoing reintroduction efforts underscore area's importance	High
	Dungeness/Elwha	Discovery Bay	1711002001	2	1	2	2	2	3	12	High HUC5 score; one of only four occupied HUC5s supporting Strait of Juan de Fuca populations	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code							Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
	Dungeness/Elwha	Sequim Bay	1711002002	1	1	2	3	1	3	11	High HUC5 score; one of only four occupied HUC5s supporting Strait of Juan de Fuca populations	High
	Dungeness/Elwha	Dungeness River	1711002003	1	1	2	1	0	3	8	Relatively low HUC5 score for the Strait of Juan de Fuca region; uncertain whether area will be emphasized for recovery activities	Medium
	NA	Nearshore Marine Area	N15							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N16							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N17							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N18							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N19							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High

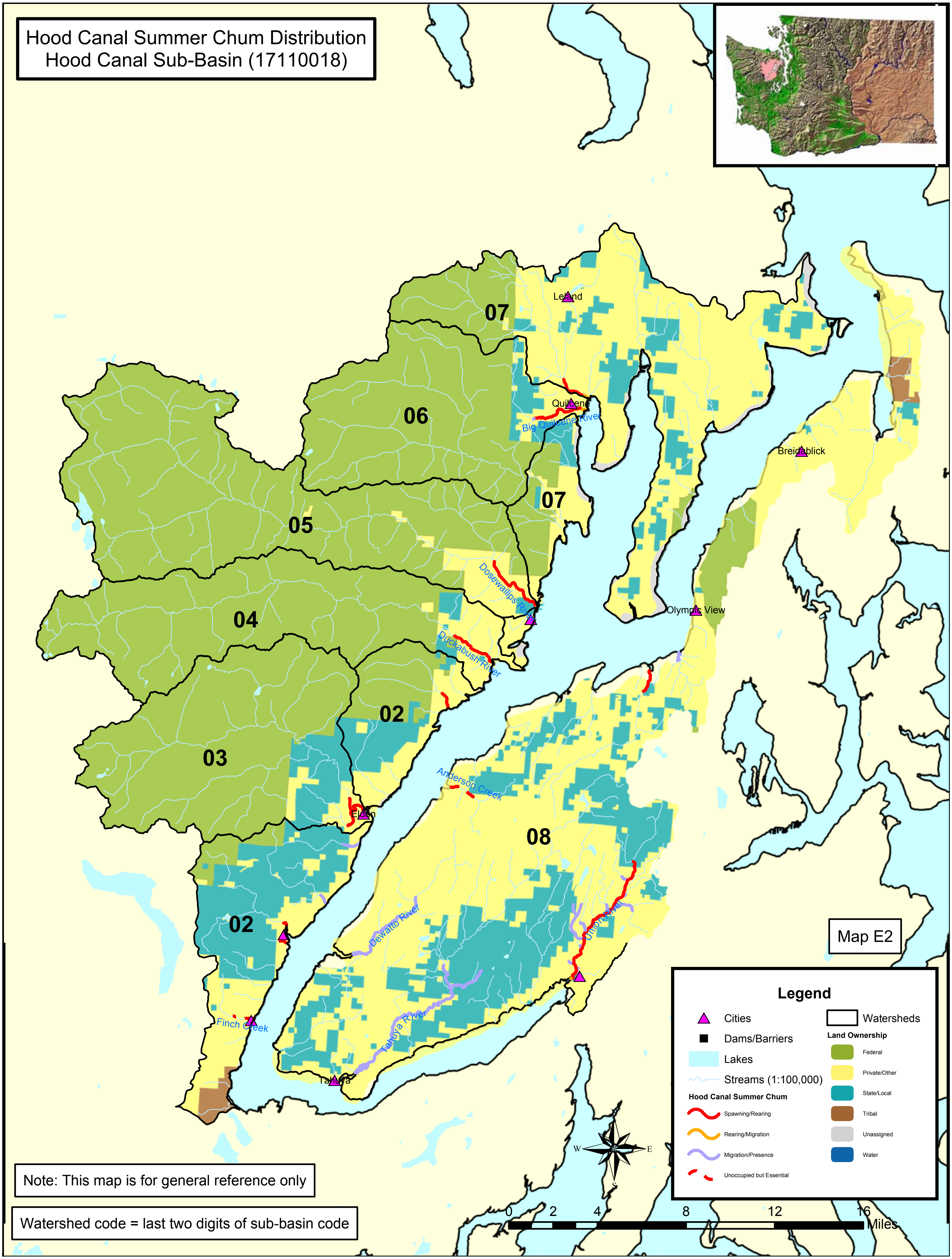
Figure E1. CHART Ratings of Conservation Value for Habitat Areas in HUC5 Watersheds Occupied by the Hood Canal Summer-run Chum Salmon ESU

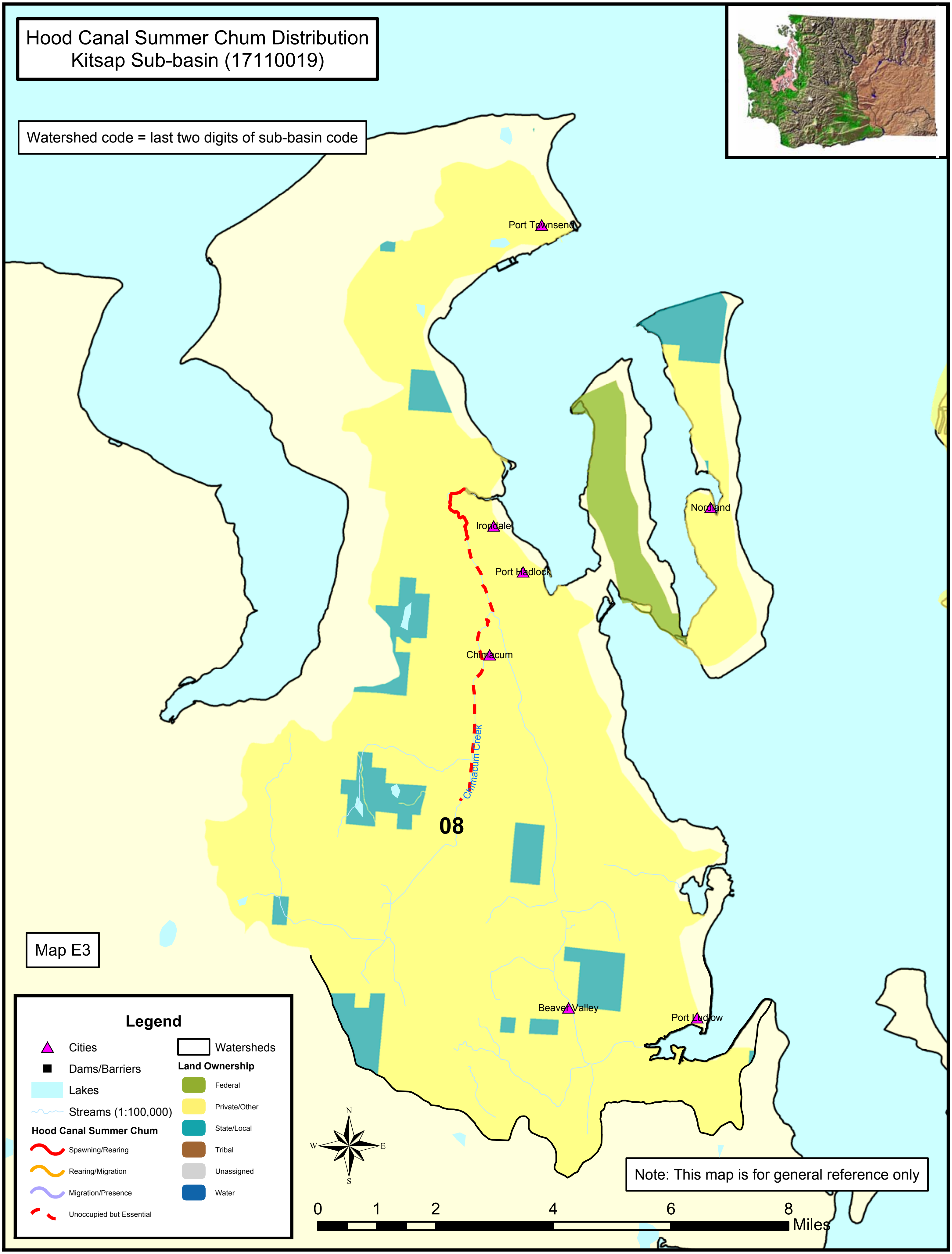


Hood Canal Summer Chum
CHART Watershed Ratings
1711002002
1711002001
1711001908
1711002003
1711001807
1711001806
1711001805
1711001804
1711001803
1711001808
1711001802
1711001701
Legend
Watersheds (HUC5)
CHART Ratings
High
Medium
N
W
E
S
0 2 4 8 12 16
Miles

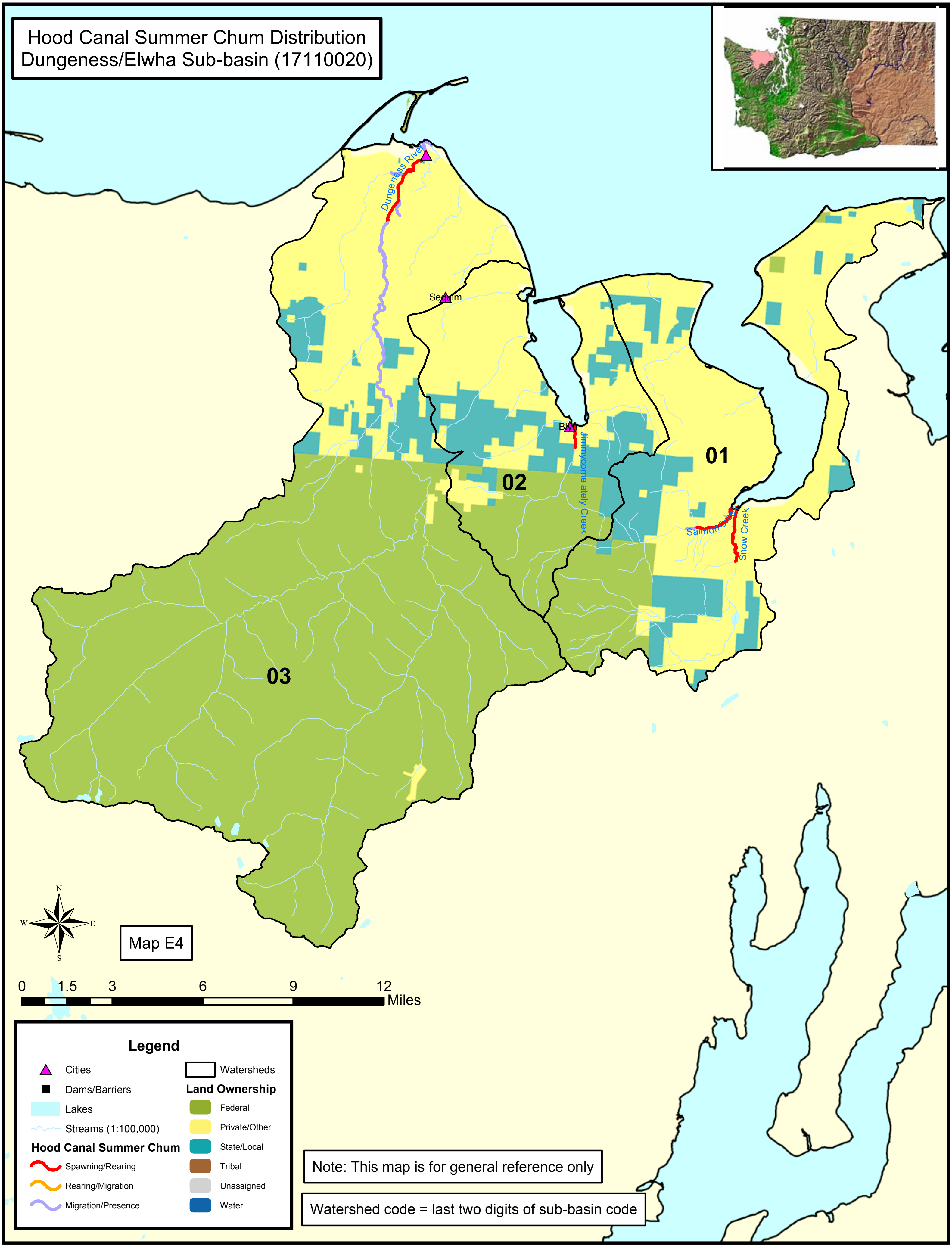


Hood Canal Summer Chum Distribution
Skokomish Sub-basin (17110017)
01
Cushman No 1
Skokomish
Skokomish River
Mussel Shell Creek
Map E1
Legend
Cities
Dams/Barriers
Lakes
Streams (1:100,000)
Hood Canal Summer Chum
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
E
S
W
0
1.25
2.5
5
7.5
10
Miles
Note: This map is for general reference only
Watershed code = last two digits of sub-basin code


Hood Canal Summer Chum Distribution
Hood Canal Sub-Basin (17110018)
07
06
05
04
03
02
08
Leland
Quilcene
Big Quilcene River
Breidablick
Dosewallips River
Olympic View
Duckabush River
Anderson Creek
Dewatto River
Union River
Tahuya River
Finch Creek
Tahuya
Map E2
Legend
Cities
Dams/Barriers
Lakes
Streams (1:100,000)
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Hood Canal Summer Chum
Spawning/Rearing
Rearing/Migration
Migration/Presence
Unoccupied but Essential
W
E
S
0
2
4
8
12
16
Miles
Note: This map is for general reference only
Watershed code = last two digits of sub-basin code


Hood Canal Summer Chum Distribution
Kitsap Sub-basin (17110019)
Watershed code = last two digits of sub-basin code
Port Townsend
Nordland
Irondale
Port Hadlock
Chimacum
Chimacum Creek
08
Beaver Valley
Port Ludlow
Map E3
Legend
Cities
Dams/Barriers
Lakes
Streams (1:100,000)
Hood Canal Summer Chum
Spawning/Rearing
Rearing/Migration
Migration/Presence
Unoccupied but Essential
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
0
1
2
4
6
8
Miles
Note: This map is for general reference only

Hood Canal Summer Chum Distribution
Dungeness/Elwha Sub-basin (17110020)



Map E4

Note: This map is for general reference only

Watershed code = last two digits of sub-basin code

Appendix F
CHART Assessment for the Columbia River Chum Salmon ESU

CHART Participants

The CHART for this ESU consisted of the following NOAA Fisheries biologists: Ben Meyer (CHART Leader), Michelle Day, Patty Dornbusch, Dan Guy, Lynne Krasnow, Lance Kruzic, Nancy Munn, Mindy Simmons, Cathy Tortorici, and Rich Turner. This CHART assessment also benefitted from review and comments from the Oregon Department of Fish and Wildlife and the Washington Department of Fish and Wildlife.

ESU Description

The Columbia River chum salmon ESU was listed as a threatened species in 1999 (64 FR 14508; March 25, 1999). The ESU includes all naturally spawned populations of chum salmon in the Columbia River and its tributaries in Washington and Oregon (64 FR 14508; March 25, 1999). The agency recently conducted a review to update the ESU's status, taking into account new information and considering the net contribution of artificial propagation efforts in the ESU. We recently published the results of this review and concluded that Columbia River chum salmon (including three hatchery programs) should remain listed as threatened (70 FR 37160; June 28, 2005).

The following brief description is based largely on life history information and excerpts from the report of the Lower Columbia Fish Recovery Board (LCFRB 2003) and the Willamette/Lower Columbia River Technical Recovery Team's (TRT) recent review of historical population structure for this ESU (Myers et al. 2003).

Intensive monitoring of chum spawning escapement is conducted in three Washington tributaries in the lower Columbia basin—Grays River, Hardy Creek, and Hamilton Creek—and in the mainstem Columbia River near Ives Island. The latter three populations are located immediately downstream of Bonneville Dam. Chum salmon populations exist in other river systems of the lower Columbia, but are not consistently monitored and are assumed to be extremely low in abundance.

Chum salmon returning to the Columbia River are considered a fall run. Adult fall run chum salmon return to the Columbia River from mid-October through November, but apparently do not reach the Grays River until late October-early December. Spawning occurs in the Grays River from early November to late December. Fish returning to Hamilton and Hardy Creeks begin to appear in the tributaries in early November and their spawn timing is more protracted (mid-November-mid-January).

Chum seldom show persistence in surmounting river blockages and falls, which may be why they usually spawn in lower river reaches. Chum salmon spawn typically dig their redds in the mainstem or in side channels of rivers from just above tidal influence to nearly 60 miles (100 km) from the sea. They spawn in shallower, slower-running streams and side channels more frequently than do other salmonids. In some locations, subgravel flow (upwelled groundwater from seeps and springs) may be important in the choice of redd sites by chum salmon. Many Columbia River chum have been found to select spawning sites in areas of upwelling groundwater. New spawning grounds for chum were recently discovered along the northern Columbia River shoreline near the I-205 Glen Jackson Bridge where groundwater upwelling occurs. A significant number of chum returning to Hamilton Creek spawn in a spring-fed channel, and portions of the Grays River and Hardy Creek populations spawn in the area of springs. Hundreds of chum salmon once returned to spawn within spring-fed areas along Duncan Creek; efforts have been completed to restore passage to these productive areas and protect the springs that feed them.

Chum do not have a clearly defined smolt stage, but are nonetheless capable of adapting to seawater soon after emerging from gravel. Downstream migration may take only a few hours or days in rivers where spawning sites are close to the mouth of the river. Historical information concerning the timing of chum salmon emigration in the lower Columbia River is limited. Recent seining projects conducted in the Grays River and at Ives Island indicate outmigration occurs from March through May and peaks from mid-April to early May.

Chum salmon juveniles, like other anadromous salmonids, use estuaries to feed before beginning long-distance oceanic migrations. However, chum and ocean-type Chinook salmon usually have longer residence times in estuaries than do other anadromous salmonids. The period of estuarine residence appears to be the most critical phase in the life history of chum salmon and may play a major role in determining the size of the subsequent adult run back to fresh water. Chum salmon spend more of their life history in marine waters than other Pacific salmonids. Juveniles feed primarily on plankton and epibenthic organisms, while subadults feed on similar items as well as larger prey (including fishes and squid). Most adults mature and spawn as 3-year old fish.

Recovery Planning Status

The Willamette/Lower Columbia River TRT identified 16 historical demographically independent populations of chum in the Columbia River: the Youngs Bay, Grays River, Big Creek, Elochoman River, Clatskanie River, Mill Creek, Scappoose Creek, Cowlitz

River fall-run and summer-run, Kalama fall-run, Salmon Creek fall-run, Lewis River fall-run, Clackamas River fall-run, Washougal River fall-run, Sandy River fall-run, Lower Gorge tributaries fall-run, and the Upper Gorge tributaries fall-run populations (Myers et al. 2003). All but two of these historical populations appear to have been extirpated, or nearly so. Although the historical record for Columbia River chum salmon is limited, it is clear that chum salmon were present in most tributaries to the lower Columbia River and to some extent were present in the mainstem (Myers et al. 2003). The Columbia River chum salmon ESU inhabits three ecological zones (Coast Range, Cascade, and Columbia Gorge) and contains a single life-history type (fall run). Recovery planning will likely emphasize the need for a geographical distribution of viable populations across the range of ecological zones (Ruckelshaus et al. 2002, McElhany et al. 2003). A draft recovery plan for the Washington management unit of this ESU was completed by the Lower Columbia Fish Recovery Board (LCFRB 2004) and released by NMFS for public comment in April 2005. NMFS expects to use this plan as an interim regional recovery plan until a plan for the whole ESU is completed. A preliminary draft plan for Oregon areas of the ESU is expected by the end of 2005. The CHART considered LCFRB plan and the TRT products in rating each habitat area, but did not have the benefit of regional recovery plans throughout the range of this ESU. We anticipate that, as recovery planning proceeds, we will have better information and may revise our recommendations regarding critical habitat designation.

CHART Area Assessments

The CHART assessment for this ESU addressed six subbasins containing 19 occupied watersheds, as well as the lower Columbia River rearing/migration corridor. The Willamette/Lower Columbia Technical Recovery Team (TRT) has placed groups of populations in this recovery planning domain into “strata” intended to assist in evaluating ESU-wide recovery scenarios (McElhany et al. 2002). The strata are based on major life history characteristics (e.g., species run types) and ecological zones. The Columbia River chum salmon ESU inhabits three ecological zones (Coast Range, Cascade, and Columbia Gorge) and contains a single life history type (fall run), resulting in a total of three strata for this ESU (McElhany et al. 2002). As noted above, recovery planning will likely emphasize the need for a geographical distribution of viable populations across the range of such strata/regions in an ESU (Ruckelshaus et al. 2002, McElhany et al. 2003). Therefore, as part of its assessment the CHART considered the conservation value of each HUC5 in the context of the populations within these strata. Information is presented below by USGS subbasin because they present a convenient and systematic way to organize the CHART's watershed assessments for this ESU and their names are generally more recognizable because they typically identify major river systems.

Middle Columbia/Hood Subbasin (HUC4# 17070105)

The Middle Columbia/Hood subbasin is located in the eastern portion of the Columbia River gorge of Oregon and Washington. Occupied watersheds in this subbasin are contained in Hood River, Multnomah, and Wasco counties in Oregon, and Klickitat and Skamania counties in Washington. The subbasin contains 13 watersheds, three of which are occupied by this ESU (almost exclusively as rearing/migration habitat). Occupied watersheds encompass approximately 669 mi^2 and 282 miles of streams. This subbasin may be the upstream extent of the species' distribution in the entire Columbia River basin (Myers et al. 2003). Fish distribution and habitat use data from the Washington Department of Fish and Wildlife (WDFW) identify approximately 27 miles of occupied riverine habitat in the watersheds, including a 22-mile segment of the Columbia River (WDFW 2003). The CHART amended the WDFW distribution data with recent information indicating that chum salmon may occupy the lower reaches of the White Salmon River (Ehlke 2003). Myers et al. (2003) identified a single ecological zone (Columbia Gorge) containing two historical demographically independent populations in this subbasin (Upper Gorge Tributaries and Lower Gorge Tributaries). The Lower Gorge Tributaries population has been classified by the TRT as a "core" population (i.e., historically abundant and "may offer the most likely path to recovery") as well as a genetic legacy population (i.e., one of "the most intact representatives of the genetic character of the ESU") (McElhany et al. 2003).

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table F1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map F1 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART also determined that all of the occupied HUC5 watersheds in this subbasin were of high conservation value to the ESU. The CHART noted that two HUC5s (Middle Columbia/Eagle Creek and Middle Columbia/Grays Creek) contain a high value rearing and migration corridor in the Columbia River connecting high value upstream watersheds with downstream reaches and the ocean. Table F2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure F1 shows the overall distribution of ratings by HUC5 watershed

Lower Columbia/Sandy Subbasin (HUC4# 17080001)

The Lower Columbia/Sandy subbasin is located in the western portion of the Columbia River gorge of Oregon and Washington. Occupied watersheds in this subbasin are contained in Multnomah County, Oregon, and Clark and Skamania counties in Washington. The subbasin contains nine watersheds, three of which are occupied by this ESU. Occupied watersheds encompass approximately 571 mi^2 and 277 miles of streams. This subbasin contains some of the principal spawning habitat for the entire ESU (e.g., in Hardy and Hamilton creeks and adjacent areas of the mainstem Columbia River). Fish distribution and habitat use data from the Washington Department of Fish and Wildlife (WDFW) identify approximately 84 miles of occupied riverine habitat in the watersheds, including a 26-mile segment of the Columbia River (ODFW 2003a,b; WDFW 2003). Myers et al. (2003) identified two ecological zones (Cascade and Columbia Gorge) containing three historical demographically independent populations in this subbasin: Lower Gorge Tributaries, Washougal River, and Salmon Creek. The Lower Gorge Tributaries population has been classified by the TRT as a “core” population (i.e., historically abundant and “may offer the most likely path to recovery”) as well as a genetic legacy population (i.e., one of “the most intact representatives of the genetic character of the ESU”) (McElhany et al. 2003).

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table F1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map F2 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART also determined that all of the occupied HUC5 watersheds in this subbasin are of high conservation value to the ESU. The CHART also noted that the Columbia Gorge Tributaries HUC5, in addition to the key mainstem spawning areas, also contains a high value rearing and migration corridor in the Columbia River connecting high value upstream watersheds with downstream reaches and the ocean. Table F2 summarizes the CHART’s PCE/watershed scores and conservation value ratings, and Figure F1 shows the overall distribution of ratings by HUC5 watershed.

Lewis Subbasin (HUC4# 17080002)

The Lewis subbasin is located in southwest Washington and contained in Clark, Cowlitz, and Skamania counties (a very small and unoccupied portion in the uppermost watershed is contained in Yakima County). The subbasin contains six watersheds, two of which are currently occupied by this ESU and the remaining four are now blocked by Merwin Dam and others upstream. Occupied watersheds encompass approximately 456 mi^2 and 255 miles of streams. Fish distribution and habitat use data from the Washington Department of Fish and Wildlife (WDFW) identify approximately 71 miles of occupied riverine habitat in the watersheds (WDFW 2003). Myers et al. (2003) identified a single ecological zone (Cascade) containing one historical demographically independent population in this subbasin (Lewis River). The TRT has classified this as a "core" population (historically abundant and "may offer the most likely path to recovery") and the East Fork Lewis River summer-run population as a genetic legacy population (one of "the most intact representatives of the genetic character of the ESU") (McElhany et al. 2003).

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table F1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map F3 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART also determined that both of the occupied HUC5 watersheds in this subbasin were of high conservation value to the ESU. Table F2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure F1 shows the overall distribution of ratings by HUC5 watershed.

Lower Columbia/Clatskanie Subbasin (HUC4# 17080003)

The Lower Columbia/Clatskanie subbasin is located in southwest Washington and northwest Oregon. This subbasin contains six watersheds, three of which are occupied by this ESU and encompass approximately 543 square miles. Occupied watersheds in this subbasin are contained in Cowlitz, Lewis, Skamania, and Wahkiakum counties in Washington. Occupied watersheds encompasses approximately 543 mi^2 and 267 miles of streams. Fish distribution and habitat use data from the Washington Department of Fish and Wildlife (WDFW) identify approximately 51 miles of occupied riverine habitat in these watersheds (WDFW 2003). Myers et al. (2003) identified two ecological zones (Coast Range and Cascade) containing five historical demographically independent populations in this subbasin: Kalama River, Mill Creek, Elochoman River, Clatskanie River, and Scappoose River. The Elochoman River population has been classified by the TRT as a "core" population, i.e., historically abundant and "may offer the most likely path to recovery" (McElhany et al. 2003).

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table F1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watershed. Map F4 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART also determined that all of the occupied HUC5 watersheds in this subbasin of high conservation value to the ESU. Table F2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure F1 shows the overall distribution of ratings by HUC5 watershed.

Lower Cowlitz Subbasin (HUC4# 17080005)

The Lower Cowlitz subbasin is located in southwest Washington and contained in Cowlitz, Lewis, and Skamania counties. The subbasin contains eight watersheds, six of which are occupied by this ESU. Occupied watersheds encompass approximately 1,102 mi^2 and 492 miles of streams. Fish distribution and habitat use data from the Washington Department of Fish and Wildlife (WDFW) identify approximately 243 miles of occupied riverine habitat in the watersheds (WDFW 2003). Myers et al. (2003) identified one ecological zone (Cascade) containing a single historical demographically independent population (Cowlitz River) of chum salmon in this subbasin. This population has been classified by the TRT as a "core" population (i.e., historically abundant and "may offer the most likely path to recovery") and a genetic legacy population (i.e., one of "the most intact representatives of the genetic character of the ESU") (McElhany et al. 2003).

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table F1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map F5 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART determined that the occupied HUC5 watersheds in this subbasin were of high or medium conservation value to the ESU. Of the six HUC5s reviewed, three were rated as having high and three were rated as having medium conservation value to the ESU. The CHART also noted that two HUC5s (East Willapa and Coweeman River) contained high value rearing and migration corridors connecting high value upstream watersheds with downstream reaches and the ocean. Table F2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure F1 shows the overall distribution of ratings by HUC5 watershed.

Lower Columbia Subbasin (HUC4# 17080006)

The Lower Columbia subbasin is located at the mouth of the Columbia River in southwest Washington and Northwest Oregon. Occupied watersheds in this subbasin are contained in Clatsop County, Oregon, and Lewis, Pacific, and Wahkiakum counties in Washington. The subbasin contains three watersheds, two of which (Grays Bay and Big Creek) are occupied by this ESU. Occupied watersheds encompass approximately 304 mi^2 and 138 miles of streams. Fish distribution and habitat use data from the Oregon Department of Fish and Wildlife (ODFW) and Washington Department of Fish and Wildlife (WDFW) identify approximately 62 miles of occupied riverine habitat in the watersheds (ODFW 2003a,b; WDFW 2003). The CHART received recent data from ODFW (R. Turner, NOAA Fisheries, personal communication) indicating that the Big Creek watershed is occupied by this ESU, even though ODFW data identifies these reaches as "historically occupied." Myers et al. (2003) identified a single ecological zone (Coast Range) containing three demographically independent populations in this subbasin (Grays and Chinook Rivers, Youngs Bay, and Big Creek). The Youngs Bay, Grays and Chinook Rivers, and Big Creek populations have been classified by the TRT as "core" populations, i.e., historically abundant and "may offer the most likely path to recovery" (McElhany et al. 2003). In addition, the TRT classified the Grays and Chinook Rivers population as a genetic legacy population, i.e., one of "the most intact representatives of the genetic character of the ESU."

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table F1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map F6 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART also determined that the occupied HUC5 watersheds in this subbasin were of high conservation value to the ESU. Table F2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure F1 shows the overall distribution of ratings by HUC5 watershed.

Lower Columbia River Corridor

The lower Columbia River rearing and migration corridor consists of that segment from the mouth of the Columbia River at the Pacific Ocean upstream to an imaginary line connecting the confluences of the Sandy River (Oregon) and Washougal River (Washington). This corridor overlaps with the following counties: Clatsop, Columbia, and Multnomah counties in Oregon, and Clark, Cowlitz, Pacific, and Wahkiakum counties in Washington. Fish distribution and habitat use data from WDFW identify approximately 118 miles of occupied riverine and estuarine habitat in this corridor (WDFW 2003). Table B1 summarizes the total number of occupied reaches in this corridor containing rearing or migration PCEs, as well as management activities that may affect the PCEs.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the lower Columbia River corridor was of high conservation value to the ESU. Other upstream reaches of the Columbia River corridor (within the Middle Columbia/Hood and Lower Columbia/Sandy subbasins above) are also high value for rearing/migration. The CHART noted that the lower Columbia River corridor connects every watershed and population in this ESU with the ocean and is used by rearing/migrating juveniles and migrating adults. The Columbia River estuary is a particularly important area for this ESU as both juveniles and adults make the critical physiological transition between life in freshwater and marine habitats (ISAB 2000, Marriott et al. 2002).

Marine Areas

NOAA Fisheries' analysis focused on freshwater and estuarine habitats upstream of the mouth of the Columbia River. While marine areas are occupied by this ESU, within this vast area the agency has not identified "specific areas within the geographical area occupied by the species . . . on which are found those physical or biological features . . . essential to the conservation of the species."

Changes to the CHART's Initial Assessments

The CHART reviewed the public and peer reviewer comments received on the Team's initial findings for this ESU as well as new information relevant to evaluating habitat areas for this ESU. As a result, the CHART did not change conservation value ratings for any watershed within the geographical area occupied by this ESU, and there were no changes to the delineation of occupied habitat areas. The proposed critical habitat designation (69 FR 74572, December 14, 2004) summarizes the comments and responses pertaining to the CHART's initial determinations for this ESU, and Tables F1 and F2 reflect the final CHART assessments.

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Table F1. Summary of Occupied Areas, PCEs, and Management Activities Affecting PCEs for the Columbia River Chum Salmon ESU

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCESs)			Unoccupied but may be essential (mi)**	Management Activities***
				Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*		
	Middle Columbia/ Hood	White Salmon River	1707010509	0	0	3.4	4.5[x]	A, C, D, F, R, U
	Middle Columbia/ Hood	Wind River	1707010511	0	0	0	2.8[y]	
	Middle Columbia/ Hood	Middle Columbia/Grays Creek	1707010512	0	0	13.8		R, U
	Middle Columbia/ Hood	Middle Columbia/Eagle Creek	1707010513	0	0	9.3		D, R, U
	Lower Columbia/ Sandy	Washougal River	1708000106	0	0	14.9		C, F, R, S, U, W
	Lower Columbia/ Sandy	Columbia Gorge Tributaries	1708000107	8.5	0.1	41.3		C, D, F, R, U, W
	Lower Columbia/ Sandy	Salmon Creek	1708000109	0.2	0	19.4		A, C, F, R, U, W
	Lewis	East Fork Lewis River	1708000205	0	0	44.1		A, C, F, R, S, U, W
	Lewis	Lower Lewis River	1708000206	0	0	27.1		A, C, D, F, R, U, W
	Lower Columbia/ Claskanie	Kalama River	1708000301	0	0	9.1		C, F, R, U, W
	Lower Columbia/ Claskanie	Germany/Abernathy	1708000304	0	0	6.8		A, C, F, R, U, W
	Lower Columbia/ Claskanie	Skamokawa/ Elochoman	1708000305	3.4	8	24		A, C, F, R, W
	Cowlitz	Jackson Prairie	1708000503	0	0	78.7		A, C, D, F, R
	Cowlitz	North Fork Toutle River	1708000504	0	0	0.9		F, R
	Cowlitz	Green River	1708000505	0	0	2.4		F, R
	Cowlitz	South Fork Toutle River	1708000506	0	0	9.4		F, R
	Cowlitz	East Willapa	1708000507	0	0	74.9		A, C, F, R, U, W
	Cowlitz	Coweeman	1708000508	0	0	76.8		A, C, F, R, U, W
	Lower Columbia	Big Creek	1708000602	0	0	6		A, C, F, I, R, W
	Lower Columbia	Grays Bay	1708000603	6.8	17.8	31.4		C, F, R, W

[x] Watershed contains unoccupied habitat above Condit Dam that may be essential for conservation.

[y] Unoccupied HUC5, but population expansion into this HUC5 possibly essential for conservation.

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCESs) Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*	Unoccupied but may be essential (mi)**	Management Activities***
	Multiple	Lower Columbia Corridor (Sandy/Washougal to Ocean)	NA	0	29.1	147.2[z]		C, D, I, R, T, U, W

* Some streams classified as "Migration/Presence PCEs" may also include rearing or spawning PCEs, but the GIS data are still undergoing review to confirm additional habitat use types.

** These watersheds contain unoccupied habitat that historically supported spawning and rearing PCEs. The CHART determined that these habitat areas/watersheds may be essential for conservation of the ESU. Since these watersheds are unoccupied, the CHART did not identify management activities.

*** This list is not exhaustive. It is intended to highlight key management activities affecting PCEs in each watershed. Activities identified are based on the general categories described by Spence et al. (1996) and summarized previously in the "Special Management Considerations or Protection" section of this report. Coding is as follows: F= forestry, G = grazing, A = agriculture, C = channel modifications/diking, R = road building/maintenance, U = urbanization, S = sand and gravel mining, M = mineral mining, D = dams, I = irrigation impoundments and withdrawals, T = river, estuary, and ocean traffic, W = wetland loss/removal, B = beaver removal, X = exotic/invasive species introductions, H = forage fish/species harvest. Primary sources for this information were the CHART and reports by LCFRB (2003), Subbasin Summary Reports of the NWPPC, and land use/land cover GIS layers from the U.S. Geological Survey.

[z] The Lower Columbia River from the ocean upstream approximately 46.5 miles is considered to contain estuarine PCEs, in addition to migration and rearing (ISAB 2000).

Table F2. Summary of Initial CHART Scores and Ratings of Conservation Value for Habitat Areas in HUC5 Watersheds Occupied by the Columbia River Chum Salmon ESU

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)					Total HUC5 Score (0-15)[2]	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5			
	Middle Columbia/Hood	White Salmon River	1707010509	2	1	2	1	2	8	Moderate HUC5 score; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs; recent evidence of spawning in the Big White Salmon River may be the only extant production within the range of the TRT's historical Upper Gorge Tributaries population; Watershed contains unoccupied habitat above Condit Dam that may be essential for conservation.	High
	Middle Columbia/Hood	Wind River	1707010511						*	Unoccupied HUC5, but population expansion into this HUC5 possibly essential for conservation; High HUC5 score	Possibly High

[2] PCE/watershed scores were derived using the CHART scoring process described in the introduction to this report. The CHART employed an earlier 5-factor version of the scoring matrix for three ESUs (Columbia River chum salmon and Upper Willamette River chinook salmon and steelhead) therefore the maximum possible score for these ESUs was 15 points.

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)					Total HUC5 Score (0-15)[2]	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5			
	Middle Columbia/Hood	Middle Columbia/Grays Creek	1707010512	1	1	1	2	3	8	Moderate HUC5 score; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs; no tributary or spawning habitat identified in this HUC5 but CHART concluded that Columbia River rearing/migration PCEs in this HUC5 downstream from Big White Salmon River are of high conservation value to the ESU	High
	Middle Columbia/Hood	Middle Columbia/Eagle Creek	1707010513	1	1	1	2	3	8	Moderate HUC5 score; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs; no tributary or spawning habitat identified but CHART concluded that Columbia River rearing/migration PCEs in this HUC5 are of high conservation value to the ESU	High
	Lower Columbia/Sandy	Washougal River	1708000106	2	1	1	2	3	9	Moderate HUC5 score; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs; this HUC5 is near mainstem Columbia River spawning area and may contain important rearing PCEs; LaCamas Creek noted as having seeps or springs that may be important for this ESU	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)					Total HUC5 Score (0-15)[2]	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5			
	Lower Columbia/Sandy	Columbia Gorge Tributaries	1708000107	3	2	3	3	3	14	High HUC5 score; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs; this HUC5 within range of TRT historical Lower Gorge Tributaries population and contains essential tributary spawning sites as well as mainstem Columbia River spawning sites in the vicinity of Hardy and Hamilton creeks and downstream near Camas, WA; HUC5 also contains important springs/seeps and is a high value Columbia River rearing/migration corridor for the ESU	High
	Lower Columbia/Sandy	Salmon Creek	1708000109	2	2	3	1	3	11	Moderate-high HUC5 score; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs; this HUC5 is believed to contain some spawning/rearing habitat; HUC5 includes entire spawning range of a TRT historical population	High
	Lewis	East Fork Lewis River	1708000205	3	1	1	2	2	9	Moderate HUC5 score; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs; HUC5 is one of two supporting a TRT historical core population; East Fork Lewis River noted as having seeps or springs that may be important for this ESU	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)					Total HUC5 Score (0-15)[2]	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5			
	Lewis	Lower Lewis River	1708000206	3	3	1	2	2	11	Moderate-high HUC5 score; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs; HUC5 is one of two supporting a TRT historical core population	High
	Lower Columbia/ Clatskanie	Kalama River	1708000301	3	2	1	2	3	11	Moderate-high HUC5 score; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs; HUC5 includes entire spawning range of a TRT historical population	High
	Lower Columbia/ Clatskanie	Germany/ Abernathy	1708000304	2	2	2	1	3	10	Moderate HUC5 score; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs; one of only four HUC5s with tributary PCEs in the Coast Range region; HUC5 includes entire spawning range of a TRT historical population; Mill, Germany, and Abernathy creeks noted as having seeps or springs that may be important for this ESU	High

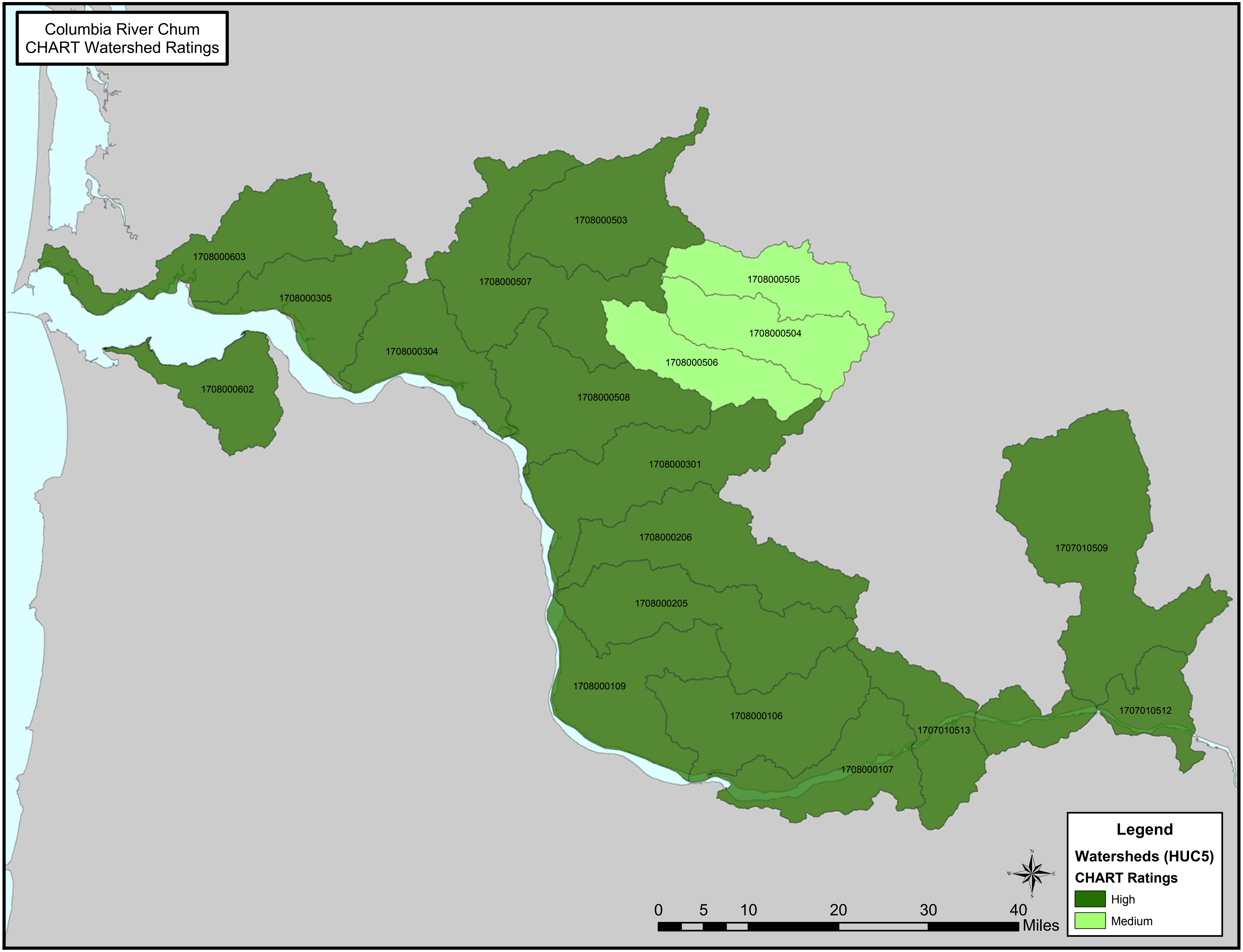
Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)					Total HUC5 Score (0-15)[2]	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5			
	Lower Columbia/ Clatskanie	Skamokawa/ Elochoman	1708000305	2	1	2	2	3	10	Moderate HUC5 score; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs; one of only four HUC5s with tributary PCEs in the Coast Range region; HUC5 includes entire spawning range of a TRT historical population; Skamokawa Creek noted as having seeps or springs that may be important for this ESU	High
	Cowlitz	Jackson Prairie	1708000503	3	2	1	2	2	10	Moderate HUC5 score; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs; one of at least three HUC5s supporting a TRT historical core population and PCEs are relatively extensive here	High
	Cowlitz	North Fork Toutle River	1708000504	0	3	1	0	2	6	Low-Moderate HUC5 score; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs (and this HUC5 has one of the lowest)	Medium
	Cowlitz	Green River	1708000505	3	1	1	0	2	7	Moderate HUC5 score; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs (and this HUC5 has one of the lowest)	Medium

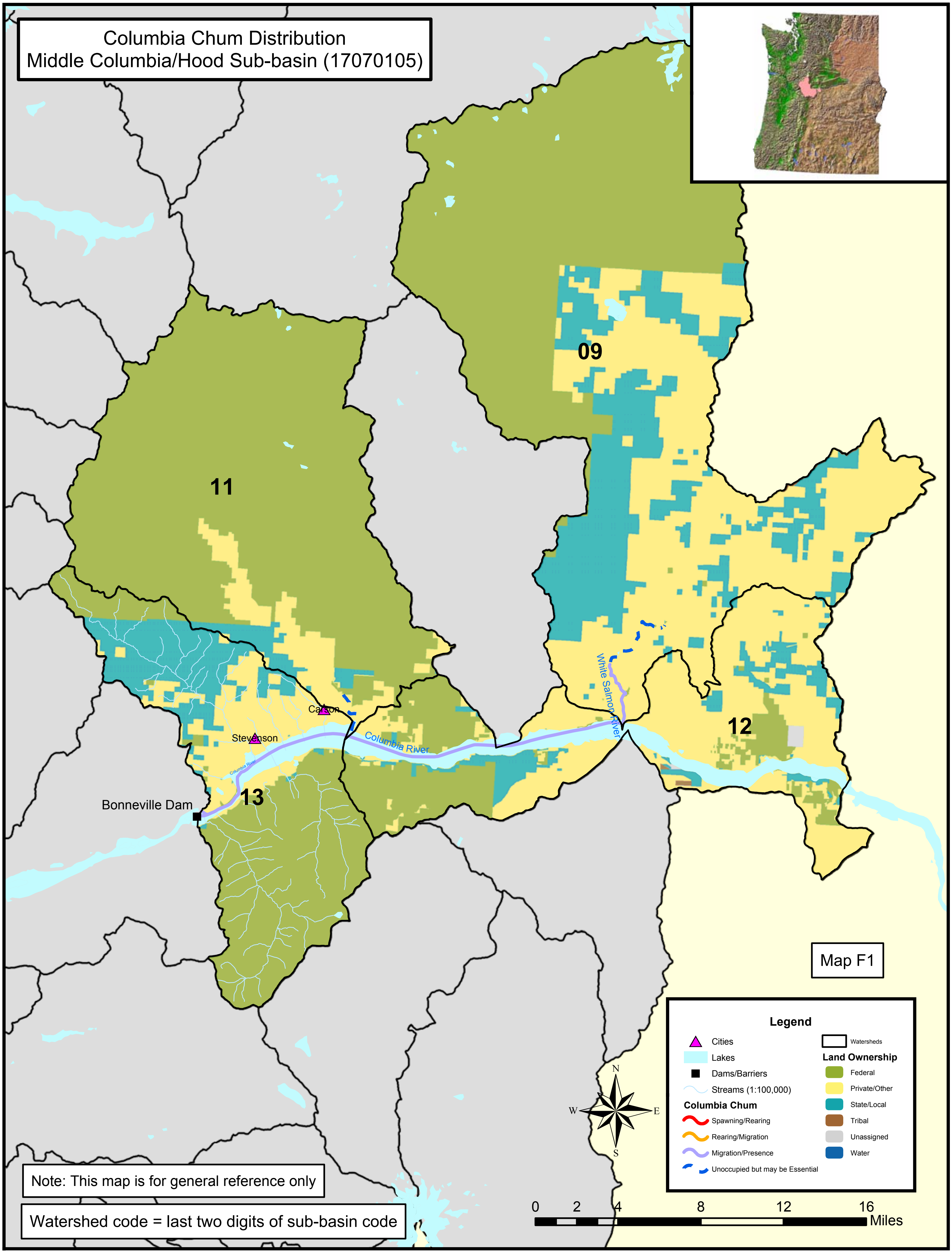
Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)					Total HUC5 Score (0-15)[2]	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5			
	Cowlitz	South Fork Toutle River	1708000506	2	1	1	1	2	7	Moderate HUC5 score; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs (and this HUC5 has one of the lowest)	Medium
	Cowlitz	East Willapa	1708000507	3	2	1	2	2	10	Moderate HUC5 score; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs; one of at least three HUC5s supporting a TRT historical core population and PCEs are relatively extensive here; HUC5 also contains important connectivity corridor for a high-value upstream HUC5	High
	Cowlitz	Coweeman	1708000508	3	2	1	2	2	10	Moderate HUC5 score; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs; one of at least three HUC5s supporting a TRT historical core population and PCEs are relatively extensive here; HUC5 also contains important connectivity corridor for a high-value upstream HUC5	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)					Total HUC5 Score (0-15)[2]	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5			
	Lower Columbia	Big Creek	1708000602	2	2	2	2	3	11	Moderate-high HUC5 score; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs; one of only four HUC5s with tributary PCEs in the Coast Range region; HUC5 includes entire spawning range of a TRT historical population	High
	Lower Columbia	Grays Bay	1708000603	3	2	3	3	3	14	Highest HUC5 score for entire range of ESU; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs; one of only four HUC5s with tributary PCEs in the Coast Range region; HUC5 includes entire spawning range of a TRT historical population	High
	Multiple	Lower Columbia Corridor (Sandy/Washougal to Ocean)	NA						NS	Area not scored since many reaches are outside HUC5 boundaries. However, the CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation	High

* Rated by CHART although HUC5 is currently unoccupied

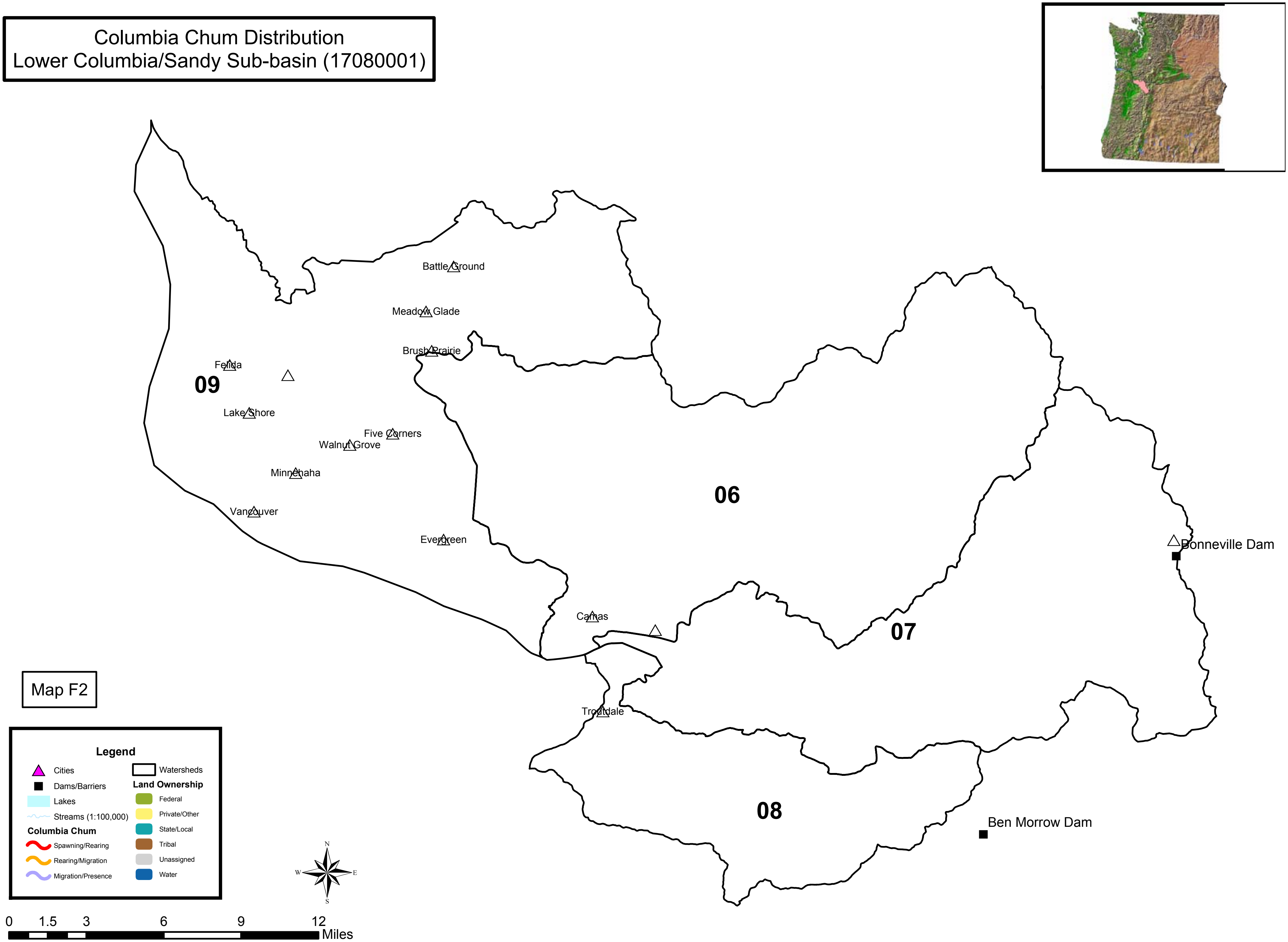
Figure F1. CHART Ratings of Conservation Value for Habitat Areas in HUC5 Watersheds Occupied by the Columbia River Chum Salmon ESU


Columbia River Chum
CHART Watershed Ratings
1708000503
1708000603
1708000507
1708000505
1708000305
1708000504
1708000304
1708000506
1708000602
1708000508
1708000301
1708000206
1707010509
1708000205
1708000109
1708000106
1707010512
1707010513
1708000107
Legend
Watersheds (HUC5)
CHART Ratings
High
Medium
0
5
10
20
30
40
Miles



Columbia Chum Distribution
Middle Columbia/Hood Sub-basin (17070105)
09
11
12
13
Carson
Stevenson
Bonneville Dam
Columbia River
White Salmon River
Map F1
Legend
Cities
Lakes
Dams/Barriers
Streams (1:100,000)
Columbia Chum
Spawning/Rearing
Rearing/Migration
Migration/Presence
Unoccupied but may be Essential
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
0
2
4
8
12
16
Miles
Note: This map is for general reference only
Watershed code = last two digits of sub-basin code

Columbia Chum Distribution
Lower Columbia/Sandy Sub-basin (17080001)

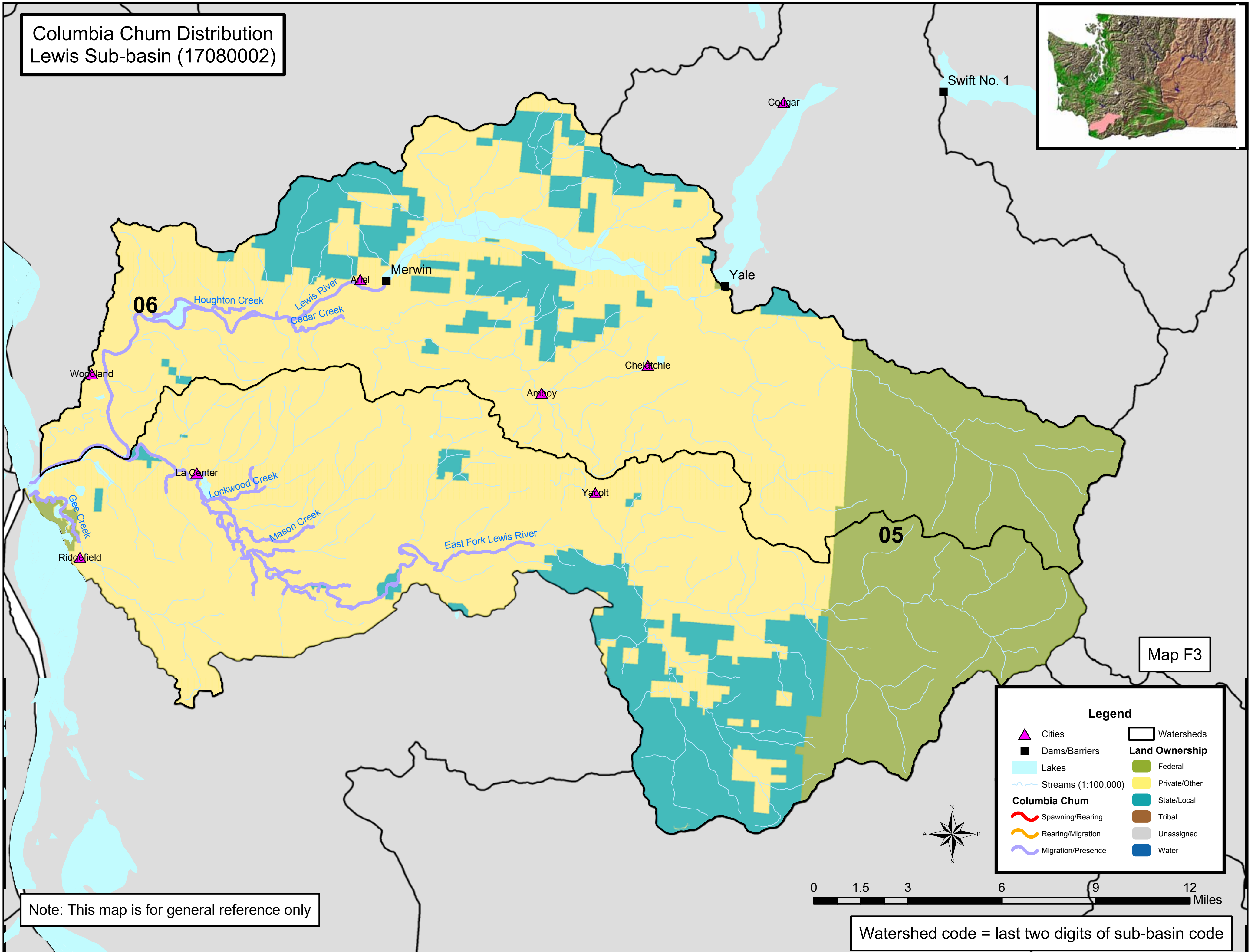


Map F2

Watershed code = last two digits of sub-basin code

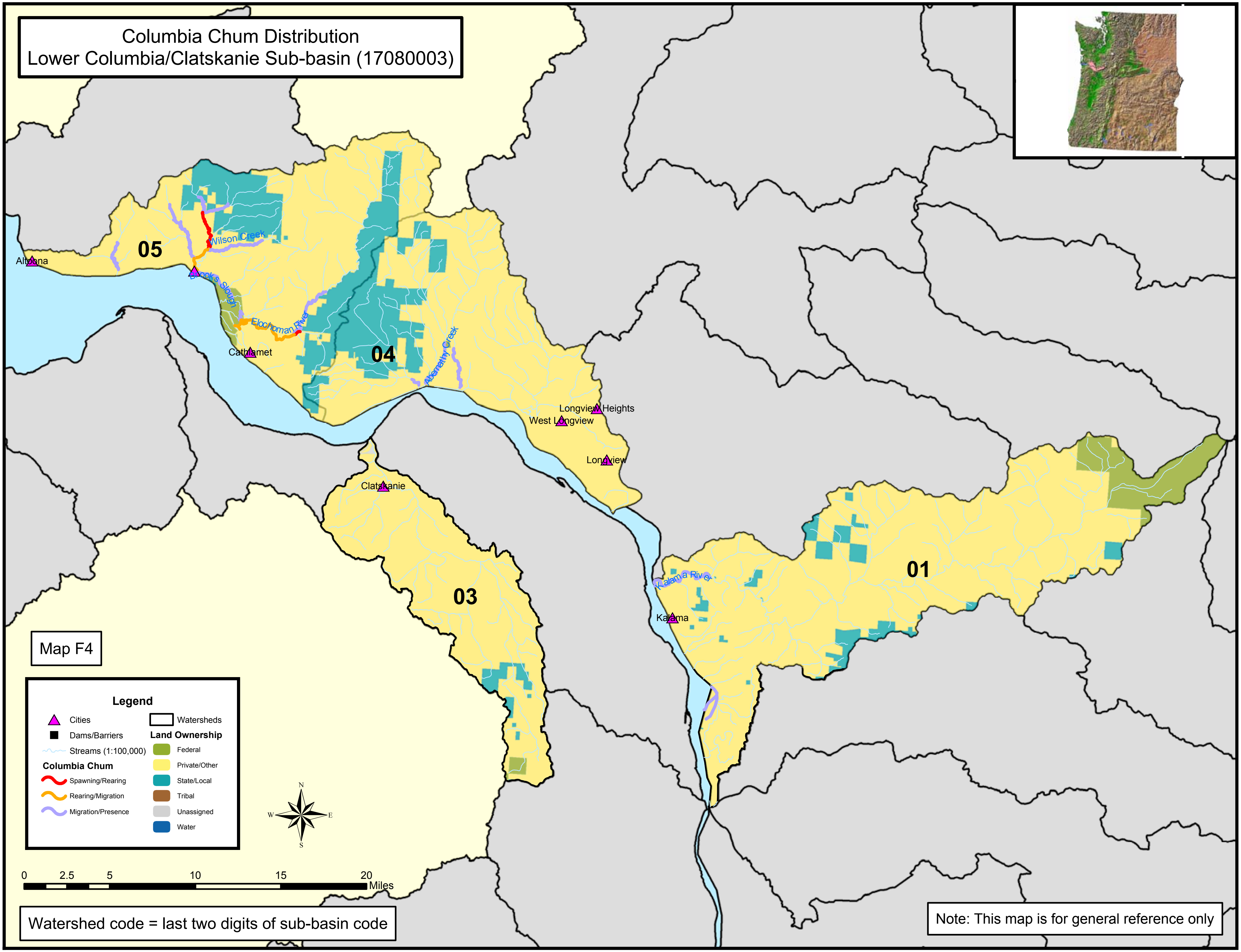
Note: This map is for general reference only

Columbia Chum Distribution
Lewis Sub-basin (17080002)

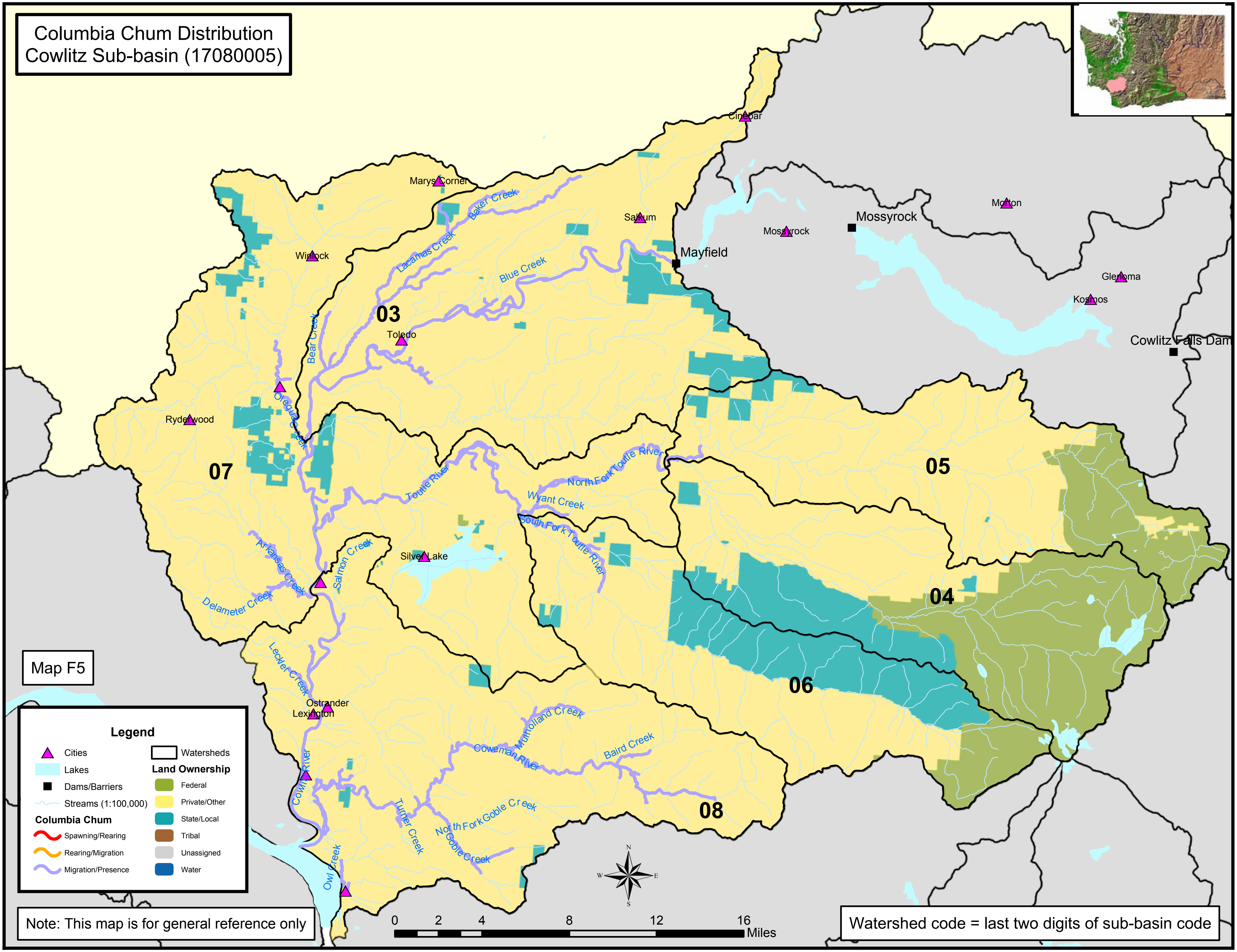


Note: This map is for general reference only

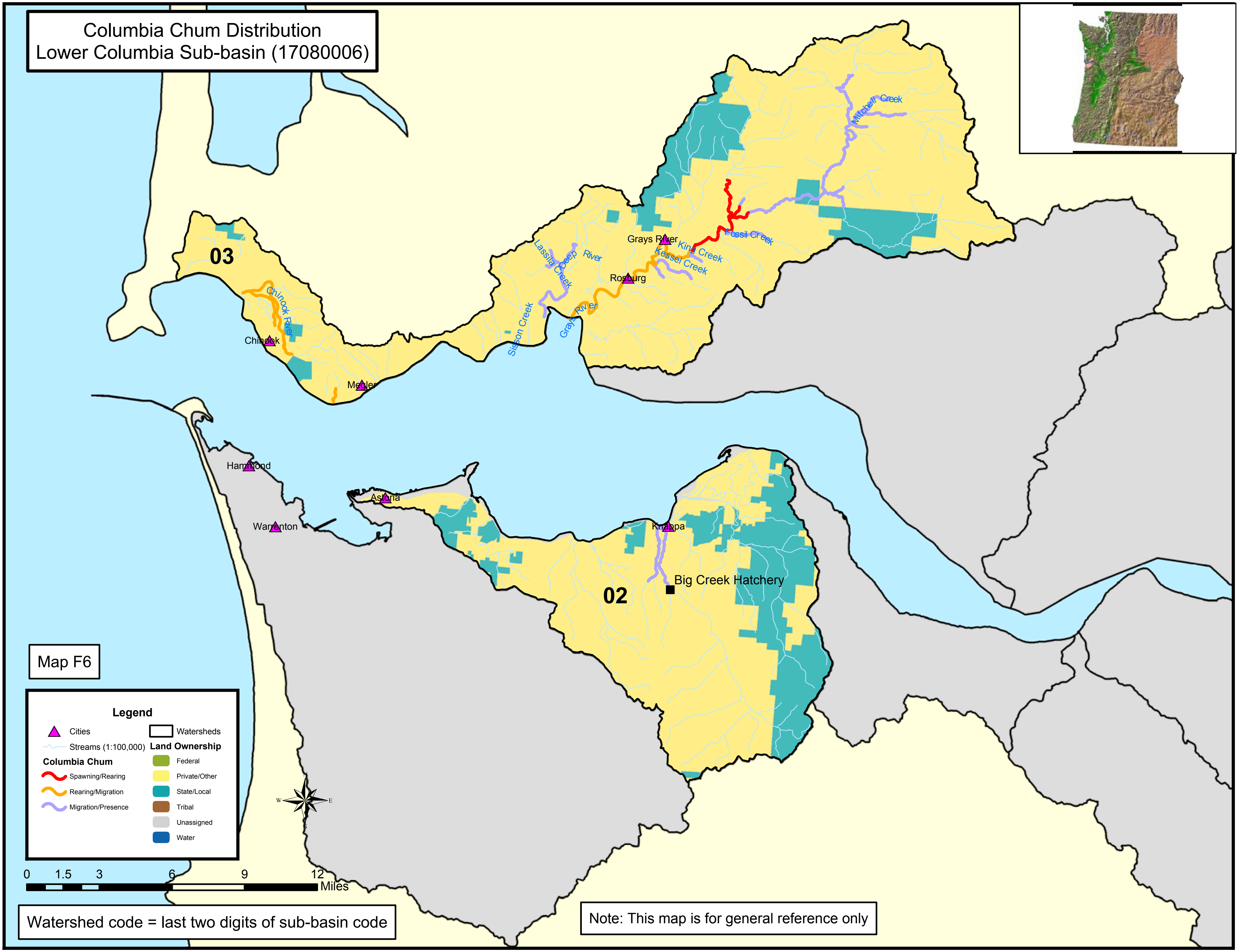
Watershed code = last two digits of sub-basin code



Columbia Chum Distribution
Lower Columbia/Clatskanie Sub-basin (17080003)
05
04
03
01
Altoona
Brooks Slough
Wilson Creek
Elochoman River
Cathlamet
Abernathy Creek
Longview Heights
West Longview
Longview
Clatskanie
Kalama River
Kalama
Map F4
Legend
Cities
Dams/Barriers
Streams (1:100,000)
Columbia Chum
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
E
S
W
0
2.5
5
10
15
20
Miles
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only



Columbia Chum Distribution
Cowlitz Sub-basin (17080005)
Map F5
Legend
Cities
Lakes
Dams/Barriers
Streams (1:100,000)
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Columbia Chum
Spawning/Rearing
Rearing/Migration
Migration/Presence
03
04
05
06
07
08
Cinebar
Marys Corner
Salkum
Mayfield
Mossyrock
Morton
Glenoma
Kosmos
Cowlitz Falls Dam
Winlock
Toledo
Ryderwood
Silver Lake
Ostrander
Lexington
Baker Creek
Lacamas Creek
Blue Creek
Bear Creek
Olequa Creek
Toutle River
North Fork Toutle River
Wyant Creek
South Fork Toutle River
Arkansas Creek
Salmon Creek
Delameter Creek
Leckler Creek
Mulholland Creek
Coweman River
Baird Creek
Cowlitz River
Turner Creek
North Fork Goble Creek
Goble Creek
Owl Creek
0 2 4 8 12 16 Miles
Note: This map is for general reference only
Watershed code = last two digits of sub-basin code



Columbia Chum Distribution
Lower Columbia Sub-basin (17080006)
03
02
Chinook River
Chinook
Megler
Sisson Creek
Grays River
Lassila Creek
Deep River
Grays River
Rosburg
King Creek
Kessel Creek
Fossil Creek
Mitchell Creek
Hammond
Astoria
Warrenton
Knappa
Big Creek Hatchery
Map F6
Legend
Cities
Streams (1:100,000)
Columbia Chum
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
0
1.5
3
6
9
12
Miles
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only

Appendix G
CHART Assessment for the
Ozette Lake Sockeye Salmon ESU

CHART Participants

The CHART for this ESU consisted of the following NOAA Fisheries biologists: DeeAnn Kirkpatrick (CHART Leader), Steve Fransen, Tom Hooper, Mike Parton, and Tim Tynan. Steve Ralph (Environmental Protection Agency) is another federal biologist who served on this CHART.

The following biologists working for NOAA Fisheries provided valuable expertise to the CHART, but were not part of deliberations or the formal scoring/rating process: Bill Graeber (NOAA Fisheries), John Meyers (National Park Service [NPS]), and Tom Sibley (NOAA Fisheries).

ESU Description

The Ozette Lake sockeye salmon ESU was listed as a threatened species in 1999 (64 FR 14528; March 25, 1999). The ESU includes all naturally spawned populations of sockeye salmon in Ozette Lake and streams and tributaries flowing into Ozette Lake, Washington. The agency recently conducted a review to update the ESU's status, taking into account new information and considering the net contribution of artificial propagation efforts in the ESU. We recently published the results of this review and concluded that Puget Sound Chinook salmon (including two hatchery programs) should remain listed as threatened (70 FR 37160; June 28, 2005). The Puget Sound Technical Recovery Team considers the Ozette Lake sockeye ESU to be comprised of one historical population with multiple spawning aggregations.

Migration of adult sockeye salmon (typically 4-year-old fish) up the Ozette River generally occurs from April to early August (WDFW et al. 1993). High water temperatures in the lake and river and low water flows in the summer may create a thermal block to migration and influence timing of the sockeye salmon migration (LaRiviere 1991). Recorded water temperatures in late-July and August in the Ozette River near the lake outlet have exceeded the temperature range over which sockeye salmon are known to migrate (Gustafson et al. 1997).

Disjunct spawning times for fish at different beach spawning sites within the lake suggest that Ozette Lake sockeye may be composed of discrete subpopulations (Dlugokenski et al. 1981). The primary existing spawning aggregations occur in two beach locations—Allen's and Olsen's beaches, and in two tributaries, Umbrella Creek and Big River. Both of the tributary spawning groups were initiated through a hatchery introduction program. Spawning fish are occasionally found in other tributaries and may occur at other beach locations within the lake (Makah Fisheries 2000). The extent to which sockeye spawned historically in tributaries to the lake is controversial (Gustafson et al. 1997), but it is clear that multiple beach-spawning aggregations of sockeye occurred historically, and that genetically distinct kokanee currently spawn in large numbers in all surveyed lake tributaries (except Umbrella Creek and Big River). During low water levels in summer, much of the available beach spawning habitat may become exposed (Bortleson and Dion 1979).

Eggs and alevins reside beneath fine gravel/cobble generally from 1.3 to 10.2 cm in diameter (Reiser and Bjornn 1979). Incubation is temperature dependent and generally takes as little as 50 days (or less) or more than five months (Hart 1973). After hatching most juveniles spend one winter in Ozette Lake rearing before outmigrating to the ocean as two-year-old fish during April and May (Dlugokenski et al. 1981). Juvenile sockeye feed primarily on plankton and a variety of terrestrial and aquatic insects (Hart 1973, Scott and Crossman 1973). The fish typically spend two years in the northeast Pacific Ocean foraging on zooplankton, squid, and, infrequently, on small fishes (Scott and Crossman 1973).

Recovery Planning Status

The Puget Sound TRT considers the Ozette Lake sockeye ESU to be comprised of one historical population with multiple spawning aggregations (Ruckelshaus et al. 2001, 2002). A local technical team (the Lake Ozette Steering Committee) has developed initial technical assessments and preliminary recovery strategies. The Makah tribe intends to complete the technical analysis of the factors limiting recovery of Ozette Lake sockeye and develop an initial draft recovery plan for the ESU by the end of 2005. NOAA Fisheries will support that effort with both technical and recovery planning staff assistance.

CHART Area Assessment and Conservation Value Rating

The CHART assessment for this ESU addressed a single subbasin containing a single (Ozette Lake) watershed.

Ozette Lake Subbasin (HUC4# 17100101)

The Ozette Lake subbasin includes a single watershed and is located in Clallam County, Washington, in the northwest corner of the Olympic Peninsula. The watershed encompasses approximately 101 mi^2 and approximately 317 miles of streams; Ozette Lake is a dominant feature of the watershed.

Fish distribution and habitat use type data from the Washington Department of Fish and Wildlife (WDFW) identify approximately 40 miles of occupied riverine/estuarine habitat in this watershed (WDFW 1993). In addition, Ozette Lake covers approximately 12 mi^2 and contains important spawning beaches and rearing areas. The CHART concluded that all of these occupied areas contained PCEs, including spawning beaches, lake and river rearing habitat, and river migration corridors. The CHART noted several corrections to the information regarding distribution of fish and PCEs for this ESU, including recent spawning/rearing range extension in Solberg Creek (J. Meyers, NPS, personal communication). These corrections were discussed with WDFW (B. McTeague, WDFW, personal communication) and were later incorporated into its GIS database (WDFW et al. 2003) for this species/area. Management activities that may affect PCEs in this watershed include, but are not limited to, forestry and introduction of exotic invasive plants. Map G1 depicts the areas occupied by this ESU and under consideration for critical habitat designation. This watershed supports the one and only population constituting this ESU; therefore, the CHART concluded that this watershed warranted a high conservation value rating.

While the CHART did not identify any unoccupied areas that may be essential for this ESU, they did note that tributary streams near lake spawning beaches may have a major influence on PCEs (e.g., sedimentation and substrate recruitment).

Marine Areas

NOAA Fisheries' analysis focused on freshwater and estuarine habitats upstream of the mouth of the Ozette River. While marine areas are occupied by this ESU, within this vast area the agency has not identified "specific areas within the geographical area occupied by the species . . . on which are found those physical or biological features . . . essential to the conservation of the species."

Changes to the CHART's Initial Assessments

The CHART reviewed the public and peer reviewer comments received on the Team's initial findings for this ESU as well as new information relevant to evaluating habitat areas for this ESU. As a result, the CHART did not change the high conservation value rating for this watershed, and there were only minor changes (approximately 4 miles (6.6 km)) to the delineation of occupied habitat areas based on new information submitted by the Makah Tribe (Makah Fisheries Management 2003,2004; Makah Tribe 2005). The proposed critical habitat designation (69 FR 74572, December 14, 2004) summarizes the comments and responses pertaining to the CHART's initial determinations for this ESU.

References and Sources of Information

References cited above as well as key reports and data sets reviewed by the CHART include the following:

Beauchamp, D.A., and M.G. LaRiviere. 1993. An evaluation of competition and predation as limits to juvenile sockeye salmon production in Lake Ozette, Washington. Final Report to Makah Tribal Fisheries Management, Neah Bay, WA.

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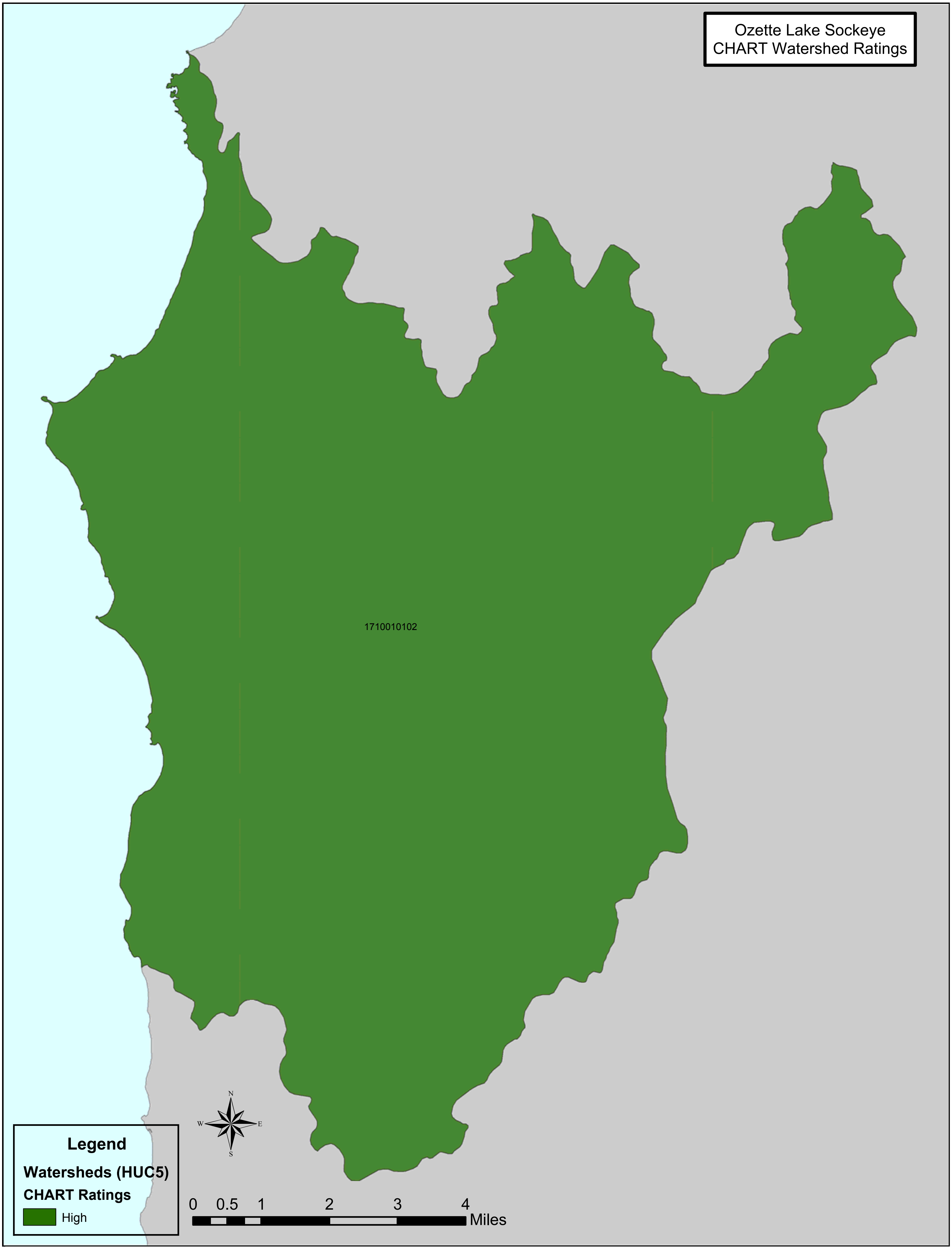
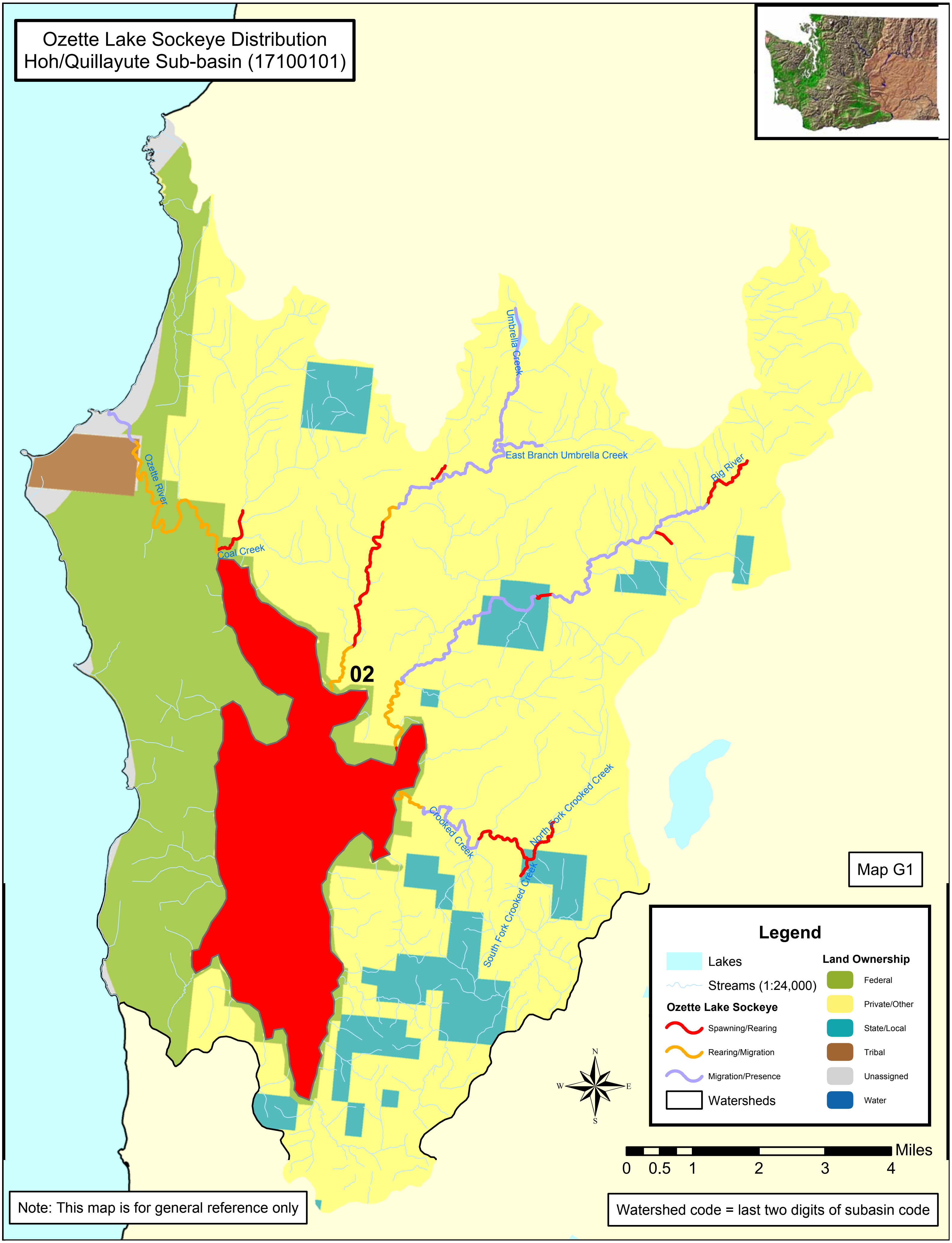
Map G1. Ozette Lake Sockeye Salmon ESU – Habitat Areas Under Consideration for Critical Habitat Designation


Ozette Lake Sockeye
CHART Watershed Ratings
1710010102
N
W
E
S
Legend
Watersheds (HUC5)
CHART Ratings
High
0 0.5 1 2 3 4
Miles


Ozette Lake Sockeye Distribution
Hoh/Quillayute Sub-basin (17100101)
Umbrella Creek
East Branch Umbrella Creek
Big River
Ozette River
Coal Creek
02
Crooked Creek
North Fork Crooked Creek
South Fork Crooked Creek
Map G1
Legend
Lakes
Streams (1:24,000)
Ozette Lake Sockeye
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
Miles
0 0.5 1 2 3 4
Note: This map is for general reference only
Watershed code = last two digits of subasin code

Appendix H
CHART Assessment for the
Upper Columbia River Steelhead ESU

CHART Participants

The CHART for this ESU consisted of the following NOAA Fisheries biologists: Dale Bambrick (CHART Leader), Dennis Carlson, Kale Gullett, and Lynn Hatcher. CHART members also included Ken McDonald from the U.S. Forest Service and Jim Craig from the U.S. Fish and Wildlife Service.

ESU Description

The Upper Columbia River steelhead ESU was listed an endangered species in 1997 (62 FR 43937; August 18, 1997). The ESU includes all naturally spawned populations of steelhead in streams in the Columbia River Basin upstream from the Yakima River, Washington, to the U.S.-Canada border (62 FR 43937; August 18, 1997). The agency recently conducted a review to update the ESU's status, taking into account new information, evaluating component resident rainbow trout populations, and considering the net contribution of artificial propagation efforts in the ESU. We have proposed that Upper Columbia River *O. mykiss* (steelhead and rainbow trout, inclusive) be listed as threatened (69 FR 33102; June 14, 2004). Additionally, we have proposed that the listing include resident populations of *O. mykiss* below impassible barriers (natural and manmade) that co-occur with anadromous populations (69 FR 33102; June 14, 2004). We have also proposed that the listing include six artificial propagation programs considered part of the ESU (69 FR 33102; June 14, 2004). The final listing determination for all *O. mykiss* ESUs was extended by six months (70 FR 37219, June 28, 2005), therefore the CHART's assessment focused on the anadromous range of *O. mykiss*.

Unlike Pacific salmon, steelhead are capable of spawning more than once before death. However, it is rare for steelhead to spawn more than twice before dying, and most that do so are females. Steelhead can be divided into two basic run types based on their level of sexual maturity at the time they enter fresh water and the duration of the spawning migration. The stream-maturing type, or summer steelhead, enters fresh water in a sexually immature condition and requires several months in fresh water to mature and spawn. The ocean-maturing type, or winter steelhead, enters fresh water with well-developed gonads and spawns relatively shortly after river entry. Fish in the Upper Columbia River steelhead ESU are made up entirely of summer steelhead.

Upper Columbia River steelhead spawn in cool, clear streams with suitable gravel size, depth, and current velocity. They sometimes also use smaller streams for spawning. The adult steelhead enter fresh water between May and October. During summer and fall before spawning, they hold in cool, deep pools. They migrate inland toward spawning areas, overwinter in the larger rivers, resume migration to natal streams in early spring, and then spawn. In general, adults in this ESU spawn later than in most downstream populations—often remaining in fresh water for a year before spawning.

Depending on water temperature, steelhead eggs may incubate for 1.5 to four months before hatching. Rearing takes place primarily in the faster parts of pools, although young-of-the-year are abundant in glides and riffles. Some older juveniles move downstream to rear in larger tributaries and mainstem rivers. Productive steelhead habitat is characterized by complexity—primarily in the form of large and small wood.

The dry habitat conditions in the Upper Columbia River are less conducive to steelhead survival than in many other parts of the Columbia River Basin. Although the life history of this ESU is similar to that of other inland steelhead, smolt ages are some of the oldest on the West Coast (up to seven years old), probably due to the area's cold water temperatures. The cold stream temperatures also lead to the possibility that many fish in this ESU may be thermally-fated to a resident (rainbow trout) life history regardless of whether they are the progeny of resident or anadromous parents. Most current natural production occurs in the Wenatchee and Methow River systems, with a smaller run returning to the Entiat River. Very limited spawning also occurs in the Okanagan River Basin. Most of the fish spawning in natural production areas are of hatchery origin. They limited data available indicate that smolt age in the this ESU is dominated by 2-year-olds. It also appears that steelhead from the Wenatchee and Entiat Rivers return to fresh water after one year in salt water, whereas Methow River steelhead primarily return after two years of ocean residence.

Recovery Planning Status

Five populations are identified for the Upper Columbia River *O. mykiss* ESU: the Wenatchee River, Methow River, Entiat River, Okanogan Basin, and Crab Creek populations. The Interior Columbia Basin Technical Recovery Team (ICBTRT 2003, 2005) placed these populations into a single major population grouping based on life-history type and ecological spawning zone. Recovery planning will likely emphasize the need for a geographical distribution of viable populations across the range of the ESU (Ruckelshaus et al. 2002, McElhany et al. 2003, McClure 2004 [pers comm.]). Subbasin assessments and plans have been completed for each subbasin through the Northwest

Power and Conservation Council. Recovery planners are now using those subbasin plans and TRT products to develop ESA recovery plans. Draft recovery plans are expected by the end of 2005. The CHART considered the available subbasin plans and TRT products in rating each watershed. We anticipate that, as recovery planning proceeds, we will have better information and may revise our recommendations regarding critical habitat designation.

CHART Area Assessments

The CHART assessment for this ESU addressed 10 subbasins containing 31 occupied watersheds, as well as the Columbia River rearing/migration corridor. Recovery planning will likely emphasize the need for a geographical distribution of viable populations across the range of population groupings (also called “strata”) in an ESU (Ruckelshaus et al. 2002, McElhany et al. 2003). The ICBTRT (2003, 2005) did not identify separate major groupings/strata for this ESU due to the relatively small size of the area. Therefore, as part of its assessment the CHART considered the conservation value of each HUC5 in the context of a single population group. Information is presented below by USGS subbasin because they present a convenient and systematic way to organize the CHART’s watershed assessments for this ESU and their names are generally more recognizable because they typically identify major river systems.

Chief Joseph Subbasin (HUC4# 17020005)

The Chief Joseph subbasin is located in north-central Washington and contained in Chelan, Douglas and Okanogon counties, Washington. The subbasin contains five watersheds, three of which are occupied by the ESU. These watersheds encompass approximately 817 mi^2 and 1,493 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 42 miles of occupied riverine habitat in the watershed (WDFW 2003). The Interior Columbia Basin TRT (2003, 2005) identified two demographically independent populations (Methow River and Okanogan River) occupying this subbasin. Table H1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map H1 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that one of the occupied watersheds (Upper Columbia/Swamp) was of high conservation value to the ESU because it contains a high value migration corridor for the Methow River and Okanogan

River populations, connecting upstream watersheds with downstream reaches and the ocean. The other two occupied watersheds in this subbasin were of low conservation value to this ESU. Table H2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure H1 shows the overall distribution of ratings by HUC5 watershed.

Okanogan Subbasin (HUC4# 17020006)

The Okanogan subbasin is located in north-central Washington adjacent to the U.S.-Canada border and contained entirely in Okanogon County, Washington. The subbasin contains five watersheds, all of which are occupied by the ESU. This watershed encompasses approximately 2,650 mi^2 and 3,928 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 131 miles of occupied riverine habitat in the watershed (WDFW 2003). The Interior Columbia Basin TRT (2003, 2005) identified one demographically independent population (Okanogan River) occupying this subbasin. Table H1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map H2 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watersheds in this subbasin were of either high or medium conservation value to the ESU. Of the five HUC5s reviewed, two were rated as having high and three were rated as having medium conservation value. The CHART also concluded that the HUC5s with a medium overall rating contain a high value rearing and migration corridor connecting high value upstream watersheds with downstream reaches and the ocean. The CHART also believed that Loup Loup Creek (Lower Okanogan HUC5) may be occupied by this ESU based on maps/information contained in a report by the Washington State Conservation Commission and Northwest Indian Fisheries Commission (2003). Table H2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure H1 shows the overall distribution of ratings by HUC5 watershed.

Similkameen Subbasin (HUC4# 17020007)

The Similkameen subbasin is located in north-central Washington adjacent to the U.S.-Canada border and contained entirely in Okanogon County, Washington. The subbasin contains four watersheds, one of which (Lower Similkameen River) is occupied by the ESU. This watershed encompasses approximately 69 mi^2 and 167 miles of streams.

Historically occupied areas in this subbasin are now blocked by Enloe Dam. Fish distribution and habitat use data from WDFW identify approximately 4 miles of occupied riverine habitat in the watershed (WDFW 2003). The Interior Columbia Basin TRT (2003, 2005) identified one demographically independent population (Okanogan River) occupying this subbasin. Table H1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map H3 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied reaches in the Lower Similkameen HUC5 watershed was of high conservation value to the ESU. The CHART also concluded that historically occupied areas upstream of Enloe Dam may be essential for the conservation of the ESU. The CHART noted that a recent report describing habitat and fish conditions in this subbasin (Talayco 2002) observed that Enloe Dam blocks access to more than 95 percent of the potential anadromous fish habitat in the Similkameen River and that there is “significant potential for increasing spawning and rearing habitat available to anadromous fish in this subbasin by addressing passage barriers such as Enloe Dam.” This report also noted that “recently there has been interest in relicensing the Enloe Dam, and fish passage alternatives are being investigated.” Therefore, the CHART concluded that the ESU would likely benefit if the extant population had access to spawning/rearing habitat upstream and that these areas may warrant consideration as critical habitat. Table H2 summarizes the CHART’s PCE/watershed scores and conservation value ratings, and Figure H1 shows the overall distribution of ratings by HUC5 watershed.

Methow Subbasin (HUC4# 17020008)

The Methow subbasin is located in north-central Washington adjacent to the U.S.-Canada border and contained entirely in Okanogon County, Washington. The subbasin contains seven watersheds, all of which are occupied by the ESU. This watershed encompasses approximately 1,823 mi^2 and 6,726 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 216 miles of occupied riverine habitat in the watershed (WDFW 2003). The Interior Columbia Basin TRT (2003, 2005) identified one demographically independent population (Methow River) occupying this subbasin. Table H1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map H4 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied HUC5 watersheds in this subbasin were of high conservation value to the ESU. Table H2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure H1 shows the overall distribution of ratings by HUC5 watershed.

Lake Chelan Subbasin (HUC4# 17020009)

The Lake Chelan subbasin is located in central Washington and contained entirely in Chelan County, Washington. The subbasin contains two watersheds, only one of which is occupied by the ESU. This watershed encompasses approximately 262 mi^2 and 970 miles of stream/lake reaches. Most of these reaches are above the Lake Chelan gorge and were likely historically inaccessible to anadromous fish. Fish distribution and habitat use data from WDFW identify approximately one mile of occupied riverine habitat in the lowermost reach of this watershed (WDFW 2003). The Interior Columbia Basin TRT (2003, 2005) did not associate a demographically independent population with this subbasin but Kaputa (2002) noted a priority management goal for the Chelan River is to provide spawning and rearing habitat for steelhead in Reach 4 (near the confluence of the Columbia River). Table H1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map H5 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watershed in this subbasin was of medium conservation value to the ESU. Table H2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure H1 shows the overall distribution of ratings by HUC5 watershed.

Upper Columbia/Entiat Subbasin (HUC4# 17020010)

The Upper Columbia/Entiat subbasin drains the eastern Cascade Range in central Washington. Occupied watersheds in this subbasin are contained in Chelan, Douglas, Grant and Kittitas counties in Washington. The subbasin contains four watersheds, all of which are occupied by the ESU. These watersheds encompass approximately 1,491 mi^2 and 4,715 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 185 miles of occupied riverine habitat in the subbasin (WDFW 2003).

The CHART noted that steelhead PCE distribution in the Mad River may be less than shown and only include reaches upstream to vicinity of Hornet Creek (i.e., near the upstream extent of spawning/rearing reaches shown in Map H6). However, this issue was not resolved by the time of this report. All four demographically independent populations in this ESU (Okanogan River, Methow River, Entiat River, and Wenatchee River) occupy this subbasin (ICBTRT 2003, 2005). Table H1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map H6 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watersheds in this subbasin were of high and medium (Lake Entiat) conservation value to the ESU. The CHART also concluded that while the tributary habitats in the Lake Entiat HUC5 were of medium conservation value, the HUC5 still contains a high value rearing and migration corridor connecting high value upstream watersheds with downstream reaches and the ocean. Table H2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure H1 shows the overall distribution of ratings by HUC5 watershed.

Wenatchee Subbasin (HUC4# 17020011)

The Wenatchee subbasin drains the eastern Cascade Range in central Washington and is contained in Chelan County, Washington. The subbasin contains five watersheds, all of which are occupied by the ESU. The subbasin encompasses approximately 1,328 mi^2 and 4,170 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 241 miles of occupied riverine habitat in the subbasin (WDFW 2003).

The CHART noted that steelhead PCEs may be more extensive than identified in the WDFW GIS data (WDFW 2003). The Team noted in particular that steelhead in Icicle Creek (Icicle/Chumstick HUC5) are passed above the hatchery and likely get upstream as far as the confluence of French Creek. This extended distribution is depicted in Map H7 as containing at least migration PCEs (with spawning/rearing PCEs likely as well). The Interior Columbia Basin TRT (2003, 2005) identified one demographically independent population (Wenatchee River) occupying this subbasin. Table H1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map H7 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watersheds in this subbasin were of high and medium conservation value to the ESU. Of the five HUC5s reviewed, four were rated as having high and one (Icicle/Chumstick) was rated as having medium conservation value. Table H2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure H1 shows the overall distribution of ratings by HUC5 watershed.

Moses Coulee Subbasin (HUC4# 17020012)

The Moses Coulee subbasin is located in central Washington and contained in Douglas and Grant counties, Washington. The subbasin contains two watersheds, one of which (Rattlesnake Creek) is occupied by the ESU. This watershed encompasses approximately 218 mi^2 and 569 miles of streams. Fish distribution and habitat use data from WDFW identify approximately one mile of occupied riverine habitat in the subbasin (WDFW 2003). The Interior Columbia Basin TRT (2003, 2005) identified one demographically independent population (Wenatchee) with this subbasin. Table H1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map H8 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watershed in this subbasin was of low conservation value to the ESU. Table H2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure H1 shows the overall distribution of ratings by HUC5 watershed.

Lower Crab Subbasin (HUC4# 17020015)

The Lower Crab subbasin is located in south-central Washington and occupied watersheds are contained in Adams and Grant counties, Washington. The subbasin contains eight watersheds, only one of which (Lower Crab Creek) is occupied by the ESU. This watershed encompasses approximately 400 mi^2 and 867 miles of streams. Fish distribution and habitat use data from WDFW identified very little occupied riverine habitat in the subbasin (WDFW 2003). However, the CHART concluded that this was inaccurate and cited distribution information in Quinn (2001) that steelhead likely spawn further upstream (approximately 54 miles) in Crab Creek. The Interior Columbia Basin TRT (2003, 2005) identified one historic demographically independent population (Crab Creek) within this subbasin. Table H1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map H9 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watershed in this subbasin was of medium conservation value to the ESU. Table H2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure H1 shows the overall distribution of ratings by HUC5 watershed.

Upper Columbia/Priest Rapids Subbasin (HUC4# 17020016)

The Upper Columbia/Priest Rapids subbasin is located in south-central Washington and contained in Adams, Benton, Franklin, Grant, Kittitas, and Yakima counties in Washington. The subbasin contains six watersheds, three of which are occupied by the ESU. Occupied watersheds encompasses approximately 929 mi^2 and 1,599 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 113 miles of occupied riverine habitat in the subbasin (WDFW 2003). The CHART noted that steelhead PCEs may be more extensive than identified in the WDFW GIS data (WDFW 2003). The Team noted that in the Yakima/Hansen Creek HUC5 that (1) steelhead in Hanson Creek likely spawn as far upstream as the confluence of Cottonwood Creek, and (2) steelhead in Alkali Canyon Creek likely spawn in reaches located approximately halfway to the first major fork in this drainage. This extended distribution is depicted in Map H10 as containing at least migration PCEs (with spawning/rearing PCEs likely as well). Also, two of the HUC5s (1605 and 1606) were preliminarily rated as medium but are now considered high due to their sole contribution as rearing/migration corridors (i.e., no tributary habitat). All four extant demographically independent populations identified by the Interior Columbia Basin TRT (2003, 2005) occupy this subbasin. Table H1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map H10 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watersheds in this subbasin were of high (Yakima/Hanson Creek) and medium (Middle Columbia/Priest Rapids and Columbia River/Zintel Canyon) conservation value to the ESU. Table H2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure H1 shows the overall distribution of ratings by HUC5 watershed.

Columbia River Corridor

The Columbia River rearing and migration corridor consists of that segment from the confluence of the Yakima and Columbia rivers downstream to the Pacific Ocean. This confluence is located in the Columbia River/Zintel Canyon HUC5 which was the furthest downstream HUC5 with spawning or tributary PCEs identified in the range of this ESU. Fish distribution and habitat use data from WDFW identify approximately 331 miles of occupied riverine and estuarine habitat in this corridor (WDFW 2003). This corridor overlaps with the following counties: Clatsop, Columbia, Gilliam, Hood River, Morrow, Multnomah, Sherman, Umatilla, and Wasco counties in Oregon, and Benton, Clark, Cowlitz, Franklin, Klickitat, Skamania, Wahkiakum, and Walla Walla counties in Washington.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the Columbia River corridor was of high conservation value to the ESU. The CHART noted that this corridor connects every watershed and population in this ESU with the ocean and is used by rearing/migrating juveniles and migrating adults. The Columbia River estuary is a particularly important area for this ESU as both juveniles and adults make the critical physiological transition between life in freshwater and marine habitats (ISAB 2000, Marriott et al. 2002).

Marine Areas

NOAA Fisheries' analysis focused on freshwater and estuarine habitats upstream of the mouth of the Columbia River. While marine areas are occupied by this ESU, within this vast area the agency has not identified "specific areas within the geographical area occupied by the species . . . on which are found those physical or biological features . . . essential to the conservation of the species."

Changes to the CHART's Initial Assessments

The CHART reviewed the public and peer reviewer comments received on the Team's initial findings for this ESU as well as new information relevant to evaluating habitat areas for this ESU. As a result, the CHART changed the conservation value rating for one watershed (Upper Columbia River/Swamp Creek HUC5) within the geographical area occupied by this ESU to reflect the fact that there are no tributary habitats here but there is a high value connectivity corridor. Additionally, based on public comments and new information reviewed by the CHART, we have identified changes to the delineation of occupied habitat areas in one watershed (Nason/Tumwater HUC5). The proposed critical habitat designation (69 FR 74572, December 14, 2004) summarizes the comments and responses pertaining to the CHART's initial determinations for this ESU. And Tables H1 and H2 reflect the final CHART assessments, including the following changes in habitat area delineations:

Subbasin	Watershed code	Watershed name	Changes from Initial CHART Assessment
Chief Joseph	1702000505	Upper Columbia/ Swamp Creek	Changed conservation rating from Medium to High.
Wenatchee	1702001103	Nason/Tumwater	Removed 1 mile (1.6 km) of unoccupied stream reach.

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Washington State Conservation Commission and Northwest Indian Fisheries Commission. 2003. WRIA 49 Salmonid Distribution Table and maps, dated March 2003.

Table H1. Summary of Occupied Areas, PCEs, and Management Activities Affecting PCEs for the Upper Columbia River Steelhead ESU

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs) Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*	Unoccupied but may be essential (mi)**	Management Activities***
	Chief Joseph	Foster Creek	1702000503	0.9	0	0		A, D, Fi
	Chief Joseph	Jordan/Tumwater	1702000504	0	4.2	0		A, D, F, Fi, G, R
	Chief Joseph	Upper Columbia/Swamp Creek	1702000505	0	5.6	31.3		A, D, F, Fi, G, R
	Okanogan	Upper Okanogan River	1702000601	2.5	3	32.8		A, D, F, Fi, G, I, M, R
	Okanogan	Okanogan River/Bonaparte Creek	1702000602	0.7	0	18.9		A, D, F, Fi, G, M, R
	Okanogan	Salmon Creek	1702000603	17	0	0		A, D, F, Fi, G, I, R
	Okanogan	Okanogan River/Omak Creek	1702000604	0	0	27.2		A, D, F, Fi, G, M, R, U
	Okanogan	Lower Okanogan River	1702000605	0	2.6	25.9		A, D, F, Fi, G, R
	Similkameen	Sinlahekin Creek	1702000703	0	0	0	[aa]	
	Similkameen	Lower Similkameen River	1702000704	0	0	3.8	[bb]	A, D, F, Fi, G, M, R
	Methow	Lost River	1702000801	4.1	0	3.3		F, Fi
	Methow	Upper Methow River	1702000802	6	0	3.5		F, Fi, G, I
	Methow	Upper Chewuch River	1702000803	0	0	19.7		F, Fi, R
	Methow	Lower Chewuch River	1702000804	25.8	<0.1	3.3		A, D, F, Fi, G, R, I
	Methow	Twisp River	1702000805	29.7	0	9.4		F, Fi, G, R, I
	Methow	Middle Methow River	1702000806	57.9	0.1	4.6		A, D, F, Fi, G, M, R, I
	Methow	Lower Methow River	1702000807	29.8	0.1	18.7		D, F, Fi, G, M, R
	Lake Chelan	Lower Chelan	1702000903	0.5	0	0.5		A, D, F, Fi, G, R
	Upper Columbia/Entiat	Entiat River	1702001001	42.7	0.9	17		F, Fi, G, R, I
	Upper Columbia/Entiat	Lake Entiat	1702001002	0	0.8	54.7		A, D, F, Fi, G, M, R, U
	Upper Columbia/Entiat	Columbia River/Lynch Coulee	1702001003	7.4	3.7	33.5		A, D, F, Fi, G, M, R

[aa] CHART concluded that historic areas upstream of Enloe Dam to the U.S.-Canada border may be essential for ESU conservation

[bb] CHART concluded that historic areas upstream of Enloe Dam to the U.S.-Canada border may be essential for ESU conservation

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs) Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*	Unoccupied but may be essential (mi)**	Management Activities***
	Upper Columbia/Entiat	Columbia River/Sand Hollow	1702001004	1.1	0	23.5		A, D, Fi, G, M
	Wenatchee	White River	1702001101	20.2	11.2	3.6		F, Fi
	Wenatchee	Chiwawa River	1702001102	37.5	4.2	0.6		F, Fi, R
	Wenatchee	Nason/Tumwater	1702001103	56.4	2.4	4.6		D, F, Fi, R
	Wenatchee	Icicle/Chumstick	1702001104	20.1	2.1	22.8		A, D, F, Fi, G, M, R, U
	Wenatchee	Lower Wenatchee River	1702001105	1	39.9	14.6		A, D, F, Fi, G, I, M, R, U
	Moses Coulee	Rattlesnake Creek	1702001204	0	0.6	0.3		A, D, Fi, G, R
	Lower Crab	Lower Crab Creek	1702001509	0	0	54.2		A, D, Fi, G, I
	Upper Columbia/Priest Rapids	Yakima/Hansen Creek	1702001604	0	0	43.2		A, D, F, Fi, G, M
	Upper Columbia/Priest Rapids	Middle Columbia/Priest Rapids	1702001605	0	0	35.5		A, Fi, G
	Upper Columbia/Priest Rapids	Columbia River/Zintel Canyon	1702001606	0	0	47.9		A, D, Fi, R, U
	Middle Columbia/Lake Wallula	Upper Lake Wallula	1707010101	0	0	11.8		C, D, I, R, T, U, W
	Middle Columbia/Lake Wallula	Lower Lake Wallula	1707010102	0	0	21.7		A, D, Fi, R
	Middle Columbia/Lake Wallula	Upper Lake Umatilla	1707010106	0	0	20.2		A, D, Fi, R, U
	Middle Columbia/Lake Wallula	Middle Lake Umatilla	1707010109	0	0	17.3		A, D, Fi, R
	Middle Columbia/Lake Wallula	Lower Lake Umatilla	1707010114	0	0	42.3		A, D, Fi, R
	Middle Columbia/Hood	Upper Middle Columbia/Hood	1707010501	0	0	14.7		A, D, Fi, G, S, R, T
	Middle Columbia/Hood	Middle Columbia/Mill Creek	1707010504	0	0	24.6		A, D, F, Fi, G, R, T, I, U

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs)			Unoccupied but may be essential (mi)**	Management Activities***
				Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*		
	Middle Columbia/Hood	Middle Columbia/Grays Creek	1707010512	0	0	25.6		F, Fi, R, T
	Middle Columbia/Hood	Middle Columbia/Eagle Creek	1707010513	0	0	9.3		D, R, U
	Lower Columbia/Sandy	Columbia Gorge Tributaries	1708000107	0	0	25.8		C, D, F, R, U, W
	Multiple	Lower Columbia Corridor (Sandy/Washougal to Ocean)	NA	0	0	117.4[cc]		C, D, I, R, T, U, W

* Some streams classified as "Migration/Presence PCEs" may also include rearing or spawning PCEs, but the GIS data are still undergoing review to confirm additional habitat use types.
** These watersheds contain unoccupied habitat that historically supported spawning and rearing PCEs. The CHART determined that these habitat areas/watersheds may be essential for conservation of the ESU. Since these watersheds are unoccupied, the CHART did not identify management activities.
*** This list is not exhaustive. It is intended to highlight key management activities affecting PCEs in each watershed. Activities identified are based on the general categories described by Spence et al. (1996) and summarized previously in the "Special Management Considerations or Protection" section of this report. Coding is as follows: F= forestry, G = grazing, A = agriculture, C = channel modifications/diking, R = road building/maintenance, U = urbanization, S = sand and gravel mining, M = mineral mining, D = dams, I = irrigation impoundments and withdrawals, T = river, estuary, and ocean traffic, W = wetland loss/removal, B = beaver removal, X = exotic/invasive species introductions, H = forage fish/species harvest. Primary sources for this information were the CHART and reports by Andonaegui (1999, 2000, 2001, and 2003), Quigley et al. (2001), and land use/land cover GIS layers from the U.S. Geological Survey.

[cc] The Lower Columbia River from the ocean upstream approximately 46.5 miles is considered to contain estuarine PCEs, in addition to migration and rearing (ISAB 2000).

Table H2. Summary of Initial CHART Scores and Ratings of Conservation Value for Habitat Areas in HUC5 Watersheds Occupied by the Upper Columbia River Steelhead ESU

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors) 1	2	3	4	5	6	Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
	Chief Joseph	Foster Creek	1702000503	1	1	1	1	0	1	5	Low-moderate HUC5 score; this HUC5 contains part of the historic Sanpoil TRT demographically independent population. There is a small amount of spawning habitat in this watershed.	Low
	Chief Joseph	Jordan/Tumwater	1702000504	1	1	1	1	0	1	5	Low-moderate HUC5 score. This HUC5 is within the lower most section of the historic Sanpoil River TRT demographically independent population. There is limited habitat within this watershed due to Chief Joseph Dam. Rearing/migration PCEs in this watershed provide support for a small amount of upstream spawning habitat in the Foster Creek watershed.	Low
	Chief Joseph	Upper Columbia/Swamp Creek	1702000505	1	2	1	1	2	1	8	Moderate HUC5 score; PCEs support three TRT demographically independent populations; the medium HUC5 rating pertains to reaches upstream of the Okanogon/Columbia confluence – reaches downstream of this confluence are a high value rearing/migration corridor. CHART noted that this HUC5 does not have tributary habitats and thus warranted elevating to a High conservation value due to it's importance as a connectivity corridor.	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Okanogan	Upper Okanogan River	1702000601	1	1	1	1	1	2	7	Moderate HUC5 score; PCEs support one of four TRT demographically independent populations in this ESU; PCE quality in uppermost Okanogan subbasin not as high as downstream HUC5s but does contain a high value rearing/migration corridor for a high value HUC5 upstream	Medium
	Okanogan	Okanogan River/Bonaparte Creek	1702000602	1	1	1	1	1	2	7	Moderate HUC5 score; PCEs support one of four TRT demographically independent populations in this ESU; PCE quality in uppermost Okanogan subbasin not as high as downstream HUC5s but does contain a high value rearing/migration corridor for a high value HUC5 upstream	Medium
	Okanogan	Salmon Creek	1702000603	1	2	2	1	1	2	9	Moderate HUC5 score; PCEs support one of four TRT demographically independent populations in this ESU; this HUC5 likely contains some of the highest quality PCEs remaining for this population	High
	Okanogan	Okanogan River/Omak Creek	1702000604	1	2	2	1	1	2	9	Moderate HUC5 score; PCEs support one of four TRT demographically independent populations in this ESU; this HUC5 likely contains some of the highest quality PCEs remaining for this population as well as a high value rearing/migration corridor for upstream HUC5s	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Okanogan	Lower Okanogan River	1702000605	1	1	1	1	1	2	7	Moderate HUC5 score; PCEs support one of four TRT demographically independent populations in this ESU; HUC5 contains a high value rearing/migration corridor for upstream HUC5s; CHART believed that Loup Loup Creek may be occupied	Medium
	Similkameen	Sinlahekin Creek	1702000703							*	HUC5 not currently occupied so not scored; however, CHART concluded that historic areas upstream of Enloe Dam to the U.S.-Canada border may be essential for ESU conservation	Possibly High
	Similkameen	Lower Similkameen River	1702000704	1	1	1	1	2	2	8*	Moderate HUC5 score; PCEs support one of four TRT demographically independent populations in this ESU; CHART concluded that historic areas upstream of Enloe Dam to the U.S.-Canada border may be essential for ESU conservation	High
	Methow	Lost River	1702000801	2	3	3	1	2	2	13	Moderate-high HUC5 score; PCEs support one of four TRT demographically independent populations in this ESU; CHART considered PCEs in this and other Methow subbasin HUC5s to be of the highest quantity and quality in the range of this ESU; PCEs in this HUC5 overlap with FEMAT key watershed for at-risk anadromous salmonids as well as an ICBEMP priority area for steelhead; interim abundance targets relevant to recovery of Methow River population are the highest for the entire ESU	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Methow	Upper Methow River	1702000802	2	3	3	1	1	2	12	Moderate-high HUC5 score; PCEs support one of four TRT demographically independent populations in this ESU; CHART considered PCEs in this and other Methow subbasin HUC5s to be of the highest quantity and quality in the range of this ESU; PCEs in this HUC5 overlap with FEMAT key watershed for at-risk anadromous salmonids; interim abundance targets relevant to recovery of Methow River population are the highest for the entire ESU	High
	Methow	Upper Chewuch River	1702000803	3	3	2	1	2	2	13	Moderate-high HUC5 score; PCEs support one of four TRT demographically independent populations in this ESU; CHART considered PCEs in this and other Methow subbasin HUC5s to be of the highest quantity and quality in the range of this ESU; PCEs in this HUC5 overlap with FEMAT key watershed for at-risk anadromous salmonids; interim abundance targets relevant to recovery of Methow River population are the highest for the entire ESU	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Methow	Lower Chewuch River	1702000804	3	2	2	1	2	2	12	Moderate-high HUC5 score; PCEs support one of four TRT demographically independent populations in this ESU; CHART considered PCEs in this and other Methow subbasin HUC5s to be of the highest quantity and quality in the range of this ESU; PCEs in this HUC5 overlap with FEMAT key watershed for at-risk anadromous salmonids; interim abundance targets relevant to recovery of Methow River population are the highest for the entire ESU	High
	Methow	Twisp River	1702000805	3	3	2	1	2	2	13	Moderate-high HUC5 score; PCEs support one of four TRT demographically independent populations in this ESU; CHART considered PCEs in this and other Methow subbasin HUC5s to be of the highest quantity and quality in the range of this ESU; PCEs in this HUC5 overlap with FEMAT key watershed for at-risk anadromous salmonids; interim abundance targets relevant to recovery of Methow River population are the highest for the entire ESU	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors) 1	2	3	4	5	6	Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
	Methow	Middle Methow River	1702000806	3	2	2	1	2	2	12	Moderate-high HUC5 score; PCEs support one of four TRT demographically independent populations in this ESU; CHART considered PCEs in this and other Methow subbasin HUC5s to be of the highest quantity and quality in the range of this ESU; PCEs in this HUC5 overlap with FEMAT key watershed for at-risk anadromous salmonids as well as an ICBEMP priority area for steelhead; interim abundance targets relevant to recovery of Methow River population are the highest for the entire ESU	High
	Methow	Lower Methow River	1702000807	3	2	2	1	2	2	12	Moderate-high HUC5 score; PCEs support one of four TRT demographically independent populations in this ESU; CHART considered PCEs in this and other Methow subbasin HUC5s to be of the highest quantity and quality in the range of this ESU; interim abundance targets relevant to recovery of Methow River population are the highest for the entire ESU	High
	Lake Chelan	Lower Chelan	1702000903	1	1	1	1	0	2	6	Low-moderate HUC5 score; not identified as supporting a TRT demographically independent population; PCEs quantity very limited in this HUC5 but a priority management goal for the Chelan River is to provide spawning and rearing habitat for steelhead in lowermost reach	Medium

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Upper Columbia/Entiat	Entiat River	1702001001	2	2	2	1	2	3	12	Moderate-high HUC5 score; PCEs support one of four TRT demographically independent populations in this ESU and overlap with FEMAT key watershed for at-risk anadromous salmonids; this HUC5 contains majority of spawning PCEs for this population	High
	Upper Columbia/Entiat	Lake Entiat	1702001002	1	2	1	1	2	3	10	Moderate HUC5 score; rearing/migration PCEs support four TRT populations making the Columbia River a high value connectivity corridor in this HUC5; medium rating associated with relatively limited tributary PCEs in this HUC5	Medium
	Upper Columbia/Entiat	Columbia River/Lynch Coulee	1702001003	1	2	1	3	1	2	10	Moderate HUC5 score; rearing/migration PCEs support four TRT populations making the Columbia River a high value connectivity corridor in this HUC5; HUC5 contains some spawning PCEs and CHART noted that PCEs in this HUC5 may support fish uniquely adapted to high temperatures	High
	Upper Columbia/Entiat	Columbia River/Sand Hollow	1702001004	1	2	1	3	1	2	10	Moderate HUC5 score; rearing/migration PCEs support four TRT populations making the Columbia River a high value connectivity corridor in this HUC5; HUC5 contains some spawning PCEs and CHART noted that PCEs in this HUC5 may support fish uniquely adapted to high temperatures	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Wenatchee	White River	1702001101	3	3	3	2	1	2	14	High HUC5 score; PCEs support one of four TRT demographically independent populations in this ESU; high value spawning/rearing PCEs are most extensive in upper watersheds; PCEs in this HUC5 overlap with FEMAT key watershed for at-risk anadromous salmonids	High
	Wenatchee	Chiwawa River	1702001102	3	3	3	2	2	2	15	Highest HUC5 score for entire ESU; PCEs support one of four TRT demographically independent populations in this ESU; high value spawning/rearing PCEs are most extensive in upper watersheds; PCEs in this HUC5 overlap with FEMAT key watershed for at-risk anadromous salmonids	High
	Wenatchee	Nason/Tumwater	1702001103	3	2	2	1	2	2	12	Moderate-high HUC5 score; PCEs support one of four TRT demographically independent populations in this ESU; high value spawning/rearing PCEs are most extensive in upper watersheds; some PCEs in this HUC5 overlap with FEMAT key watershed for at-risk anadromous salmonids; HUC5 also contains high value rearing/migration PCEs for upstream HUC5s	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Wenatchee	Icicle/Chumstick	1702001104	1	1	2	1	2	2	9	Moderate HUC5 score; PCEs support one of four TRT demographically independent populations in this ESU; PCEs overlap with a FEMAT key watershed for at-risk anadromous salmonids; CHART determined that tributary PCEs here were likely of lowest quality and quantity and may not have as high a conservation value as others supporting this population; this HUC5 does contain high value rearing/migration PCEs for upstream HUC5s	Medium
	Wenatchee	Lower Wenatchee River	1702001105	2	2	2	1	2	2	11	Moderate-high HUC5 score; PCEs support one of four TRT demographically independent populations in this ESU; some PCEs overlap with a FEMAT key watershed for at-risk anadromous salmonids; HUC5 contains high value rearing/migration PCEs for all HUC5s supporting this population	High
	Moses Coulee	Rattlesnake Creek	1702001204	1	0	1	0	1	1	4	Low-moderate HUC5 score, lowest of all HUC5s in this ESU; very limited habitat here and HUC5 not identified as part of a TRT demographically independent population	Low
	Lower Crab	Lower Crab Creek	1702001509	1	1	2	2	1	2	9	Moderate HUC5 score; rearing/migration PCEs support one TRT population; HUC5 contains some spawning PCEs and CHART noted that PCEs in this HUC5 may support fish uniquely adapted to high temperatures	Medium

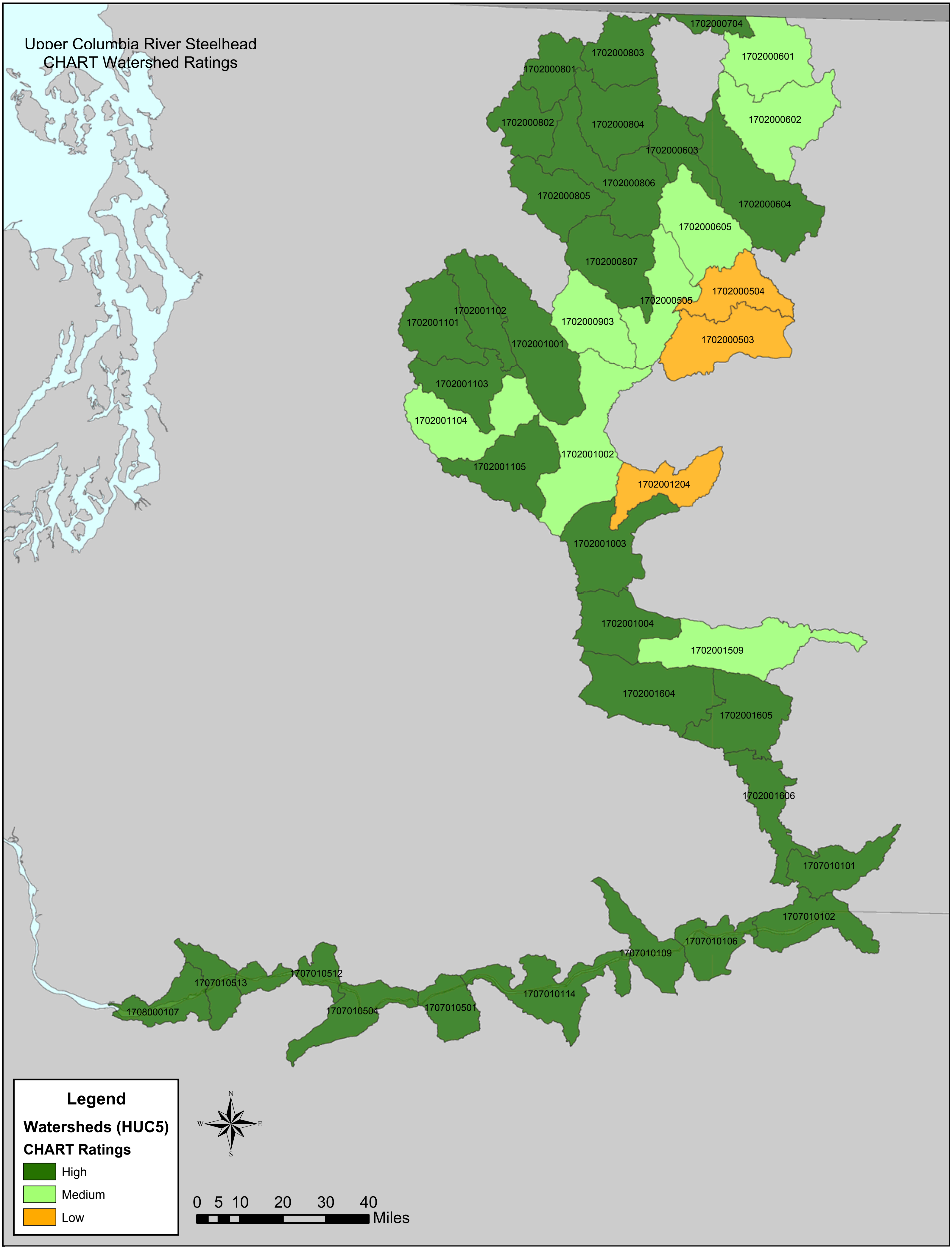
Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Upper Columbia/Priest Rapids	Yakima/Hansen Creek	1702001604	1	2	1	3	1	2	10	Moderate HUC5 score; rearing/migration PCEs support all TRT populations making the Columbia River a high value connectivity corridor in this HUC5; HUC5 contains some spawning PCEs (including tributaries) and CHART noted that PCEs in this HUC5 may support fish uniquely adapted to high temperatures	High
	Upper Columbia/Priest Rapids	Middle Columbia/Priest Rapids	1702001605	2	2	1	1	1	2	9	Moderate HUC5 score; rearing/migration PCEs support all TRT populations making the Columbia River a high value connectivity corridor in this HUC5; CHART noted that this HUC5 likely unique in that it contains mainstem spawning PCEs	High
	Upper Columbia/Priest Rapids	Columbia River/Zintel Canyon	1702001606	2	2	1	1	1	2	9	Moderate HUC5 score; rearing/migration PCEs support all TRT populations making the Columbia River a high value connectivity corridor in this HUC5; CHART noted that this HUC5 likely unique in that it contains mainstem spawning PCEs	High
	Middle Columbia/Lake Wallula	Upper Lake Wallula	1707010101							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Middle Columbia/Lake Wallula	Lower Lake Wallula	1707010102							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors) 1	2	3	4	5	6	Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
	Middle Columbia/Lake Wallula	Upper Lake Umatilla	1707010106							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Middle Columbia/Lake Wallula	Middle Lake Umatilla	1707010109							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Middle Columbia/Lake Wallula	Lower Lake Umatilla	1707010114							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Middle Columbia/Hood	Upper Middle Columbia/Hood	1707010501							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Middle Columbia/Hood	Middle Columbia/Mill Creek	1707010504							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Middle Columbia/Hood	Middle Columbia/Grays Creek	1707010512							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Middle Columbia/Hood	Middle Columbia/Eagle Creek	1707010513							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Lower Columbia/Sandy	Columbia Gorge Tributaries	1708000107							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Multiple	Lower Columbia Corridor (Sandy/Washougal to Ocean) corridor	NA							NS	Area not scored since CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation	High

* Indicates that HUC5 may contain additional occupied areas or contain blocked/inaccessible areas that the CHART concluded may be essential for ESU conservation. See Unit Description text for specific areas considered.

Figure H1. CHART Ratings of Conservation Value for Habitat Areas in HUC5 Watersheds Occupied by the Upper Columbia River Steelhead ESU


Upper Columbia River Steelhead
CHART Watershed Ratings
1702000704
1702000601
1702000803
1702000801
1702000602
1702000802
1702000804
1702000603
1702000806
1702000805
1702000604
1702000605
1702000807
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1707010114
1707010504
1707010501
1708000107
Legend
Watersheds (HUC5)
CHART Ratings
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Medium
Low
N
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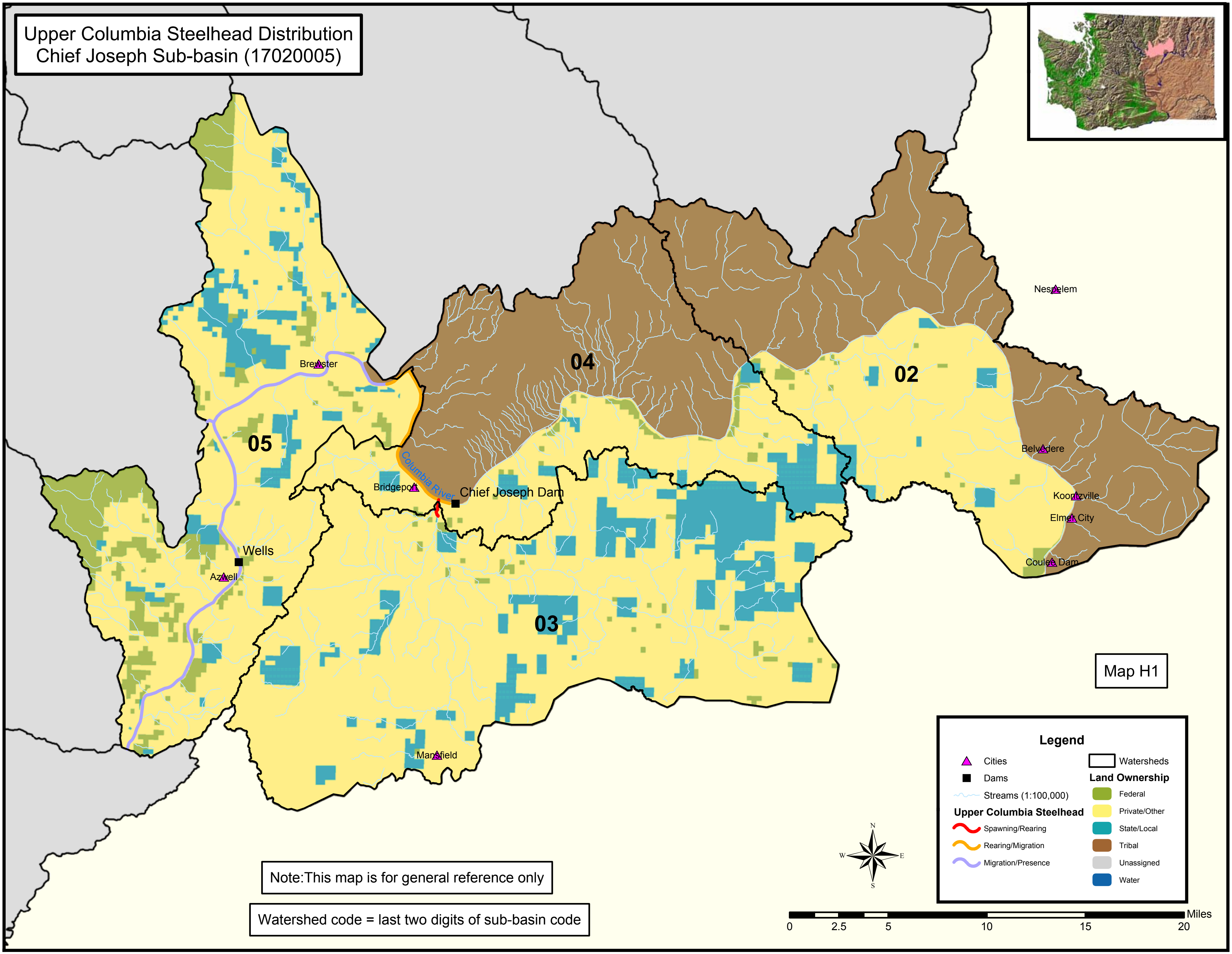
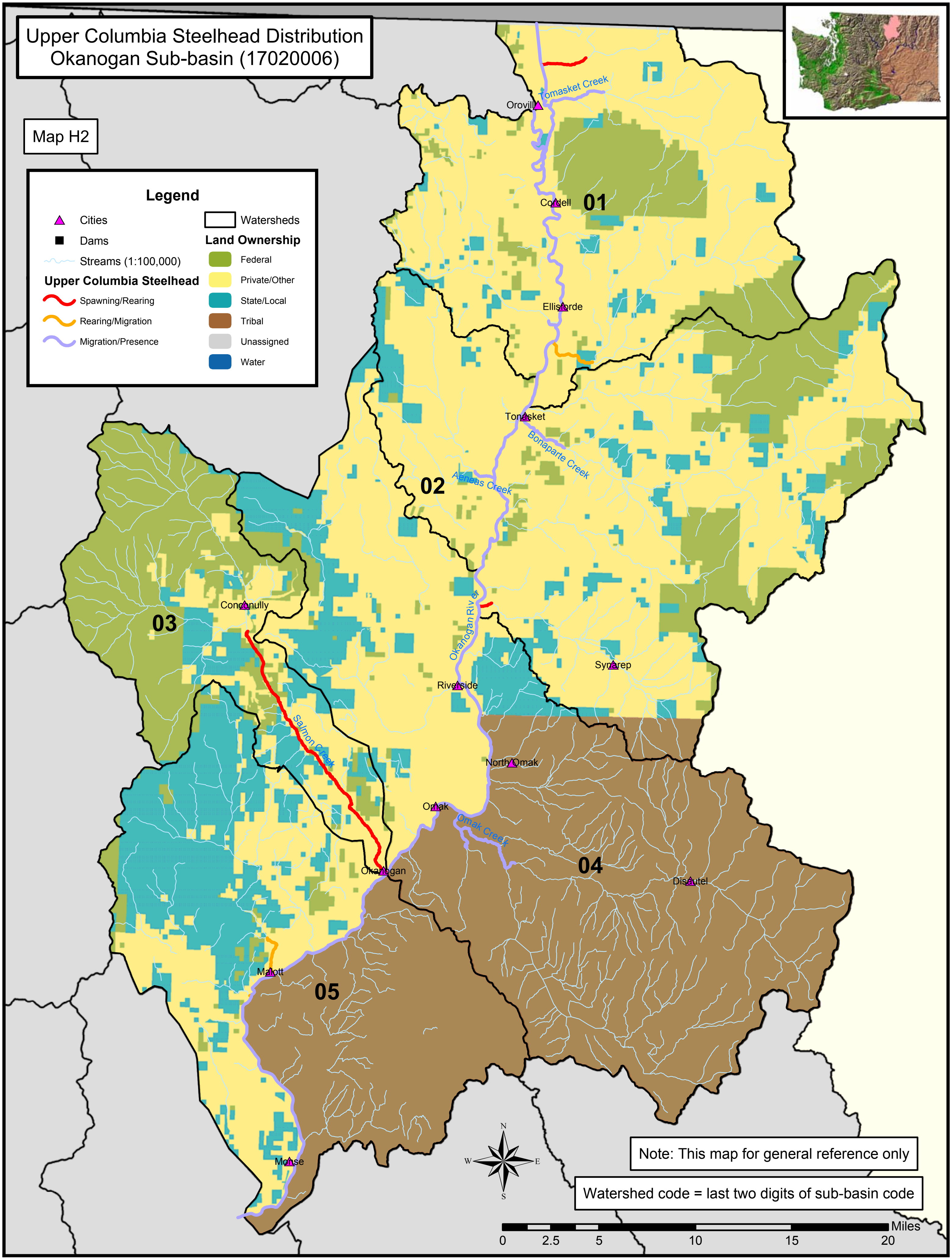
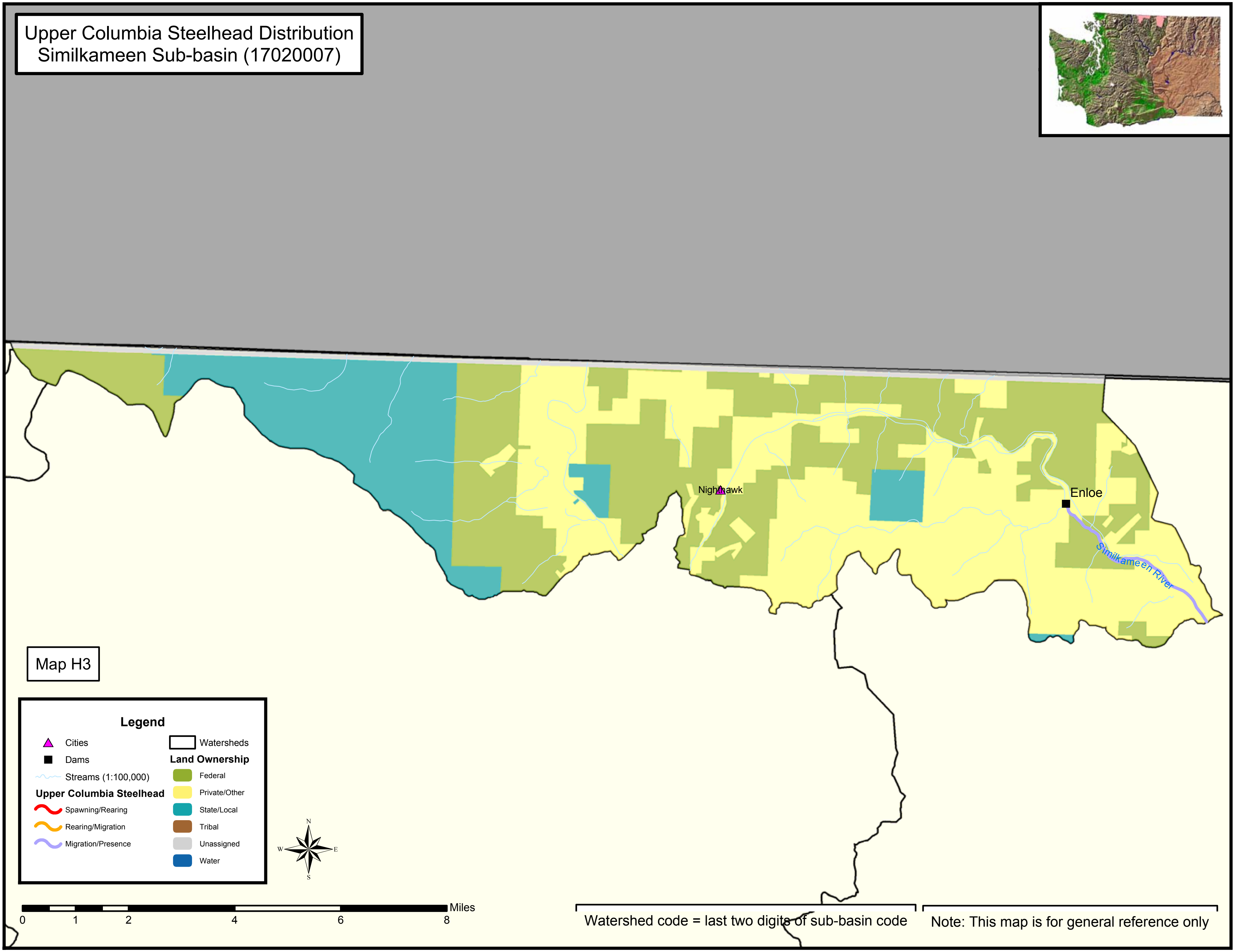
Miles



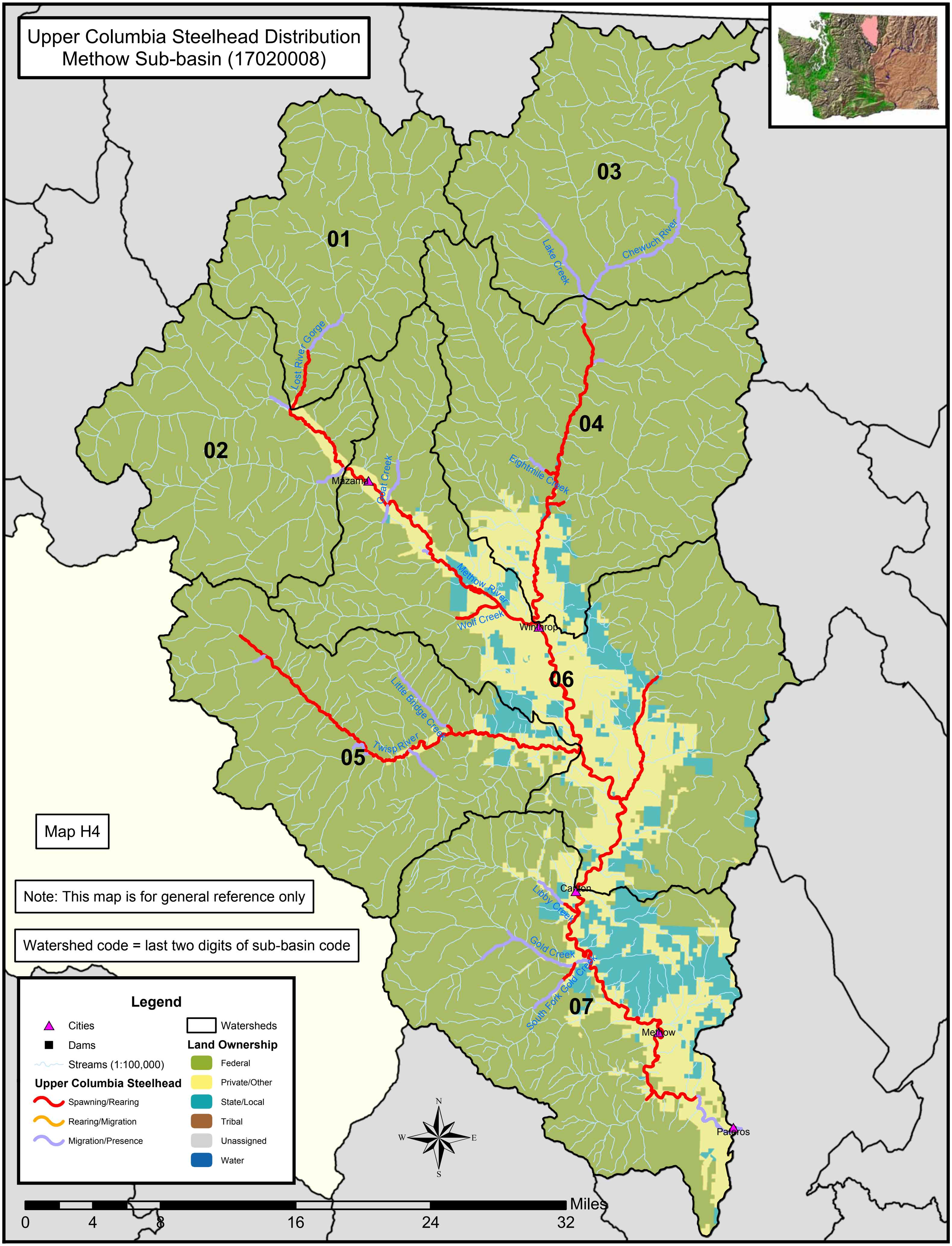
Upper Columbia Steelhead Distribution
Chief Joseph Sub-basin (17020005)
04
02
05
03
Nespelem
Brewster
Bridgeport
Columbia River
Chief Joseph Dam
Belvedere
Koontzville
Elmer City
Coulee Dam
Wells
Azwell
Mansfield
Map H1
Legend
Cities
Dams
Streams (1:100,000)
Upper Columbia Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
Note:This map is for general reference only
Watershed code = last two digits of sub-basin code
0
2.5
5
10
15
20
Miles



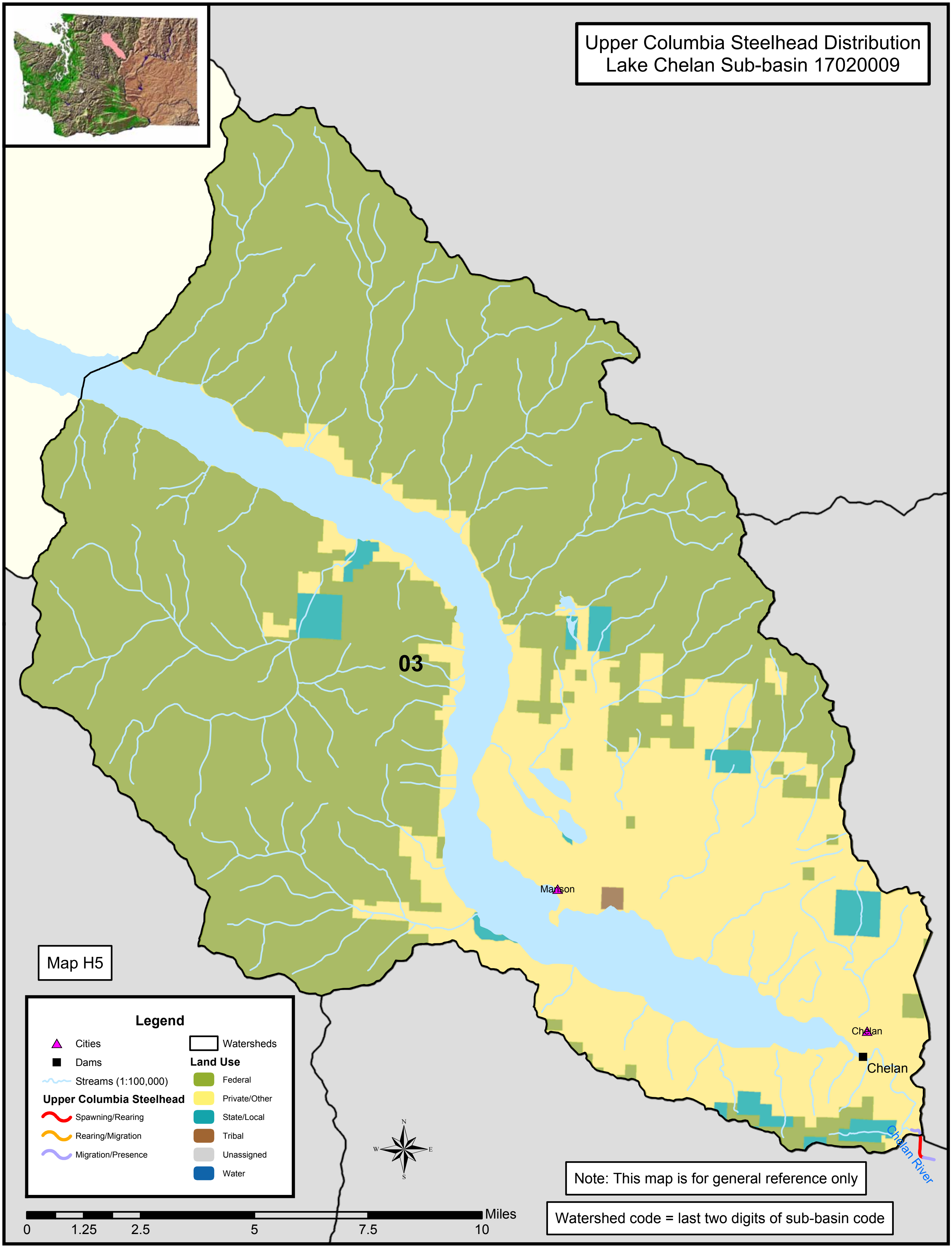
Upper Columbia Steelhead Distribution
Okanogan Sub-basin (17020006)
Map H2
Legend
Cities
Dams
Streams (1:100,000)
Upper Columbia Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Oroville
Tomasket Creek
Cordell
01
Ellisforde
Tonasket
Bonaparte Creek
Aeneas Creek
02
Okanogan River
Conconully
03
Synarep
Riverside
Salmon Creek
North Omak
Omak
Omak Creek
Okanogan
04
Disautel
Malott
05
Monse
Note: This map for general reference only
Watershed code = last two digits of sub-basin code
Miles
0
2.5
5
10
15
20
N
S
E
W



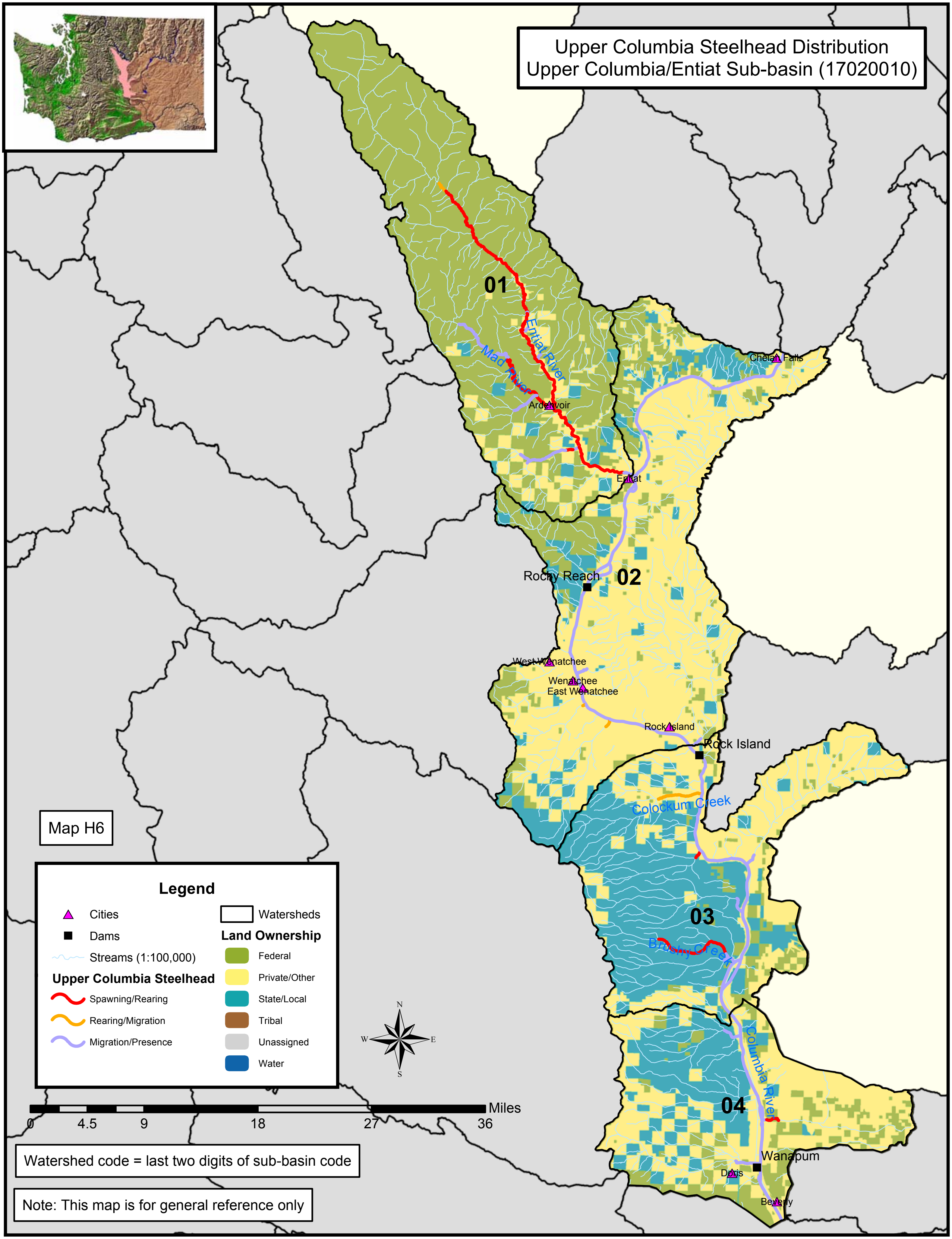
Upper Columbia Steelhead Distribution
Similkameen Sub-basin (17020007)
Nighthawk
Enloe
Similkameen River
Map H3
Legend
Cities
Dams
Streams (1:100,000)
Upper Columbia Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
W
E
S
0
1
2
4
6
8
Miles
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only



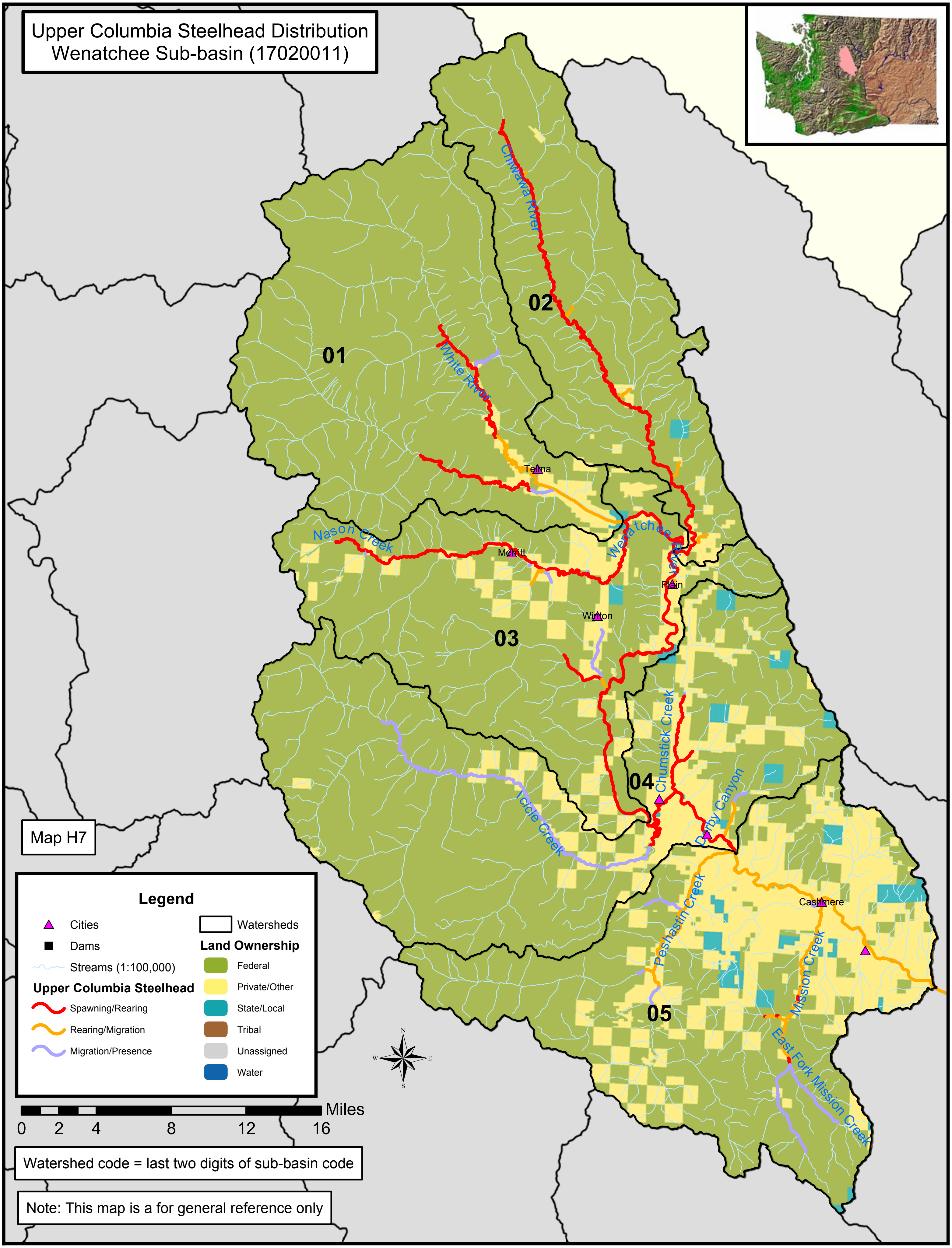
Upper Columbia Steelhead Distribution
Methow Sub-basin (17020008)
01
02
03
04
05
06
07
Lost River Gorge
Mazama
Goat Creek
Lake Creek
Chewuch River
Eightmile Creek
Methow River
Wolf Creek
Winthrop
Little Bridge Creek
Twisp River
Carlton
Libby Creek
Gold Creek
South Fork Gold Creek
Methow
Pateros
Map H4
Note: This map is for general reference only
Watershed code = last two digits of sub-basin code
Legend
Cities
Dams
Streams (1:100,000)
Upper Columbia Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
Miles
0
4
8
16
24
32

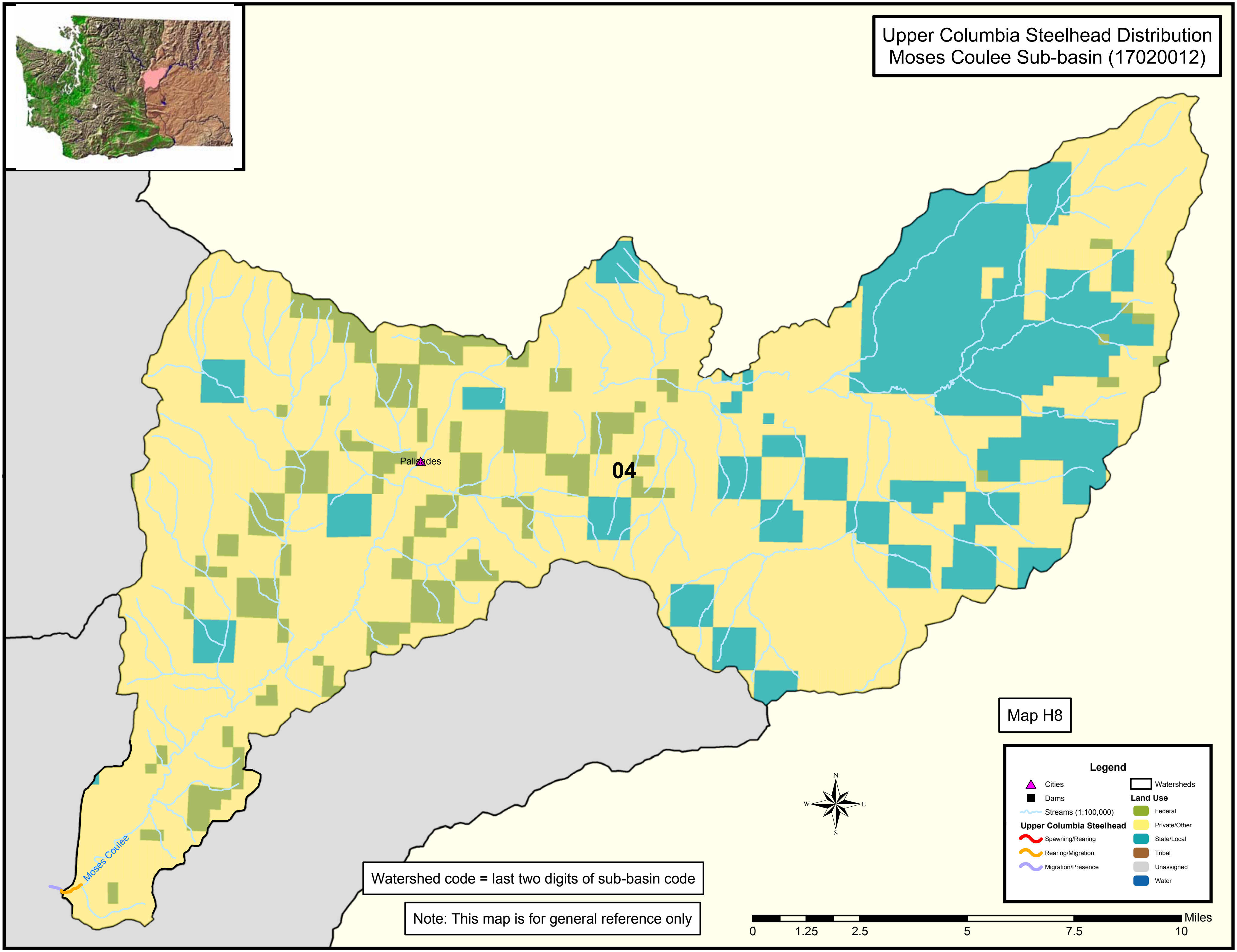


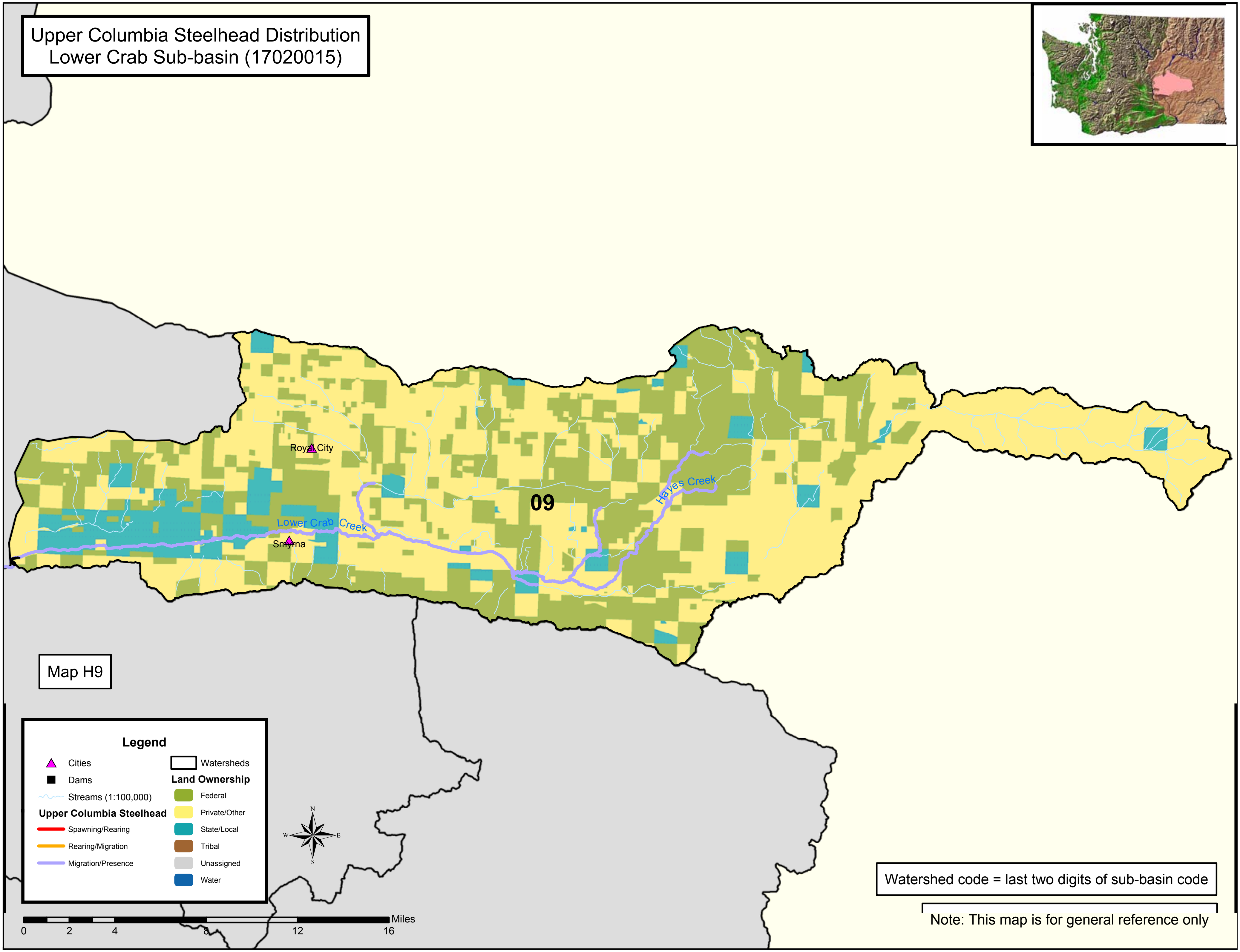
Upper Columbia Steelhead Distribution
Lake Chelan Sub-basin 17020009
03
Manson
Chelan
Chelan
Chelan River
Map H5
Legend
Cities
Dams
Streams (1:100,000)
Upper Columbia Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Use
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
0
1.25
2.5
5
7.5
10
Miles
Note: This map is for general reference only
Watershed code = last two digits of sub-basin code

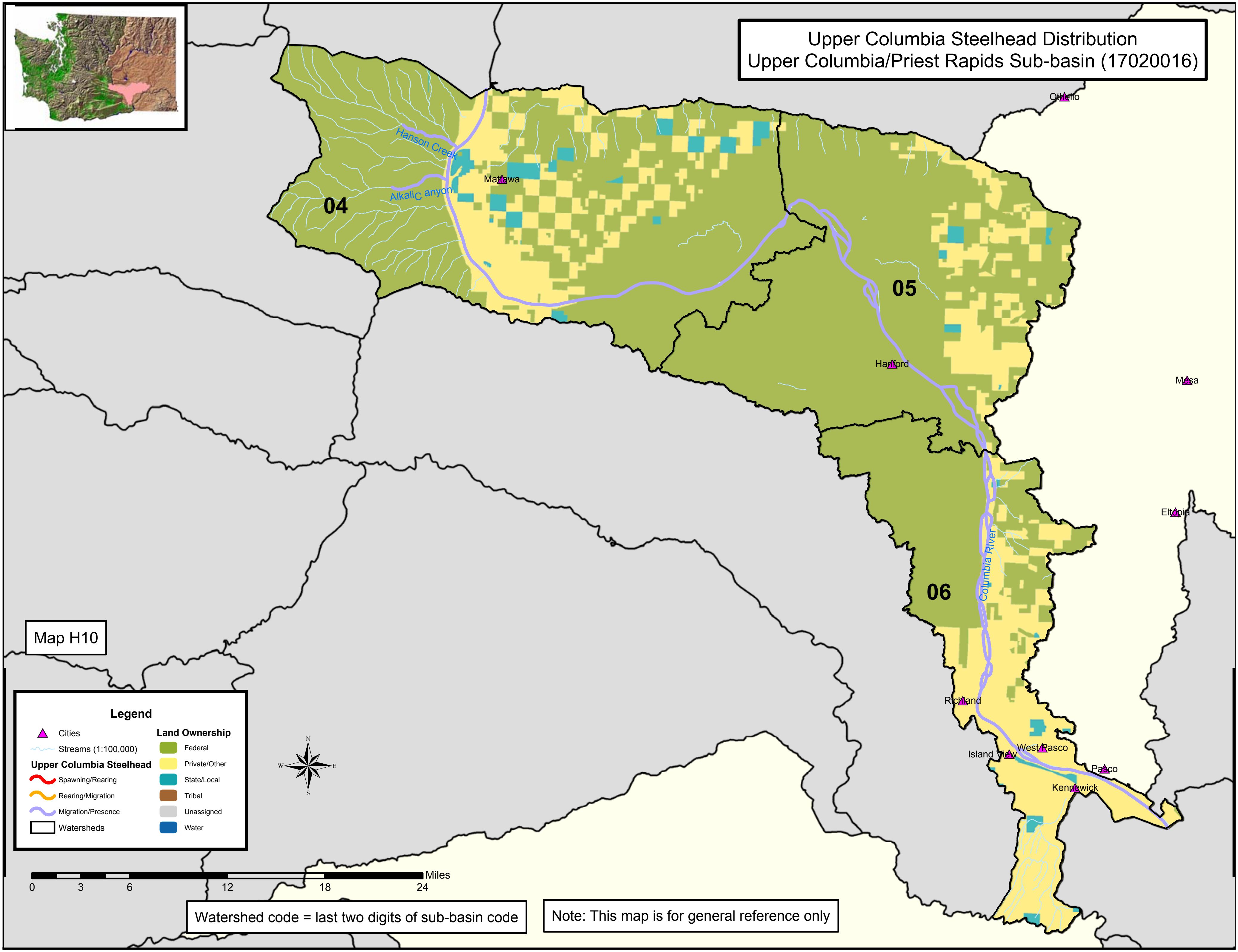


Upper Columbia Steelhead Distribution
Upper Columbia/Entiat Sub-basin (17020010)
01
02
03
04
Entiat River
Mad River
Ardenvoir
Entiat
Chelan Falls
Rocky Reach
West Wenatchee
Wenatchee
East Wenatchee
Rock Island
Rock Island
Colockum Creek
Brushy Creek
Columbia River
Wanapum
Doris
Beverly
Map H6
Legend
Cities
Dams
Streams (1:100,000)
Upper Columbia Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
Miles
0
4.5
9
18
27
36
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only


Upper Columbia Steelhead Distribution
Wenatchee Sub-basin (17020011)
01
02
03
04
05
Chiwawa River
White River
Nason Creek
Chumstick Creek
Derby Canyon
Icicle Creek
Peshastin Creek
Mission Creek
East Fork Mission Creek
Plain
Cashmere
Map H7
Legend
Cities
Dams
Streams (1:100,000)
Upper Columbia Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
0 2 4 8 12 16
Miles
Watershed code = last two digits of sub-basin code
Note: This map is a for general reference only


Upper Columbia Steelhead Distribution
Moses Coulee Sub-basin (17020012)
Palisades
04
Moses Coulee
Map H8
Legend
Cities
Dams
Streams (1:100,000)
Upper Columbia Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Use
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only
0
1.25
2.5
5
7.5
10
Miles


Upper Columbia Steelhead Distribution
Lower Crab Sub-basin (17020015)
Royal City
Smyrna
Lower Crab Creek
Hayes Creek
09
Map H9
Legend
Cities
Dams
Streams (1:100,000)
Upper Columbia Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
W
E
S
Miles
0
2
4
8
12
16
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only



Upper Columbia Steelhead Distribution
Upper Columbia/Priest Rapids Sub-basin (17020016)
Map H10
04
05
06
Hanson Creek
Alkali Canyon
Columbia River
Mattawa
Othello
Hanford
Mesa
Eltopia
Richland
West Pasco
Island View
Pasco
Kennewick
Legend
Cities
Streams (1:100,000)
Upper Columbia Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
0
3
6
12
18
24
Miles
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only

Appendix I
CHART Assessment for the
Snake River Basin Steelhead ESU

CHART Participants

The CHART for this ESU consisted of the following NOAA Fisheries biologists: Ken Troyer, (CHART Leader), Vince Kozakiewicz, Randy Tweten, Larry Zuckerman, Bob Ries, Dale Brege, Eric Murray, Don Anderson, Jim Morrow, Angela Somma, and Herb Pollard. CHART members from the U.S. Forest Service consisted of: Bruce Smith, Joe Vacirca, Tom Montoya, Mark Moulton, Ken Bronec, Brad Lovatt, Dell Groat, Bill Dowdy, Lisa Hawdon, Pat Murphy, Scott Russell, Russ Thurow, David Burns, and Roger Nelson. CHART members also included Jackie Dougan and Craig Johnson from the U.S. Bureau of Land Management, and Jody Brostrom from the U.S. Fish and Wildlife Service. This CHART assessment also benefitted from review and comments by the Oregon Department of Fish and Wildlife and Washington Department of Fish and Wildlife. Comments were received from Idaho Department of Fish and Game however they did not arrive in time to be considered in the CHART's assessment.

ESU Description

The Snake River Basin steelhead ESU was listed as a threatened species in 1997 (62 FR 43937; August 18, 1997). The ESU includes all naturally spawned populations of steelhead in streams in the Snake River Basin of southeast Washington, northeast Oregon, and Idaho. The agency recently conducted a review to update the ESU's status, taking into account new information, evaluating component resident rainbow trout populations, and considering the net contribution of artificial propagation efforts in the ESU. We have proposed that Snake River Basin *O. mykiss* (including steelhead and rainbow trout) remain listed as threatened (69 FR 33102; June 14, 2004). Additionally, we have proposed that the listing include resident populations of *O. mykiss* below impassible barriers (natural and manmade) that co-occur with anadromous populations. Recent genetic data also suggest that native resident *O. mykiss* above Dworshak Dam on the North Fork Clearwater River are part of this ESU. We have proposed that these native resident *O. mykiss* populations above Dworshak Dam on the North Fork Clearwater River also be considered part of the Snake River Basin *O. mykiss* ESU. We have also proposed that the listing include six artificial propagation programs considered part of the ESU. The final listing determination for all *O. mykiss* ESUs was extended by six months (70 FR 37219, June 28, 2005), therefore the CHART's assessment focused on the anadromous range of *O. mykiss*.

The Snake River steelhead ESU is distributed throughout the Snake River drainage system, including tributaries in southeast Washington, eastern Oregon and north/central Idaho. Snake River steelhead migrate a substantial distance from the ocean (up to 930 mi) and use high elevation tributaries (typically 3,300-6,600 ft above sea level) for spawning and juvenile rearing. Snake River steelhead occupy habitat that is considerably warmer and drier (on an annual basis) than other steelhead ESUs. Snake River basin steelhead are generally classified as summer run, based on their adult run timing patterns. Summer steelhead enter the Columbia River from late June to October. After holding over the winter, summer steelhead spawn during the following spring (March to May). Managers classify up-river summer steelhead runs into two groups based primarily on ocean age and adult size upon return to the Columbia River. Those classified as A-run steelhead are predominately age-1 ocean fish while B-run steelhead are larger, predominately age-2 ocean fish.

Recovery Planning Status

The Interior Columbia Basin TRT (ICBTRT 2003, 2005) has identified 24 demographically independent populations in 5 "major groupings" in the Snake River Basin *O. mykiss* ESU: the Lower Snake group (including the Tucannon River and Asotin Creek populations); Clearwater group (including the Lower Clearwater, South Fork, Lolo Creek, Lochsa River, and Selway River populations); Grande Ronde group (including the Lower Grande Ronde, Joseph Creek, Wallowa River, and Upper Grande Ronde populations); Salmon River group (including the Little Salmon, South Fork, Secesh River, Chamberlain Creek, Big/Camas/Loon, Upper Middle Fork, Panther Creek, North Fork, Lemhi River, Pahsimeroi River, East Fork, and Upper mainstem populations); and Imnaha group (including the Imnaha River population). Despite geographic separation from other spawning areas, the TRT did not identify Hells Canyon as an independent population but noted that maintaining this area may be important for ESU viability and other recovery goals. The groupings of populations are based on similarities in genetic distances, distances between spawning aggregates, life history, and habitat or environmental considerations. Recovery planning will likely emphasize the need for a geographical distribution of viable populations across the range of such groupings in an ESU (Ruckelshaus et al. 2002, McElhany et al. 2003, McClure 2004 [pers comm.]). Subbasin assessments and plans have been completed for each subbasin through the Northwest Power and Conservation Council. Recovery planners are now using those subbasin plans and TRT products to develop ESA recovery plans. Draft recovery plans are expected by the end of 2005. The CHART considered the available subbasin plans and TRT products in rating each watershed. We anticipate that, as recovery planning proceeds, we will have better information and may revise our recommendations regarding critical habitat designation.

CHART Area Assessments

The CHART assessment for this ESU addressed 25 subbasins containing 271 occupied watersheds and 20 unoccupied watersheds. As part of its assessment the CHART considered the conservation value of each HUC5 watershed in the context of the populations within the 5 major groupings described above. During the orientation meetings the CHART noted that the Idaho Department of Fish and Game (IDFG) steelhead distribution data did not accurately reflect their own knowledge of the species distribution. A review of the problem prompted NOAA Fisheries to take on the task of revising the steelhead distribution throughout Idaho. NOAA Fisheries solicited input from the Bureau of Land Management (BLM) and U.S. Forest Service (USFS) for steelhead distribution within watersheds of the Clearwater River, Salmon River, and lower Snake River basins in Idaho. NOAA Fisheries also received updated steelhead distribution data from IDFG for the Salmon River Basin. The ratings and associated maps that follow reflect the updated steelhead distribution. Information is presented below by USGS subbasin because they present a convenient and systematic way to organize the CHART's watershed assessments for this ESU and their names are generally more recognizable because they typically identify major river systems.

Hells Canyon Subbasin (HUC4# 17060101)

The Hells Canyon subbasin is located in the Lower Snake River Basin and includes areas in Oregon and Idaho. In Oregon the subbasin includes part of Wallowa county and in Idaho portions of Adams and Idaho counties. The subbasin contains three watersheds occupied by this ESU and encompasses approximately 541s mi^2 and 705 miles of streams. Fish distribution and habitat use data from ODFW, USFS, BLM, and IDFG identify approximately 156 miles of occupied riverine habitat in the watersheds (NOAA 2005). The ICBTRT (2005) recently identified a single population (Hells Canyon) in this subbasin. However, the CHART determined that maintaining this area may be important for ESU viability or other conservation goals. The northern end of the subbasin also provides rearing and migration habitat for the Imnaha River population. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table J1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map J1 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Imnaha River Subbasin (HUC4# 17060102)

The Imnaha River subbasin is located in the Lower Snake River Basin and contained in Baker, Union, and Wallowa counties, Oregon. The subbasin contains five watersheds occupied by this ESU and encompasses approximately 851 mi^2 and 964 miles of streams. Fish distribution and habitat use data from ODFW identify approximately 357 miles of occupied riverine habitat in the watersheds (ODFW 2003). The Interior Columbia Basin TRT (2003, 2005) identified one historically independent population in this subbasin, the Imnaha River population. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may threaten the PCEs. Table I1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map I2 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Lower Snake/Asotin Subbasin (HUC4# 17060103)

The Imnaha River subbasin is located in the Lower Snake River Basin and includes areas in Idaho, Oregon, and Washington. In Idaho the subbasin contains part of Nez Perce county, and in Oregon the subbasin includes part of Wallowa county. The area of the subbasin in Washington contains portions of Asotin and Garfield counties. The Subbasin contains three watersheds occupied by this ESU and encompasses approximately 704 mi^2 and 995 miles of streams. Fish distribution and habitat use data from ODFW identify approximately 196 miles of occupied riverine habitat in the watersheds (ODFW 2003). The Interior Columbia Basin TRT (2003, 2005) identified three historically independent populations in this subbasin: Asotin Creek, Lower Grande Ronde, and Little Salmon and Lower Salmon tributaries. Additionally, other populations use watersheds in this subbasin for rearing and migration. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table I1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map I3 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Upper Grande Ronde River Subbasin (HUC4# 17060104)

The Upper Grande Ronde River subbasin is located in the Lower Snake River Basin and contained in Baker, Umatilla, Union, and Wallowa counties, Oregon. The subbasin contains 11 watersheds occupied by this ESU and encompasses approximately 1,637 mi^2 and 2,140 miles of streams. Fish distribution and habitat use data from ODFW identify approximately 798 miles of occupied riverine habitat in the watersheds (ODFW 2003). The Interior Columbia Basin TRT (2003, 2005) identified one historically independent population in this subbasin, the Upper Grande Ronde River population. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table I1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map I4 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Wallowa River Subbasin (HUC4# 17060105)

The Wallowa River subbasin is located in the Lower Snake River Basin and contained in Union and Wallowa counties, Oregon. The subbasin contains six watersheds occupied by this ESU and encompasses approximately 954 mi^2 and 1,095 miles of streams. Fish distribution and habitat use data from ODFW identify approximately 265 miles of occupied riverine habitat in the watersheds (ODFW 2003). The Interior Columbia Basin TRT (2003, 2005) identified one historically independent population in this subbasin, the Wallowa River population. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table I1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map I5 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Lower Grande Ronde Subbasin (HUC4# 17060106)

The Lower Grande Ronde River subbasin is located in the Lower Snake River Basin and within both Washington and Oregon. The portion of the subbasin in Washington is contained in Asotin, Columbia, and Garfield counties. In Oregon, the subbasin contains portions of Union and Wallowa counties. The subbasin contains seven watersheds occupied by this ESU and encompasses approximately 1,518 mi^2 and 1,707 miles of streams. Fish distribution and habitat use data from ODFW identify approximately 576 miles of occupied riverine habitat in the watersheds (ODFW 2003). The Interior

Columbia Basin TRT (2003, 2005) identified two historically independent populations in this subbasin: Lower Grande Ronde River and Joseph Creek. Additionally, other populations use watersheds in this subbasin for rearing and migration. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table I1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map I6 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Lower Snake/Tucannon Subbasin (HUC4# 17060107)

The Lower Snake/Tucannon subbasin is located in the Lower Snake River Basin and contained in Asotin, Columbia, Garfield, and Whitman counties, Washington. The subbasin contains eight watersheds occupied by this ESU and encompasses approximately 1,458 mi^2 and 1,968 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 325 miles of occupied riverine habitat in the watersheds (WDFW 2003). The Interior Columbia Basin TRT (2003, 2005) identified two historically independent populations in this subbasin: Asotin Creek and Tucannon River. Additionally, other populations use watersheds in this subbasin for rearing and migration.

The ratings for three of the watersheds within this subbasin were changed after the CHART reviewed co-manager comments from WDFW. Of the eight watersheds reviewed by the CHART, two were rated as having high, two were rated as having medium, and four were rated as having low conservation value to the ESU (NOAA 2005). Co-manager comments from WDFW prompted the CHART to change the ratings of Alpowa Creek and Snake River/Penawawa Creek watersheds from low to medium conservation value to the ESU. Additionally, co-manager comments from WDFW prompted the CHART to change the rating of the Deadmand Creek watershed from medium to low conservation value to the ESU.

The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table I1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map I7 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Palouse River Subbasin (HUC4# 17060108)

The Palouse River subbasin is located in the Lower Snake River Basin. The ESU is limited to the lowermost watershed of the subbasin, which is in Adams, Franklin, and Whitman counties, Washington. The upper portion of the subbasin is in Benewah, Latah, and Nez Perce counties, Idaho. The subbasin contains one watershed that is occupied by this ESU. The occupied watershed encompasses approximately 199 mi^2 and 205 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 8 miles of occupied riverine habitat in the watersheds (WDFW 2003). The ICBTRT (2005) recently identified a single population (Tucannon River) in this subbasin.However, the CHART determined that this area may provide spawning habitats during years of high abundance or favorable habitat conditions. Additionally, the CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table I1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map I8 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Upper Salmon Subbasin (HUC4# 17060201)

The Upper Salmon subbasin is located in the Salmon River Basin and contained in Blaine and Custer counties, Idaho. The subbasin contains 27 watersheds occupied by this ESU and encompasses approximately 2,119 mi^2 and 3,303 miles of streams. Fish distribution and habitat use data from BLM, IDFG, and USFS identify approximately 570 miles of occupied riverine habitat in the watersheds (NOAA 2005). The Interior Columbia Basin TRT (2003, 2005) identified two historically independent populations in this subbasin: Upper Mainstem Salmon River and East Fork Salmon River. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table I1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map I9 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Pahsimeroi Subbasin (HUC4# 17060202)

The Pahsimeroi subbasin is located in the Salmon River Basin and contained in Custer and Lemhi counties, Idaho. The subbasin contains three watersheds occupied by this ESU and three unoccupied watersheds that the CHART determined may be essential for conservation of the ESU. The occupied watersheds encompass approximately 376 square miles; other historically occupied areas in this subbasin are now blocked by irrigation impoundments and low stream flows due to irrigation withdrawals. The subbasin encompasses approximately 831 mi^2 and 981 miles of streams. Fish distribution and habitat use data from BLM, IDFG, and USFS identify approximately 51 miles of occupied riverine habitat in the watersheds (NOAA 2005). In addition, the CHART identified 83 miles of unoccupied riverine habitat that may be essential for conservation of the ESU (NOAA 2005). The Interior Columbia Basin TRT (2003, 2005) identified one historically independent population that is partially contained by this subbasin, the Pahsimeroi River population. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table I1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map I10 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART also believed that historically occupied areas within three watersheds (Big Creek, Pahsimeroi River/Goldberg Creek, Upper Pahsimeroi River) may be essential for the conservation of the ESU.

Middle Salmon-Panther Subbasin (HUC4# 17060203)

The Middle Salmon-Panther subbasin is located in the Salmon River Basin and contained in Custer and Lemhi counties, Idaho. The subbasin contains 23 watersheds occupied by this ESU and encompasses approximately 1,821 mi^2 and 1,987 miles of streams. Fish distribution and habitat use data from BLM, IDFG, and USFS identify approximately 340 miles of occupied riverine habitat in the watersheds (NOAA 2005). The Interior Columbia Basin TRT (2003, 2005) identified four historically independent populations within this subbasin. The Lemhi River, Pahsimeroi River, and Panther Creek populations are partially contained within the subbasin. The North Fork Salmon River population is completely contained within the subbasin. Additionally, other populations use watersheds in this subbasin for rearing and migration. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table I1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map I11 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Lemhi Subbasin (HUC4# 17060204)

The Lemhi subbasin is located in the Salmon River Basin and contained in Lemhi county, Idaho. The subbasin contains 10 watersheds occupied by this ESU and four unoccupied watersheds that the CHART determined may be essential for conservation of the ESU. Fish distribution and habitat use data from BLM, IDFG, and USFS identify approximately 132 miles of occupied riverine habitat in the watersheds (NOAA 2005). In addition to the occupied riverine habitat, the CHART determined that there are 191 miles of unoccupied riverine habitat that may be essential for conservation of the ESU (NOAA 2005). In addition to the occupied riverine habitat, the CHART determined that there are 191 miles of unoccupied riverine habitat that may be essential for conservation of the ESU (NOAA 2005). These segments of unoccupied riverine habitat are found within both occupied and unoccupied watersheds. The Interior Columbia Basin TRT (2003, 2005) identified one historically independent population that is partially contained within this subbasin, the Lemhi River population. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table I1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map I12 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART also believed that historically occupied areas within three watersheds (Big Timber Creek, Eighteen Mile Creek, Hawley Creek) may be essential for the conservation of the ESU.

Upper Middle Fork Salmon Subbasin (HUC4# 17060205)

The Upper Middle Fork subbasin is located in the Salmon River Basin and contained in Custer, Lemhi, and Valley counties, Idaho. The subbasin contains 13 watersheds occupied by this ESU and encompasses approximately 1,506 mi^2 and 1,980 miles of streams. Fish distribution and habitat use data from IDFG and USFS identify approximately 572 miles of occupied riverine habitat in the watersheds (NOAA 2005). The Interior Columbia Basin TRT (2003, 2005) identified two historically independent populations in this subbasin. The subbasin supports the entire spawning range of the Upper Middle Fork Salmon River population and a portion of the Big, Camas, and Loon Creeks population. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table I1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map I13 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Lower Middle Fork Salmon Subbasin (HUC4# 17060206)

The Lower Middle Fork Salmon subbasin is located in the Salmon River Basin and contained in Idaho, Lemhi, and Valley counties, Idaho. The subbasin contains 17 watersheds occupied by this ESU and encompasses approximately 1,373 mi^2 and 1,573 miles of streams. Fish distribution and habitat use data from IDFG and USFS identify approximately 340 miles of occupied riverine habitat in the watersheds (NOAA 2005). The Interior Columbia Basin TRT (2003, 2005) identified one historically independent population in this subbasin, the Big, Camas, and Loon Creeks population. Additionally, the Upper Middle Fork Salmon River population uses watersheds within this subbasin for rearing and migration. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table I1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map I14 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Middle Salmon-Chamberlain Subbasin (HUC4# 17060207)

The Middle Salmon-Salmon Chamberlain subbasin is located in the Salmon River Basin and contained in Idaho, Lemhi, and Valley counties, Idaho. The subbasin contains 19 watersheds occupied by this ESU and encompasses approximately 1,715 mi^2 and 2,025 miles of streams. Fish distribution and habitat use data from BLM, IDFG, and USFS identify approximately 402 miles of occupied riverine habitat in the watersheds (NOAA 2005). The Interior Columbia Basin TRT (2003, 2005) identified two historically independent populations in this subbasin. The Chamberlain Creek population and a portion of the Panther Creek population are contained in this subbasin. Additionally, other populations use watersheds in this subbasin for rearing and migration. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table I1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map I15 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

South Fork Salmon Subbasin (HUC4# 17060208)

The Middle Salmon-Salmon Chamberlain subbasin is located in the Salmon River Basin and contained in Idaho and Valley counties, Idaho. The subbasin contains 15 watersheds occupied by this ESU and encompasses approximately 1,313 mi^2 and 1,630 miles of streams. Fish distribution and habitat use data from BLM, IDFG, and USFS identify approximately 410 miles of occupied riverine habitat in the watersheds (NOAA 2005). The Interior Columbia Basin TRT (2003, 2005) identified two historically independent populations in this subbasin: South Fork Salmon River and Secesh River. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table I1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map I16 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Lower Salmon Subbasin (HUC4# 17060209)

The Lower Salmon subbasin is located in the Salmon River Basin and contained in Idaho, Lewis and Nez Perce counties, Idaho. The subbasin contains 17 watersheds occupied by this ESU and encompasses approximately 1,179 mi^2 and 1,632 miles of streams. Fish distribution and habitat use data from BLM, IDFG, and USFS identify approximately 318 miles of occupied riverine habitat in the watersheds (NOAA 2005). The Interior Columbia Basin TRT (2003, 2005) identified two historically independent populations in this subbasin. Portions of the Chamberlain Creek and Little Salmon/Rapid River populations are contained in this subbasin. Additionally, other populations use watersheds in this subbasin for rearing and migration. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table I1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map I17 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART noted that due to an oversight, HUC5# 1706020907 (Salmon River/ Hammer Creek) warranted a rating change from preliminarily medium to high value due to the lack of tributary habitat and its importance as a high value connectivity corridor for upstream HUC5s.

Little Salmon Subbasin (HUC4# 17060210)

The Little Salmon subbasin is located in the Salmon River Basin and contained in Adams and Idaho counties, Idaho. The subbasin contains five watersheds occupied by this ESU and encompasses approximately 406 mi^2 and 744 miles of streams. Fish distribution and habitat use data from BLM, IDFG, and USFS identify approximately 101 miles of occupied riverine habitat in the watersheds (NOAA 2005). The Interior Columbia Basin TRT (2003, 2005) identified one historically independent population that is partially contained in this subbasin: Little Salmon/Rapid River. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table I1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map I18 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Upper Selway Subbasin (HUC4# 17060301)

The Upper Selway subbasin is located in the Clearwater River Basin and contained in Idaho County, Idaho. The subbasin contains nine watersheds occupied by this ESU and encompasses approximately 983 mi^2 and 1,246 miles of streams. Fish distribution and habitat use data from IDFG and USFS identify approximately 314 miles of occupied riverine habitat in the watersheds (NOAA 2005). The Interior Columbia Basin TRT (2003, 2005) identified one historically independent population that is partially contained in this subbasin, the Selway River population. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table I1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map I19 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Lower Selway Subbasin (HUC4# 17060302)

The Lower Selway subbasin is located in the Clearwater River Basin and contained in Idaho County, Idaho. The subbasin contains 13 watersheds occupied by this ESU and encompasses approximately 1,005 mi^2 and 1,297 miles of streams. Fish distribution and habitat use data from IDFG and USFS identify approximately 242 miles of occupied riverine habitat in the watersheds (NOAA 2005). The Interior Columbia Basin TRT (2003, 2005) identified one historically independent population that is partially contained in this subbasin, the Selway River population. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table I1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map I20 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Lochsa Subbasin (HUC4# 17060303)

The Lochsa subbasin is located in the Clearwater River Basin and contained in Clearwater and Idaho counties, Idaho. The subbasin contains 14 watersheds occupied by this ESU and encompasses approximately 1,178 mi^2 and 1,378 miles of streams. Fish distribution and habitat use data from IDFG and USFS identify approximately 277 miles of occupied riverine habitat in the watersheds (NOAA 2005). The Interior Columbia Basin TRT (2003, 2005) identified one historically independent population that in this subbasin, the Lochsa River population. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table I1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map I21 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART noted that HUC5# 1706030310 (Upper White Sands Creek) warranted a rating change from preliminarily low to high value due to recent surveys supporting a higher certainty that steelhead are using tributary habitats in this HUC5 for spawning and rearing.

Middle Fork Clearwater Subbasin (HUC4# 17060304)

The Middle Fork Clearwater subbasin is located in the Clearwater River Basin and contained in Idaho County, Idaho. The subbasin contains two watersheds occupied by this ESU and encompasses approximately 217 mi^2 and 296 miles of streams. Fish distribution and habitat use data from BLM, IDFG and USFS identify approximately 80 miles of occupied riverine habitat in the watersheds (NOAA 2005). The Interior Columbia Basin TRT (2003, 2005) identified one historically independent population that is partially contained by this subbasin, the Lower Clearwater River population. Additionally, other populations use watersheds in this subbasin for rearing and migration. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table I1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map I22 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

South Fork Clearwater Subbasin (HUC4# 17060305)

The South Fork Clearwater subbasin is located in the Clearwater River Basin and contained in Idaho County, Idaho. The subbasin contains 13 watersheds occupied by this ESU and encompasses approximately 1,176 mi^2 and 1,673 miles of streams. Fish distribution and habitat use data from BLM, IDFG and USFS identify approximately 443 miles of occupied riverine habitat in the watersheds (NOAA 2005). The Interior Columbia Basin TRT (2003, 2005) identified two historically independent populations in this subbasin. The South Fork Clearwater River population and a portion of the Lower Clearwater River population are contained within this subbasin. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table I1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map I23 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Clearwater Subbasin (HUC4# 17060306)

The Clearwater subbasin is located in the Clearwater River Basin and contained in Clearwater, Idaho, Latah, Lewis, and Nez Perce counties, Idaho. In addition to those areas in Idaho, there is a small portion of the subbasin (approximately 12 mi^2) within Whitman County, Washington. The subbasin contains 26 watersheds occupied by this ESU and encompasses approximately 2,046 mi^2 and 3,147 miles of streams. Fish distribution and habitat use data from BLM, IDFG and USFS identify approximately 425 miles of occupied riverine habitat in the watersheds (NOAA 2005). The Interior Columbia Basin TRT (2003, 2005) identified two historically independent populations in this subbasin. The Lolo Creek population and a portion of the Lower Clearwater River population are contained within this subbasin. Additionally, other populations use watersheds in this subbasin for rearing and migration. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table I1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map I24 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Lower North Fork Clearwater Subbasin (HUC4# 17060308)

The Lower North Fork Clearwater subbasin is located in the Clearwater River Basin. The ESU is limited to the lowermost watershed in the subbasin which contains portions of Clearwater and Latah counties, Idaho. The upper areas of the subbasin also contain portions of Shoshone County, Idaho. The subbasin contains one watershed that is occupied by the anadromous life history type of this ESU. The occupied watershed encompasses approximately 81 mi^2 and 93 miles of streams. Fish distribution and habitat use data from IDFG and USFS identify approximately 2 miles of occupied riverine habitat in the lowermost watershed of the subbasin (NOAA 2005). The occupied habitat is part of the Lower Clearwater River population (ICBTRT 2003, 2005). The CHART initially concluded that all of the occupied areas contained one or more PCEs for this ESU. However, after considering again the the extremely limited quality and quantity of habitat features in this HUC5 the CHART concluded that PCEs are lacking here and did not consider it eligible for designation as critical habitat.

In addition, the CHART also considered whether historically occupied areas of this subbasin (and the upstream subbasin – Upper North Fork Clearwater) above Dworshak Dam are essential for ESU conservation. Although many areas are now inundated, the CHART concluded that most of the blocked watersheds are still in good condition. The CHART also noted that the ICBTRT identified these areas as part of a historically independent population and underscored that the resident *O. mykiss* above Dworshak Dam are genetically unique relative to other *O. mykiss* in the Clearwater basin. In addition, NOAA Fisheries recently completed a status review update of this ESU (NOAA Fisheries 2003) that noted "recent genetic data suggest that native resident *O. mykiss* above Dworshak Dam on the North Fork Clearwater should be considered part of this ESU, but hatchery rainbow trout that have been introduced to that and other areas would not." Given these considerations, the CHART concluded that these blocked watersheds may be essential for ESU conservation however they were uncertain which specific areas within them may warrant consideration as critical habitat.

Lower Snake/Columbia River corridor

The lower Snake/Columbia River rearing and migration corridor begins in southeast Washington immediately downstream of the confluence of the Snake River with the Palouse River. The corridor includes approximately 58 miles of the Lower Snake River and 320 miles of the Columbia River. Watersheds downstream of the Palouse River are outside of the spawning range of this ESU and likely used in a limited way as juvenile rearing habitat for this ESU.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the lower Snake/Columbia River corridor was of high conservation value to the ESU. The CHART noted that this corridor connects every watershed and population in this ESU with the ocean and by rearing/migrating juveniles and migrating adults. The Columbia River estuary also contains PCEs and is a particularly important area for this ESU as both juveniles and adults make the critical physiological transition between life in freshwater and marine habitats (Marriot et al. 2002).

CHART Conservation Value Rating

Freshwater/Estuarine Areas

After reviewing the best available scientific data regarding critical habitat for this ESU, the CHART concluded that most of the occupied HUC5 watersheds were of either high or medium conservation value to the ESU. Of the 291 HUC5s reviewed, 220 were rated as high, 44 were rated as medium, and 27 were rated as low conservation value. Table J2 summarizes the CHART's PCE/watershed scores[6] and conservation value ratings, and Figure J1 shows the overall distribution of ratings by HUC5 watershed. The CHART concluded that it was important to have high value watersheds identified in each of the six TRT major groupings of populations and their assessment reflects that conclusion.

Marine Areas

NOAA Fisheries' analysis focused on freshwater and estuarine habitats upstream of the mouth of the Columbia River. While marine areas are occupied by this ESU, within this vast area the agency has not identified "specific areas within the geographical area occupied by the species . . . on which are found those physical or biological features . . . essential to the conservation of the species."

Changes to the CHART's Initial Assessments

The CHART reviewed the public and peer reviewer comments received on the Team's initial findings for this ESU as well as new information relevant to evaluating habitat areas for this ESU. As a result, the CHART changed the conservation value rating for one watershed within the geographical area occupied by this ESU (Agency Creek). Additionally, based on public comments and new information reviewed by the CHART, we have identified changes to the delineation of occupied habitat areas (including reductions associated with areas lacking PCEs) in numerous watersheds and identified four watersheds that were previously considered to be unoccupied. The proposed critical habitat designation (69 FR 74572, December 14, 2004) summarizes the comments and responses pertaining to the CHART's initial determinations for this ESU. And Tables I1

[6] PCE/watershed scores were derived using the CHART scoring process described in the introduction to this report.

and I2 reflect the final CHART assessments, including the following changes in habitat area delineations:

Subbasin	Watershed code	Watershed name	Changes from Initial CHART Assessment
Hells Canyon	1706010101	Snake River/ Granite Creek	Added 1 mile (1.6 km) of occupied habitat areas.
Hells Canyon	1706010102	Snake River/ Getta Creek	Added 1 mile (1.6 km) of occupied habitat areas.
Hells Canyon	1706010104	Snake River/ Divide Creek	Added 1 mile (1.6 km) of occupied habitat areas.
Upper Grande Ronde River	1706010408	Phillips Creek/ Willow Creek	Added 10 miles (16.1 km) of occupied habitat areas.
Upper Salmon	1706020118	Salmon River/ Fourth of July Creek	Added 4 miles (6.4 km) of occupied habitat areas.
Upper Salmon	1706020132	Morgan Creek	Added 15 miles (24.1 km) of occupied habitat areas.
Lemhi	1706020404	Agency Creek	Changed conservation rating from Low to Medium.
Lemhi	1706020408	Big Eight Mile Creek	Added 6 miles (9.6 km) of occupied habitat areas.
Lemhi	1706020412	Texas Creek	Added 14 miles (22.5 km) of occupied habitat areas. This watershed was considered to be unoccupied in the proposed designation.
Lower Salmon	1706020911	Slate Creek	Added 1 mile (1.6 km) of occupied habitat areas.
Little Salmon	1706021001	Lower Little Salmon River	Added 3 miles (4.8 km) of occupied habitat areas.

Subbasin	Watershed code	Watershed name	Changes from Initial CHART Assessment
South Fork Clearwater	1706030503	South Fork Clearwater River/ Peasley Creek	Added 1 mile (1.6 km) of occupied habitat areas.
South Fork Clearwater	1706030507	Red River	Added 3 miles (4.8 km) of occupied habitat areas.
South Fork Clearwater	1706030508	Crooked River	Added 4 miles (6.4 km) of occupied habitat areas.
South Fork Clearwater	1706030510	John's Creek	Added 10 miles (16.1 km) of occupied habitat areas.
South Fork Clearwater	1706030511	Mill Creek	Added 8 miles (12.9 km) of occupied habitat areas.
South Fork Clearwater	1706030513	Cottonwood Creek	Added 11 miles (17.7 km) of occupied habitat areas.
Clearwater	1706030602	Clearwater River/ Lower Potlatch River	Added 11 miles (17.7 km) of occupied habitat areas.
Clearwater	1706030604	Lower Big Bear Creek	Added 22 miles (35.4 km) of occupied habitat areas.
Clearwater	1706030605	Upper Big Bear Creek	Added 12 miles (19.3 km) of occupied habitat areas. This watershed was considered to be unoccupied in the proposed designation.
Clearwater	1706030606	Potlatch River/ Pine Creek	Added 5 miles (8.0 km) of occupied habitat areas.
Clearwater	1706030607	Upper Potlatch River	Added 7 miles (11.3 km) of occupied habitat areas.

Subbasin	Watershed code	Watershed name	Changes from Initial CHART Assessment
Clearwater	1706030608	Clearwater River/ Bedrock Creek	Added 8 miles (12.9 km) of occupied habitat areas.
Clearwater	1706030610	Big Canyon Creek	Added 9 miles (14.5 km) of occupied habitat areas.
Clearwater	1706030613	Upper Orofino Creek	Added 1 mile (1.6 km) of occupied habitat areas.
Clearwater	1706030614	Jim Ford Creek	Added 6 miles (9.6 km) of occupied habitat areas.
Clearwater	1706030615	Lower Lolo Creek	Added 1 mile (1.6 km) of occupied habitat areas.
Clearwater	1706030620	Clearwater River/ Fivemile Creek	Added 2 miles (3.2 km) of occupied habitat areas.
Clearwater	1706030623	Lower Lawyer Creek	Added 4 miles (6.4 km) of occupied habitat areas.
Clearwater	1706030627	Cottonwood Creek	Added 2 miles (3.2 km) of occupied habitat areas.
Clearwater	1706030628	Upper Lapwai Creek	Added 12 miles (19.3 km) of occupied habitat areas. This watershed was considered to be unoccupied in the proposed designation.
Clearwater	1706030629	Mission Creek	Added 14 miles (22.5 km) of occupied habitat areas. This watershed was considered to be unoccupied in the proposed designation.
Clearwater	1706030630	Upper Sweetwater Creek	Added 1 mile (1.6 km) of occupied habitat areas.

Subbasin	Watershed code	Watershed name	Changes from Initial CHART Assessment
Clearwater	1706030801	Lower North Fork Clearwater River	Removed 2 miles (3.2 km) of occupied stream reaches lacking PCEs.
Clearwater	1706030631	Lower Sweetwater	Added 2 miles (3.2 km) of occupied habitat areas.

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Table I1. Summary of Occupied Areas, PCEs, and Management Activities Affecting PCEs for the Snake River Basin Steelhead ESU

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs)			Unoccupied but may be essential (mi)***	Occupied but lacking PCEs (mi)	Management Activities***
				Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*			
	Hells Canyon	Snake River/ Granite Creek	1706010101	25.6	18.2	15.5		0	D, G, T
	Hells Canyon	Snake River/ Getta Creek	1706010102	27	23.7	18.7		0	D, G, T
	Hells Canyon	Snake River/ Divide Creek	1706010104	13.6	12.5	1.4		0	D, G, T
	Imnaha River	Upper Imnaha River	1706010201	46.5	0	0		0	F, G, R
	Imnaha River	Middle Imnaha River	1706010202	64.1	0	0		0	F, G, I, R
	Imnaha River	Big Sheep Creek	1706010203	64	0	0		0	F, G, I
	Imnaha River	Little Sheep Creek	1706010204	69.4	0	0.6		0	F, G, I, U
	Imnaha River	Lower Imnaha River	1706010205	112.3	0	0		0	G, I
	Lower Snake/ Asotin	Snake River/ Rogersburg	1706010301	12.5	19.6	0		0	G, T
	Lower Snake/ Asotin	Asotin River	1706010302	89.3	<0.1	4.7		0	F, G, I, U
	Lower Snake/ Asotin	Snake River/ Captain John Creek	1706010303	45.1	18	6.6		0	A, G, X
	Upper Grande Ronde	Upper Grande Ronde River	1706010401	106.1	0.2	0		0	C, F, G, M, R
	Upper Grande Ronde	Meadow Creek	1706010402	99.9	0	0		0	C, F, G, R
	Upper Grande Ronde	Grande Ronde River/ Beaver Creek	1706010403	118.7	0.5	0		0	C, F, G, R
	Upper Grande Ronde	Grande Ronde River/ Five Points Creek	1706010404	56.7	12.2	0		0	A, C, F, G, I, R, U
	Upper Grande Ronde	Catherine Creek	1706010405	45.5	6	0		0	F, G, I, R, U
	Upper Grande Ronde	Ladd Creek	1706010406	30.2	8.1	0		0	C, F, G, I, R
	Upper Grande Ronde	Grande Ronde River/ Mill Creek	1706010407	10.8	40.2	0		0	A, C, I, R
	Upper Grande Ronde	Phillips Creek/ Willow Creek	1706010408	43.2	4.2	2.5		0	A, C, F, G, I, R
	Upper Grande Ronde	Grande Ronde River/ Indian Creek	1706010409	68.3	16	0		0	A, F, G, I, R
	Upper Grande Ronde	Lookingglass Creek	1706010410	45.8	1.2	0		0	F, G, R
	Upper Grande Ronde	Grande Ronde River/ Cabin Creek	1706010411	82	0	0		0	A, F, G, R, U

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs) Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*	Unoccupied but may be essential (mi)***	Occupied but lacking PCEs (mi)	Management Activities***
	Wallowa River	Upper Wallowa River	1706010501	39.5	0	0		0	C, F, G, I, U
	Wallowa River	Lostine River	1706010502	25.6	0	0		0	F, G, I, M
	Wallowa River	Middle Wallowa River	1706010503	36.8	0	0		0	A, C, F, G, I
	Wallowa River	Bear Creek	1706010504	25.5	0	0		0	F, G, I, R, U
	Wallowa River	Minam River	1706010505	64.5	0	0		0	C, F, I
	Wallowa River	Lower Wallowa River	1706010506	70.2	2.4	0		0	C, F, G, I, R
	Lower Grande Ronde	Grande Ronde River/ Rondowa	1706010601	56.3	0	0		0	F, G, I
	Lower Grande Ronde	Grande Ronde River/ Mud Creek	1706010602	116.3	0	0		0	F, G, R
	Lower Grande Ronde	Weneha River	1706010603	88.4	0	<0.1		0	F, G
	Lower Grande Ronde	Chesnimnus Creek	1706010604	83.7	0	0		0	F, G
	Lower Grande Ronde	Upper Joseph Creek	1706010605	77.1	0	0		0	G, I, X
	Lower Grande Ronde	Lower Joseph Creek	1706010606	73.9	0	0		0	G, R
	Lower Grande Ronde	Lower Grande Ronde River/ Menathce Creek	1706010607	57.6	18.6	4.2		0	F, G, R, T
	Lower Snake/ Tucannon	Alpowa Creek	1706010701	19.3	0	3.4		0	A, G, I
	Lower Snake/ Tucannon	Snake River/ Steptoe Canyon	1706010702	13.4	0	24.3		0	D, G, T, X
	Lower Snake/ Tucannon	Deadman Creek	1706010703	44.6	0	1		0	G, I
	Lower Snake/ Tucannon	Flat Creek	1706010704	8.3	0	<0.1		0	A, D, G
	Lower Snake/ Tucannon	Pataha Creek	1706010705	40	0	11.1		0	A, F, G, I, X
	Lower Snake/ Tucannon	Upper Tucannon River	1706010706	64.9	0	2.8		0	A, F, G, I
	Lower Snake/ Tucannon	Lower Tucannon River	1706010707	18.9	<0.1	5		0	C, G, I

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs) Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*	Unoccupied but may be essential (mi)***	Occupied but lacking PCEs (mi)	Management Activities***
	Lower Snake/ Tucannon	Snake River/ Penawawa Creek	1706010708	16.4	0.2	51.2		0	D, G, T, X
	Palouse River	Lower Palouse River	1706010808	6.3	0	2		0	A, D
	Upper Salmon	Salmon River/ Challis	1706020101	16.4	13.2	0.5		0	R
	Upper Salmon	Salmon River/ Bayhorse Creek	1706020104	7.9	15	0		0	G, I, R, S
	Upper Salmon	East Fork Salmon River/ McDonald Creek	1706020105	21.6	0	0		0	G, I
	Upper Salmon	Road Creek	1706020107	2.8	0	0		0	G, I, R
	Upper Salmon	Herd Creek	1706020108	27.9	0	0		0	G, I, R
	Upper Salmon	East Fork Salmon River/ Big Boulder Creek	1706020109	22.2	0	0		0	G, I, M, R
	Upper Salmon	Upper East Fork Salmon River	1706020110	19.4	0	0		0	G, I, M
	Upper Salmon	Germania Creek	1706020111	4.8	0	0		0	G, I, M
	Upper Salmon	Salmon River/ Kinnikinic Creek	1706020112	8.8	0	0		0	C, G, R
	Upper Salmon	Salmon River/ Slate Creek	1706020113	29.8	0.1	0		0	F, G, I, R, M
	Upper Salmon	Warm Springs Creek	1706020114	10	0	0		0	G, M, R
	Upper Salmon	Salmon River/ Big Casino Creek	1706020115	28.6	0.6	0		0	C, I, M
	Upper Salmon	Salmon River/ Fisher Creek	1706020117	16.5	0	0		0	G, I
	Upper Salmon	Salmon River/ Fourth of July Creek	1706020118	13.4	0	0		0	G, I, M
	Upper Salmon	Upper Salmon River	1706020119	41.5	0	0		0	G, I
	Upper Salmon	Alturas Lake Creek	1706020120	20	3.8	0		0	G, I
	Upper Salmon	Redfish Lake Creek	1706020121	10.6	0	0		0	R, U
	Upper Salmon	Valley Creek/ Iron Creek	1706020122	29.6	3	0		0	G, I, M, U
	Upper Salmon	Upper Valley Creek	1706020123	38.1	0	0		0	G, I
	Upper Salmon	Basin Creek	1706020124	13.2	0	0		0	G, M, R
	Upper Salmon	Yankee Fork/ Jordan Creek	1706020125	38.2	0	0		0	I, M, R
	Upper Salmon	West Fork Yankee Fork	1706020126	29.7	0	0		0	M, R

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs) Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*	Unoccupied but may be essential (mi)***	Occupied but lacking PCEs (mi)	Management Activities***
	Upper Salmon	Upper Yankee Fork	1706020127	29.2	0	0		0	G, R
	Upper Salmon	Squaw Creek	1706020128	14.7	0	0		0	I, M, R
	Upper Salmon	Garden Creek	1706020129	7.5	0	0		0	A, G, I, U
	Upper Salmon	Challis Creek/ Mill Creek	1706020130	4.4	0	0		0	G, I
	Upper Salmon	Morgan Creek	1706020132	26.9	0	0		0	G, I, R
	Pahsimeroi	Lower Pahsimeroi River	1706020201	23	0	0		0	A, G, I
	Pahsimeroi	Pahsimeroi River/ Falls Creek	1706020202	17.1	0	0		0	A, G, I
	Pahsimeroi	Paterson Creek	1706020203	11	0	0		0	G, I, M
	Pahsimeroi	Big Creek	1706020204	0	0	0	[dd]	0	
	Pahsimeroi	Pahsimeroi River/ Goldberg Creek	1706020205	0	0	0	[ee]	0	
	Pahsimeroi	Upper Pahsimeroi River	1706020206	0	0	0	[ff]	0	
	Middle Salmon-Panther	Salmon River/ Colson Creek	1706020301	2.5	0	11.3		0	A, F, I, M
	Middle Salmon-Panther	Owl Creek	1706020302	6.2	0	0		0	F, M
	Middle Salmon-Panther	Salmon River/ Pine Creek	1706020303	14.6	0	17.8		0	F, I, M, R, U
	Middle Salmon-Panther	Indian Creek	1706020304	11.1	0	2.1		0	F, I, M, U
	Middle Salmon-Panther	Salmon River/ Moose Creek	1706020305	26.7	0	7.5		0	C, R, U

[dd] Unoccupied HUC5, ephemeral barrier prevents population expansion into this HUC5; Based on a review of public comments and new information the CHART determined that this HUC5 is not essential for conservation of the ESU

[ee] Unoccupied HUC5, ephemeral barrier prevents population expansion into this HUC5; Based on a review of public comments and new information the CHART determined that this HUC5 is not essential for conservation of the ESU

[ff] Unoccupied HUC5, ephemeral barrier prevents population expansion into this HUC5; Based on a review of public comments and new information the CHART determined that this HUC5 is not essential for conservation of the ESU

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs) Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*	Unoccupied but may be essential (mi)***	Occupied but lacking PCEs (mi)	Management Activities***
	Middle Salmon-Panther	North Fork Salmon River	1706020306	54.8	0	0		0	A, F, G, M
	Middle Salmon-Panther	Salmon River/ Tower Creek	1706020307	10	0	0.1		0	C, G, I, U
	Middle Salmon-Panther	Carmen Creek	1706020308	11.5	0	0		0	A, I, U
	Middle Salmon-Panther	Salmon River/ Jesse Creek	1706020309	5.9	0	7.4		0	A, U
	Middle Salmon-Panther	Salmon River/ Williams Creek	1706020310	10.8	0	0		0	I, U
	Middle Salmon-Panther	Salmon River/ Twelvemile Creek	1706020311	0.3	0	13.2		0	C, G, I, R
	Middle Salmon-Panther	Salmon River/ Cow Creek	1706020312	22.4	6.1	0		0	C, G, I, R
	Middle Salmon-Panther	Hat Creek	1706020313	2.2	0	0		0	G, I
	Middle Salmon-Panther	Iron Creek	1706020314	8.1	0.8	0		0	G, I, M
	Middle Salmon-Panther	Upper Panther Creek	1706020315	16	0	0		0	G, I
	Middle Salmon-Panther	Moyer Creek	1706020316	7.7	0	0		0	F, G, I, R
	Middle Salmon-Panther	Panther Creek/ Woodtick Creek	1706020317	15	0	0		0	M, R
	Middle Salmon-Panther	Deep Creek	1706020318	2.3	0	0		0	R
	Middle Salmon-Panther	Napias Creek	1706020319	0	0	0.7		0	A, F, M, R
	Middle Salmon-Panther	Panther Creek/ Spring Creek	1706020320	5.1	0	7.3		0	M, R

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs) Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*	Unoccupied but may be essential (mi)***	Occupied but lacking PCEs (mi)	Management Activities***
	Middle Salmon-Panther	Big Deer Creek	1706020321	0.8	0	0		0	M
	Middle Salmon-Panther	Panther Creek/ Trail Creek	1706020322	21.5	0	0		0	D, I, M, R
	Middle Salmon-Panther	Clear Creek	1706020323	9.8	0	0		0	F
	Lemhi	Lemhi River/ Bohannon Creek	1706020401	19.3	0	0		0	C, G, I, M, R
	Lemhi	Lemhi River/ Whimpey Creek	1706020402	12.8	0	0		0	C, G, I, M, R
	Lemhi	Lemhi River/ Kenney Creek	1706020403	14.5	0	0		0	C, G, R
	Lemhi	Agency Creek	1706020404	2.7	0	0		0	G, M, R
	Lemhi	Lemhi River/ McDevitt Creek	1706020405	5.6	0	0		0	C, G, R
	Lemhi	Lemhi River/ Yearian Creek	1706020406	9.6	0	0		0	I
	Lemhi	Peterson Creek	1706020407	5.9	0	0		0	I
	Lemhi	Big Eight Mile Creek	1706020408	14.9	0	0	13.6	0	I
	Lemhi	Canyon Creek	1706020409	1	<0.1	0	18.1	0	G, I
	Lemhi	Hawley Creek	1706020410	0	0	0	15.4	0	G, I, Rec
	Lemhi	Eighteen Mile Creek	1706020411	0	0	0	38.6	0	G, I
	Lemhi	Texas Creek	1706020412	13.6	0.4	0		0	G, I
	Lemhi	Big Timber Creek	1706020413	0	0	0	28.3	0	G, I
	Lemhi	Hayden Creek	1706020414	31.4	0	0		0	C, I
	Upper Middle Fork Salmon	Lower Loon Creek	1706020501	29.3	0	0		0	I, M, R
	Upper Middle Fork Salmon	Warm Springs	1706020502	26.2	0	0		0	M, R
	Upper Middle Fork Salmon	Upper Loon Creek	1706020503	49.3	0	0		0	I, R
	Upper Middle Fork Salmon	Little Loon Creek	1706020504	11.5	0	0		0	R

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	Upper Middle Fork Salmon	Rapid River	1706020505	30.9	0	0		0	I, M, R
	Upper Middle Fork Salmon	Marsh Creek	1706020506	78.1	0	0		0	G, M, R
	Upper Middle Fork Salmon	Middle Fork Salmon River/ Soldier Creek	1706020507	51	0	0		0	M, R
	Upper Middle Fork Salmon	Bear Valley Creek	1706020508	121.2	0	0		0	G, M, R
	Upper Middle Fork Salmon	Sulphur Creek	1706020509	29.9	0	0		0	G, I
	Upper Middle Fork Salmon	Pistol Creek	1706020510	36.1	0	0		0	Fi, M
	Upper Middle Fork Salmon	Indian Creek	1706020511	29	0	0		0	Fi, I
	Upper Middle Fork Salmon	Upper Marble Creek	1706020512	43.7	0	0		0	M
	Upper Middle Fork Salmon	Middle Fork Salmon River/ Lower Marble Creek	1706020513	36.2	0	0		0	I
	Lower Middle Fork Salmon	Lower Middle Fork Salmon River	1706020601	9.1	17.9	0		0	Fi, M, Rec
	Lower Middle Fork Salmon	Wilson Creek	1706020602	3.5	0	0		0	Fi, M, Rec
	Lower Middle Fork Salmon	Middle Fork Salmon River/ Brush Creek	1706020603	6.9	5.2	0		0	G, I
	Lower Middle Fork Salmon	Yellow Jacket Creek	1706020604	31.1	0	1.5		0	G, I, R
	Lower Middle Fork Salmon	Silver Creek	1706020605	3.3	0	0		0	G, I, M, R
	Lower Middle Fork Salmon	Upper Camas Creek	1706020606	26.2	0	0.8		0	G, I, R

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	Lower Middle Fork Salmon	West Fork Camas Creek	1706020607	7.3	0	0		0	G
	Lower Middle Fork Salmon	Lower Camas Creek	1706020608	15.4	0	0		0	G, I, M, R
	Lower Middle Fork Salmon	Middle Fork Salmon River/ Sheep Creek	1706020609	24.1	0	0		0	I
	Lower Middle Fork Salmon	Rush Creek	1706020610	16.9	0	0.3		0	Fi, M, Rec
	Lower Middle Fork Salmon	Monumental Creek	1706020611	31.8	0	0		0	M, R
	Lower Middle Fork Salmon	Big Creek/ Little Marble Creek	1706020612	17.3	0	0		0	M
	Lower Middle Fork Salmon	Upper Big Creek	1706020613	22	0	0		0	I, M, R
	Lower Middle Fork Salmon	Beaver Creek	1706020614	12.3	0	0		0	M
	Lower Middle Fork Salmon	Big Ramey Creek	1706020615	11.7	0	0		0	Rec, R
	Lower Middle Fork Salmon	Big Creek/ Crooked Creek	1706020616	43	0	0		0	M
	Lower Middle Fork Salmon	Lower Big Creek	1706020617	32.9	0	0		0	C
	Middle Salmon-Chamberlain	Salmon River/ Fall Creek	1706020701	3.6	0	4.8		0	G, F, R, Fi
	Middle Salmon-Chamberlain	Wind River	1706020702	1	0	0		0	G, Fi
	Middle Salmon-Chamberlain	Salmon River/ California Creek	1706020703	33.1	0	7.5		0	F, R, M, Fi
	Middle Salmon-Chamberlain	Sheep Creek	1706020704	13.4	0	0.4		0	Fi, R

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	Middle Salmon-Chamberlain	Crooked Creek	1706020705	26.1	0	0		0	M, F, Fi
	Middle Salmon-Chamberlain	Salmon River/ Rabbit Creek	1706020706	3.1	0	8.1		0	Fi, R
	Middle Salmon-Chamberlain	Big Mallard Creek	1706020707	1.1	0	0		0	G, R
	Middle Salmon-Chamberlain	Salmon River/ Trout Creek	1706020708	25.7	0	25.9		0	Fi, F, R
	Middle Salmon-Chamberlain	Bargamin Creek	1706020709	37	0	0		0	Fi, G
	Middle Salmon-Chamberlain	Salmon River/ Rattlesnake Creek	1706020710	0.9	0	9.3		0	Fi
	Middle Salmon-Chamberlain	Sabe Creek	1706020711	19.1	0	0		0	Fi
	Middle Salmon-Chamberlain	Salmon River/ Hot Springs Creek	1706020712	17.7	0	0.1		0	M
	Middle Salmon-Chamberlain	Salmon River/ Disappointment Creek	1706020713	7.3	0	4.6		0	Fi, Rec
	Middle Salmon-Chamberlain	Horse Creek	1706020714	39.5	0	0		0	M, R
	Middle Salmon-Chamberlain	Salmon River/ Kitchen Creek	1706020715	9.8	0	7.9		0	I, M, R
	Middle Salmon-Chamberlain	Cottonwood Creek	1706020716	3.3	0	0		0	Rec
	Middle Salmon-Chamberlain	Lower Chamberlain/ McCalla Creek	1706020717	25.7	0	1.4		0	Rec
	Middle Salmon-Chamberlain	Upper Chamberlain Creek	1706020718	44.5	0	0		0	M
	Middle Salmon-Chamberlain	Warren Creek	1706020719	20.3	0	0		0	M, Rec

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	South Fork Salmon	Lower South Fork Salmon River	1706020801	31.1	0	0		0	I, M, R
	South Fork Salmon	South Fork Salmon River/ Sheep Creek	1706020802	24.8	0	3		0	I, M, R
	South Fork Salmon	Lower East Fork South Fork Salmon River	1706020803	22.2	0	0		0	I, M, R
	South Fork Salmon	Upper East Fork South Fork Salmon River	1706020804	38.4	0	0		0	I, M, R
	South Fork Salmon	Lower Johnson Creek	1706020805	14.4	0	0		0	I, M, R
	South Fork Salmon	Burntlog Creek	1706020806	14.1	0	0		0	I, M, R
	South Fork Salmon	Upper Johnson Creek	1706020807	48.9	0	0		0	I, M, R
	South Fork Salmon	Upper South Fork Salmon River	1706020808	46.8	0	0		0	I, M, R
	South Fork Salmon	South Fork Salmon River/ Cabin Creek	1706020809	33	0	0		0	I, M, R
	South Fork Salmon	South Fork Salmon River/ Blackmare Creek	1706020810	29.3	0	1		0	I, M, R
	South Fork Salmon	Buckhorn Creek	1706020811	14.2	0	0		0	I, M, R
	South Fork Salmon	South Fork Salmon River/ Fitsum Creek	1706020812	23.4	0	0		0	I, M, R
	South Fork Salmon	Lower Secesh River	1706020813	33	0	1.2		0	I, M, R
	South Fork Salmon	Middle Secesh River	1706020814	13.8	0	0		0	I, M, R
	South Fork Salmon	Upper Secesh River	1706020815	17.2	0	0		0	I, M, R
	Lower Salmon	Salmon River/ China Creek	1706020901	6.7	1.1	13.5		0	A, F, Fi, G
	Lower Salmon	Eagle Creek	1706020902	11.2	0	0		0	A, F, Fi, G
	Lower Salmon	Deer Creek	1706020903	4.1	0	0		0	A, F, Fi, G
	Lower Salmon	Salmon River/ Cottonwood Creek	1706020904	7	0	10.8		0	A, F, Fi, G
	Lower Salmon	Salmon River/ Deep Creek	1706020905	11.8	0	11.8		0	A, F, Fi, G
	Lower Salmon	Rock Creek	1706020906	13.2	0	0		0	A, F, Fi, R
	Lower Salmon	Salmon River/ Hammer Creek	1706020907	15.7	0	0		0	A, Fi, G

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs) Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*	Unoccupied but may be essential (mi)***	Occupied but lacking PCEs (mi)	Management Activities***
	Lower Salmon	White Bird Creek	1706020908	37.8	0	23.7		0	A, F, Fi, G, R, U
	Lower Salmon	Salmon River/ McKinzie Creek	1706020909	13.7	1.6	0.8		0	A, F, Fi, G
	Lower Salmon	Skookumchuck Creek	1706020910	14.2	0	0		0	A, F, Fi, G
	Lower Salmon	Slate Creek	1706020911	23.3	0	3.5		0	A, F, Fi, G, M, R
	Lower Salmon	Salmon River/ John Day Creek	1706020912	15.7	0.3	17.4		0	A, F, Fi, G, M, R
	Lower Salmon	Salmon River/ Lake Creek	1706020913	10.2	0	20.1		0	A, F, Fi, G, R, U
	Lower Salmon	Salmon River/ Van Creek	1706020914	0.3	0	9		0	A, F, Fi, G, R
	Lower Salmon	French Creek	1706020915	3.8	0	0		0	A, F, Fi, G, R
	Lower Salmon	Partridge Creek	1706020916	5.4	0	0.5		0	A, F, Fi, G
	Lower Salmon	Rice Creek	1706020917	9.6	0	0		0	A, F
	Little Salmon	Lower Little Salmon River	1706021001	25.9	0	3.4		0	F, Fi, G, R, U
	Little Salmon	Little Salmon River/ Hard Creek	1706021002	13.8	0	2.2		0	D, F, Fi, G, R
	Little Salmon	Hazard Creek	1706021003	2.4	0	0		0	F, Fi, G
	Little Salmon	Boulder Creek	1706021006	20	0	7.1		0	F, Fi, G, R
	Little Salmon	Rapid River	1706021007	28.9	0	0.7		0	A, F, Fi, G
	Upper Selway	Selway River/ Pettibone Creek	1706030101	29.4	0	0		0	Fi, Rec
	Upper Selway	Bear Creek	1706030102	30.5	0	0		0	Fi, R, Rec
	Upper Selway	Selway River/ Gardner Creek	1706030103	38	0	0		0	Fi, R
	Upper Selway	White Cap Creek	1706030104	35	0	8.8		0	Fi, Rec, R
	Upper Selway	Indian Creek	1706030105	16.7	0	1		0	Rec, R
	Upper Selway	Upper Selway River	1706030106	73.8	0	1.7		0	Fi, R
	Upper Selway	Burnt Knob Creek	1706030107	29.6	0	0.5		0	Fi, R
	Upper Selway	Running Creek	1706030108	36.2	0	0		0	Fi, Rec
	Upper Selway	Goat Creek	1706030109	12.8	0	0		0	Fi, Rec
	Lower Selway	Selway River/ Goddard Creek	1706030201	16.7	14.9	0		0	F, Fi, R
	Lower Selway	Gedney Creek	1706030202	5.4	0	0		0	Fi, Rec
	Lower Selway	Selway River/ Three Links Creek	1706030203	20.4	4.4	0		0	Fi, R, Rec

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs) Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*	Unoccupied but may be essential (mi)***	Occupied but lacking PCEs (mi)	Management Activities***
	Lower Selway	Upper Three Links Creek	1706030204	1.1	0	0		0	Fi, Rec
	Lower Selway	Rhoda Creek	1706030205	23.6	0	0		0	Fi, Rec
	Lower Selway	North Fork Moose Creek	1706030207	22.8	0	0		0	Fi, Rec
	Lower Selway	East Fork Moose Creek/ Trout Creek	1706030208	25.3	8.3	0		0	Fi, Rec
	Lower Selway	Upper East Fork Moose Creek	1706030209	7.5	0	0		0	Fi, Rec
	Lower Selway	Martin Creek	1706030210	9.4	0	0		0	Fi, Rec
	Lower Selway	Upper Meadow Creek	1706030211	26.8	0	0		0	F, Fi, G
	Lower Selway	Middle Meadow Creek	1706030212	16.4	0	0		0	Fi
	Lower Selway	Lower Meadow Creek	1706030213	29.9	0	0		0	F, Fi, R
	Lower Selway	O'Hara Creek	1706030214	9.1	0	0		0	F, Fi, R
	Lochsa	Lower Lochsa River	1706030301	42.6	7	0.2		0	F, Fi. R
	Lochsa	Fish Creek	1706030302	33.7	0	4.5		0	F, R
	Lochsa	Lochsa River/ Stanley Creek	1706030303	34	3.3	1.4		0	Fi, R
	Lochsa	Lochsa River/ Squaw Creek	1706030304	52.3	0	0.2		0	F, Fi, R
	Lochsa	Lower Crooked Fork	1706030305	6.9	0	0		0	F, Fi, R
	Lochsa	Upper Crooked Fork	1706030306	13.4	0	0		0	F, Fi, R
	Lochsa	Brushy Fork	1706030307	11.5	0	0.4		0	F, Fi, R
	Lochsa	Lower White Sands Creek	1706030308	13.8	0	0		0	F, Fi
	Lochsa	Storm Creek	1706030309	9.5	0	0.2		0	Rec
	Lochsa	Upper White Sands Creek	1706030310	18.1	0	0		0	F, Fi, R
	Lochsa	Warm Springs Creek	1706030311	4.2	0	0		0	Fi
	Lochsa	Fish Lake Creek	1706030312	9.4	0	0		0	Rec
	Lochsa	Boulder Creek	1706030313	7.7	0	0		0	Fi
	Lochsa	Old Man Creek	1706030314	3.1	0	0		0	Rec
	Middle Fork Clearwater	Middle Fork Clearwater River/ Maggie Creek	1706030401	34.5	0	0		0	A, F, Fi, G, R, U

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs) Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*	Unoccupied but may be essential (mi)***	Occupied but lacking PCEs (mi)	Management Activities***
	Middle Fork Clearwater	Clear Creek	1706030402	45.3	0	0		0	A, F, Fi, G, R
	South Fork Clearwater	Lower South Fork Clearwater River	1706030501	51.8	2.8	0.8		0	A, F, Fi, G, R, U
	South Fork Clearwater	South Fork Clearwater River/ Meadow Creek	1706030502	17.1	0	0		0	F, Fi, R
	South Fork Clearwater	South Fork Clearwater River/ Peasley Creek	1706030503	17.6	0	2.1		0	F, Fi, R
	South Fork Clearwater	South Fork Clearwater River/ Leggett Creek	1706030504	36.6	0.1	0.4		0	Fi, G, R
	South Fork Clearwater	Newsome Creek	1706030505	47.8	0	0		0	F, Fi, R
	South Fork Clearwater	American River	1706030506	56.8	0	0.8		0	F, Fi, R, U
	South Fork Clearwater	Red River	1706030507	67.7	0	1.2		0	F, Fi, R
	South Fork Clearwater	Crooked River	1706030508	26.6	0	3.8		0	F, Fi, M, R
	South Fork Clearwater	Ten Mile Creek	1706030509	14.4	0	0.8		0	F, Fi, R
	South Fork Clearwater	John's Creek	1706030510	28.9	0	13.2		0	F, Fi, R
	South Fork Clearwater	Mill Creek	1706030511	15.9	0	11.7		0	R
	South Fork Clearwater	Three Mile Creek	1706030512	10.7	0	0		0	A, F, Fi, R, U
	South Fork Clearwater	Cottonwood Creek	1706030513	12.8	0	0		0	A, F, Fi, R
	Clearwater	Lower Clearwater River	1706030601	18.4	0	0		0	A, D, R, U

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs) Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*	Unoccupied but may be essential (mi)***	Occupied but lacking PCEs (mi)	Management Activities***
	Clearwater	Clearwater River/ Lower Potlatch River	1706030602	21.8	0	2.9		0	A, Fi, R
	Clearwater	Potlatch River/ Middle Potlatch Creek	1706030603	13.2	0	0		0	A, F, R, U
	Clearwater	Big Bear Creek	1706030604	24.1	0	0		0	A, D, F, Fi, M, R, U
	Clearwater	Upper Big Bear Creek	1706030605	5.1	0	6.6		0	A, D, F, Fi, M, R, U
	Clearwater	Potlatch River/ Pine Creek	1706030606	32	0	0		0	A, F, Fi, R, U
	Clearwater	Upper Potlatch River	1706030607	62.9	0	1.2		0	A, D, F, Fi, G, M, R, U
	Clearwater	Clearwater River/ Bedrock Creek	1706030608	29.5	0	0		0	A, F, Fi, M, R
	Clearwater	Clearwater River/ Jack's Creek	1706030609	16.3	0	0		0	A, R
	Clearwater	Big Canyon Creek	1706030610	38.2	0	0		0	A, F, Fi, G, R, U
	Clearwater	Little Canyon Creek	1706030611	18.6	0	0		0	A, D, F, R
	Clearwater	Clearwater River/ Lower Orofino Creek	1706030612	15.5	0	0		0	A, F, Fi, M, R, U
	Clearwater	Upper Orofino Creek	1706030613	2.4	0	0		0	F, Fi, M, R
	Clearwater	Jim Ford Creek	1706030614	14.5	0	0		0	F, Fi, R
	Clearwater	Lower Lolo Creek	1706030615	23.5	0	0		0	A, F, Fi, G, R
	Clearwater	Middle Lolo Creek	1706030616	25.5	0	0		0	A, F, Fi, G, R
	Clearwater	Musselshell Creek	1706030617	11.2	0	0		0	F, Fi, R
	Clearwater	Upper Lolo Creek	1706030618	14.3	0	0		0	R
	Clearwater	Eldorado Creek	1706030619	10.5	0	2.1		0	R
	Clearwater	Clearwater River/ Fivemile Creek	1706030620	6.5	4.5	1.6		0	A, F, G, M, R
	Clearwater	Clearwater River/ Sixmile Creek	1706030621	6.1	8.2	0		0	A, F, Fi, G, R
	Clearwater	Clearwater River/ Tom Taha Creek	1706030622	12.6	0	0		0	A, F, Fi, R, U
	Clearwater	Lower Lawyer Creek	1706030623	16.9	0	0		0	A, R, U
	Clearwater	Middle Lawyer Creek	1706030624	11.3	0	0		0	A, R
	Clearwater	Cottonwood Creek	1706030627	13.4	0	0		0	A, F, Fi, R

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs)			Unoccupied but may be essential (mi)***	Occupied but lacking PCEs (mi)	Management Activities***
				Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*			
	Clearwater	Upper Lapwai Creek	1706030628	8.5	0	4		0	A, F, Fi, R
	Clearwater	Mission Creek	1706030629	14.2	0	0		0	A, F, Fi, R
	Clearwater	Upper Sweetwater Creek	1706030630	13.7	0	0		0	A, D, F, I, R
	Clearwater	Lower Sweetwater Creek	1706030631	14.5	0	0		0	A, R, U
	Lower North Fork Clearwater	Lower North Fork Clearwater River	1706030801	0	0	0		2	A, D, F, Fi, R
	Lower Snake River	Snake River/ Walker Creek	1706011001	0	0	33.8		0	A, D, Fi, R, U
	Lower Snake River	Snake River/ McCoy Creek	1706011003	0	0	24.4		0	A, D, Fi, R, U
	Lower Snake River	Mouth of Snake River	1706011004	0	0	11.7		0	A, D, Fi, R, U
	Upper Columbia/ Priest Rapids	Columbia River/ Zintel Canyon	1702001606	0	0	1.4		0	A, D, Fi, R, U
	Middle Columbia/Lake Wallula	Upper Lake Wallula	1707010101	0	0	11.9		0	C, D, I, R, T, U, W
	Middle Columbia/Lake Wallula	Lower Lake Wallula	1707010102	0	0	21.7		0	A, D, Fi, R
	Middle Columbia/Lake Wallula	Upper Lake Umatilla	1707010106	0	0	20.2		0	A, D, Fi, R, U
	Middle Columbia/Lake Wallula	Middle Lake Umatilla	1707010109	0	0	17.3		0	A, D, Fi, R
	Middle Columbia/Lake Wallula	Lower Lake Umatilla	1707010114	0	0	42.3		0	A, D, Fi, R
	Middle Columbia/Hood	Upper Middle Columbia/Hood	1707010501	0	0	14.7		0	A, D, Fi, G, S, R, T
	Middle Columbia/Hood	Middle Columbia/Mill Creek	1707010504	0	0	24.6		0	A, D, F, Fi, G, R, T, I, U

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs)			Unoccupied but may be essential (mi)***	Occupied but lacking PCEs (mi)	Management Activities***
				Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*			
	Middle Columbia/Hood	Middle Columbia/Grays Creek	1707010512	0	0	25.6		0	F, Fi, R, T
	Middle Columbia/Hood	Middle Columbia/Eagle Creek	1707010513	0	0	9.3		0	D, R, U
	Lower Columbia/Sandy	Columbia Gorge Tributaries	1708000107	0	0	25.8		0	C, D, F, R, U, W
	Multiple	Lower Columbia Corridor (Sandy/Washougal to Ocean)	NA	0	0	117.4[gg]		0	D, I, T, W

* Some streams classified as "Migration/ Presence PCEs" may also include rearing or spawning PCEs, but the GIS data are still undergoing review to confirm additional habitat use types.
** These watersheds historically supported spawning and rearing PCEs. The CHART determined that these watersheds may be essential for conservation of the ESU. Since these watersheds are unoccupied, the CHART did not identify management activities.
*** This list is not exhaustive. It is intended to highlight key management activities affecting PCEs in each watershed. Activities identified are based on the general categories described by Spence et al. (1996) and summarized previously in the "Special Management Considerations or Protection" section of this report. Coding is as follows: A = agriculture, C = channel modifications/diking, D = hydroelectric dams, F= forestry, Fi = fire activity and disturbance, G = grazing, I = irrigation impoundments and withdrawals, M = mineral mining, R = road building/ maintenance, Rec = recreational facilities and activities management, S = sand and gravel mining, T = river, estuary, and ocean traffic, U = urbanization, W = wetland loss/ removal, X = exotic/ invasive species introductions. Primary sources for this information include the CHART and reports by Ecovista (2003b), Quigley et al. (2001), NMFS (1998), and ICBTRT (2003).

[gg] The Lower Columbia River from the ocean upstream approximately 46.5 miles is considered to contain estuarine PCEs, in addition to migration and rearing (ISAB 2000).

Table I2. Summary of Initial CHART Scores and Ratings of Conservation Value for Habitat Areas in HUC5 Watersheds Occupied by the Snake River Basin Steelhead ESU

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors) 1	2	3	4	5	6	Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
	Hells Canyon	Snake River/ Granite Creek	1706010101	3	3	3	2	1	2	14	High HUC5 score; PCEs in this watershed support one TRT demographically independent population	High
	Hells Canyon	Snake River/ Getta Creek	1706010102	3	3	3	1	1	2	13	High HUC5 score; PCEs in this watershed support one TRT demographically independent population; Priority Watershed (NMFS 1998)	High
	Hells Canyon	Snake River/ Divide Creek	1706010104	3	3	3	1	1	2	13	High HUC5 score; PCEs in this watershed support two TRT demographically independent populations; However, the CHART determined that maintaining this area may be important for ESU viability or other recovery goals; Priority Watershed (NMFS 1998); AFS Critical Watershed	High
	Imnaha River	Upper Imnaha River	1706010201	3	3	3	3	1	2	15	High HUC5 score; PCEs support the only population in the Imnaha group; AFS Critical Watershed	High
	Imnaha River	Middle Imnaha River	1706010202	3	2	2	2	2	2	13	High HUC5 score; PCEs support the only population in the Imnaha group; AFS Critical Watershed	High
	Imnaha River	Big Sheep Creek	1706010203	3	2	3	3	2	2	15	High HUC5 score; PCEs support the only population in the Imnaha group; AFS Critical Watershed	High
	Imnaha River	Little Sheep Creek	1706010204	3	2	3	1	2	2	13	High HUC5 score; PCEs support the only population in the Imnaha group	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Imnaha River	Lower Imnaha River	1706010205	3	3	3	2	3	2	16	High HUC5 score; PCEs support the only population in the Imnaha group; AFS Critical Watershed	High
	Lower Snake/ Asotin	Snake River/ Rogersburg	1706010301	3	3	3	1	1	3	14	High HUC5 score; PCEs support one of twelve populations in the Salmon River group; AFS Critical Watershed	High
	Lower Snake/ Asotin	Asotin River	1706010302	3	2	3	3	3	3	17	High HUC5 score; PCEs support one of two populations within the Lower Snake River group	High
	Lower Snake/ Asotin	Snake River/ Captain John Creek	1706010303	3	2	2	1	2	3	13	High HUC5 score; PCEs support one of four populations within the Grande Ronde group	High
	Upper Grande Ronde	Upper Grande Ronde River	1706010401	3	2	2	1	3	2	13	High HUC5 score; PCEs support one of four populations within the Grande Ronde group; AFS Critical Watershed	High
	Upper Grande Ronde	Meadow Creek	1706010402	3	2	2	1	2	2	12	High HUC5 score; PCEs support one of four populations within the Grande Ronde group	High
	Upper Grande Ronde	Grande Ronde River/ Beaver Creek	1706010403	3	2	2	1	3	2	13	High HUC5 score; PCEs support one of four populations within the Grande Ronde group; AFS Critical Watershed	High
	Upper Grande Ronde	Grande Ronde River/ Five Points Creek	1706010404	3	1	2	1	2	2	11	Meduim HUC5 score, but CHART determined that the spawning and rearing habitat in this HUC5 is essential for conservation and the HUC5 should be rated as High; PCEs support one of four populations within the Grande Ronde group; AFS Critical Watershed	High
	Upper Grande Ronde	Catherine Creek	1706010405	3	2	3	3	3	2	16	High HUC5 score; PCEs support one of four populations within the Grande Ronde group; AFS Critical Watershed	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Upper Grande Ronde	Ladd Creek	1706010406	3	1	3	2	2	2	13	High HUC5 score, but CHART determined that the PCEs in this HUC5 are likely less important than other HUC5s in this area; PCEs support one of four populations within the Grande Ronde group	Medium
	Upper Grande Ronde	Grande Ronde River/ Mill Creek	1706010407	3	0	3	2	2	2	12	High HUC5 score, but CHART determined that the PCEs in this HUC5 are likely less important than other HUC5s in this area; PCEs support one of four populations within the Grande Ronde group	Medium
	Upper Grande Ronde	Phillips Creek/ Willow Creek	1706010408	3	1	3	2	2	2	13	High HUC5 score; PCEs support one of four populations within the Grande Ronde group	High
	Upper Grande Ronde	Grande Ronde River/ Indian Creek	1706010409	3	2	2	3	2	2	14	High HUC5 score; PCEs support one of four populations within the Grande Ronde group; AFS Critical Watershed	High
	Upper Grande Ronde	Lookingglass Creek	1706010410	3	2	2	3	2	2	14	High HUC5 score; PCEs support one of four populations within the Grande Ronde group; AFS Critical Watershed	High
	Upper Grande Ronde	Grande Ronde River/ Cabin Creek	1706010411	3	2	2	1	2	2	12	High HUC5 score; PCEs support one of four populations within the Grande Ronde group	High
	Wallowa River	Upper Wallowa River	1706010501	3	1	3	0	3	2	12	High HUC5 score; PCEs support one of four populations within the Grande Ronde group	High
	Wallowa River	Lostine River	1706010502	3	2	3	1	2	2	13	High HUC5 score; PCEs support one of four populations within the Grande Ronde group; Priority Watershed (NMFS 1998); AFS Critical Watershed	High
	Wallowa River	Middle Wallowa River	1706010503	3	1	3	0	2	2	11	Medium HUC5 score; PCEs support one of four populations within the Grande Ronde group; Priority Watershed (NMFS 1998)	Medium

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors) 1	2	3	4	5	6	Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
	Wallowa River	Bear Creek	1706010504	3	2	3	1	2	2	13	High HUC5 score; PCEs support one of four populations within the Grande Ronde group; Priority Watershed (NMFS 1998); AFS Critical Watershed	High
	Wallowa River	Minam River	1706010505	3	3	3	3	3	2	17	High HUC5 score; PCEs support one of four populations within the Grande Ronde group; Priority Watershed (NMFS 1998); AFS Critical Watershed	High
	Wallowa River	Lower Wallowa River	1706010506	3	2	2	1	2	2	12	High HUC5 score; PCEs support one of four populations within the Grande Ronde group; Priority Watershed (NMFS 1998)	High
	Lower Grande Ronde	Grande Ronde River/ Rondowa	1706010601	3	3	2	1	2	3	14	High HUC5 score; PCEs support one of four populations within the Grande Ronde group; Priority Watershed (NMFS 1998)	High
	Lower Grande Ronde	Grande Ronde River/ Mud Creek	1706010602	3	2	2	3	3	3	16	High HUC5 score; PCEs support one of four populations within the Grande Ronde group; Priority Watershed (NMFS 1998)	High
	Lower Grande Ronde	Weneha River	1706010603	3	3	3	3	3	2	17	High HUC5 score; PCEs support one of four populations within the Grande Ronde group; Priority Watershed (NMFS 1998); AFS Critical Watershed	High
	Lower Grande Ronde	Chesnimnus Creek	1706010604	3	2	2	3	3	2	15	High HUC5 score; PCEs support the only population within the Grande Ronde group for which the TRT found no evidence of hatchery introgression; Priority Watershed (NMFS 1998); AFS Critical Watershed	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Lower Grande Ronde	Upper Joseph Creek	1706010605	3	2	2	3	3	2	15	High HUC5 score; PCEs support the only population within the Grande Ronde group for which the TRT found no evidence of hatchery introgression; Priority Watershed (NMFS 1998); AFS Critical Watershed	High
	Lower Grande Ronde	Lower Joseph Creek	1706010606	3	1	2	3	3	2	14	High HUC5 score; PCEs support the only population within the Grande Ronde group for which the TRT found no evidence of hatchery introgression; Priority Watershed (NMFS 1998); AFS Critical Watershed	High
	Lower Grande Ronde	Lower Grande Ronde River/ Menathce Creek	1706010607	3	1	3	0	2	3	12	High HUC5 score; PCEs support one of four populations within the Grande Ronde group; Priority Watershed (NMFS 1998)	High
	Lower Snake/ Tucannon	Alpowa Creek	1706010701	3	1	1	0	1	2	8	Low HUC5 score; PCEs support one of two populations within the Lower Snake River group	Medium
	Lower Snake/ Tucannon	Snake River/ Steptoe Canyon	1706010702	3	0	1	0	1	3	8	Low HUC5 score; PCEs support one of two populations within the Lower Snake River group and support all upstream populations	Low
	Lower Snake/ Tucannon	Deadman Creek	1706010703	3	1	2	1	1	2	10	Medium HUC5 score; PCEs support one of two populations within the Lower Snake River group	Low
	Lower Snake/ Tucannon	Flat Creek	1706010704	2	0	0	0	1	2	5	Low HUC5 score; PCEs support one of two populations within the Lower Snake River group	Low
	Lower Snake/ Tucannon	Pataha Creek	1706010705	3	0	2	0	0	2	7	Low HUC5 score; PCEs support one of two populations within the Lower Snake River group	Low

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors) 1	2	3	4	5	6	Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
	Lower Snake/ Tucannon	Upper Tucannon River	1706010706	3	2	3	3	2	2	15	High HUC5 score; PCEs support one of two populations within the Lower Snake River group; Priority Watershed (NMFS 1998)	High
	Lower Snake/ Tucannon	Lower Tucannon River	1706010707	3	2	3	2	2	2	14	High HUC5 score; PCEs support one of two populations within the Lower Snake River group	High
	Lower Snake/ Tucannon	Snake River/ Penawawa Creek	1706010708	3	0	1	0	1	3	8	Low HUC5 score; PCEs support one of two populations within the Lower Snake River group and support all upstream populations	Medium
	Palouse River	Lower Palouse River	1706010808	2	0	0	0	1	2	5	Low HUC5 score; PCEs support one TRT demographically independent population.	Low
	Lower Snake River	Snake River/ Walker Creek	1706011001							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Lower Snake River	Snake River/ McCoy Creek	1706011003							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Lower Snake River	Mouth of Snake River	1706011004							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Upper Salmon	Salmon River/ Challis	1706020101	3	2	3	3	3	3	17	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Upper Salmon	Salmon River/ Bayhorse Creek	1706020104	3	2	2	0	2	3	12	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Upper Salmon	East Fork Salmon River/ McDonald Creek	1706020105	3	2	3	1	*	2	13	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Upper Salmon	Road Creek	1706020107	1	1	1	0	*	2	6	Low HUC5 score; PCEs support one of twelve populations in the Salmon River group; Priority Watershed (NMFS 1998)	Low
	Upper Salmon	Herd Creek	1706020108	3	2	3	1	*	2	13	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Upper Salmon	East Fork Salmon River/ Big Boulder Creek	1706020109	3	1	3	1	2	2	12	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Upper Salmon	Upper East Fork Salmon River	1706020110	3	2	3	1	2	2	13	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Upper Salmon	Germania Creek	1706020111	2	3	3	1	2	2	13	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Upper Salmon	Salmon River/ Kinnikinic Creek	1706020112	2	1	2	0	1	1	7	Medium HUC5 score; PCEs support one of twelve populations in the Salmon River group	Medium
	Upper Salmon	Salmon River/ Slate Creek	1706020113	3	2	2	0	2	2	11	Medium HUC5 score; PCEs support one of twelve populations in the Salmon River group; Priority Watershed (NMFS 1998)	Medium
	Upper Salmon	Warm Springs Creek	1706020114	2	3	3	3	1	2	14	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Upper Salmon	Salmon River/ Big Casino Creek	1706020115	3	2	3	3	1	2	14	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Upper Salmon	Salmon River/ Fisher Creek	1706020117	3	2	3	3	1	2	14	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Upper Salmon	Salmon River/ Fourth of July Creek	1706020118	2	2	3	3	1	2	13	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Upper Salmon	Upper Salmon River	1706020119	3	2	3	3	1	2	14	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Upper Salmon	Alturas Lake Creek	1706020120	3	3	3	3	1	2	15	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Upper Salmon	Redfish Lake Creek	1706020121	2	3	3	3	1	2	14	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Upper Salmon	Valley Creek/ Iron Creek	1706020122	3	2	3	3	1	2	14	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Upper Salmon	Upper Valley Creek	1706020123	3	3	3	3	1	2	15	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Upper Salmon	Basin Creek	1706020124	3	3	2	2	2	2	14	High HUC5 score; PCEs support one of twelve populations in the Salmon River group; Priority Watershed (NMFS 1998)	High
	Upper Salmon	Yankee Fork/ Jordan Creek	1706020125	3	1	3	0	2	2	11	Medium HUC5 score; PCEs support one of twelve populations in the Salmon River group; Priority Watershed (NMFS 1998)	Medium
	Upper Salmon	West Fork Yankee Fork	1706020126	3	3	3	3	2	3	17	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Upper Salmon	Upper Yankee Fork	1706020127	3	2	2	1	2	2	12	High HUC5 score; PCEs support one of twelve populations in the Salmon River group; Priority Watershed (NMFS 1998)	High
	Upper Salmon	Squaw Creek	1706020128	3	2	2	0	2	2	11	Medium HUC5 score; PCEs support one of twelve populations in the Salmon River group; Priority Watershed (NMFS 1998)	Medium
	Upper Salmon	Garden Creek	1706020129	2	1	2	0	1	2	8	Medium HUC5 score; PCEs support one of twelve populations in the Salmon River group	Medium

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Upper Salmon	Challis Creek/ Mill Creek	1706020130	1	1	2	1	*	1	7	Medium HUC5 score; PCEs support one of twelve populations in the Salmon River group	Medium
	Upper Salmon	Morgan Creek	1706020132	3	2	3	3	2	3	16	High HUC5 score; PCEs support one of twelve populations in the Salmon River group; Priority Watershed (NMFS 1998)	High
	Pahsimeroi	Lower Pahsimeroi River	1706020201	3	3	3	3	2	2	16	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Pahsimeroi	Pahsimeroi River/ Falls Creek	1706020202	1	2	2	2	2	2	11	Medium HUC5 score; PCEs support one of twelve populations in the Salmon River group	Medium
	Pahsimeroi	Paterson Creek	1706020203	3	1	2	0	*	1	8	Medium HUC5 score; PCEs support one of twelve populations in the Salmon River group	Medium
	Pahsimeroi	Big Creek	1706020204								Unoccupied HUC5, ephemeral barrier prevents population expansion into this HUC5; Based on a review of public comments and new information the CHART determined that this HUC5 is not essential for conservation of the ESU	None
	Pahsimeroi	Pahsimeroi River/ Goldberg Creek	1706020205								Unoccupied HUC5, ephemeral barrier prevents population expansion into this HUC5; Based on a review of public comments and new information the CHART determined that this HUC5 is not essential for conservation of the ESU	None
	Pahsimeroi	Upper Pahsimeroi River	1706020206								Unoccupied HUC5, ephemeral barrier prevents population expansion into this HUC5; Based on a review of public comments and new information the CHART determined that this HUC5 is not essential for conservation of the ESU	None

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Middle Salmon-Panther	Salmon River/ Colson Creek	1706020301	3	3	3	3	2	3	17	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Middle Salmon-Panther	Owl Creek	1706020302	1	2	1	1	1	2	8	Medium HUC5 score; PCEs support one of twelve populations in the Salmon River group	Medium
	Middle Salmon-Panther	Salmon River/ Pine Creek	1706020303	3	3	3	3	2	3	17	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Middle Salmon-Panther	Indian Creek	1706020304	3	3	3	3	3	2	17	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Middle Salmon-Panther	Salmon River/ Moose Creek	1706020305	3	3	3	3	3	3	18	High HUC5 score; PCEs support two of twelve populations in the Salmon River group	High
	Middle Salmon-Panther	North Fork Salmon River	1706020306	3	3	3	3	3	3	18	High HUC5 score; PCEs support one of twelve populations in the Salmon River group; Priority Watershed (NMFS 1998)	High
	Middle Salmon-Panther	Salmon River/ Tower Creek	1706020307	3	2	2	3	2	3	15	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Middle Salmon-Panther	Carmen Creek	1706020308	2	3	3	3	3	2	16	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Middle Salmon-Panther	Salmon River/ Jesse Creek	1706020309	3	1	3	2	2	3	14	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Middle Salmon-Panther	Salmon River/ Williams Creek	1706020310	2	1	2	0	2	3	10	Medium HUC5 score; PCEs support one of twelve populations in the Salmon River group	Medium
	Middle Salmon-Panther	Salmon River/ Twelvemile Creek	1706020311	3	2	2	2	2	3	14	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Middle Salmon-Panther	Salmon River/ Cow Creek	1706020312	3	2	3	3	2	3	16	High HUC5 score; PCEs support one of twelve populations in the Salmon River group; Priority Watershed (NMFS 1998)	High

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				1	2	3	4	5	6			
	Middle Salmon-Panther	Hat Creek	1706020313	1	2	3	1	*	2	11	Medium HUC5 score; PCEs support one of twelve populations in the Salmon River group; Priority Watershed (NMFS 1998)	Medium
	Middle Salmon-Panther	Iron Creek	1706020314	2	2	3	2	2	2	13	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Middle Salmon-Panther	Upper Panther Creek	1706020315	3	2	3	3	*	2	16	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Middle Salmon-Panther	Moyer Creek	1706020316	2	2	3	3	*	2	14	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Middle Salmon-Panther	Panther Creek/ Woodtick Creek	1706020317	3	2	3	3	*	2	16	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Middle Salmon-Panther	Deep Creek	1706020318	1	3	2	2	*	2	12	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Middle Salmon-Panther	Napias Creek	1706020319	1	2	1	0	*	2	7	Medium HUC5 score; PCEs support one of twelve populations in the Salmon River group	Medium
	Middle Salmon-Panther	Panther Creek/ Spring Creek	1706020320	3	0	3	2	*	2	12	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Middle Salmon-Panther	Big Deer Creek	1706020321	1	0	1	0	*	2	5	Low HUC5 score; PCEs support one of twelve populations in the Salmon River group	Low
	Middle Salmon-Panther	Panther Creek/ Trail Creek	1706020322	3	1	3	0	2	2	11	Medium HUC5 score; PCEs support one of twelve populations in the Salmon River group; Priority Watershed (NMFS 1998)	Medium
	Middle Salmon-Panther	Clear Creek	1706020323	2	0	3	0	*	2	8	Medium HUC5 score; PCEs support one of twelve populations in the Salmon River group; Priority Watershed (NMFS 1998)	Medium
	Lemhi	Lemhi River/ Bohannon Creek	1706020401	3	1	3	3	2	3	15	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High

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				1	2	3	4	5	6			
	Lemhi	Lemhi River/ Whimpey Creek	1706020402	3	2	3	3	2	3	16	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Lemhi	Lemhi River/ Kenney Creek	1706020403	3	2	2	2	2	2	13	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Lemhi	Agency Creek	1706020404	1	1	1	1	1	1	6	Rating was upgraded to a medium based on information about local watershed restoration efforts and comments from the CHART. PCEs support one of twelve populations in the Salmon River group	Medium
	Lemhi	Lemhi River/ McDevitt Creek	1706020405	2	2	2	2	2	2	12	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Lemhi	Lemhi River/ Yearian Creek	1706020406	3	2	2	2	2	2	13	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Lemhi	Peterson Creek	1706020407	2	2	2	2	2	2	12	High HUC5 score; PCEs support one of twelve populations in the Salmon River group; Priority Watershed (NMFS 1998)	High
	Lemhi	Big Eight Mile Creek	1706020408	2	2	3	3	2	2	14**	High HUC5 score; PCEs support one of twelve populations in the Salmon River group; CHART concluded that historic areas in Big Eight Mile Creek may be essential for ESU conservation; Priority Watershed (NMFS 1998)	High
	Lemhi	Canyon Creek	1706020409	1	2	3	3	*	1	12**	High HUC5 score; PCEs support one of twelve populations in the Salmon River group; CHART concluded that historic areas in Canyon Creek may be essential for ESU conservation; Priority Watershed (NMFS 1998)	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Lemhi	Hawley Creek	1706020410							***	Unoccupied HUC5, but ephemeral barrier prevents population expansion into this HUC5; CHART determined that this HUC5 may be essential for conservation; High HUC5 score; Priority Watershed (NMFS 1998)	Possibly High
	Lemhi	Eighteen Mile Creek	1706020411							***	Unoccupied HUC5, but ephemeral barrier prevents population expansion into this HUC5; CHART determined that this HUC5 may be essential for conservation; High HUC5 score; Priority Watershed (NMFS 1998)	Possibly High
	Lemhi	Texas Creek	1706020412	3	3	3	3	*	1	16	Intially believed to be unoccupied, but public comments and new information supplied by the Salmon Challis National Forest indicate that this watershed is occupied; The CHART confirmed that the watershed is occupied and contains spawning and rearing PCEs; PCEs support one of twelve populations in the Salmon River group; High HUC5 score; Priority Watershed (NMFS 1998)	High
	Lemhi	Big Timber Creek	1706020413							***	Unoccupied HUC5, but ephemeral barrier prevents population expansion into this HUC5; CHART determined that this HUC5 may be essential for conservation; High HUC5 score; Priority Watershed (NMFS 1998)	Possibly High
	Lemhi	Hayden Creek	1706020414	3	2	3	3	2	3	16	High HUC5 score; PCEs support one of twelve populations in the Salmon River group; Priority Watershed (NMFS 1998)	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Upper Middle Fork Salmon	Lower Loon Creek	1706020501	3	3	3	3	3	3	18	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Upper Middle Fork Salmon	Warm Springs	1706020502	3	3	3	3	2	3	17	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Upper Middle Fork Salmon	Upper Loon Creek	1706020503	3	3	3	3	*	2	17	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Upper Middle Fork Salmon	Little Loon Creek	1706020504	3	3	3	3	1	2	15	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Upper Middle Fork Salmon	Rapid River	1706020505	3	3	3	3	2	3	17	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Upper Middle Fork Salmon	Marsh Creek	1706020506	3	2	3	3	2	3	16	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Upper Middle Fork Salmon	Middle Fork Salmon River/ Soldier Creek	1706020507	3	3	3	3	3	3	18	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Upper Middle Fork Salmon	Bear Valley Creek	1706020508	3	2	3	3	3	3	17	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Upper Middle Fork Salmon	Sulphur Creek	1706020509	3	3	3	3	2		14	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Upper Middle Fork Salmon	Pistol Creek	1706020510	3	3	3	3	2	3	17	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Upper Middle Fork Salmon	Indian Creek	1706020511	3	3	3	3	2	3	17	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Upper Middle Fork Salmon	Upper Marble Creek	1706020512	3	3	3	3	2	2	16	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Upper Middle Fork Salmon	Middle Fork Salmon River/ Lower Marble Creek	1706020513	3	3	3	3	3	3	18	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Lower Middle Fork Salmon	Lower Middle Fork Salmon River	1706020601	3	3	3	3	3	3	18	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Lower Middle Fork Salmon	Wilson Creek	1706020602	1	3	3	3	2	3	15	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Lower Middle Fork Salmon	Middle Fork Salmon River/ Brush Creek	1706020603	3	3	3	3	2	3	17	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Lower Middle Fork Salmon	Yellow Jacket Creek	1706020604	3	2	3	3	*	3	17	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Lower Middle Fork Salmon	Silver Creek	1706020605	1	1	3	3	2	3	13	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Lower Middle Fork Salmon	Upper Camas Creek	1706020606	3	3	3	3	2	3	17	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Lower Middle Fork Salmon	West Fork Camas Creek	1706020607	2	2	3	3	2	3	15	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Lower Middle Fork Salmon	Lower Camas Creek	1706020608	3	2	3	3	2	3	16	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Lower Middle Fork Salmon	Middle Fork Salmon River/ Sheep Creek	1706020609	3	3	3	3	3	3	18	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Lower Middle Fork Salmon	Rush Creek	1706020610	3	3	3	3	3	3	18	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Lower Middle Fork Salmon	Monumental Creek	1706020611	3	3	3	3	3	3	18	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Lower Middle Fork Salmon	Big Creek/ Little Marble Creek	1706020612	3	3	3	3	3	3	18	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Lower Middle Fork Salmon	Upper Big Creek	1706020613	3	2	2	3	3	3	16	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Lower Middle Fork Salmon	Beaver Creek	1706020614	3	3	3	3	*	2	17	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Lower Middle Fork Salmon	Big Ramey Creek	1706020615	3	3	3	3	*	2	17	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Lower Middle Fork Salmon	Big Creek/ Crooked Creek	1706020616	3	3	3	3	3	3	18	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Lower Middle Fork Salmon	Lower Big Creek	1706020617	3	3	3	3	3	3	18	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Middle Salmon-Chamberlain	Salmon River/ Fall Creek	1706020701	2	2	2	1	1	3	11	Medium HUC5 score; PCEs support one of twelve populations in the Salmon River group	Medium
	Middle Salmon-Chamberlain	Wind River	1706020702	2	2	1	1	1	2	9	Low HUC5 score; PCEs support one of twelve populations in the Salmon River group; Priority Watershed (NMFS 1998)	Low
	Middle Salmon-Chamberlain	Salmon River/ California Creek	1706020703	3	2	2	2	2	3	14	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Middle Salmon-Chamberlain	Sheep Creek	1706020704	3	3	3	2	2	2	15	High HUC5 score; PCEs support one of twelve populations in the Salmon River group; Priority Watershed (NMFS 1998)	High
	Middle Salmon-Chamberlain	Crooked Creek	1706020705	3	2	2	2	3	2	14	High HUC5 score; PCEs support one of twelve populations in the Salmon River group; Priority Watershed (NMFS 1998)	High
	Middle Salmon-Chamberlain	Salmon River/ Rabbit Creek	1706020706	3	2	1	1	1	3	11	Medium HUC5 score; PCEs support one of twelve populations in the Salmon River group	Medium
	Middle Salmon-Chamberlain	Big Mallard Creek	1706020707	1	2	1	1	1	2	8	Low HUC5 score; PCEs support one of twelve populations in the Salmon River group	Low
	Middle Salmon-Chamberlain	Salmon River/ Trout Creek	1706020708	3	2	2	1	2	3	13	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Middle Salmon-Chamberlain	Bargamin Creek	1706020709	3	3	3	2	3	2	16	High HUC5 score; PCEs support one of twelve populations in the Salmon River group; Priority Watershed (NMFS 1998)	High
	Middle Salmon-Chamberlain	Salmon River/ Rattlesnake Creek	1706020710	3	2	1	1	1	3	11	Medium HUC5 score; PCEs support one of twelve populations in the Salmon River group	Medium
	Middle Salmon-Chamberlain	Sabe Creek	1706020711	3	3	3	2	2	2	15	High HUC5 score; PCEs support one of twelve populations in the Salmon River group; Priority Watershed (NMFS 1998)	High
	Middle Salmon-Chamberlain	Salmon River/ Hot Springs Creek	1706020712	3	3	3	3	3	3	18	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Middle Salmon-Chamberlain	Salmon River/ Disappointment Creek	1706020713	3	2	3	1	2	3	14	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Middle Salmon-Chamberlain	Horse Creek	1706020714	3	3	3	1	0	2	14	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Middle Salmon-Chamberlain	Salmon River/ Kitchen Creek	1706020715	3	3	3	0	1	3	13	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Middle Salmon-Chamberlain	Cottonwood Creek	1706020716	1	3	3	3	1	2	13	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Middle Salmon-Chamberlain	Lower Chamberlain/ McCalla Creek	1706020717	3	3	3	3	3	2	17	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Middle Salmon-Chamberlain	Upper Chamberlain Creek	1706020718	3	3	3	3	3	2	17	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Middle Salmon-Chamberlain	Warren Creek	1706020719	3	2	2	1	2	2	12	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	South Fork Salmon	Lower South Fork Salmon River	1706020801	3	2	2	3	2	3	15	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	South Fork Salmon	South Fork Salmon River/ Sheep Creek	1706020802	3	2	2	3	2	3	15	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	South Fork Salmon	Lower East Fork South Fork Salmon River	1706020803	3	1	2	3	2	3	14	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	South Fork Salmon	Upper East Fork South Fork Salmon River	1706020804	3	1	2	3	2	3	14	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	South Fork Salmon	Lower Johnson Creek	1706020805	3	2	2	3	2	3	15	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	South Fork Salmon	Burntlog Creek	1706020806	3	2	1	3	*	2	13	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	South Fork Salmon	Upper Johnson Creek	1706020807	3	2	1	3	*	3	14	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	South Fork Salmon	Upper South Fork Salmon River	1706020808	3	3	3	3	*	3	18	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	South Fork Salmon	South Fork Salmon River/ Cabin Creek	1706020809	3	2	2	3	2	3	15	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	South Fork Salmon	South Fork Salmon River/ Blackmare Creek	1706020810	3	2	2	3	3	3	16	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	South Fork Salmon	Buckhorn Creek	1706020811	3	2	1	3	*	2	13	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	South Fork Salmon	South Fork Salmon River/ Fitsum Creek	1706020812	3	2	2	3	3	3	16	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	South Fork Salmon	Lower Secesh River	1706020813	3	2	2	3	2	3	15	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	South Fork Salmon	Middle Secesh River	1706020814	3	2	2	3	2	3	15	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	South Fork Salmon	Upper Secesh River	1706020815	3	2	2	3	*	2	14	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Lower Salmon	Salmon River/ China Creek	1706020901	3	2	2	1	2	3	13	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Lower Salmon	Eagle Creek	1706020902	3	2	2	1	2	2	12	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Lower Salmon	Deer Creek	1706020903	2	2	2	1	2	2	11	Medium HUC5 score; PCEs support one of twelve populations in the Salmon River group	Medium
	Lower Salmon	Salmon River/ Cottonwood Creek	1706020904	3	2	2	1	2	3	13	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Lower Salmon	Salmon River/ Deep Creek	1706020905	3	2	1	1	2	3	12	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Lower Salmon	Rock Creek	1706020906	3	1	2	1	2	2	11	Medium HUC5 score; PCEs support one of twelve populations in the Salmon River group	Medium
	Lower Salmon	Salmon River/ Hammer Creek	1706020907	3	2	1	1	1	3	11	Medium HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Lower Salmon	White Bird Creek	1706020908	3	2	3	2	3	2	15	High HUC5 score; PCEs support one of twelve populations in the Salmon River group; Priority Watershed (NMFS 1998)	High
	Lower Salmon	Salmon River/ McKinzie Creek	1706020909	3	2	2	1	1	3	12	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Lower Salmon	Skookumchuck Creek	1706020910	3	2	2	1	2	2	12	High HUC5 score; PCEs support one of twelve populations in the Salmon River group; Priority Watershed (NMFS 1998)	High
	Lower Salmon	Slate Creek	1706020911	3	3	3	2	3	2	16	High HUC5 score; PCEs support one of twelve populations in the Salmon River group; Priority Watershed (NMFS 1998)	High
	Lower Salmon	Salmon River/ John Day Creek	1706020912	3	2	2	2	2	3	14	High HUC5 score; PCEs support one of twelve populations in the Salmon River group; Priority Watershed (NMFS 1998)	High
	Lower Salmon	Salmon River/ Lake Creek	1706020913	3	2	2	2	2	3	14	High HUC5 score; PCEs support two of twelve populations in the Salmon River group; Priority Watershed (NMFS 1998)	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Lower Salmon	Salmon River/ Van Creek	1706020914	3	2	1	1	1	3	11	Medium HUC5 score; PCEs support one of twelve populations in the Salmon River group	Medium
	Lower Salmon	French Creek	1706020915	3	2	2	1	2	2	12	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Lower Salmon	Partridge Creek	1706020916	1	2	2	1	2	2	10	Medium HUC5 score; PCEs support one of twelve populations in the Salmon River group	Medium
	Lower Salmon	Rice Creek	1706020917	2	1	2	1	2	2	10	Medium HUC5 score; PCEs support one of twelve populations in the Salmon River group	Medium
	Little Salmon	Lower Little Salmon River	1706021001	2	2	2	1	2	2	11	Medium HUC5 score; PCEs support one of twelve populations in the Salmon River group	Medium
	Little Salmon	Little Salmon River/ Hard Creek	1706021002	2	2	2	1	2	2	11	Medium HUC5 score; PCEs support one of twelve populations in the Salmon River group	Medium
	Little Salmon	Hazard Creek	1706021003	1	3	2	1	2	2	11	Medium HUC5 score; PCEs support one of twelve populations in the Salmon River group	Medium
	Little Salmon	Boulder Creek	1706021006	3	2	3	2	2	2	14	High HUC5 score; PCEs support one of twelve populations in the Salmon River group	High
	Little Salmon	Rapid River	1706021007	3	3	3	3	3	2	17	High HUC5 score; PCEs support one of twelve populations in the Salmon River group; Priority Watershed (NMFS 1998)	High
	Upper Selway	Selway River/ Pettibone Creek	1706030101	2	3	3	2	2	2	14	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Upper Selway	Bear Creek	1706030102	3	3	3	2	3	2	16	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Upper Selway	Selway River/ Gardner Creek	1706030103	3	3	3	2	2	2	15	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Upper Selway	White Cap Creek	1706030104	3	3	3	2	2	2	15	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Upper Selway	Indian Creek	1706030105	2	3	3	2	2	2	14	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Upper Selway	Upper Selway River	1706030106	3	3	3	2	2	2	15	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Upper Selway	Burnt Knob Creek	1706030107	3	3	3	2	2	2	15	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Upper Selway	Running Creek	1706030108	3	3	3	2	2	2	15	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Upper Selway	Goat Creek	1706030109	2	3	3	2	2	2	14	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Lower Selway	Selway River/ Goddard Creek	1706030201	2	2	3	2	1	2	12	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Lower Selway	Gedney Creek	1706030202	3	3	3	2	3	2	16	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Lower Selway	Selway River/ Three Links Creek	1706030203	2	3	3	2	2	2	14	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Lower Selway	Upper Three Links Creek	1706030204	1	3	3	2	1	2	12	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Lower Selway	Rhoda Creek	1706030205	3	3	3	2	2	2	15	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Lower Selway	North Fork Moose Creek	1706030207	3	3	3	2	2	2	15	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Lower Selway	East Fork Moose Creek/ Trout Creek	1706030208	3	3	3	2	3	2	16	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Lower Selway	Upper East Fork Moose Creek	1706030209	3	3	3	2	3	2	16	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Lower Selway	Martin Creek	1706030210	2	3	3	2	2	2	14	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Lower Selway	Upper Meadow Creek	1706030211	3	3	3	2	2	2	15	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Lower Selway	Middle Meadow Creek	1706030212	3	3	3	2	2	2	15	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Lower Selway	Lower Meadow Creek	1706030213	3	3	3	2	3	2	16	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Lower Selway	O'Hara Creek	1706030214	3	2	3	2	2	2	14	High HUC5 score; PCEs support one of only five populations within the ESU that are important strongholds of genetically unique steelhead; Priority Watershed (NMFS 1998)	High
	Lochsa	Lower Lochsa River	1706030301	3	2	2	1	2	2	12	High HUC5 score; PCEs support one of two populations in the Clearwater River group for which the TRT found no evidence of hatchery introgression; Priority Watershed (NMFS 1998)	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Lochsa	Fish Creek	1706030302	3	3	3	3	3	2	17	High HUC5 score; PCEs support one of two populations in the Clearwater River group for which the TRT found no evidence of hatchery introgression; Priority Watershed (NMFS 1998)	High
	Lochsa	Lochsa River/ Stanley Creek	1706030303	2	3	3	1	1	2	12	High HUC5 score; PCEs support one of two populations in the Clearwater River group for which the TRT found no evidence of hatchery introgression; Priority Watershed (NMFS 1998)	High
	Lochsa	Lochsa River/ Squaw Creek	1706030304	3	2	3	2	2	2	14	High HUC5 score; PCEs support one of two populations in the Clearwater River group for which the TRT found no evidence of hatchery introgression; Priority Watershed (NMFS 1998)	High
	Lochsa	Lower Crooked Fork	1706030305	2	3	3	2	2	2	14	High HUC5 score; PCEs support one of two populations in the Clearwater River group for which the TRT found no evidence of hatchery introgression; Priority Watershed (NMFS 1998)	High
	Lochsa	Upper Crooked Fork	1706030306	3	3	3	2	2	2	15	High HUC5 score; PCEs support one of two populations in the Clearwater River group for which the TRT found no evidence of hatchery introgression; Priority Watershed (NMFS 1998)	High
	Lochsa	Brushy Fork	1706030307	3	3	3	2	2	2	15	High HUC5 score; PCEs support one of two populations in the Clearwater River group for which the TRT found no evidence of hatchery introgression; Priority Watershed (NMFS 1998)	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Lochsa	Lower White Sands Creek	1706030308	3	3	3	2	2	2	15	High HUC5 score; PCEs support one of two populations in the Clearwater River group for which the TRT found no evidence of hatchery introgression; Priority Watershed (NMFS 1998)	High
	Lochsa	Storm Creek	1706030309	2	3	3	1	2	2	13	High HUC5 score; PCEs support one of two populations in the Clearwater River group for which the TRT found no evidence of hatchery introgression; Priority Watershed (NMFS 1998)	High
	Lochsa	Upper White Sands Creek	1706030310	3	3	3	0	1	2	9	Low HUC5 score; PCEs support one of two populations in the Clearwater River group for which the TRT found no evidence of hatchery introgression; Priority Watershed (NMFS 1998)	High
	Lochsa	Warm Springs Creek	1706030311	2	3	3	1	2	2	13	High HUC5 score; PCEs support one of two populations in the Clearwater River group for which the TRT found no evidence of hatchery introgression; Priority Watershed (NMFS 1998)	High
	Lochsa	Fish Lake Creek	1706030312	3	3	3	2	2	2	15	High HUC5 score; PCEs support one of two populations in the Clearwater River group for which the TRT found no evidence of hatchery introgression; Priority Watershed (NMFS 1998)	High
	Lochsa	Boulder Creek	1706030313	2	3	3	1	2	2	13	High HUC5 score; PCEs support one of two populations in the Clearwater River group for which the TRT found no evidence of hatchery introgression; Priority Watershed (NMFS 1998)	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Lochsa	Old Man Creek	1706030314	2	3	3	1	2	2	13	High HUC5 score; PCEs support one of two populations in the Clearwater River group for which the TRT found no evidence of hatchery introgression; Priority Watershed (NMFS 1998)	High
	Middle Fork Clearwater	Middle Fork Clearwater River/ Maggie Creek	1706030401	2	2	2	2	2	3	13	High HUC5 score; PCEs support one of five populations in the Clearwater River group	High
	Middle Fork Clearwater	Clear Creek	1706030402	3	1	3	3	2	2	14	High HUC5 score; PCEs support one of five populations in the Clearwater River group; Priority Watershed (NMFS 1998)	High
	South Fork Clearwater	Lower South Fork Clearwater River	1706030501	1	2	2	1	1	3	10	Medium HUC5 score; PCEs support two of five populations in the Clearwater River group	Medium
	South Fork Clearwater	South Fork Clearwater River/ Meadow Creek	1706030502	3	2	2	1	2	2	12	High HUC5 score; PCEs support one of five populations in the Clearwater River group; Priority Watershed (NMFS 1998)	High
	South Fork Clearwater	South Fork Clearwater River/ Peasley Creek	1706030503	2	2	1	1	1	2	9	Low HUC5 score; PCEs support one of five populations in the Clearwater River group	Low
	South Fork Clearwater	South Fork Clearwater River/ Leggett Creek	1706030504	2	2	2	1	2	2	11	Medium HUC5 score; PCEs support one of five populations in the Clearwater River group	Medium
	South Fork Clearwater	Newsome Creek	1706030505	3	2	3	2	2	2	14	High HUC5 score; PCEs support one of five populations in the Clearwater River group; Priority Watershed (NMFS 1998)	High
	South Fork Clearwater	American River	1706030506	3	2	3	2	2	2	14	High HUC5 score; PCEs support one of five populations in the Clearwater River group; Priority Watershed (NMFS 1998)	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	South Fork Clearwater	Red River	1706030507	3	2	3	2	2	2	14	High HUC5 score; PCEs support one of five populations in the Clearwater River group; Priority Watershed (NMFS 1998)	High
	South Fork Clearwater	Crooked River	1706030508	3	2	3	2	2	2	14	High HUC5 score; PCEs support one of five populations in the Clearwater River group; Priority Watershed (NMFS 1998)	High
	South Fork Clearwater	Ten Mile Creek	1706030509	3	3	3	3	2	2	16	High HUC5 score; PCEs support one of five populations in the Clearwater River group; Priority Watershed (NMFS 1998)	High
	South Fork Clearwater	John's Creek	1706030510	3	3	3	3	2	2	16	High HUC5 score; PCEs support one of five populations in the Clearwater River group; Priority Watershed (NMFS 1998)	High
	South Fork Clearwater	Mill Creek	1706030511	3	2	2	1	2	2	12	High HUC5 score; PCEs support one of five populations in the Clearwater River group; Priority Watershed (NMFS 1998)	High
	South Fork Clearwater	Three Mile Creek	1706030512	2	1	2	1	1	2	9	Low HUC5 score; PCEs support one of five populations in the Clearwater River group	Low
	South Fork Clearwater	Cottonwood Creek	1706030513	3	1	2	1	2	2	11	Medium HUC5 score; PCEs support one of five populations in the Clearwater River group	Medium
	Clearwater	Lower Clearwater River	1706030601	1	1	1	2	1	3	9	Low HUC5 score; PCEs support one of five populations in the Clearwater River group	Low
	Clearwater	Clearwater River/ Lower Potlatch River	1706030602	2	1	1	2	1	3	10	Medium HUC5 score; PCEs support one of five populations in the Clearwater River group	Medium
	Clearwater	Potlatch River/ Middle Potlatch Creek	1706030603	3	1	2	1	2	2	11	Medium HUC5 score; PCEs support one of five populations in the Clearwater River group	Medium

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Clearwater	Big Bear Creek	1706030604	3	2	2	1	1	2	11	Medium HUC5 score; PCEs support one of five populations in the Clearwater River group	Medium
	Clearwater	Upper Big Bear Creek	1706030605	2	2	2	1	*	1	10	At the time of the proposed rule this watershed was thought to be unoccupied. New information from the Cottonwood office of the BLM indicates that there have been recent observations of steelhead in this watershed. Medium HUC5 score; PCEs support one of five populations in the Clearwater River group	Medium
	Clearwater	Potlatch River/ Pine Creek	1706030606	3	2	2	1	2	2	12	High HUC5 score; PCEs support one of five populations in the Clearwater River group	High
	Clearwater	Upper Potlatch River	1706030607	3	2	2	3	2	2	14	High HUC5 score; PCEs support one of five populations in the Clearwater River group	High
	Clearwater	Clearwater River/ Bedrock Creek	1706030608	2	1	2	2	2	3	12	High HUC5 score; PCEs support one of five populations in the Clearwater River group	High
	Clearwater	Clearwater River/ Jack's Creek	1706030609	2	1	2	2	2	3	12	High HUC5 score; PCEs support one of five populations in the Clearwater River group	High
	Clearwater	Big Canyon Creek	1706030610	3	1	2	3	2	3	14	High HUC5 score; PCEs support one of five populations in the Clearwater River group	High
	Clearwater	Little Canyon Creek	1706030611	3	1	2	3	2	2	13	High HUC5 score; PCEs support one of five populations in the Clearwater River group	High
	Clearwater	Clearwater River/ Lower Orofino Creek	1706030612	2	1	1	2	1	2	9	Low HUC5 score; PCEs support one of five populations in the Clearwater River group	Low
	Clearwater	Upper Orofino Creek	1706030613	1	2	0	0	*	2	6	Low HUC5 score; PCEs support one of five populations in the Clearwater River group	Low

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Clearwater	Jim Ford Creek	1706030614	2	1	2	2	2	2	11	Medium HUC5 score; PCEs support one of five populations in the Clearwater River group	Medium
	Clearwater	Lower Lolo Creek	1706030615	3	2	2	2	2	2	13	High HUC5 score; PCEs support two of five populations in the Clearwater River group; Priority Watershed (NMFS 1998)	High
	Clearwater	Middle Lolo Creek	1706030616	3	2	2	2	2	2	13	High HUC5 score; PCEs support one of five populations in the Clearwater River group	High
	Clearwater	Musselshell Creek	1706030617	3	2	2	2	2	2	13	High HUC5 score; PCEs support one of five populations in the Clearwater River group	High
	Clearwater	Upper Lolo Creek	1706030618	3	2	2	2	2	2	13	High HUC5 score; PCEs support one of five populations in the Clearwater River group	High
	Clearwater	Eldorado Creek	1706030619	3	2	2	2	2	2	13	High HUC5 score; PCEs support one of five populations in the Clearwater River group	High
	Clearwater	Clearwater River/ Fivemile Creek	1706030620	2	1	1	2	1	3	10	Medium HUC5 score; PCEs support one of five populations in the Clearwater River group	Medium
	Clearwater	Clearwater River/ Sixmile Creek	1706030621	2	1	1	2	1	3	10	Medium HUC5 score; PCEs support one of five populations in the Clearwater River group	Medium
	Clearwater	Clearwater River/ Tom Taha Creek	1706030622	2	1	1	2	1	3	10	Medium HUC5 score; PCEs support one of five populations in the Clearwater River group	Medium
	Clearwater	Lower Lawyer Creek	1706030623	3	1	2	2	2	2	12	High HUC5 score; PCEs support one of five populations in the Clearwater River group	High
	Clearwater	Middle Lawyer Creek	1706030624	3	1	2	2	2	2	12	High HUC5 score; PCEs support one of five populations in the Clearwater River group	High

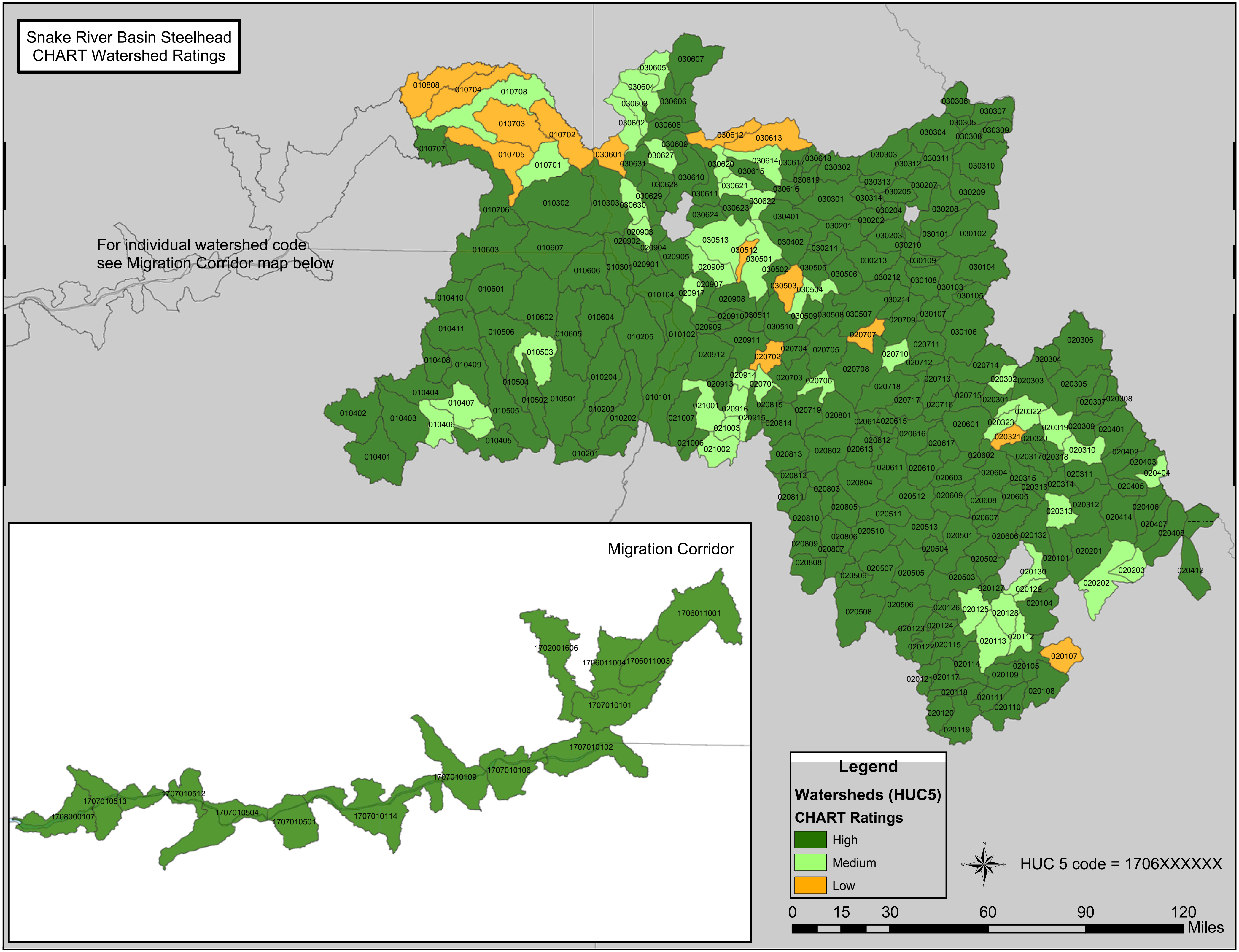
Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Clearwater	Cottonwood Creek	1706030627	2	1	2	2	2	2	11	Medium HUC5 score; PCEs support one of five populations in the Clearwater River group	Medium
	Clearwater	Upper Lapwai Creek	1706030628	3	1	2	2	2	2	12	At the time of the proposed rule this watershed was thought to be unoccupied. New information from the Cottonwood office of the BLM indicates that there have been recent observations of steelhead in this watershed. High HUC5 score; PCEs support one of five populations in the Clearwater River group	High
	Clearwater	Mission Creek	1706030629	3	2	2	2	2	2	13	At the time of the proposed rule this watershed was thought to be unoccupied. New information from the Cottonwood office of the BLM indicates that there have been recent observations of steelhead in this watershed. High HUC5 score; PCEs support one of five populations in the Clearwater River group	High
	Clearwater	Upper Sweetwater Creek	1706030630	2	1	2	2	1	2	10	Medium HUC5 score; PCEs support one of five populations in the Clearwater River group	Medium
	Clearwater	Lower Sweetwater Creek	1706030631	3	1	2	2	2	2	12	High HUC5 score; PCEs support one of five populations in the Clearwater River group	High
	Lower North Fork Clearwater	Lower North Fork Clearwater River	1706030801								Based on new information and public comments, the CHART determined that although this watershed is occupied the PCEs are severely degraded or lacking. This watershed is not essential for the conservation of the ESU.	No PCEs

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Upper Columbia/ Priest Rapids	Columbia River/ Zintel Canyon	1702001606							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Middle Columbia/ Lake Wallula	Upper Lake Wallula	1707010101							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Middle Columbia/ Lake Wallula	Lower Lake Wallula	1707010102							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Middle Columbia/ Lake Wallula	Upper Lake Umatilla	1707010106							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Middle Columbia/ Lake Wallula	Middle Lake Umatilla	1707010109							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Middle Columbia/ Lake Wallula	Lower Lake Umatilla	1707010114							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High

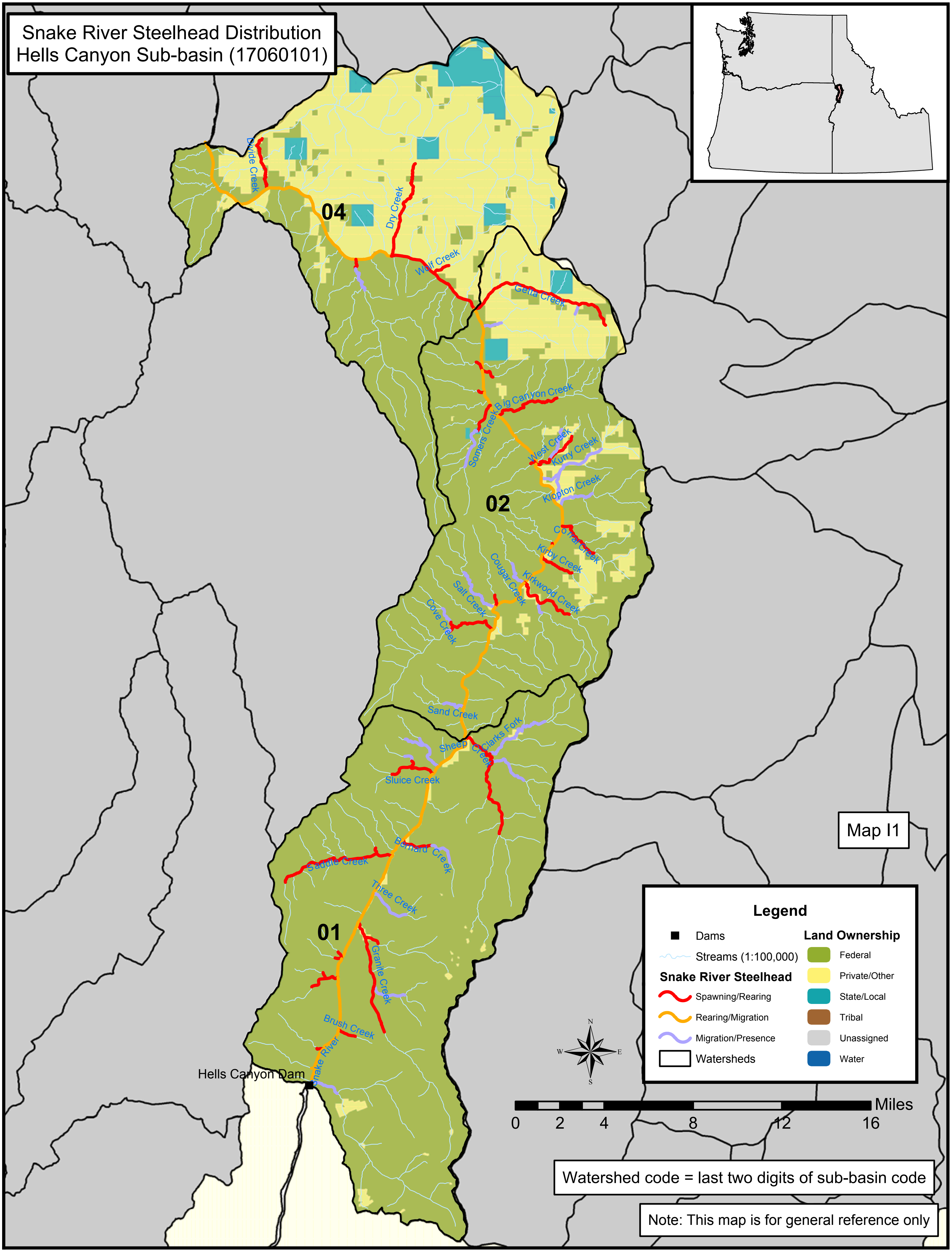
Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Middle Columbia/ Hood	Upper Middle Columbia/ Hood	1707010501							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Middle Columbia/ Hood	Middle Columbia/ Mill Creek	1707010504							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Middle Columbia/ Hood	Middle Columbia/ Grays Creek	1707010512							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Middle Columbia/ Hood	Middle Columbia/ Eagle Creek	1707010513							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Lower Columbia/ Sandy	Columbia Gorge Tributaries	1708000107							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Multiple	Lower Columbia Corridor (Sandy/ Washougal to Ocean)	NA							NS	Area not scored since many reaches are outside HUC5 boundaries. However, the CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High

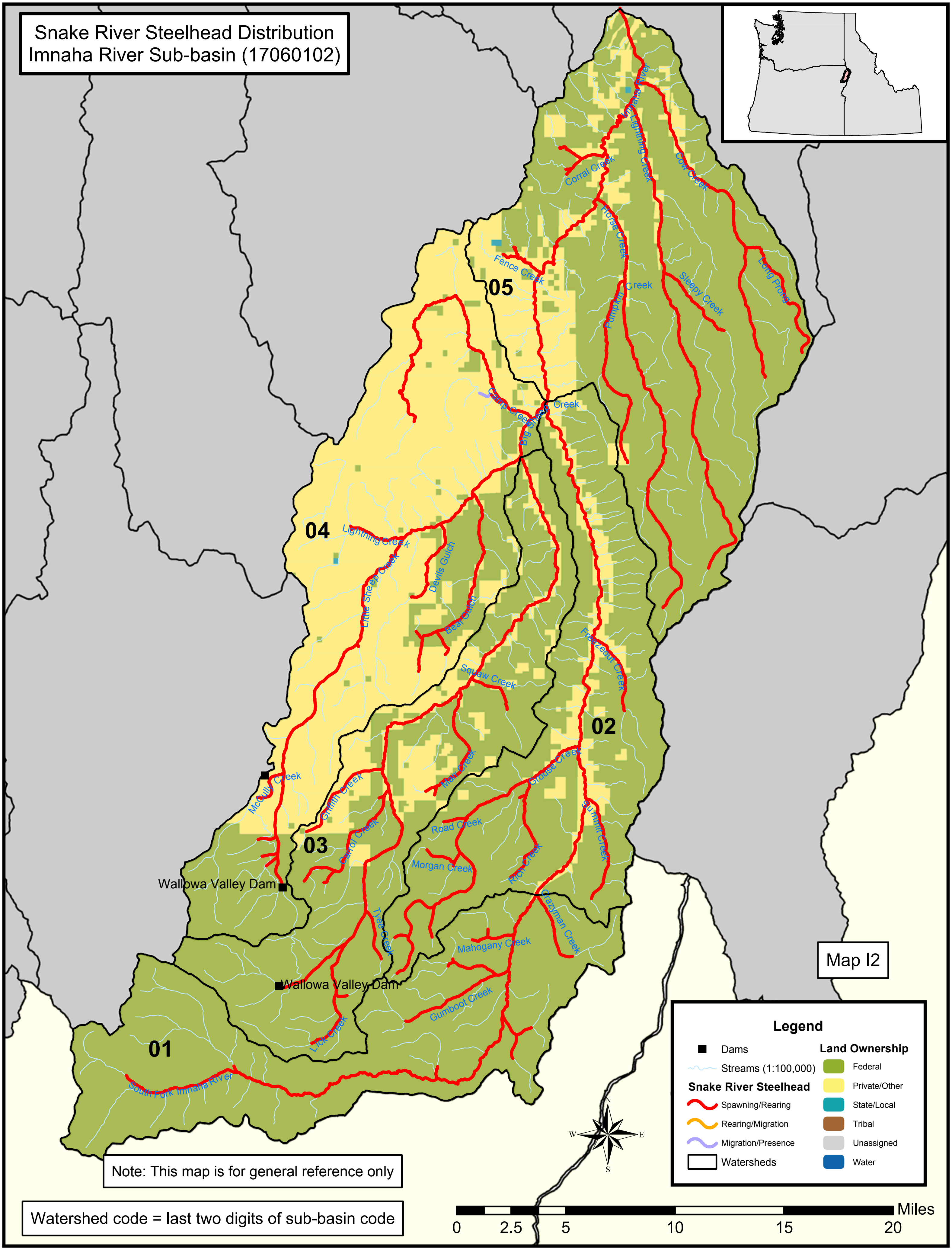
* The CHART was uncertain about the abundance of steelhead within this HUC5. The total score for the HUC5 was based on an expansion of factors 1-4 & 6 due to considerable uncertainty about factor 5.
** Indicates that HUC5 contains blocked/inaccessible areas that the CHART concluded may be essential for ESU conservation. See Unit Description text for specific areas considered.
*** Scored by CHART although HUC5 is currently blocked to steelhead.

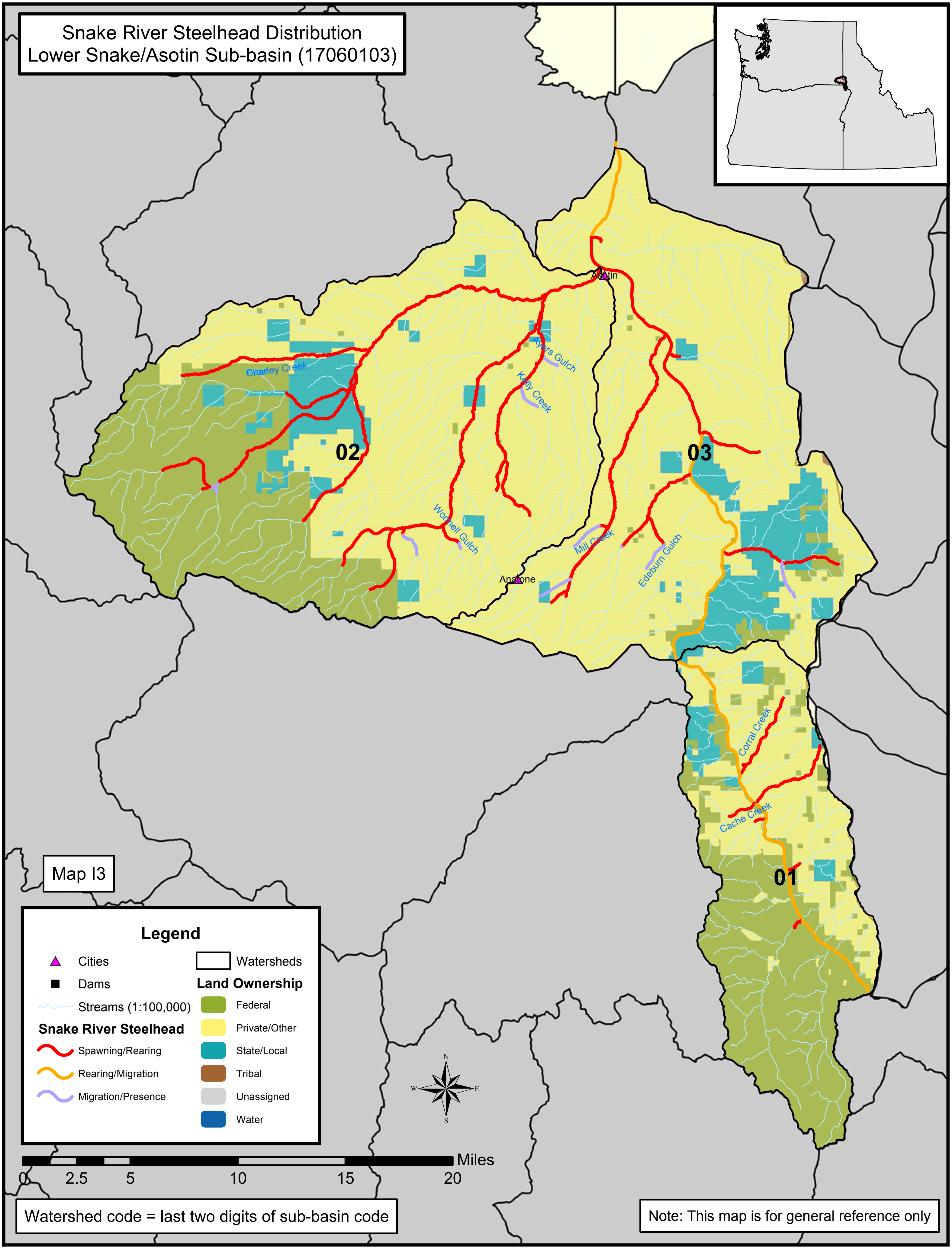
Figure I1-3. CHART Ratings of Conservation Value for Habitat Areas in HUC5 Watersheds Occupied by the Snake River Basin Steelhead ESU

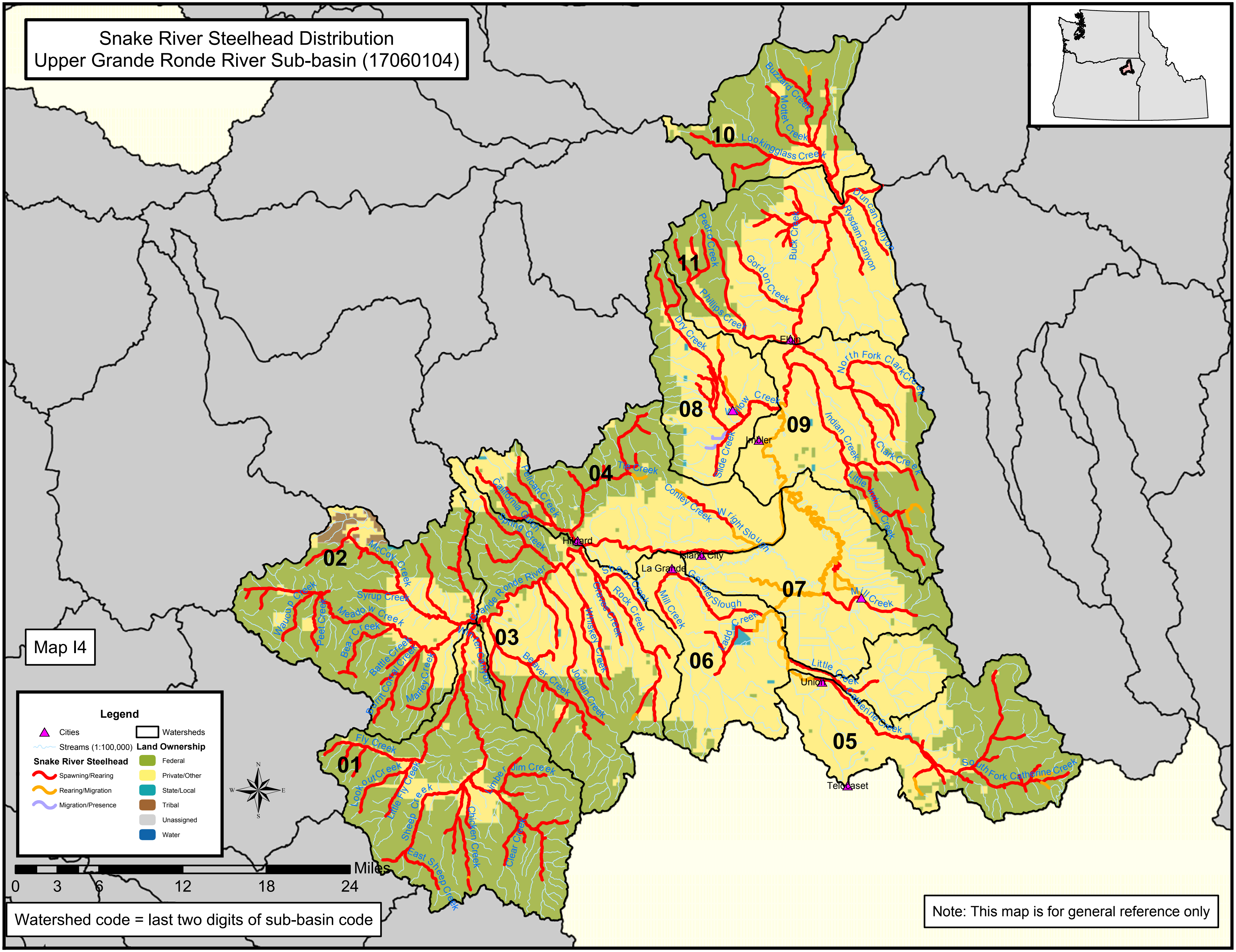


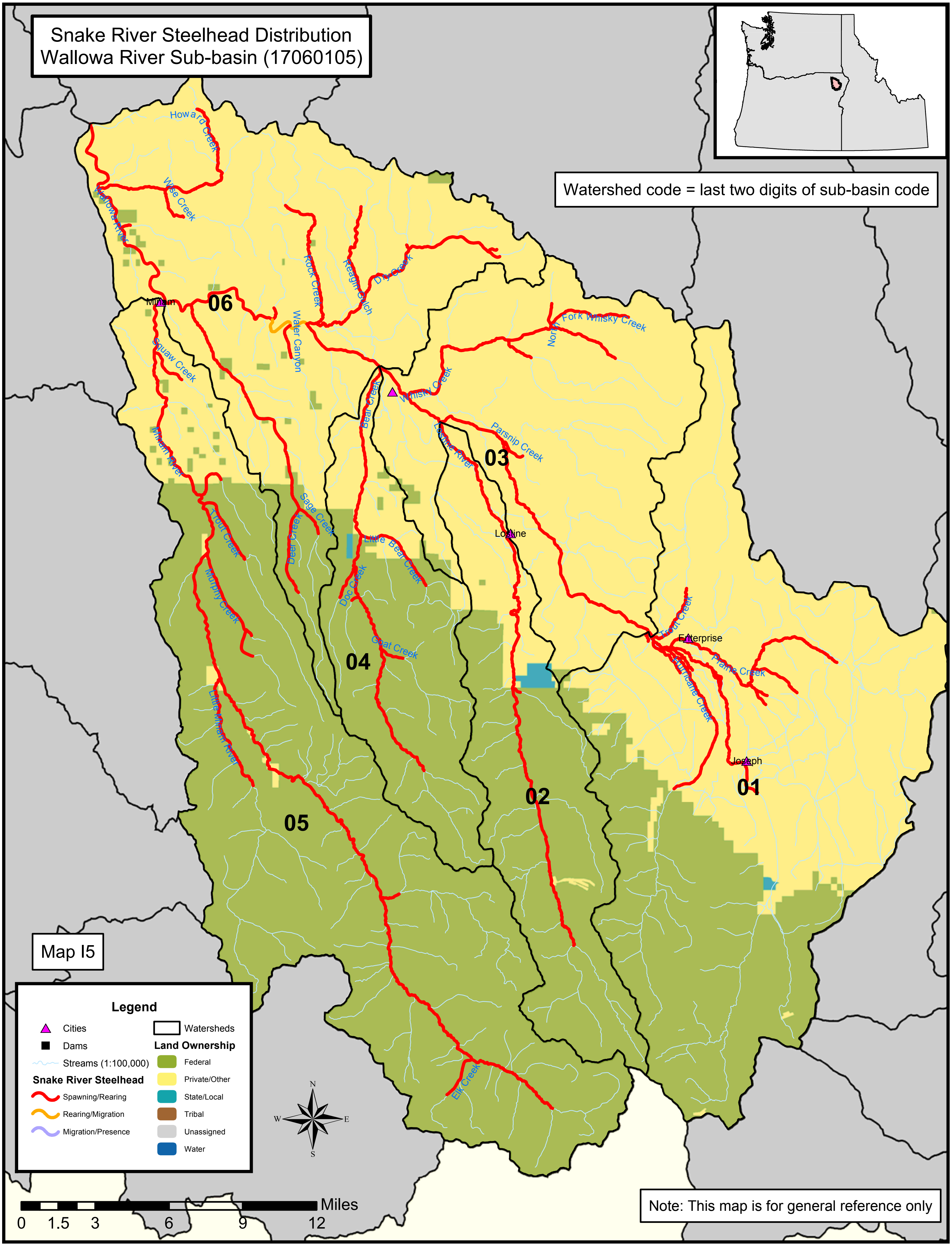
Snake River Basin Steelhead
CHART Watershed Ratings
For individual watershed code
see Migration Corridor map below
Migration Corridor
Legend
Watersheds (HUC5)
CHART Ratings
High
Medium
Low
HUC 5 code = 1706XXXXXX
0 15 30 60 90 120
Miles

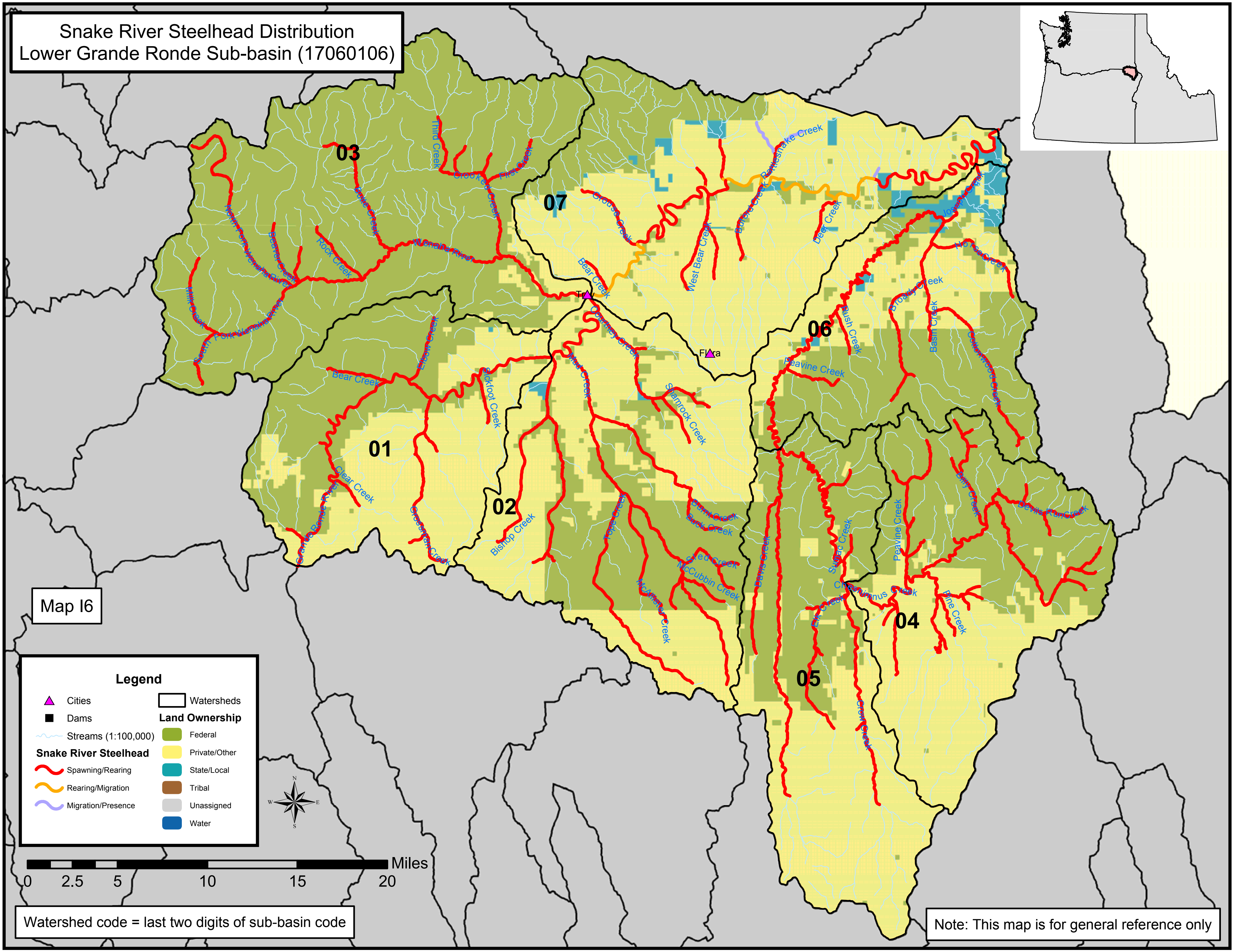

Snake River Steelhead Distribution
Hells Canyon Sub-basin (17060101)
04
02
01
Divide Creek
Dry Creek
Wolf Creek
Getta Creek
Big Canyon Creek
Somers Creek
West Creek
Kurry Creek
Klopton Creek
Corral Creek
Kirby Creek
Cougar Creek
Kirkwood Creek
Salt Creek
Cove Creek
Sand Creek
Sheep Creek
Clarks Fork
Sluice Creek
Bernard Creek
Saddle Creek
Three Creek
Granite Creek
Brush Creek
Snake River
Hells Canyon Dam
Map I1
Legend
Dams
Streams (1:100,000)
Snake River Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
0
2
4
8
12
16
Miles
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only

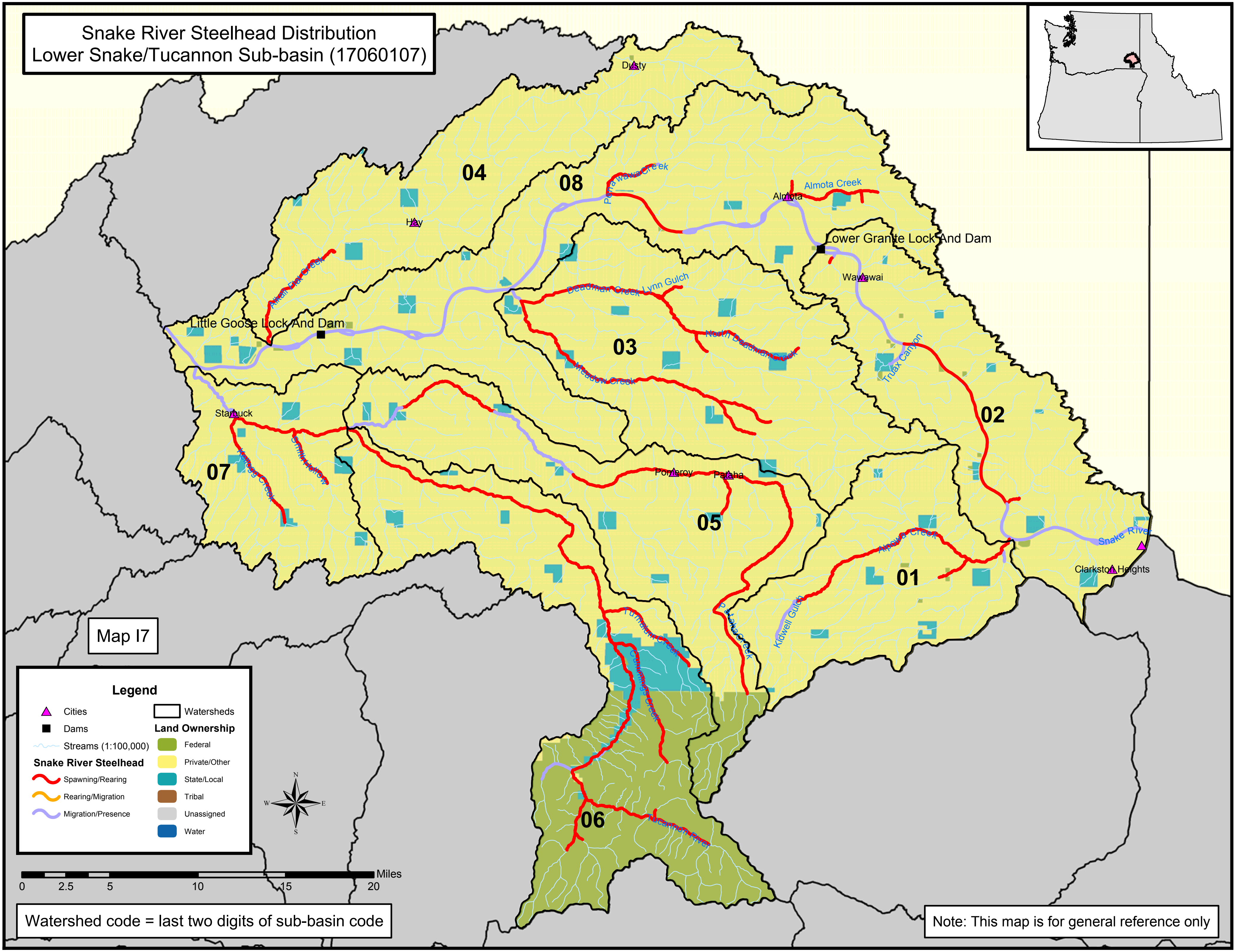

Snake River Steelhead Distribution
Imnaha River Sub-basin (17060102)
Lightning Creek
Cow Creek
Corral Creek
Horse Creek
Long Prong
Sleepy Creek
Pumpkin Creek
Fence Creek
05
Camp Creek
Creek
04
Lightning Creek
Devils Gulch
Little Sheep Creek
Bear Gulch
Freezeout Creek
Squaw Creek
02
McCully Creek
Griffith Creek
Mail Creek
Grouse Creek
Road Creek
03
Carrol Creek
Morgan Creek
Rich Creek
Wallowa Valley Dam
Tyee Creek
Crazyman Creek
Mahogany Creek
Wallowa Valley Dam
Gumboot Creek
Lick Creek
01
South Fork Imnaha River
Map I2
Legend
Dams
Streams (1:100,000)
Snake River Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
W
E
S
Note: This map is for general reference only
Watershed code = last two digits of sub-basin code
Miles
0
2.5
5
10
15
20


Snake River Steelhead Distribution
Lower Snake/Asotin Sub-basin (17060103)
Asotin
Charley Creek
Ayers Gulch
Kelly Creek
02
03
Wormell Gulch
Mill Creek
Edeburn Gulch
Anatone
Corral Creek
Cache Creek
01
Map I3
Legend
Cities
Dams
Streams (1:100,000)
Snake River Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
W
E
S
0
2.5
5
10
15
20
Miles
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only

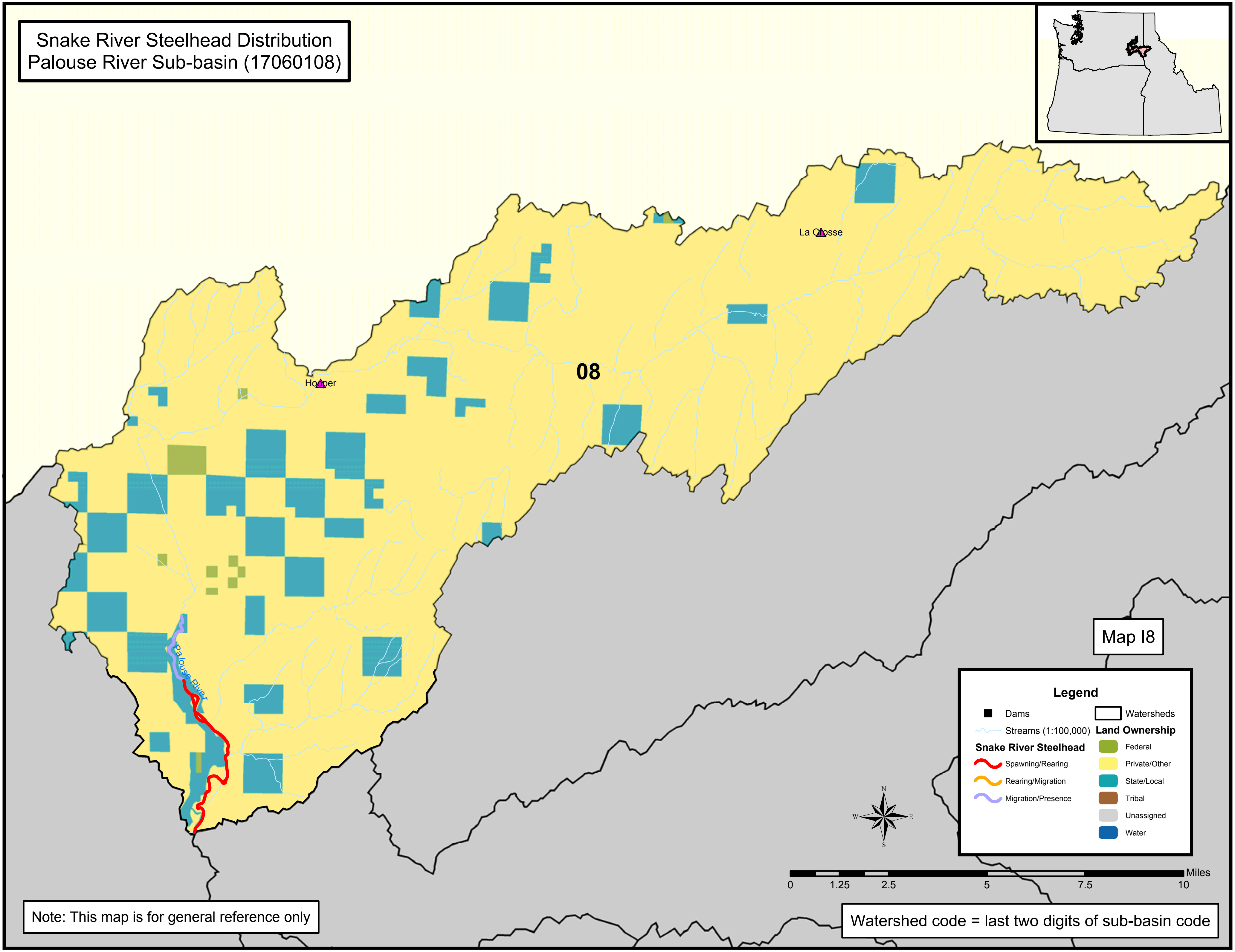

Snake River Steelhead Distribution
Upper Grande Ronde River Sub-basin (17060104)
Map I4
Legend
Cities
Watersheds
Streams (1:100,000)
Land Ownership
Snake River Steelhead
Federal
Spawning/Rearing
Private/Other
Rearing/Migration
State/Local
Migration/Presence
Tribal
Unassigned
Water
Miles
0 3 6 12 18 24
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only
01
02
03
04
05
06
07
08
09
10
11
Lookingglass Creek
Mottet Creek
Buzzard Creek
Duncan Canyon
Rysdam Canyon
Buck Creek
Gordon Creek
Phillips Creek
Pedro Creek
Dry Creek
Elgin
North Fork Clark Creek
Clark Creek
Indian Creek
Little Indian Creek
Slide Creek
Imbler
Tie Creek
Conley Creek
Wright Slough
Hilgard
Island City
La Grande
Mill Creek
Catherine Creek
Little Creek
Union
Telocaset
South Fork Catherine Creek
Pelican Creek
California Gulch
Spring Creek
Grande Ronde River
Sheep Creek
Rock Creek
Whiskey Creek
Beaver Creek
Jordan Creek
McCoy Creek
Syrup Creek
Meadow Creek
Bear Creek
Battle Creek
Burnt Corral Creek
Marley Creek
Peet Creek
Waucup Creek
Fly Creek
Lookout Creek
Little Fly Creek
Sheep Creek
East Sheep Creek
Chicken Creek
Clear Creek
Limber Jim Creek

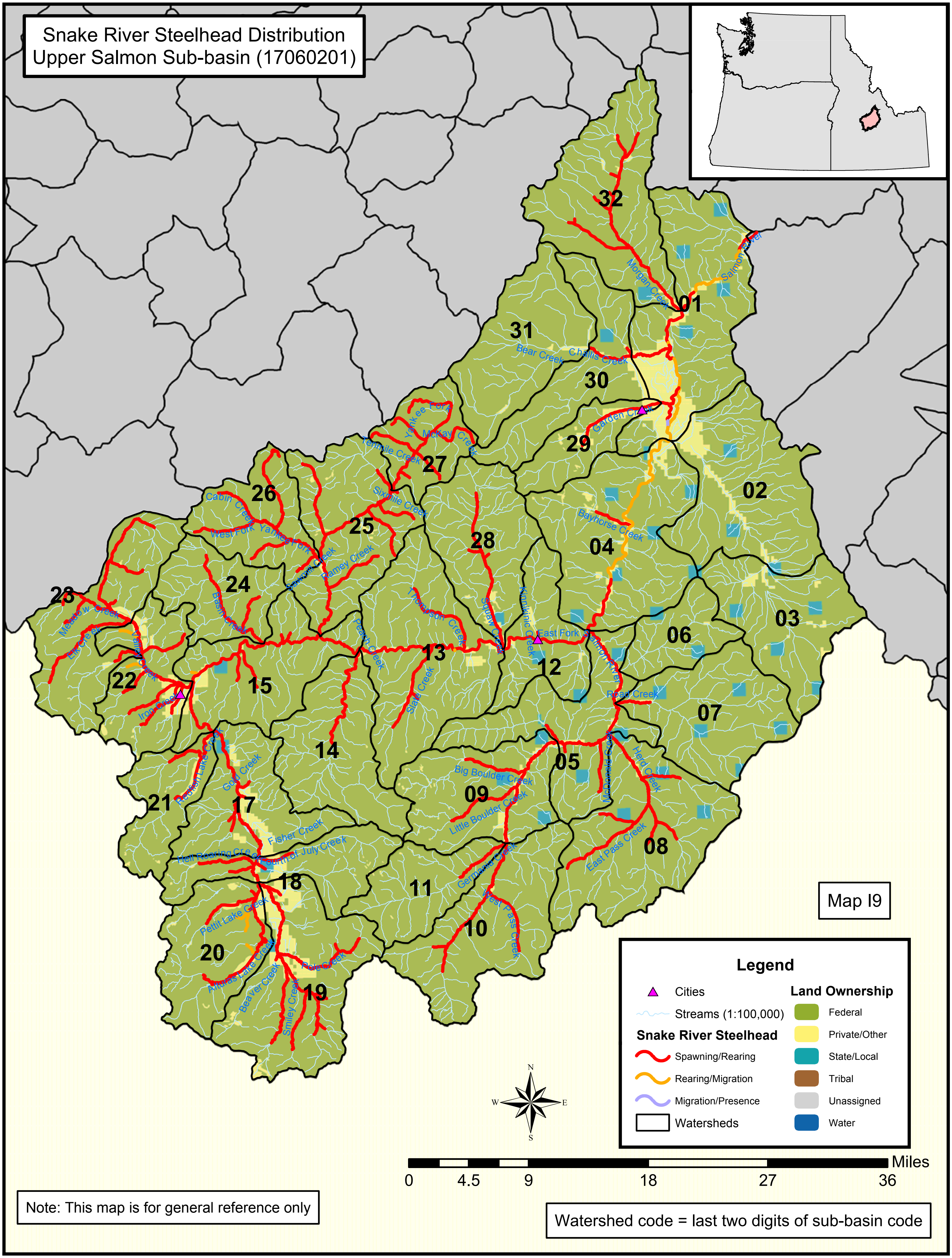

Snake River Steelhead Distribution
Wallowa River Sub-basin (17060105)
Watershed code = last two digits of sub-basin code
Howard Creek
Wise Creek
Wallowa River
Rock Creek
Reagin Gulch
Dry Creek
Water Canyon
North Fork Whisky Creek
Whisky Creek
Bear Creek
Squaw Creek
Minam River
Parsnip Creek
Lostine River
Sage Creek
Deer Creek
Trout Creek
Little Bear Creek
Doc Creek
Murphy Creek
Goat Creek
Prairie Creek
Hurricane Creek
Little Minam River
Elk Creek
Minam
Lostine
Enterprise
Joseph
01
02
03
04
05
06
Map I5
Legend
Cities
Dams
Streams (1:100,000)
Snake River Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
0
1.5
3
6
9
12
Miles
Note: This map is for general reference only

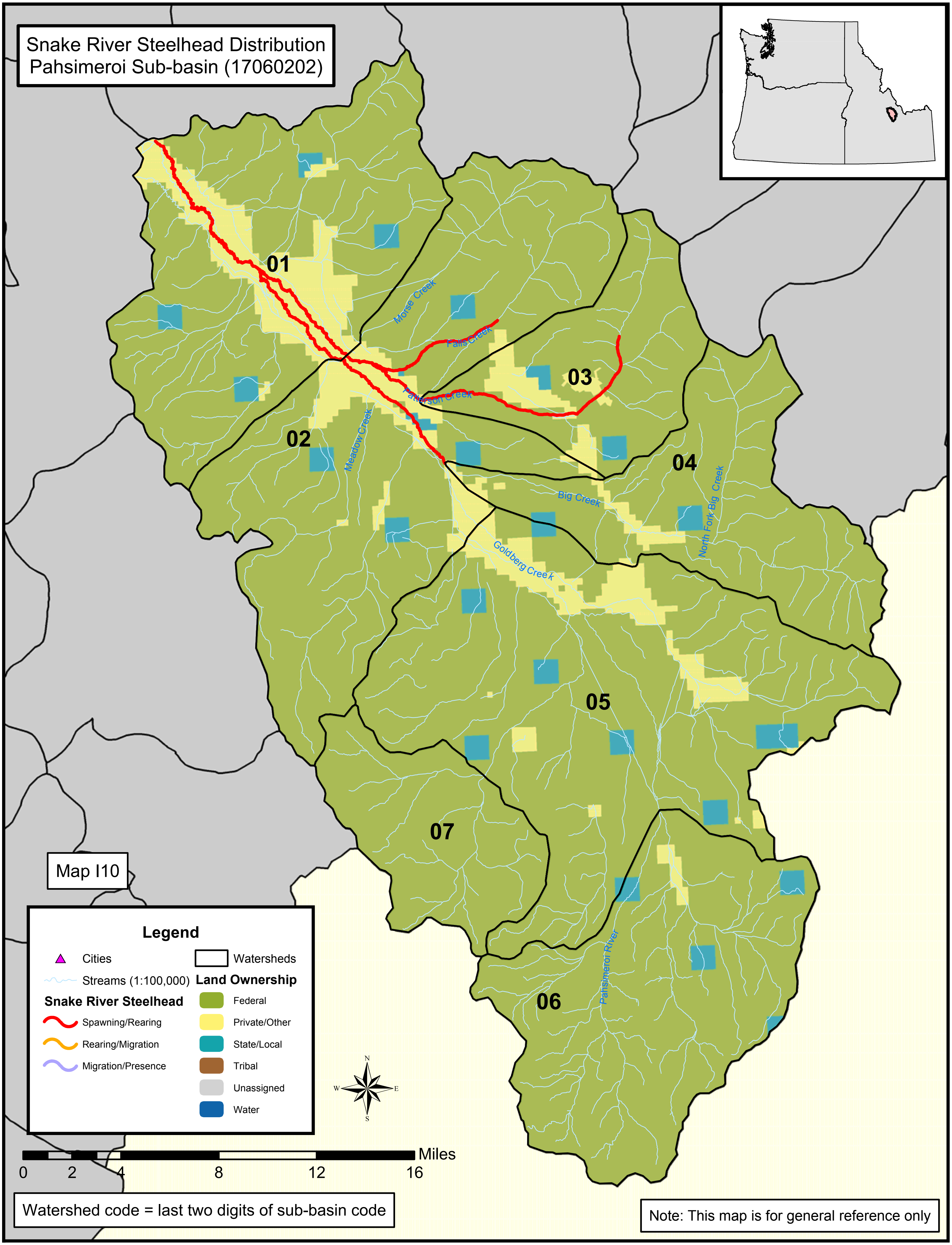

Snake River Steelhead Distribution
Lower Grande Ronde Sub-basin (17060106)
Map I6
01
02
03
04
05
06
07
Troy
Flora
Third Creek
Crooked Creek
First Creek
Grouse Creek
Rattlesnake Creek
Buford Creek
Deer Creek
Joseph Creek
West Bear Creek
Bear Creek
Horse Creek
Broady Creek
Rush Creek
Basin Creek
Cottonwood Creek
Peavine Creek
Wenaha River
Rock Creek
Beaver Creek
North Fork Wenaha River
Butte Creek
Mill Creek
South Fork Wenaha River
Elbow Creek
Bickfoot Creek
Clear Creek
Grande Ronde River
Grossman Creek
Bishop Creek
Wildcat Creek
Shamrock Creek
Courtney Creek
Cougar Creek
Buck Creek
Swamp Creek
Davis Creek
Chesnimnus Creek
Elk Creek
Crow Creek
Devils Run Creek
Pine Creek
McAlister Creek
McCubbin Creek
Legend
Cities
Dams
Streams (1:100,000)
Snake River Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
Miles
0
2.5
5
10
15
20
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only



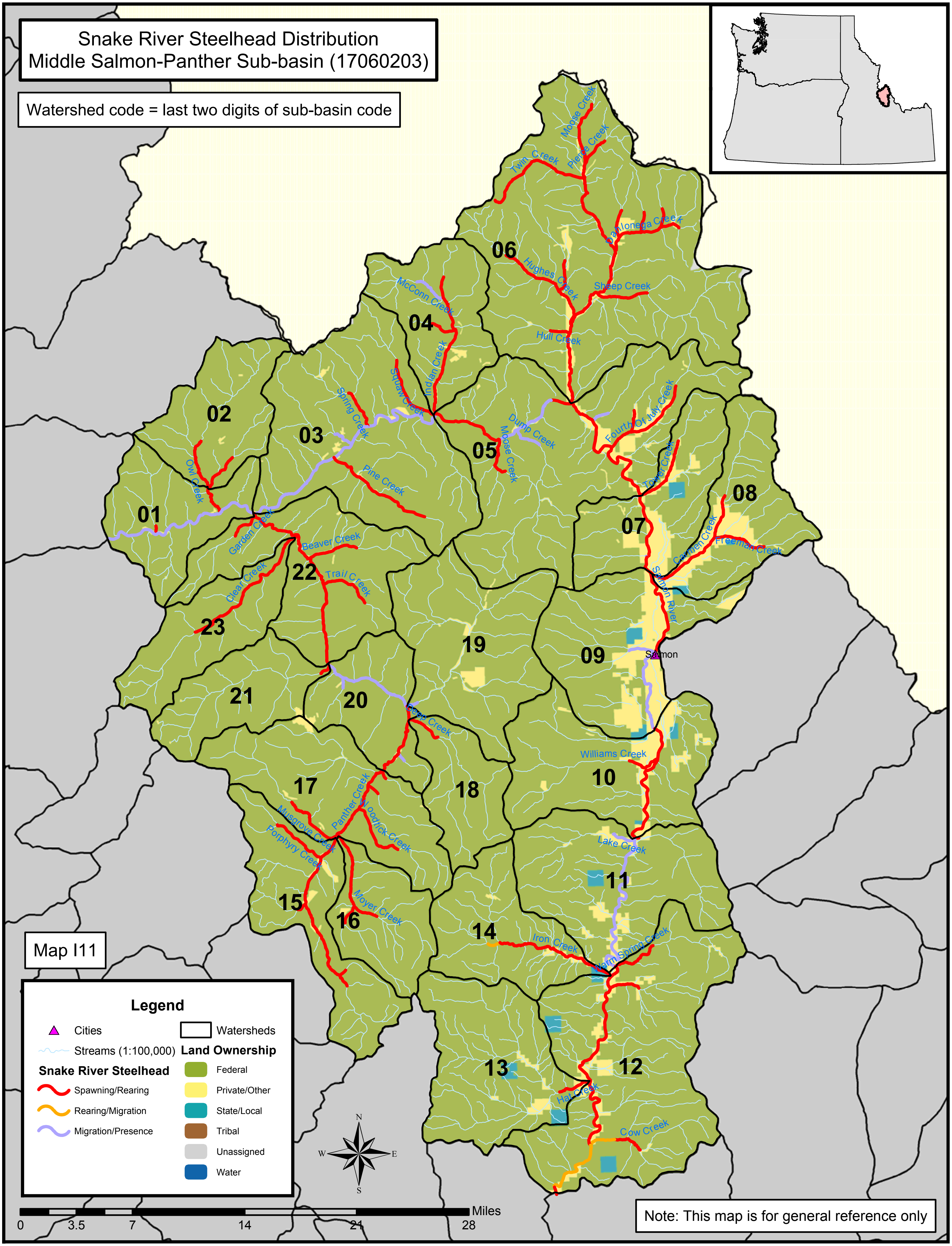
Snake River Steelhead Distribution
Lower Snake/Tucannon Sub-basin (17060107)
Dusty
Hay
04
08
Almota
Almota Creek
Lower Granite Lock And Dam
Wawawai
Little Goose Lock And Dam
03
Deadman Creek
Lynn Gulch
North Deadman Creek
Meadow Creek
Truax Canyon
02
Starbuck
07
Pomeroy
Pataha
05
Alpowa Creek
Snake River
Clarkston Heights
01
Kidwell Gulch
Pataha Creek
Tucannon River
06
Map I7
Legend
Cities
Dams
Streams (1:100,000)
Snake River Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
0
2.5
5
10
15
20
Miles
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only


Snake River Steelhead Distribution
Palouse River Sub-basin (17060108)
La Crosse
Hooper
08
Palouse River
Map I8
Legend
Dams
Watersheds
Streams (1:100,000)
Land Ownership
Snake River Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
0
1.25
2.5
5
7.5
10
Miles
Note: This map is for general reference only
Watershed code = last two digits of sub-basin code

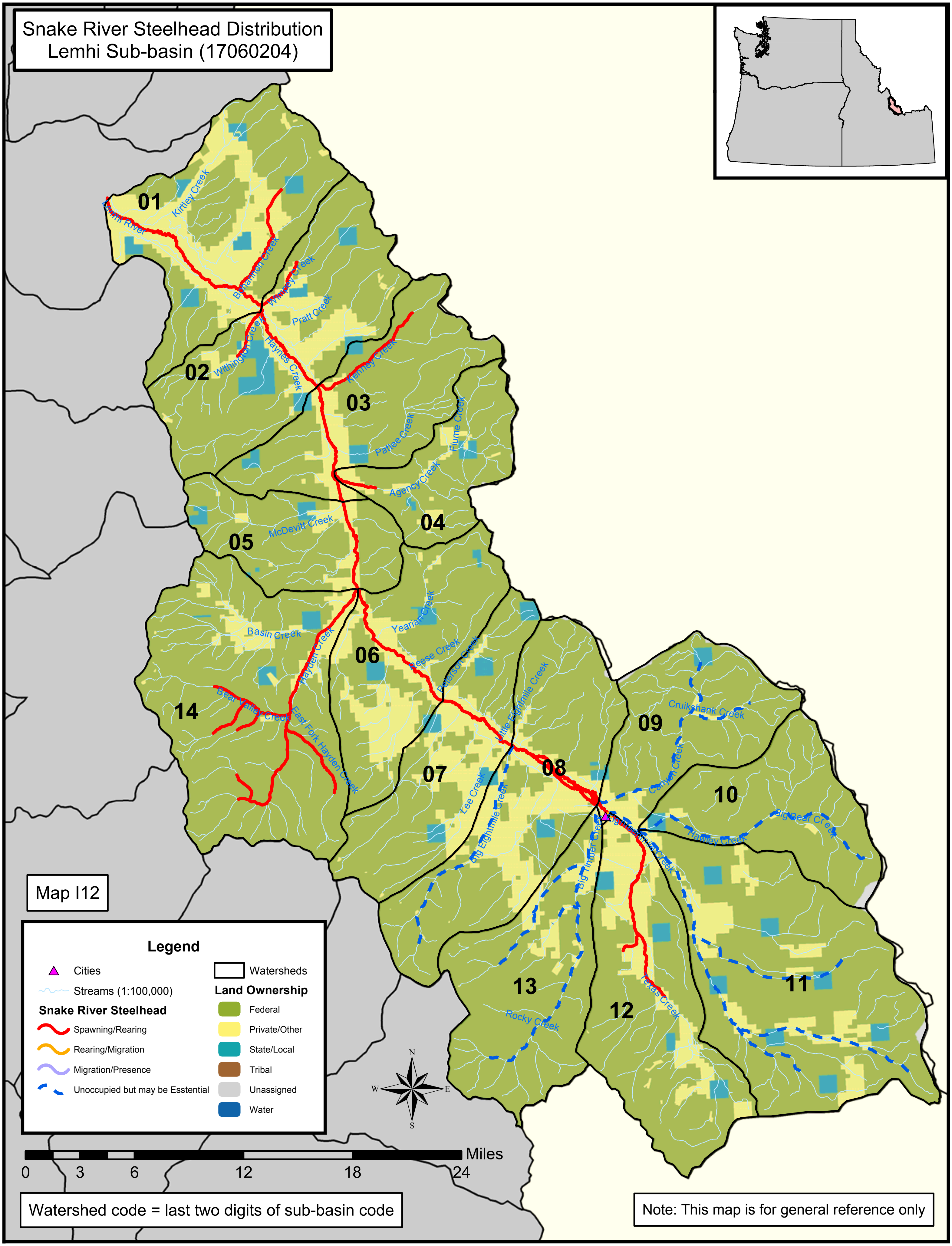

Snake River Steelhead Distribution
Upper Salmon Sub-basin (17060201)
Map I9
Legend
Cities
Streams (1:100,000)
Snake River Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
Miles
0
4.5
9
18
27
36
Note: This map is for general reference only
Watershed code = last two digits of sub-basin code
01
02
03
04
05
06
07
08
09
10
11
12
13
14
15
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
Salmon River
Morgan Creek
Challis Creek
Bear Creek
Garden Creek
Bayhorse Creek
Yankee Fork
McKay Creek
Tenmile Creek
Sixmile Creek
Cabin Creek
West Fork Yankee Fork
Ramey Creek
Basin Creek
Thompson Creek
Squaw Creek
Kinnikinic Creek
East Fork
Road Creek
Herd Creek
McDonald Creek
Big Boulder Creek
Little Boulder Creek
East Pass Creek
Germania Creek
West Pass Creek
Slate Creek
Meadow Creek
Elk Creek
Valley Creek
Iron Creek
Redfish Lake Creek
Gold Creek
Fisher Creek
Hell Roaring Creek
Fourth of July Creek
Pettit Lake Creek
Alturas Lake Creek
Pole Creek
Beaver Creek
Smiley Creek



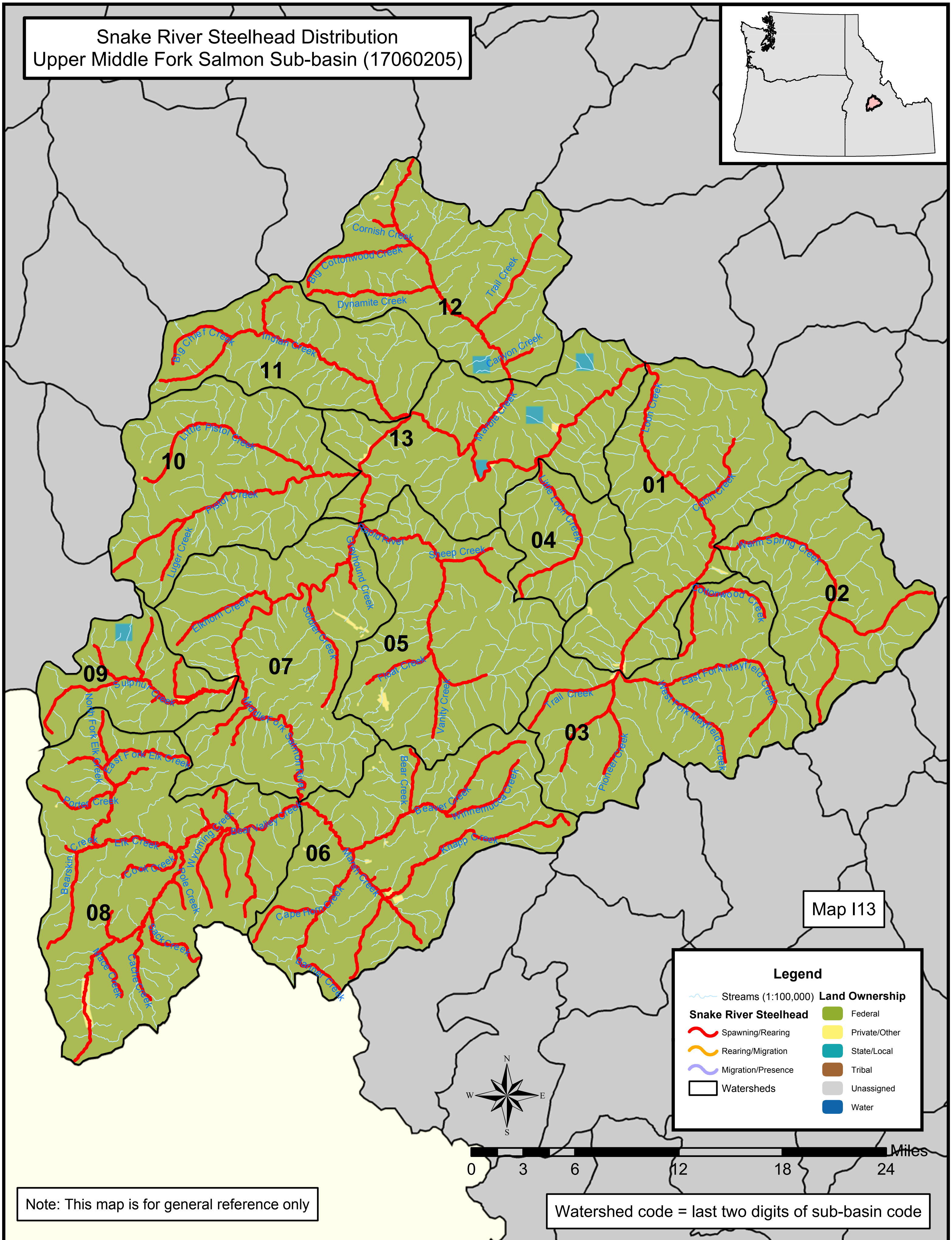
Snake River Steelhead Distribution
Pahsimeroi Sub-basin (17060202)
01
02
03
04
05
06
07
Morse Creek
Falls Creek
Patterson Creek
Meadow Creek
Big Creek
North Fork Big Creek
Goldberg Creek
Pahsimeroi River
Map I10
Legend
Cities
Streams (1:100,000)
Snake River Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
0
2
4
8
12
16
Miles
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only



Snake River Steelhead Distribution
Middle Salmon-Panther Sub-basin (17060203)
Watershed code = last two digits of sub-basin code
Map I11
Legend
Cities
Watersheds
Streams (1:100,000)
Land Ownership
Snake River Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Miles
0 3.5 7 14 21 28
Note: This map is for general reference only
Salmon
Salmon River


Snake River Steelhead Distribution
Lemhi Sub-basin (17060204)
01
02
03
04
05
06
07
08
09
10
11
12
13
14
Lemhi River
Kirtley Creek
Bohannon Creek
Wimpey Creek
Pratt Creek
Withington Creek
Haynes Creek
Kenney Creek
Pattee Creek
Flume Creek
Agency Creek
McDevitt Creek
Yearian Creek
Basin Creek
Hayden Creek
Reese Creek
Peterson Creek
Bear Valley Creek
East Fork Hayden Creek
Little Eightmile Creek
Big Eightmile Creek
Lee Creek
Cruikshank Creek
Canyon Creek
Big Bear Creek
Hawley Creek
Eighteenmile Creek
Big Timber Creek
Texas Creek
Rocky Creek
Map I12
Legend
Cities
Streams (1:100,000)
Snake River Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Unoccupied but may be Esstential
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
Miles
0
3
6
12
18
24
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only

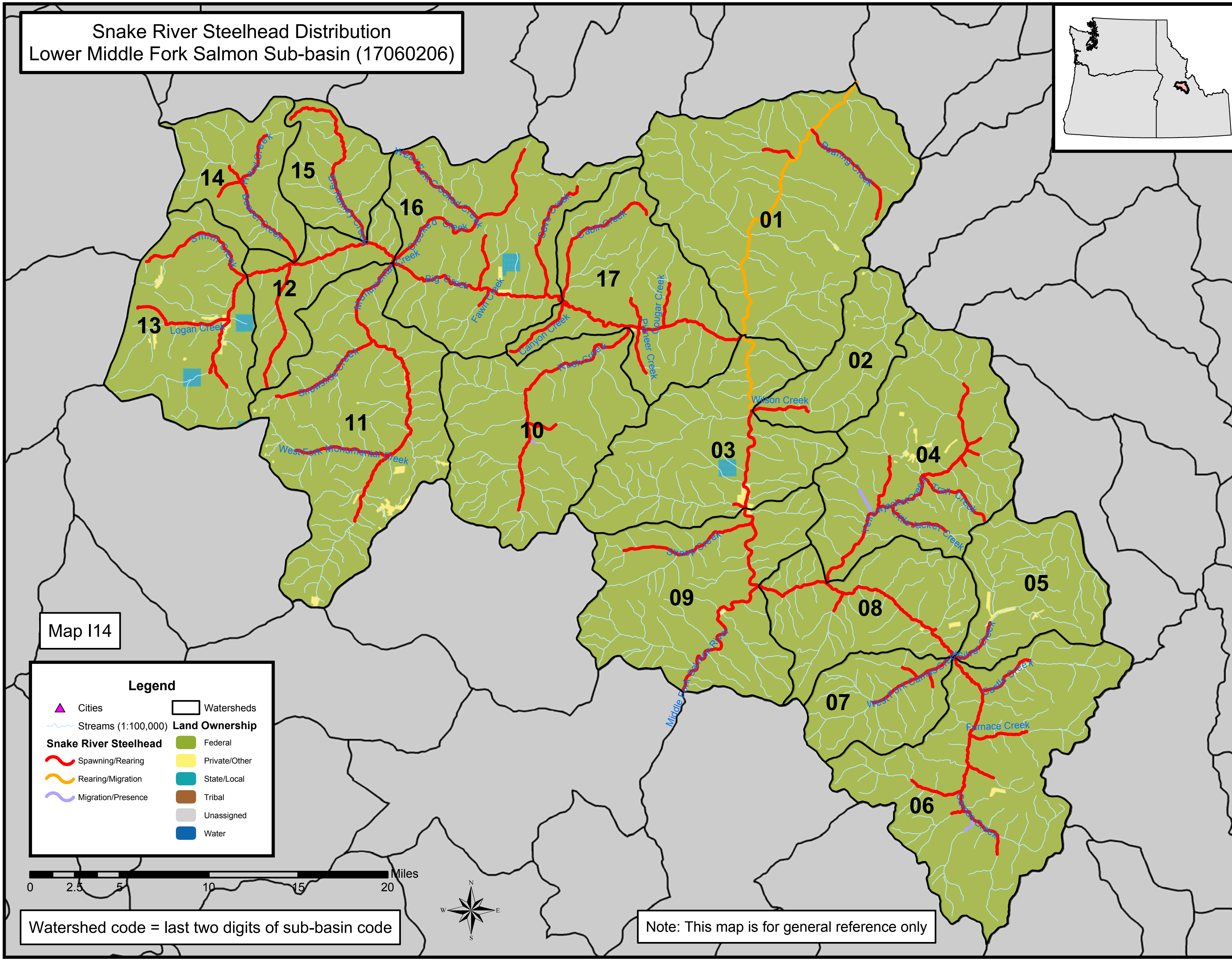
Snake River Steelhead Distribution
Upper Middle Fork Salmon Sub-basin (17060205)

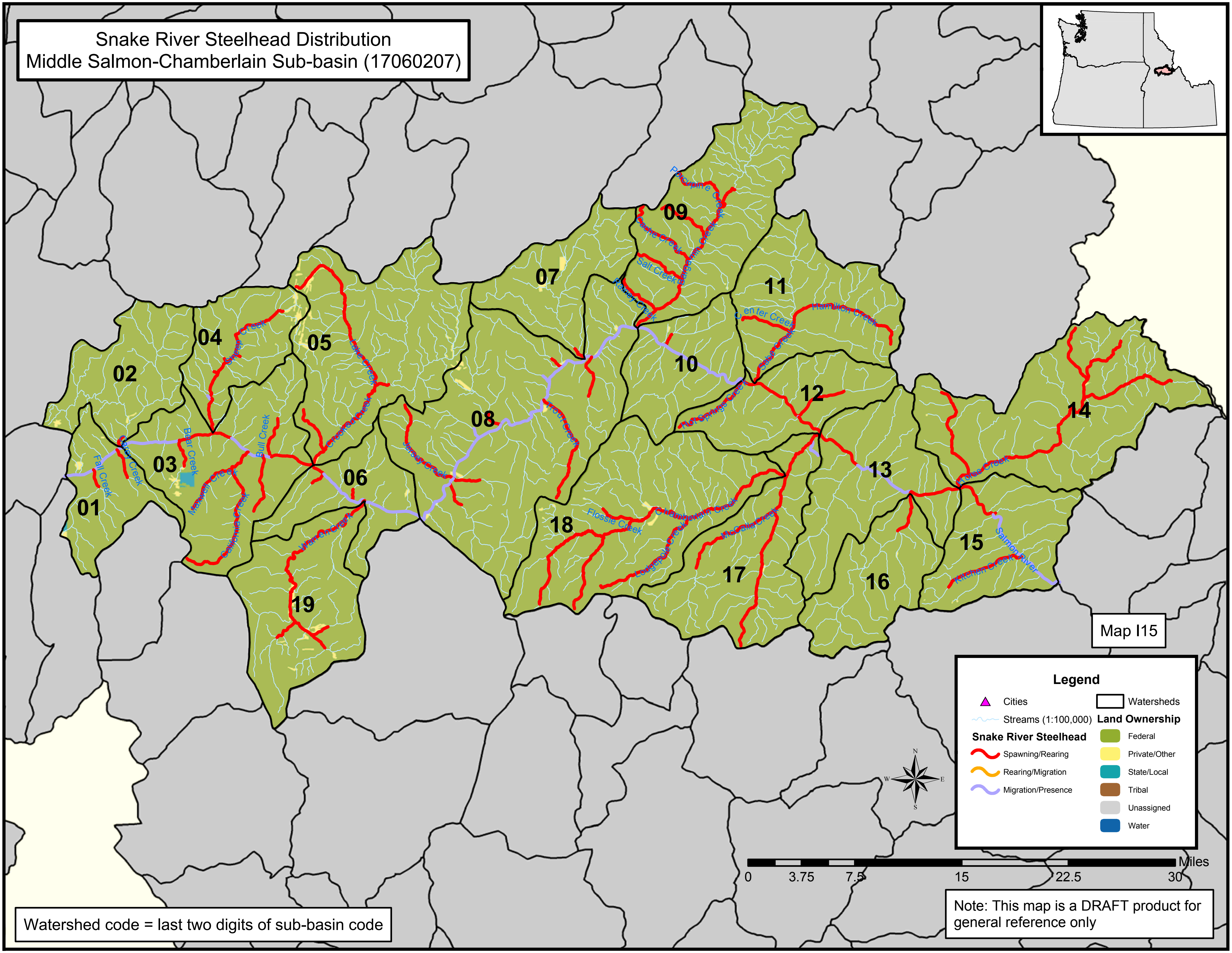


Note: This map is for general reference only

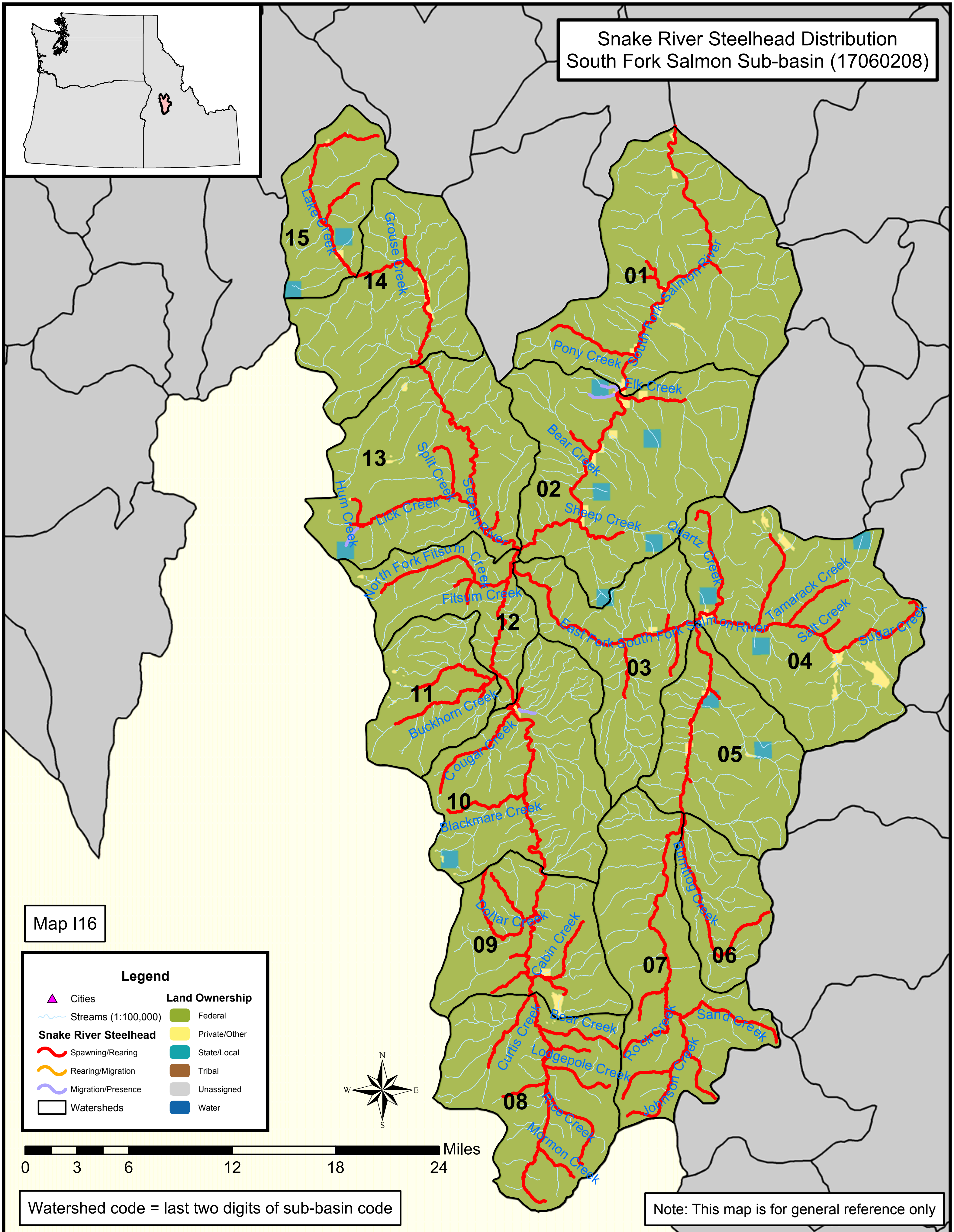
Watershed code = last two digits of sub-basin code

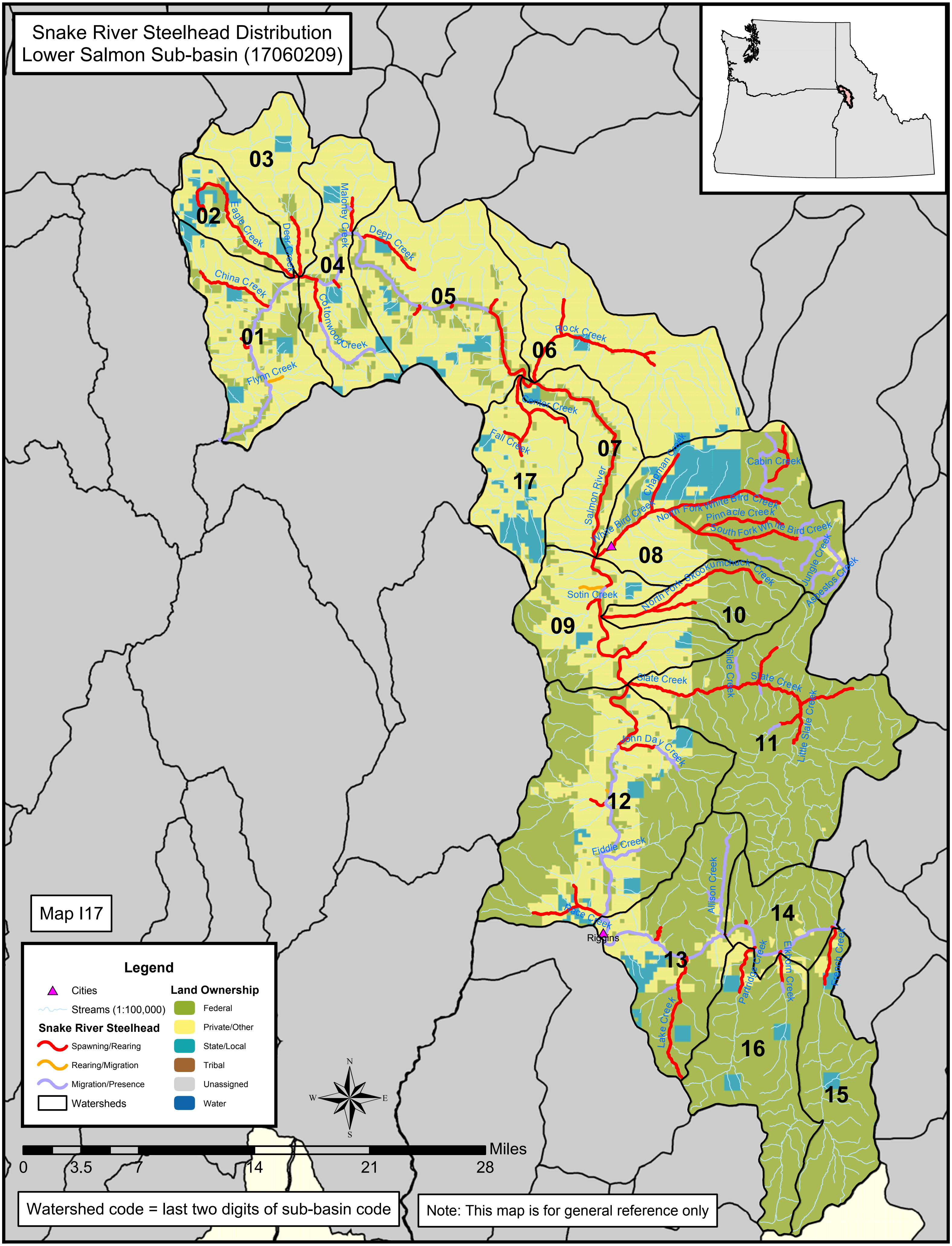
Snake River Steelhead Distribution
Lower Middle Fork Salmon Sub-basin (17060206)

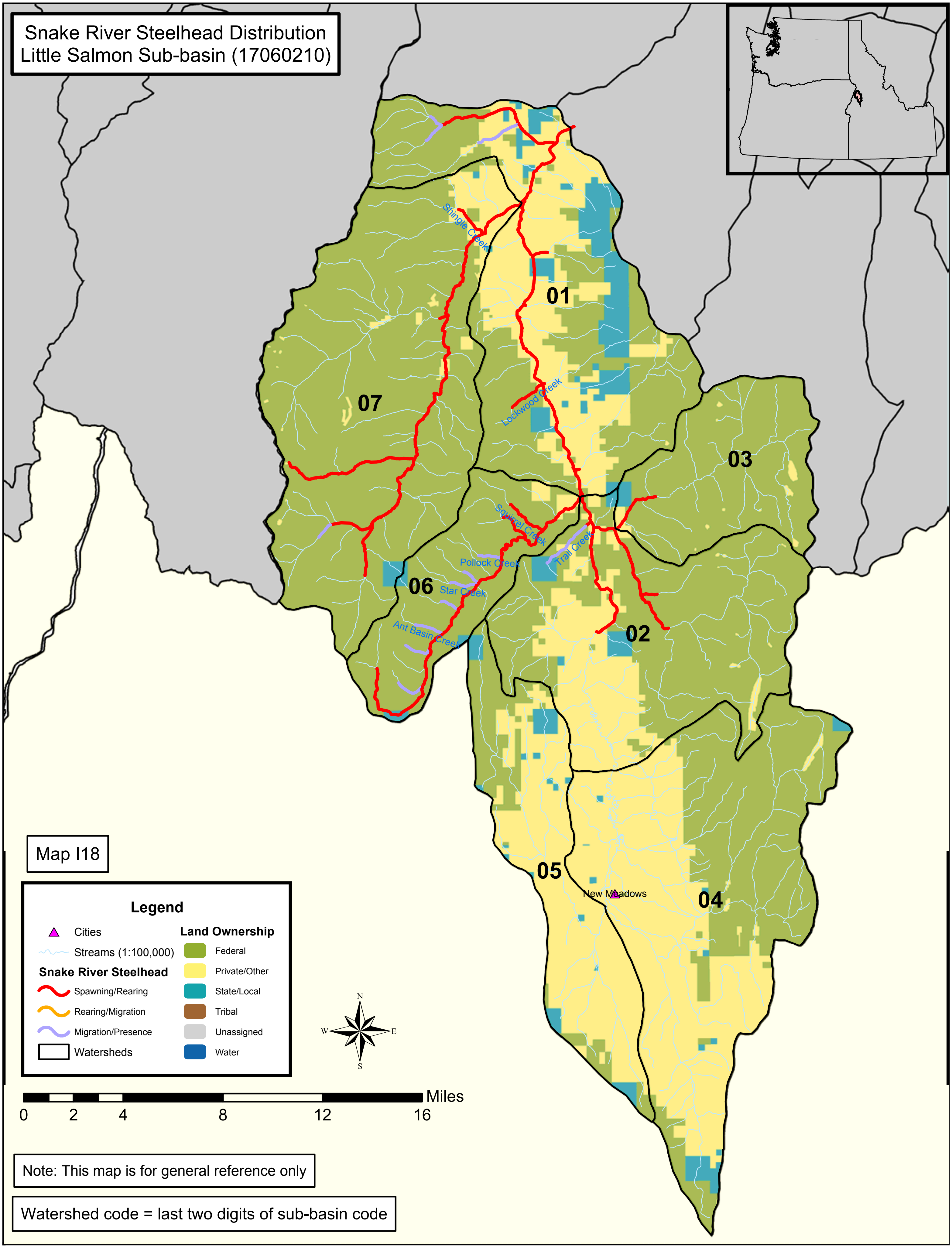


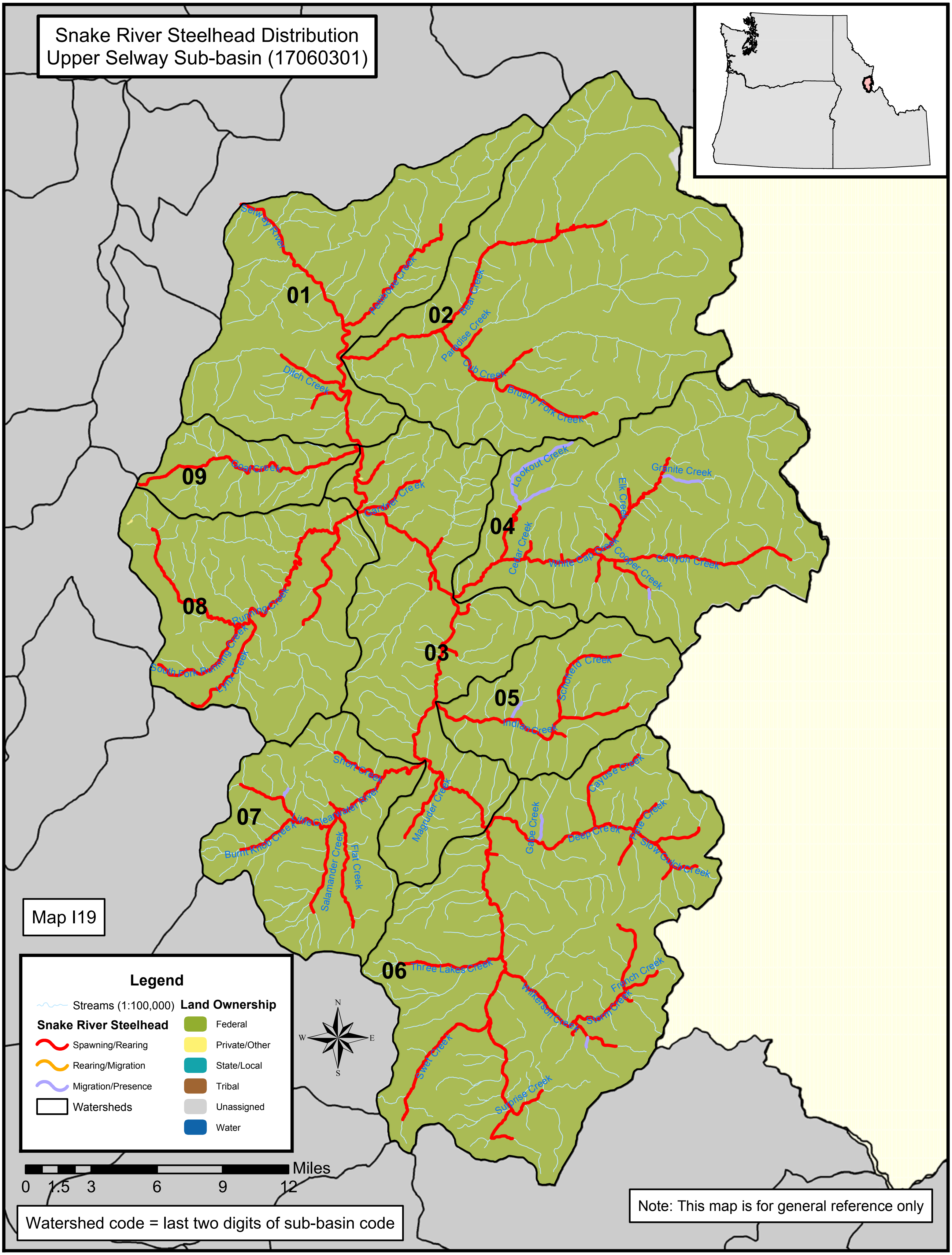


Snake River Steelhead Distribution
Middle Salmon-Chamberlain Sub-basin (17060207)
01
02
03
04
05
06
07
08
09
10
11
12
13
14
15
16
17
18
19
Fall Creek
Bear Creek
Bull Creek
Maxwell Creek
California Creek
Lake Creek
Jersey Creek
Warren Creek
Salt Creek
Hamilton Creek
Hot Springs Creek
Flossie Creek
Kitchen Creek
Salmon River
Map I15
Legend
Cities
Watersheds
Streams (1:100,000)
Land Ownership
Snake River Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
Miles
0
3.75
7.5
15
22.5
30
Note: This map is a DRAFT product for general reference only
Watershed code = last two digits of sub-basin code

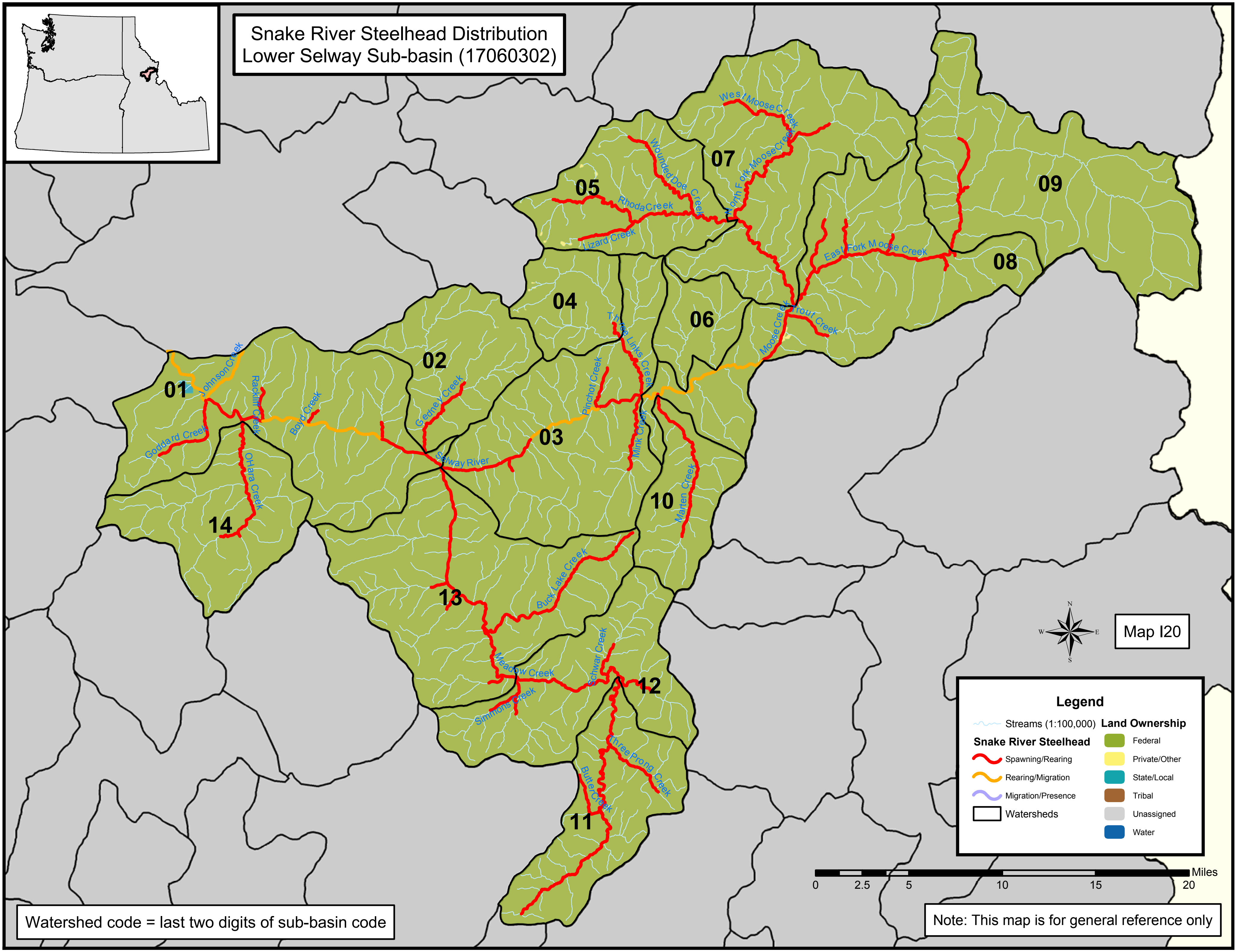

Snake River Steelhead Distribution
South Fork Salmon Sub-basin (17060208)
Map I16
Legend
Cities
Streams (1:100,000)
Snake River Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Miles
0
3
6
12
18
24
N
S
E
W
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only
01
02
03
04
05
06
07
08
09
10
11
12
13
14
15
Lake Creek
Grouse Creek
South Fork Salmon River
Pony Creek
Elk Creek
Bear Creek
Split Creek
Secesh River
Lick Creek
Hum Creek
Sheep Creek
Quartz Creek
North Fork Fitsum Creek
Fitsum Creek
Tamarack Creek
Salt Creek
Sugar Creek
East Fork South Fork Salmon River
Buckhorn Creek
Cougar Creek
Blackmare Creek
Burntlog Creek
Dollar Creek
Cabin Creek
Curtis Creek
Bear Creek
Lodgepole Creek
Rock Creek
Sand Creek
Johnson Creek
Rice Creek
Mormon Creek

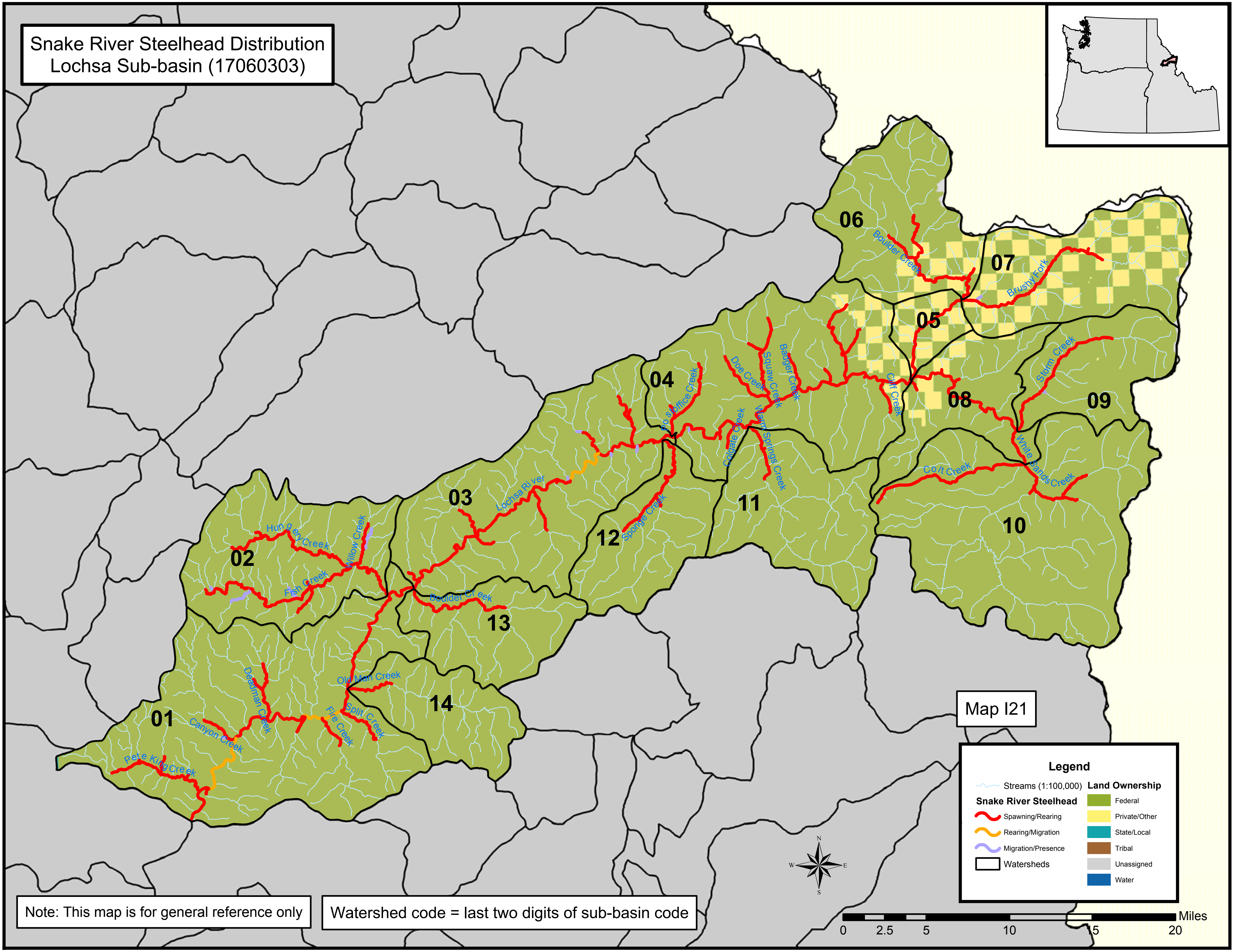

Snake River Steelhead Distribution
Lower Salmon Sub-basin (17060209)
01
02
03
04
05
06
07
08
09
10
11
12
13
14
15
16
17
Eagle Creek
Deer Creek
Maloney Creek
Deep Creek
China Creek
Cottonwood Creek
Flynn Creek
Rock Creek
Center Creek
Fall Creek
Salmon River
Chapman Creek
Cabin Creek
White Bird Creek
North Fork White Bird Creek
Pinnacle Creek
South Fork White Bird Creek
Jungle Creek
Asbestos Creek
North Fork Skookumchuck Creek
Sotin Creek
Slide Creek
Slate Creek
Little Slate Creek
John Day Creek
Fiddle Creek
Race Creek
Riggins
Allison Creek
Partridge Creek
Elkhorn Creek
French Creek
Lake Creek
Map I17
Legend
Cities
Streams (1:100,000)
Snake River Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
0
3.5
7
14
21
28
Miles
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only


Snake River Steelhead Distribution
Little Salmon Sub-basin (17060210)
01
02
03
04
05
06
07
Shingle Creek
Lockwood Creek
Squirrel Creek
Trail Creek
Pollock Creek
Star Creek
Ant Basin Creek
New Meadows
Map I18
Legend
Cities
Streams (1:100,000)
Snake River Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
Miles
0
2
4
8
12
16
Note: This map is for general reference only
Watershed code = last two digits of sub-basin code



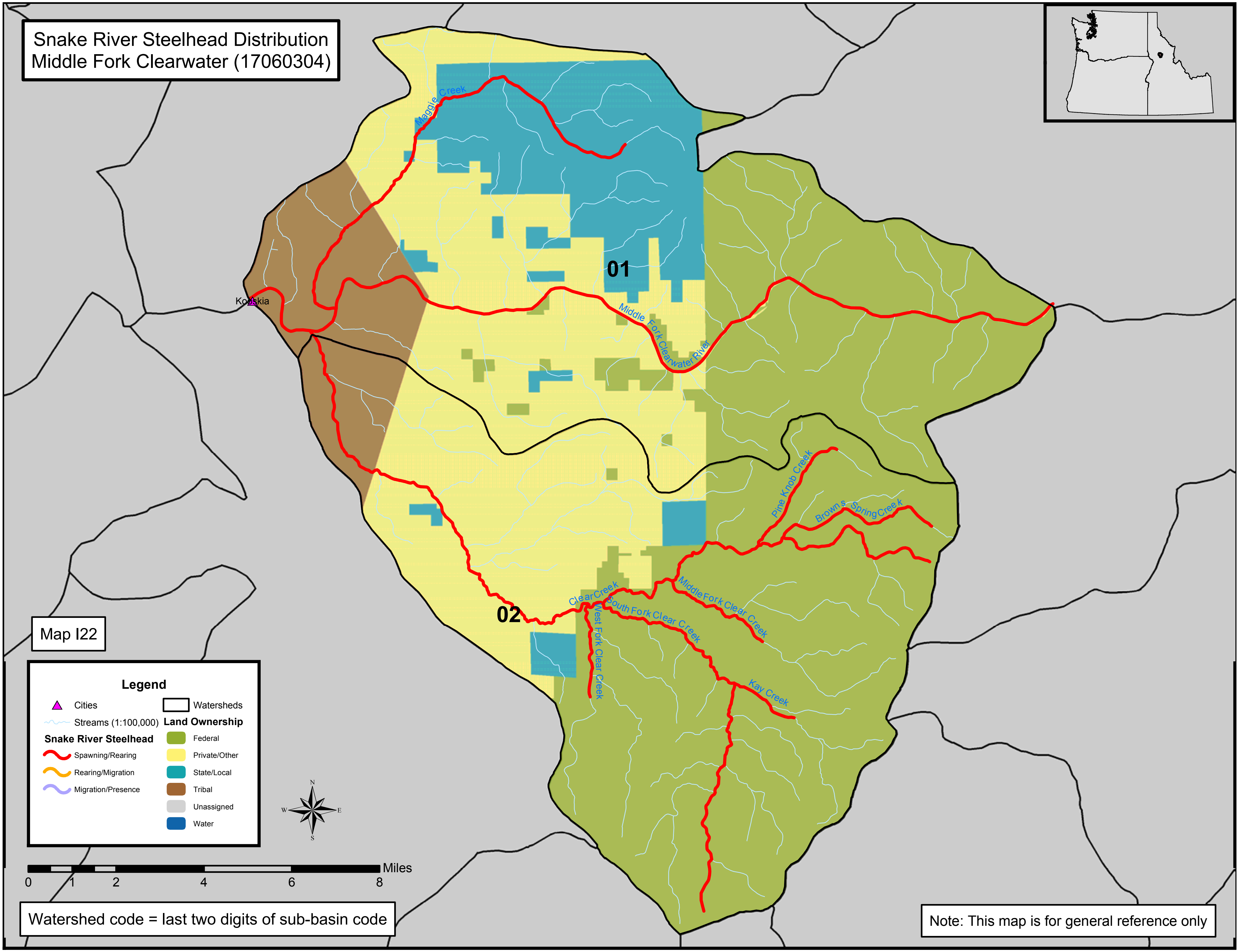
Snake River Steelhead Distribution
Upper Selway Sub-basin (17060301)
Map I19
Legend
Streams (1:100,000)
Snake River Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
0 1.5 3 6 9 12
Miles
N
E
S
W
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only
01
02
03
04
05
06
07
08
09
Selway River
Ditch Creek
Bear Creek
Paradise Creek
Cub Creek
Brushy Fork Creek
Lookout Creek
Granite Creek
Elk Creek
Cedar Creek
White Cap Creek
Cooper Creek
Canyon Creek
Gardner Creek
Running Creek
South Fork Running Creek
Lynx Creek
Schofield Creek
Indian Creek
Short Creek
Burnt Knob Creek
Salamander Creek
Flat Creek
Magruder Creek
Cayuse Creek
Deep Creek
Slow Gulch Creek
Three Lakes Creek
French Creek
Wilkerson Creek
Swet Creek
Surprise Creek


Snake River Steelhead Distribution
Lower Selway Sub-basin (17060302)
01
02
03
04
05
06
07
08
09
10
11
12
13
14
Johnson Creek
Rackliff Creek
Goddard Creek
OHara Creek
Boyd Creek
Gedney Creek
Selway River
Pinchot Creek
Three Links Creek
Mink Creek
Marten Creek
Moose Creek
Trout Creek
East Fork Moose Creek
North Fork Moose Creek
West Moose Creek
Wounded Doe Creek
Rhoda Creek
Lizard Creek
Buck Lake Creek
Meadow Creek
Simmons Creek
Schwar Creek
Three Prong Creek
Butter Creek
Map I20
Legend
Streams (1:100,000)
Snake River Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Miles
0
2.5
5
10
15
20
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only

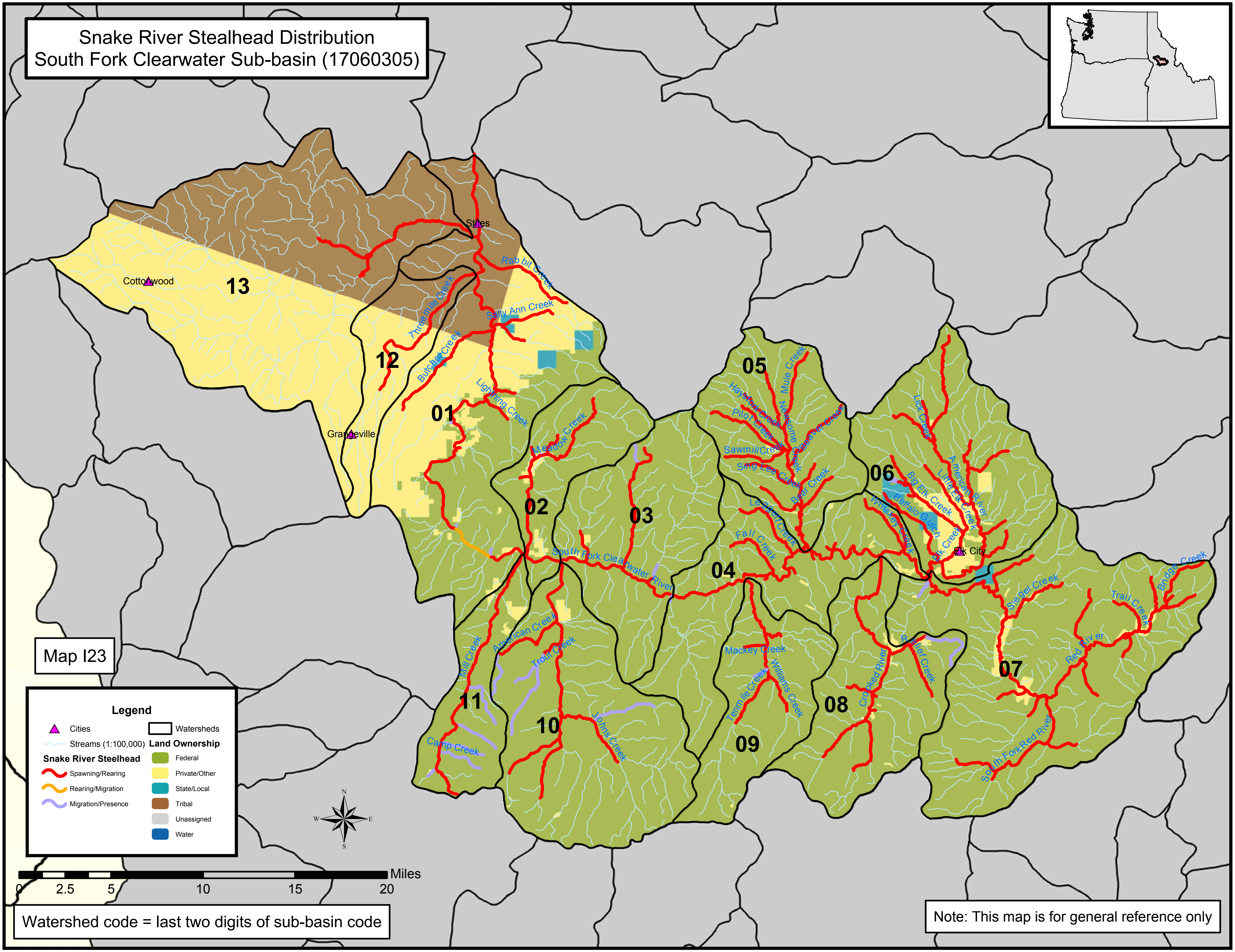


Note: This map is for general reference only

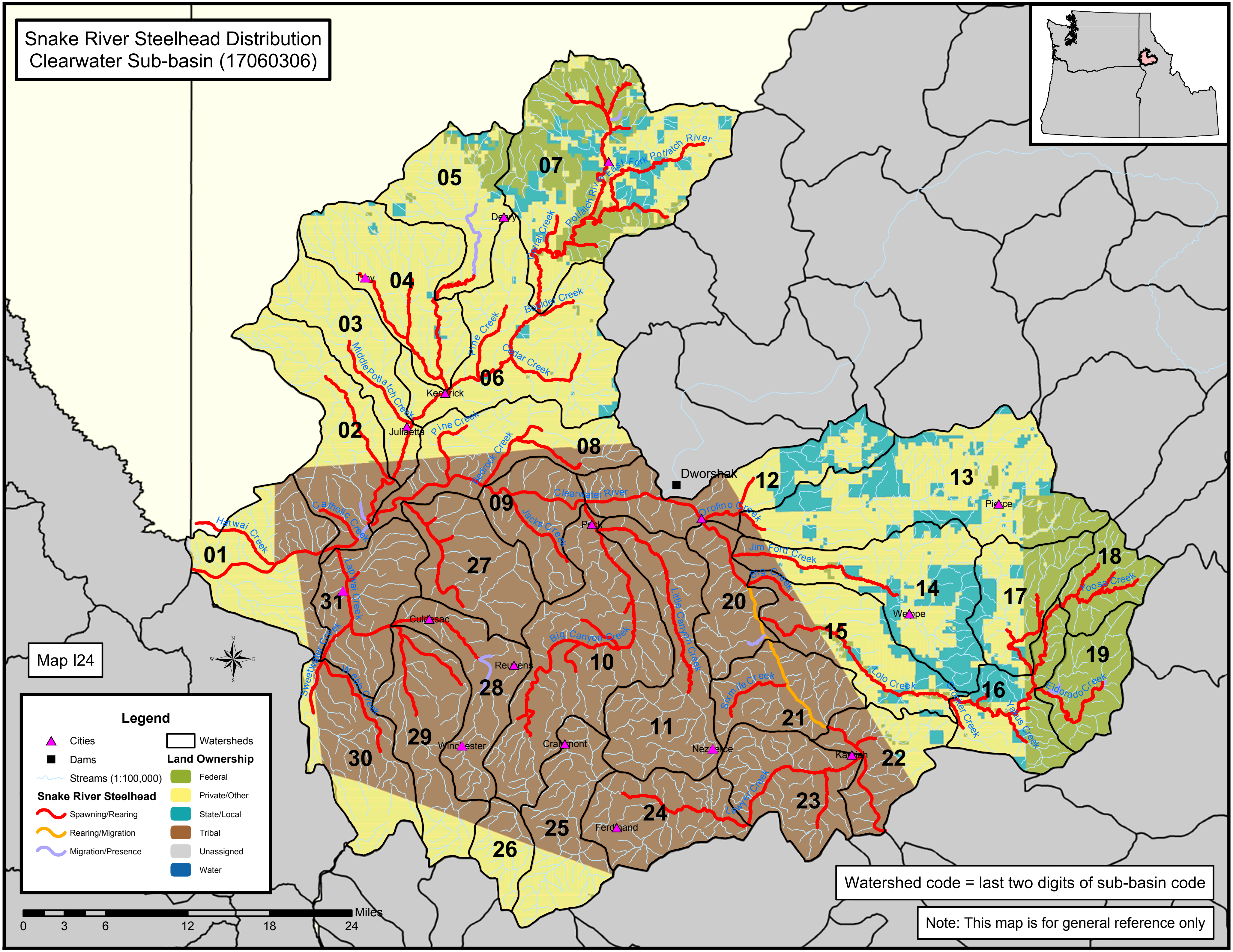
Watershed code = last two digits of sub-basin code



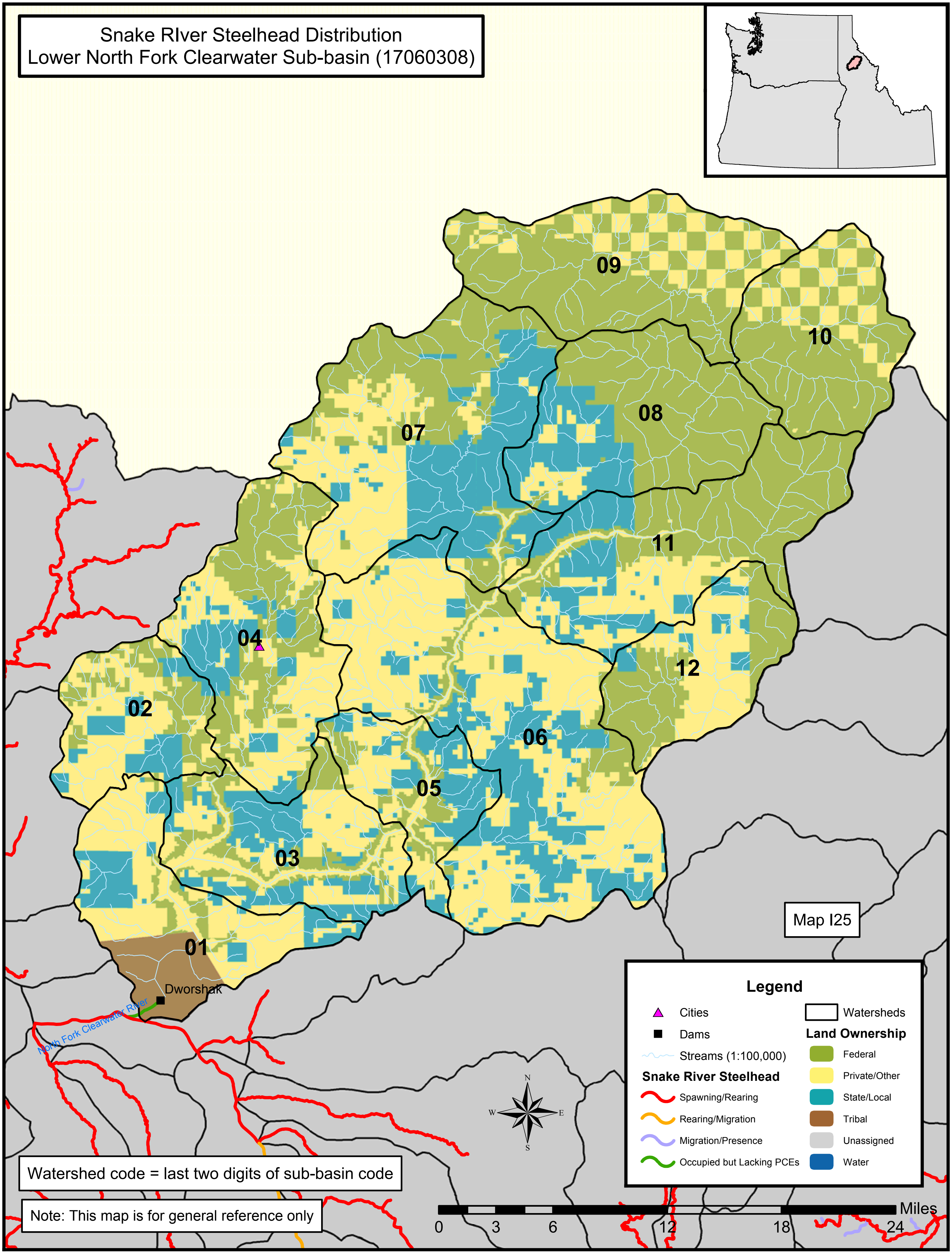
Snake River Steelhead Distribution
Middle Fork Clearwater (17060304)
Map I22
Maggie Creek
Kooskia
01
02
Middle Fork Clearwater River
Pine Knob Creek
Browns Spring Creek
Middle Fork Clear Creek
Clear Creek
South Fork Clear Creek
West Fork Clear Creek
Kay Creek
Legend
Cities
Streams (1:100,000)
Snake River Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
W
E
S
0
1
2
4
6
8
Miles
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only



Snake River Stealhead Distribution
South Fork Clearwater Sub-basin (17060305)
Map I23
Legend
Cities
Watersheds
Streams (1:100,000)
Land Ownership
Snake River Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Miles
0 2.5 5 10 15 20
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only
Cottonwood
Stites
Grangeville
Elk City
01
02
03
04
05
06
07
08
09
10
11
12
13
Rabbit Creek
Sally Ann Creek
Threemile Creek
Butcher Creek
Lightning Creek
Meadow Creek
South Fork Clearwater River
Mule Creek
Haysfork Creek
Pilot Creek
Newsome Creek
Beaver Creek
Sawmill Creek
Sing Lee Creek
Bear Creek
Leggett Creek
Fall Creek
Lick Creek
American River
Little Elk Creek
Big Elk Creek
Buffalo Gulch
Whiskey Creek
Elk Creek
Siegel Creek
Bridge Creek
Trail Creek
Red River
South Fork Red River
Crooked River
Relief Creek
Mackey Creek
Williams Creek
Tenmile Creek
Mill Creek
American Creek
Trout Creek
Johns Creek
Camp Creek



Snake River Steelhead Distribution
Clearwater Sub-basin (17060306)
Map I24
Legend
Cities
Dams
Streams (1:100,000)
Snake River Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Miles
0 3 6 12 18 24
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only
Dworshak
Kendrick
Juliaetta
Pierce
Weippe
Culdesac
Winchester
Craigmont
Ferdinand
Kamiah
Clearwater River
Potlatch River
East Fork Potlatch River
Hatwai Creek
Catholic Creek
Lapwai Creek
Sweetwater Creek
Webb Creek
Pine Creek
Bedrock Creek
Jacks Creek
Big Canyon Creek
Little Canyon Creek
Orofino Creek
Jim Ford Creek
Big Creek
Lolo Creek
Yoosa Creek
Eldorado Creek
Yakus Creek
Lawyer Creek
Sixmile Creek
Cedar Creek
Boulder Creek
Corral Creek
Middle Potlatch Creek
01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31


Snake RIver Steelhead Distribution
Lower North Fork Clearwater Sub-basin (17060308)
09
10
08
07
11
04
12
02
06
05
03
01
Dworshak
North Fork Clearwater River
Map I25
Legend
Cities
Dams
Streams (1:100,000)
Snake River Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Occupied but Lacking PCEs
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only
Miles
0
3
6
12
18
24

Appendix J
CHART Assessment for the Middle Columbia River Steelhead ESU

CHART Participants

The CHART for this ESU consisted of the following NOAA Fisheries biologists: Dale Bambrick (CHART Leader), Tom Cooney, Brett Farman, Kale Gullett, Lynn Hatcher, Scott Hoefer, Eric Murray, and Randy Tweten. CHART members from the U.S. Forest Service consisted of: Rich Gritz, Phil Howell, Ken McDonald, Dan Rife, Chris Rossel, and Al Scott. CHART members also included Jimmy Eisner and John Morris from the U.S. Bureau of Land Management, and David Hand from the U.S. Fish and Wildlife Service. This CHART assessment also benefitted from review and comments by the Washington Department of Fish and Wildlife.

ESU Description

The Middle Columbia River steelhead ESU was listed as a threatened species in 1999 (64 FR 14517; March 25, 1999). The ESU includes all naturally spawned populations of steelhead in streams from above the Wind River, Washington, and the Hood River, Oregon (exclusive), upstream to, and including, the Yakima River, Washington, excluding steelhead from the Snake River Basin. The agency recently conducted a review to update the ESU's status, taking into account new information, evaluating component resident rainbow trout populations, and considering the net contribution of artificial propagation efforts in the ESU. We have proposed that Middle Columbia River *O. mykiss* (including steelhead and rainbow trout) remain listed as threatened (69 FR 33102; June 14, 2004). Additionally, we have proposed that the listing include resident populations of *O. mykiss* below impassible barriers (natural and manmade) that co-occur with anadromous populations. We have also proposed that the listing include seven artificial propagation programs considered part of the ESU (69 FR 33102; June 14, 2004). The final listing determination for all *O. mykiss* ESUs was extended by six months (70 FR 37219, June 28, 2005), therefore the CHART's assessment focused on the anadromous range of *O. mykiss*.

Unlike Pacific salmon, steelhead are capable of spawning more than once before death. However, it is rare for steelhead to spawn more than twice before dying, and most that do so are females. Steelhead can be divided into two basic run types based on their level of sexual maturity at the time they enter fresh water and the duration of the spawning migration. The stream-maturing type, or summer steelhead, enters fresh water in a sexually immature condition and requires several months in fresh water to mature and spawn. The ocean-maturing type, or winter steelhead, enters fresh water with well-developed gonads and spawns relatively shortly after river entry. Fish in the MCR steelhead ESU are predominantly summer steelhead, but winter-run fish are found in the Klickitat River, Washington, and Fifteenmile Creek, Oregon.

Both types of steelhead spawn in cool, clear streams with suitable gravel size, depth, and current velocity. They sometimes also use smaller streams for spawning. Summer steelhead enter fresh water between May and October. During summer and fall before spawning, they hold in cool, deep pools. They migrate inland toward spawning areas, overwinter in the larger rivers, resume migration to natal streams in early spring, and then spawn. Winter steelhead enter fresh water between November and April in the Pacific Northwest, migrate to spawning areas, and then spawn in late winter or spring.

Depending on water temperature, steelhead eggs may incubate for 1.5 to four months before hatching. Summer rearing takes place primarily in the faster parts of pools, although young-of-the-year are abundant in glides and riffles. Winter rearing occurs more uniformly at lower densities across a wide range of fast and slow habitat types. Some older juveniles move downstream to rear in larger tributaries and mainstem rivers. Productive steelhead habitat is characterized by complexity—primarily in the form of large and small wood.

Most fish in this ESU smolt at two years and spend one to two years in salt water before re-entering fresh water, where they may remain for up to a year before spawning. Age-2-ocean steelhead dominate the summer steelhead run in the Klickitat River, whereas most other rivers with summer steelhead produce about equal numbers of both age-1- and 2-ocean fish. Juvenile life stages (i.e., eggs, alevins, fry, and parr) inhabit freshwater/riverine areas throughout the range of the ESU. Parr usually undergo a smolt transformation as 2-year-olds, at which time they migrate to the ocean. Subadults and adults forage in coastal and offshore waters of the North Pacific Ocean before returning to spawn in their natal streams. A nonanadromous form of *O. mykiss* (redband trout) co-occurs with the anadromous form in this ESU, and juvenile life stages of the two forms can be very difficult to differentiate. In addition, hatchery steelhead are also distributed within the range of this ESU.

Recovery Planning Status

The Interior Columbia Basin TRT (ICBTRT 2003, 2005) has identified 17 extant demographically independent populations: the Fifteenmile Creek, Deschutes River – westside, Deschutes River – eastside, John Day River lower mainstem tributaries, South Fork John Day River, John Day River upper mainstem, Middle Fork John Day River, North Fork John Day River, Umatilla River, Walla Walla River, Touchet River, Rock Creek, Klickitat River, Toppenish Creek, Satus Creek, Naches River, and Yakima River upper mainstem populations. The historical White Salmon River population was extirpated with the construction of Condit Dam. The TRT arranged these populations into four major groups in this recovery planning area: (1) Cascades Eastern Slope Tributaries, (2) John Day River, (3) Umatilla and Walla Walla Rivers, and (4) Yakima River. These groupings are based on genetic and ecological characteristics, the proximity of major drainages, and distances between spawning aggregations. Recovery planning will likely emphasize the need for a geographical distribution of viable populations across the range of population groupings (Ruckelshaus et al. 2002, McElhany et al. 2003). Subbasin assessments and plans have been completed for each subbasin through the Northwest Power and Conservation Council. Recovery planners are now using those subbasin plans and TRT products to develop ESA recovery plans. Draft recovery plans are expected by the end of 2005. The CHART considered the available subbasin plans and TRT products in rating each watershed. We anticipate that, as recovery planning proceeds, we will have better information and may revise our recommendations regarding critical habitat designation.

CHART Area Assessments

The CHART assessment for this ESU addressed 15 subbasins containing 111 occupied watersheds, as well as the Columbia River rearing/migration corridor. As part of its assessment the CHART considered the conservation value of each HUC5 in the context of a the five population groups identified above by the TRT. Information is presented below by USGS subbasin because they present a convenient and systematic way to organize the CHART's watershed assessments for this ESU and their names are generally more recognizable because they typically identify major river systems.

Upper Yakima (HUC4# 17030001)

The Upper Yakima subbasin is located in central Washington and contained in Kittitas and Yakima counties in Washington. The subbasin contains four watersheds, all of which are occupied by the ESU. These watersheds encompass approximately 2139 mi^2 and 7,558 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 292 miles of occupied riverine habitat in the subbasin (WDFW 2003). The CHART noted that steelhead PCEs may be more extensive than identified in the WDFW GIS data (WDFW 2003). The Team noted that in the Middle Upper Yakima River HUC5 steelhead in Manastash Creek likely spawn further upstream to the confluence of the north and south forks (characterized as potential habitat in Haring

2001). This extended distribution is depicted in Map J1 as containing at least migration PCEs (with spawning/rearing PCEs likely as well). One demographically independent population in this ESU (Upper Yakima River) occupies this subbasin (ICBTRT 2003, 2005). Table J1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map J1 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that three of the occupied HUC5 watersheds in this subbasin are of high conservation value and one (Umtanum/Wenas) is of medium conservation value to the ESU. The CHART also concluded that while the tributary habitats in the Umtanum/Wenas HUC5 were of medium conservation value, the HUC5 still contains a high value rearing and migration corridor connecting high value upstream watersheds with downstream reaches and the ocean.

The CHART also concluded that several historically occupied areas in this subbasin may be essential for ESU conservation, including upper reaches in Wilson and Naneum creeks (Middle Upper Yakima River HUC5) and areas upstream of Cle Elum, Kacheelus, and Kachess dams (Upper Yakima River HUC5). These dams block substantial amounts of historical habitat and the CHART noted that areas above them were historically important nursery/rearing areas for this ESU and that habitat conditions are still in generally good condition. The CHART determined that access to these areas would likely promote the conservation of the ESU. Table J2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure J1 shows the overall distribution of ratings by HUC5 watershed.

Naches (HUC4# 17030002)

The Naches subbasin is located in central Washington and contained in Kittitas and Yakima counties. The subbasin contains three watersheds, all of which are occupied by the ESU. These watersheds encompass approximately 1,105 mi^2 and 3,186 miles of streams. Fish distribution and habitat use data from the WDFW identify approximately 230 miles of occupied riverine habitat in the subbasin (WDFW 2003). One demographically independent population in this ESU (Naches River) occupies this subbasin (ICBTRT 2003, 2005). Table J1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map

J2 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied HUC5 watersheds in this subbasin are of high conservation value to the ESU. The CHART also concluded that two historically occupied areas in this subbasin may be essential for ESU conservation, including reaches blocked by Bumping Lake Dam in the Little Naches River HUC5 and reaches above Tieton Dam in the Naches/Tieton River HUC5. The CHART noted that areas above both dams were historically important nursery/rearing areas for this ESU and that habitat conditions are in generally good condition. The CHART determined that access to these areas would likely promote the conservation of the ESU. Table J2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure J1 shows the overall distribution of ratings by HUC5 watershed.

Lower Yakima (HUC4# 17030003)

The Lower Yakima subbasin is located in central Washington and contained in Benton, Klickitat, and Yakima counties. The subbasin contains seven watersheds, all of which are occupied by the ESU. These watersheds encompass approximately 2,903 mi^2 and 8,069 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 574 miles of occupied riverine habitat in the subbasin (WDFW 2003). The CHART noted that steelhead PCE distribution in South Medicine Creek (Upper Toppenish River HUC5) may be less than shown and only include reaches upstream to the vicinity of Evans Road. However, this issue was not resolved by the time of this report. Three demographically independent populations in this ESU (Naches River and Satus and Toppenish Creeks) occupy this subbasin (ICBTRT 2003, 2005). Table J1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map J3 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watersheds in this subbasin are of high and medium conservation value to the ESU. Of the seven HUC5s reviewed, four were rated as having high and three were rated as having medium conservation value. The CHART also concluded that the HUC5s with a medium overall rating contain a high value rearing and migration corridor connecting high value upstream watersheds with downstream reaches and the ocean. Table J2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure J1 shows the overall distribution of ratings by HUC5 watershed.

Middle Columbia/Lake Wallula (HUC4# 17070101)

The Middle Columbia/Lake Wallula subbasin includes the mainstem Columbia River and smaller drainages to it downstream of the Snake River and upstream of the John Day River. Counties contained in this subbasin include Gilliam, Sherman, and Umatilla counties in Oregon, and Benton, Klickitat, and Walla Walla counties in Washington. The subbasin contains 14 watersheds, ten of which are occupied by the ESU and five of these consist solely of a Columbia River rearing/migration corridor. Occupied watersheds encompass approximately 2,089 mi^2 and 3,202 miles of streams. Fish distribution and habitat use data from ODFW and WDFW identify approximately 155 miles of occupied riverine habitat in the subbasin (ODFW 2003a,b; WDFW 2003). The CHART noted that steelhead PCEs may be more extensive than identified in the states' GIS data based on recent communication with Yakama Nation biologists (K. Gullett, NOAA Fisheries, personal communication). Specifically:

- Glade Creek HUC5 – recent redd sightings indicate that steelhead likely occupy lower reaches of Glade Creek; CHART determined that distribution may be similar to that identified in report by Lautz (2000).
- Alder Creek HUC5 – recent stream surveys captured fry indicating that steelhead likely occupy lower reaches of Alder Creek; CHART determined that distribution may be similar to that identified in report by Lautz (2000).
- Pine Creek HUC5 – recent stream surveys identified live steelhead and redds indicating that steelhead likely occupy lower reaches of Alder Creek; CHART determined that distribution may be similar to that identified in report by Lautz (2000).

Map K4 reflects these modifications to the WDFW fish distribution data. The CHART briefly discussed anecdotal information that steelhead may occupy reaches of an adjacent Oregon subbasin in this region – Willow Creek (HUC4 # 17070104). This subbasin was not identified as occupied by steelhead in ODFW's GIS data (ODFW 2003a,b) however one CHART member described a recent observation of anadromous *O. mykiss* in Willow Creek and suspected that steelhead may occupy reaches at least seven miles upstream from the creek mouth. It was also noted that Fulton (1970) depicted at least 10 km of this watershed as occupied by steelhead. However, the CHART could not determine whether the Willow Creek subbasin was in fact occupied or whether such areas contained PCEs for this ESU. Therefore, the CHART decided against rating this area until such time as more information was available to clarify whether watersheds and specific areas within them qualify as critical habitat.

Seven of the 16 demographically independent steelhead populations in this ESU identified by the ICBTRT occupy Columbia River reaches within this subbasin. However, only one of these (Rock Creek, an unaffiliated independent population) is known to spawn here (ICBTRT 2003, 2005). Table J1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map J4 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watersheds in this subbasin are of high and medium conservation value to the ESU. Of the ten HUC5s reviewed, seven were rated as having high and three were rated as having medium conservation value. Table J2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure J1 shows the overall distribution of ratings by HUC5 watershed.

Walla Walla (HUC4# 17070102)

The Walla Walla subbasin is located in southeast Washington and northeast Oregon. Occupied watersheds in this subbasin are contained in Umatilla and Wallowa counties in Oregon, and Columbia and Walla Walla counties in Washington. The subbasin contains 11 watersheds, nine of which are occupied by the ESU. Occupied watersheds encompass approximately 1,525 mi^2 and 4,388 miles of streams. Fish distribution and habitat use data from ODFW and WDFW identify approximately 531 miles of occupied riverine habitat in the subbasin (ODFW 2003a,b; WDFW 2003). Two demographically independent populations in this ESU (Walla Walla River and Touchet River) occupy this subbasin (ICBTRT 2003, 2005). Table J1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map J5 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watersheds in this subbasin range from high to low conservation value to the ESU. Of the nine HUC5s reviewed, five were rated as having high, three as having medium, and one (Pine Creek) was rated as having low conservation value. The CHART also concluded that while the tributary habitats in some of the HUC5s were of medium conservation value, the HUC5s still contain a high value rearing and migration corridor connecting high value upstream watersheds with downstream reaches and the ocean. Table J2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure J1 shows the overall distribution of ratings by HUC5 watershed.

Umatilla (HUC4# 17070103)

The Umatilla subbasin is located in northeast Oregon and occupied watersheds are contained in Umatilla and Union counties. The subbasin contains 13 watersheds, ten of which are occupied by the ESU. Occupied watersheds encompass approximately 1,828 mi^2 and 2,155 miles of streams. Fish distribution and habitat use data from ODFW identify approximately 419 miles of occupied riverine habitat in the subbasin (ODFW 2003a,b). One demographically independent population in this ESU (Umatilla River) occupies this subbasin (ICBTRT 2003, 2005). Table J1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map J6 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watersheds in this subbasin range from high to low conservation value to the ESU. Of the ten HUC5s reviewed, six were rated as having high, one as having medium, and three were rated as having low conservation value. The CHART also concluded that while the tributary habitats in one of the HUC5s (Umatilla River/Mission Creek) was of medium conservation value, the HUC5 still contains a high value rearing and migration corridor connecting high value upstream watersheds with downstream reaches and the ocean. Table J2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure J1 shows the overall distribution of ratings by HUC5 watershed.

Middle Columbia/Hood (HUC4# 17070105)

The Middle Columbia/Hood subbasin is located in the eastern portion of the Columbia River gorge of Oregon and Washington. Occupied watersheds in this subbasin are contained in Hood River, Sherman, and Wasco counties in Oregon, and Klickitat and Skamania counties in Washington. The subbasin contains 13 watersheds, eight of which are occupied by this ESU. Occupied watersheds encompass approximately 1,461 mi^2 and

2,049 miles of streams. Fish distribution and habitat use data from ODFW and WDFW identify approximately 272 miles of occupied riverine habitat in the subbasin (ODFW 2003a,b; WDFW 2003). Three demographically independent populations in this ESU (Lower John Day, Klickitat River and Fifteenmile Creek) occupy this subbasin (ICBTRT 2003, 2005). Table J1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map J7 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watersheds in this subbasin ranged from high to low conservation value to the ESU. Of the eight HUC5s reviewed, three were rated as having high, four as medium, and one (Upper Middle Columbia/Hood) was rated as having low conservation value. The CHART also concluded that while the tributary habitats in two HUC5s are of low and medium conservation value, these HUC5s still contain a high value Columbia River rearing and migration corridor connecting high value upstream watersheds with downstream reaches and the ocean. Table J2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure J1 shows the overall distribution of ratings by HUC5 watershed.

Klickitat (HUC4# 17070106)

The Klickitat subbasin is located in the eastern portion of the Columbia River gorge of Oregon and Washington. Occupied watersheds in this subbasin are contained in Klickitat and Yakima counties in Washington. The subbasin contains four watersheds, all of which are occupied by this ESU. Occupied watersheds encompass approximately 1,351 mi^2 and 3,232 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 216 miles of occupied riverine habitat in the subbasin (WDFW 2003). The CHART noted that steelhead PCEs may be more extensive than identified in the states' GIS data for White Creek and Brush Creek. Also, the CHART questioned the extent of PCE distribution in Trout Creek. However, the Team was not able to resolve these concerns prior to this report. The CHART did consider spawner survey information from the Yakama Indian Nation (2005; B. Sharp, Yakama Indian Nation, pers. comm.) confirming that the area above the falls at approximately river mile 6.3 is occupied by steelhead. One demographically independent populations in this ESU (Klickitat River) occupies this subbasin (ICBTRT 2003, 2005). Table J1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map J8 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the HUC5 watersheds in this subbasin are of high conservation value to the ESU, although as noted above, some questions remain regarding the actual extent of PCEs in several streams. Table J2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure J1 shows the overall distribution of ratings by HUC5 watershed.

Upper John Day (HUC4# 17070201)

The Upper John Day subbasin is located in north-central Oregon and contained in Crook, Grant, and Wheeler counties. The subbasin contains 14 watersheds, 13 of which are occupied by this ESU. Occupied watersheds encompass approximately 1,991 mi^2 and 2,463 miles of streams. Fish distribution and habitat use data from ODFW identify approximately 803 miles of occupied riverine habitat in the subbasin (ODFW 2003a,b). The CHART noted that steelhead PCEs may be less extensive than identified in the states' GIS data for Birch Creek (Rock Creek HUC5) and Indian Creek (John Day River/Johnson Creek HUC5) on account of natural waterfalls. However, the Team was not able to resolve these concerns prior to this report. Three demographically independent populations in this ESU (South Fork John Day, Lower Mainstem John Day, Upper Mainstem John Day) occupy this subbasin (ICBTRT 2003, 2005). Table J1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map J9 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the HUC5 watersheds in this subbasin were of high or medium (Fields Creek) conservation value to the ESU. Table J2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure J1 shows the overall distribution of ratings by HUC5 watershed.

North Fork John Day (HUC4# 17070202)

The North Fork John Day subbasin is located in north-central Oregon and contained in Grant, Morrow, Umatilla, Union, and Wheeler counties. The subbasin contains ten watersheds, all of which are occupied by this ESU. Occupied watersheds encompass approximately 1,849 mi^2 and 2,366 miles of streams. Fish distribution and habitat use data from ODFW identify approximately 953 miles of occupied riverine habitat in the subbasin (ODFW 2003a,b). Two demographically independent populations in this ESU (North Fork John Day and Middle Fork John Day) occupy this subbasin (ICBTRT 2003, 2005). Table J1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map J10 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the HUC5 watersheds in this subbasin were of high or medium (Lower North Fork John Day River) conservation value to the ESU. Table J2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure J1 shows the overall distribution of ratings by HUC5 watershed.

Middle Fork John Day (HUC4# 17070203)

The Middle Fork John Day subbasin is located in north-central Oregon and contained in Grant County. The subbasin contains five watersheds, all of which are occupied by this ESU. Occupied watersheds encompass approximately 792 mi^2 and 993 miles of streams. Fish distribution and habitat use data from ODFW identify approximately 387 miles of occupied riverine habitat in the subbasin (ODFW 2003a,b). The CHART noted that steelhead PCEs may be more extensive than identified in the states' GIS data for Paul Creek (Long Creek HUC5) and that occupied reaches containg PCEs extend as far as Highway 402. Map J11 reflects this modification to ODFW's data. One demographically independent population in this ESU (Middle Fork John Day) occupies this subbasin (ICBTRT 2003, 2005). Table J1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map J11 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the HUC5 watersheds in this subbasin were of high or low (Lower Middle Fork John Day River) conservation value to the ESU. Table J2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure J1 shows the overall distribution of ratings by HUC5 watershed.

Lower John Day (HUC4# 17070204)

The Lower John Day subbasin is located in north-central Oregon and contained in Crook, Gilliam, Grant, Jefferson, Morrow, Sherman, Wasco, and Wheeler counties. The subbasin contains 14 watersheds, all of which are occupied by this ESU. Occupied watersheds encompass approximately 3,155 mi^2 and 3,633 miles of streams. Fish distribution and habitat use data from ODFW identify approximately 830 miles of occupied riverine habitat in the subbasin (ODFW 2003a,b). All five demographically independent populations in this ESU occupy this subbasin, and it contains the bulk of spawning habitat for the Lower Mainstem John Day population (ICBTRT 2003, 2005). Table J1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map J12 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the HUC5 watersheds in this subbasin range from high to low conservation value to the ESU. Table J2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure J1 shows the overall distribution of ratings by HUC5 watershed.

Lower Deschutes (HUC4# 17070306)

The Lower Deschutes subbasin drains the eastern slope of the Cascade Range in north-central Oregon. Occupied watersheds in this subbasin are contained in Jefferson, Sherman, and Wasco counties. The subbasin contains 12 watersheds, nine of which are occupied by this ESU. Occupied watersheds encompass approximately 1,891 mi^2 and 2,416 miles of streams. Fish distribution and habitat use data from ODFW identify approximately 357 miles of occupied riverine habitat in the subbasin (ODFW 2003a,b). Two demographically independent populations in this ESU (Deschutes River Westside Tributaries and Deschutes River Eastside Tributaries) occupy this subbasin (ICBTRT 2003, 2005). Table J1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map J13 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the HUC5 watersheds in this subbasin were of high or low (White River) conservation value to the ESU. Table J2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure J1 shows the overall distribution of ratings by HUC5 watershed.

Trout (HUC4# 17070307)

The Trout subbasin is located in the upper Deschutes River of central Oregon. Occupied watersheds in this subbasin are contained in Crook, Jefferson, and Wasco counties. The subbasin contains five watersheds, four of which are occupied by this ESU. Occupied watersheds encompass approximately 554 mi^2 and 683 miles of streams. Fish distribution and habitat use data from ODFW identify approximately 115 miles of occupied riverine habitat in the subbasin (ODFW 2003a,b). One demographically independent populations in this ESU (Deschutes River Eastside Tributaries) occupies this subbasin (ICBTRT 2003, 2005). Table J1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map J14 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the HUC5 watersheds in this subbasin ranged from high to low conservation value to the ESU. Table J2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure J1 shows the overall distribution of ratings by HUC5 watershed.

Upper Columbia/Priest Rapids (HUC4# 17020016)

The Upper Columbia/Priest Rapids subbasin is located in south-central Washington with occupied areas contained in Benton and Franklin counties. The subbasin contains four watersheds, only one of which (Columbia River/Zintel Canyon) is occupied by the ESU. The watershed encompasses approximately 211 mi^2 and 293 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 13 miles of occupied riverine habitat in the subbasin consisting of the Columbia River downstream of its confluence with the Yakima River (WDFW 2003). This watershed is occupied by three demographically independent populations (Satus and Toppenish Creeks, Naches River, and Upper Yakima River) identified by the Interior Columbia Basin TRT (2003, 2005). Table J1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map J15 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the Columbia River/Zintel Canyon HUC5 contained rearing/migration PCEs of high conservation value to the ESU. Table J2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure J1 shows the overall distribution of ratings by HUC5 watershed.

Columbia River Corridor

The Columbia River rearing and migration corridor consists of that segment from the confluence of the Wind and Columbia rivers downstream to the Pacific Ocean. This confluence is located at the downstream boundary of the Middle Columbia/Grays Creek HUC5 which was the furthest downstream HUC5 with spawning or tributary PCEs identified in the range of this ESU. Fish distribution and habitat use data from ODFW and WDFW identify approximately 151 miles of occupied riverine and estuarine habitat in this corridor (ODFW 2003a,b; WDFW 2003). This corridor overlaps with the following counties: Clatsop, Columbia, Gilliam, Hood River, Morrow, Multnomah, Sherman, Umatilla, and Wasco counties in Oregon, and Benton, Clark, Cowlitz, Franklin, Klickitat, Skamania, Wahkiakum, and Walla Walla counties in Washington.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the Columbia River corridor was of high conservation value to the ESU. The CHART noted that this corridor connects every watershed and population in this ESU with the ocean and is used by rearing/migrating juveniles and migrating adults. The Columbia River estuary is a particularly important area for this ESU as both juveniles and adults make the critical physiological transition between life in freshwater and marine habitats (ISAB 2000, Marriott et al. 2002).

Marine Areas

NOAA Fisheries' analysis focused on freshwater and estuarine habitats upstream of the mouth of the Columbia River. While marine areas are occupied by this ESU, within this vast area the agency has not identified "specific areas within the geographical area occupied by the species . . . on which are found those physical or biological features . . . essential to the conservation of the species."

Changes to the CHART's Initial Assessments

The CHART reviewed the public and peer reviewer comments received on the Team's initial findings for this ESU as well as new information relevant to evaluating habitat areas for this ESU. As a result, the CHART changed the conservation value rating for two watersheds (Lower John Day River/ Scott Canyon and Lower John Day River/ Ferry Canyon HUC5s) within the geographical area occupied by this ESU. Based on public comments and new information reviewed by the CHART, we have identified changes to the delineation of occupied habitat areas in several watersheds (including reductions associated with areas lacking PCEs). The proposed critical habitat designation (69 FR 74572, December 14, 2004) summarizes the comments and responses pertaining to the

CHART's initial determinations for this ESU. And Tables J1 and J2 reflect the final CHART assessments, including the following changes in habitat area delineations:

Subbasin	Watershed code	Watershed name	Changes from Initial CHART Assessment
Upper Yakima	1703000102	Teanaway River	Added 6 miles (9.6 km) of occupied habitat areas.
Upper Yakima	1703000103	Middle Upper Yakima River	Added 1 mile (1.6 km) of occupied habitat areas.
Naches	1703000201	Little Naches	Added less than 1 mile (1.6 km) of occupied habitat areas.
Lower Yakima	1703000301	Ahtanum Creek	Removed 17 miles (27.4 km) of occupied stream reaches lacking PCEs.
Lower Yakima	1703000306	Yakima River/ Spring Creek	Removed 23 miles (37.0 km) of occupied stream reaches lacking PCEs.
Klickitat	1707010604	Little Klickitat River	Removed 1 mile (1.6 km) of occupied stream reaches lacking PCEs.
Upper John Day	1707020103	Middle South Fork John Day River	Added 4 miles (6.4 km) of occupied habitat areas.
North Fork John Day	1707020201	Upper North Fork John Day River	Added 2 miles (3.2 km) of occupied habitat areas.
North Fork John Day	1707020203	North Fork John Day River/ Big Creek	Added 2 miles (3.2 km) of occupied habitat areas.
North Fork John Day	1707020206	Lower Camas Creek	Added 15 miles (24.1 km) of occupied habitat areas.
North Fork John Day	1707020207	North Fork John Day River/ Potamus Creek	Added 3 miles (4.8 km) of occupied habitat areas.

Subbasin	Watershed code	Watershed name	Changes from Initial CHART Assessment
Lower John Day	1707020409	Lower John Day River/ Ferry Canyon	Changed conservation rating from Low to Medium.
Lower John Day	1707020410	Lower John Day River/ Scott Canyon	Changed conservation rating from Low to Medium.

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Table J1. Summary of Occupied Areas, PCEs, and Management Activities Affecting PCEs for the Middle Columbia River Steelhead ESU

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs) Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*	Unoccupied but may be essential (mi)***	Occupied but lacking PCEs (mi)	Management Activities**
	Upper Yakima	Upper Yakima River	1703000101	39.8	0	8.2	[hh]	0	D, F, Fi, G, I, M, R
	Upper Yakima	Teanaway River	1703000102	39.3	22.3	22.2		0	D, F, Fi, I, M, R
	Upper Yakima	Middle Upper Yakima River	1703000103	57.4	22	39.6		0	A, D, F, Fi, G, I, M, R, U
	Upper Yakima	Umtanum/Wenas	1703000104	10.7	26.1	4.4		0	A, D, F, Fi, G, I, M, R
	Naches	Little Naches River	1703000201	63.4	0	18.1	[ii]	0	D, F, Fi, I
	Naches	Naches River/Rattlesnake Creek	1703000202	67.5	0	7.1		0	F, Fi, G, I, R
	Naches	Naches River/Tieton River	1703000203	63	4	7.3	[jj]	0	A, D, F, Fi, G, I, R
	Lower Yakima	Ahtanum Creek	1703000301	39.8	0	22.6		17.3	A, F, Fi, G, I, R, U
	Lower Yakima	Upper Lower Yakima River	1703000302	0	0	15.2		0	A, C, D, F, Fi, G, I, R, U
	Lower Yakima	Upper Toppenish Creek	1703000303	60.5	0	50.8		0	A, F, Fi, G, R
	Lower Yakima	Lower Toppenish Creek	1703000304	14.1	0	116		0	A, C, D, Fi, G, I, R, U
	Lower Yakima	Satus Creek	1703000305	83.1	0	29.2		0	F, Fi, G, M, R
	Lower Yakima	Yakima River/Spring Creek	1703000306	1.4	0	84.5		11.2	A, D, F, Fi, G, I, R, U
	Lower Yakima	Yakima River/Cold Creek	1703000307	0	0	28.1		0	A, D, Fi, I, R, U
	Middle Columbia/Lake Wallula	Upper Lake Wallula	1707010101	0	0	11.8		0	A, Fi, R, U
	Middle Columbia/Lake Wallula	Lower Lake Wallula	1707010102	0	0	21.7		0	A, D, Fi, R
	Middle Columbia/Lake Wallula	Glade Creek	1707010105	0	0	1		0	A, F, Fi, G, R

[hh] CHART concluded that unoccupied habitat areas upstream of Cle Elum, Kachess, and Keechelus dams may be essential for conservation

[ii] CHART noted that steelhead may get upstream of Bumping Lake Dam during rare flow events and also concluded that additional areas upstream of Bumping Lake Dam may be essential for ESU conservation

[jj] CHART concluded that unoccupied habitat areas upstream of Tieton Dam may be essential for ESU conservation.

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs)			Unoccupied but may be essential (mi)***	Occupied but lacking PCEs (mi)	Management Activities**
				Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*			
	Middle Columbia/Lake Wallula	Upper Lake Umatilla	1707010106	0	0	20.2		0	A, D, Fi, R, U
	Middle Columbia/Lake Wallula	Middle Lake Umatilla	1707010109	0	0	17.3		0	A, D, Fi, R
	Middle Columbia/Lake Wallula	Alder Creek	1707010110	0	0	3		0	A, Fi, G, R
	Middle Columbia/Lake Wallula	Pine Creek	1707010111	0	0	4.5		0	A, F, Fi, G
	Middle Columbia/Lake Wallula	Wood Gulch	1707010112	0	0	11.3		0	A, F, Fi, R
	Middle Columbia/Lake Wallula	Rock Creek	1707010113	3.5	0	17.8		0	A, F, Fi, G, R
	Middle Columbia/Lake Wallula	Lower Lake Umatilla	1707010114	0	0	43.3		0	A, D, Fi, R
	Walla Walla	Upper Walla Walla River	1707010201	54.3	25.2	0		0	A, D, F, Fi, G, I, R
	Walla Walla	Mill Creek	1707010202	23.5	18.1	22.4		0	A, F, Fi, I, R, U
	Walla Walla	Upper Touchet River	1707010203	70.5	22.6	26.7		0	A, F, Fi, G, I, R
	Walla Walla	Middle Touchet River	1707010204	29	8.4	7.7		0	A, C, Fi, I, R
	Walla Walla	Lower Touchet River	1707010207	0	0	41.2		0	A, I
	Walla Walla	Cottonwood Creek	1707010208	29.7	26.1	23		0	A, F, I, R, U
	Walla Walla	Pine Creek	1707010209	0	0	5.3		0	A, Fi, I, R
	Walla Walla	Dry Creek	1707010210	15.7	4.1	25.2		0	A, C, Fi, F, R
	Walla Walla	Lower Walla Walla River	1707010211	1	7	44.1		0	A, Fi, R
	Umatilla	Upper Umatilla River	1707010301	42.2	25	0		0	A, F, Fi, G, R
	Umatilla	Meacham Creek	1707010302	50.3	30	0		0	F, Fi, G, R
	Umatilla	Umatilla River/Mission Creek	1707010303	48.4	37.6	0		0	A, F, Fi, G, I, R, U
	Umatilla	Wildhorse Creek	1707010304	10.9	0.4	0		0	A, C, U
	Umatilla	Mckay Creek	1707010305	6	0	0		0	A, C, D, F, Fi, I, R, U

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs)			Unoccupied but may be essential (mi)***	Occupied but lacking PCEs (mi)	Management Activities**
				Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*			
	Umatilla	Birch Creek	1707010306	77.9	26.5	2.6		0	A, F, Fi, G, I, R
	Umatilla	Umatilla River/Alkali Canyon	1707010307	0	26.4	0		0	A, F, Fi, I, R, U
	Umatilla	Stage Gulch	1707010308	0	5.6	0		0	A, C, F, I, U
	Umatilla	Lower Butter Creek	1707010310	7.1	0	0		0	A, F, Fi, G, R
	Umatilla	Lower Umatilla River	1707010313	0	21.6	0		0	A, C, F, Fi, G, I, R, U
	Middle Columbia/Hood	Upper Middle Columbia/Hood	1707010501	6.9	0	15		0	A, D, Fi, G, S, R, T
	Middle Columbia/Hood	Fifteenmile Creek	1707010502	61.7	0	1.5		0	A, F, Fi, G, I, R, U
	Middle Columbia/Hood	Fivemile Creek	1707010503	47.8	3.2	2.4		0	A, F, Fi, G, I, R, U
	Middle Columbia/Hood	Middle Columbia/Mill Creek	1707010504	30.2	0	25.5		0	A, D, F, Fi, G, R, T, I, U
	Middle Columbia/Hood	Mosier Creek	1707010505	2.9	0	1.1		0	F, Fi, G, R, U
	Middle Columbia/Hood	White Salmon River	1707010509	3.1	0	1.9	37.3[kk]	0	A, C, D, F, R, U
	Middle Columbia/Hood	Little White Salmon River	1707010510	1.1	<0.1	0.5		0	D, F, R
	Middle Columbia/Hood	Middle Columbia/Grays Creek	1707010512	4.7	0.2	61.3		0	F, Fi, R, T
	Middle Columbia/Hood	Middle Columbia/Eagle Creek	1707010513	0	0	9.1		0	D, R, U
	Klickitat	Upper Klickitat River	1707010601	11.8	2.5	60		0	F, Fi, R
	Klickitat	Middle Klickitat River	1707010602	31	<0.1	9.2		0	F, Fi, G, R
	Klickitat	Little Klickitat River	1707010603	18.8	<0.1	17.5		0	A, F, Fi, R
	Klickitat	Lower Klickitat River	1707010604	43.4	<0.1	20.9		0.9	A, F, Fi, G, R

[kk] Watershed contains unoccupied habitat above Condit Dam that may be essential for conservation.

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs)			Unoccupied but may be essential (mi)***	Occupied but lacking PCEs (mi)	Management Activities**
				Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*			
	Upper John Day	Middle South Fork John Day	1707020103	24.3	0	0		0	F, Fi, G
	Upper John Day	Murderers Creek	1707020104	52.4	0	15.6		0	C, F, Fi, G, I, R
	Upper John Day	Lower South Fork John Day	1707020105	79.3	0	0		0	F, Fi, G, I
	Upper John Day	Upper John Day River	1707020106	73.2	0	0		0	A, F, Fi, G, I, R
	Upper John Day	Canyon Creek	1707020107	51.1	0	5.4		0	F, Fi, G, I, R
	Upper John Day	Strawberry Creek	1707020108	106	0.8	2.2		0	A, F, Fi, G, I, M, R, U
	Upper John Day	Beech Creek	1707020109	44.5	0	1.8		0	A,F, Fi, G, I, R
	Upper John Day	Laycock Creek	1707020110	46.8	14.8	1.1		0	A,F, Fi, G, I, R
	Upper John Day	Fields Creek	1707020111	45.4	20.2	3.7		0	A,F, Fi, G, I, R
	Upper John Day	Upper Middle John Day	1707020112	41.5	7.1	0		0	F, Fi, G, I
	Upper John Day	Mountain Creek	1707020113	65.3	0	0		0	A, F, Fi, G, I, R
	Upper John Day	Rock Creek	1707020114	48.6	0	0		0	Fi, G, I, R
	Upper John Day	John Day River/Johnson Creek	1707020115	32.1	19.2	0.3		0	F, Fi, G, I, R
	North Fork John Day	Upper North Fork John Day River	1707020201	74.4	6.1	1.1		0	F, Fi, G, M, R
	North Fork John Day	Granite Creek	1707020202	78.9	5.8	2.4		0	F, Fi, G, M, R
	North Fork John Day	North Fork John Day River/Big Creek	1707020203	80.7	2.5	2.2		0	F, Fi, G
	North Fork John Day	Desolation Creek	1707020204	49.6	6.8	10.1		0	F, Fi, G
	North Fork John Day	Upper Camas Creek	1707020205	75.5	0	20.2		0	F, Fi, G, R
	North Fork John Day	Lower Camas Creek	1707020206	114	0	16.3		0	A, F, Fi, G, R
	North Fork John Day	North Fork John Day River/Potamus Creek	1707020207	109	33.9	3.1		0	A, F, Fi, G, R
	North Fork John Day	Wall Creek	1707020208	97.6	12.8	0		0	F, Fi, G, R
	North Fork John Day	Cottonwood Creek	1707020209	75.8	0	8.7		0	F, Fi, G, I
	North Fork John Day	Lower North Fork John Day River	1707020210	41.8	22.1	1.3		0	F, Fi, G, I

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs)			Unoccupied but may be essential (mi)***	Occupied but lacking PCEs (mi)	Management Activities**
				Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*			
	Middle Fork John Day	Upper Middle Fork John Day River	1707020301	44.5	0	3.2		0	F, Fi, G, I, R
	Middle Fork John Day	Camp Creek	1707020302	112	0	19		0	F, Fi, G, I, M, R
	Middle Fork John Day	Big Creek	1707020303	84.1	<0.1	8		0	A, F, Fi, G, I, M, R
	Middle Fork John Day	Long Creek	1707020304	66	0	3.1		0	A, F, Fi, G, I, R
	Middle Fork John Day	Lower Middle Fork John Day River	1707020305	22.3	25.2	0		0	A, F, Fi, G, R
	Lower John Day	Lower John Day River/Kahler Creek	1707020401	84.1	0.6	24.4		0	F, Fi, G, I
	Lower John Day	Lower John Day River/Service Creek	1707020402	33.5	0	24.4		0	F, Fi, G, R
	Lower John Day	Bridge Creek	1707020403	66.9	0	0		0	F, Fi, G, I, R
	Lower John Day	Lower John Day River/Muddy Creek	1707020404	50.8	0	23.2		0	Fi, G
	Lower John Day	Lower John Day River/Clarno	1707020405	3.7	0	27.8		0	F, Fi, G
	Lower John Day	Butte Creek	1707020406	43.2	0	0		0	A, F, Fi, G, I
	Lower John Day	Pine Hollow	1707020407	36.8	0	0		0	Fi, G
	Lower John Day	Thirtymile Creek	1707020408	56.3	0	0		0	A, F, Fi, G
	Lower John Day	Lower John Day River/Ferry Canyon	1707020409	21.3	0	29.5		0	A, Fi, G
	Lower John Day	Lower John Day River/Scott Canyon	1707020410	46.3	0	33.1		0	A, Fi, G
	Lower John Day	Upper Rock Creek	1707020411	105	0	0		0	F, Fi, G
	Lower John Day	Lower Rock Creek	1707020412	29.4	29.8	0		0	A, F, Fi, G, I
	Lower John Day	Grass Valley Canyon	1707020413	36.3	1.5	0		0	A, Fi, G
	Lower John Day	Lower John Day River/Mcdonald Ferry	1707020414	0	0	21.5		0	A, F, Fi, G
	Upper Deschutes	Deschutes River/ Mckenzie Canyon	1707030107	0	0	0	a	0	

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs)			Unoccupied but may be essential (mi)***	Occupied but lacking PCEs (mi)	Management Activities**
				Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*			
	Upper Deschutes	Squaw Creek	1707030108	0	0	0	a	0	
	Upper Deschutes	Lower Metolius River	1707030110	0	0	0	a	0	
	Upper Deschutes	Deschutes River/ Haystack	1707030111	0	0	0	a	0	
	Lower Deschutes	Headwaters Deschutes River	1707030601	0	0	0	a	0	
	Lower Deschutes	Upper Deschutes River	1707030603	37.4	0	0		0	A, C, D, F, Fi, G, I, R, U
	Lower Deschutes	Mill Creek	1707030604	17.3	4.6	0		0	F, Fi, G, R
	Lower Deschutes	Beaver Creek	1707030605	32.5	0	0		0	A, F, Fi, M, R
	Lower Deschutes	Warm Springs River	1707030606	37.3	27.1	0		0	F, Fi, G, R
	Lower Deschutes	Middle Deschutes River	1707030607	72	2.4	0		0	A, F, Fi, G, I, R
	Lower Deschutes	Bakeoven Creek	1707030608	35.2	0	0		0	A, Fi, G
	Lower Deschutes	White River	1707030610	1.9	0	0		0	A, F, Fi, G, I, R
	Lower Deschutes	Buck Hollow Creek	1707030611	37.7	0	0		0	A, G, R
	Lower Deschutes	Lower Deschutes River	1707030612	40.8	10.1	0.5		0	A, Fi, G, I, R
	Trout	Upper Trout Creek	1707030701	78	1.2	0		0	F, Fi, G, I, R
	Trout	Antelope Creek	1707030702	17.7	0	0		0	A, G, I, R
	Trout	Mud Springs Creek	1707030704	1.5	0	0		0	A, F, Fi, G, I
	Trout	Lower Trout Creek	1707030705	17	0	0		0	A, C, Fi, G, I, R
	Lower Columbia/ Sandy	Columbia Gorge Tributaries	1708000107	0	0	25.1		0	C, D, F, R, U, W
	Upper Columbia/Priest Rapids	Columbia River Zintel Canyon	1702001606	0	0	13.3		0	A, D, Fi, R, U
	Multiple	Lower Columbia Corridor (Sandy/Washougal to Ocean)	NA	0	0	117[ll]		0	C, D, I, R, T, U, W

[ll] The Lower Columbia River from the ocean upstream approximately 46.5 miles is considered to contain estuarine PCEs, in addition to migration and rearing (ISAB 2000).

[a] Population expansion into this HUC5 possibly essential for conservation; Pelton Reregulating Dam, Pelton Dam, and Round Butte Dam are currently a barrier to expansion.; Agreement signed July 2004 to restore fish runs.

* Some streams classified as "Migration/Presence PCEs" may also include rearing or spawning PCEs, but the GIS data are still undergoing review to confirm additional habitat use types.

** These watersheds historically supported spawning and rearing PCEs. The CHART determined that these watersheds may be essential for conservation of the ESU.

** This list is not exhaustive. It is intended to highlight key management activities affecting PCEs in each watershed. Activities identified are based on the general categories described by Spence et al. (1996) and summarized previously in the "Special Management Considerations or Protection" section of this report. Coding is as follows: F= forestry, G = grazing, A = agriculture, C = channel modifications/diking, R = road building/maintenance, U = urbanization, S = sand and gravel mining, M = mineral mining, D = dams, I = irrigation impoundments and withdrawals, T = river, estuary, and ocean traffic, W = wetland loss/removal, B = beaver removal, X = exotic/invasive species introductions, H = forage fish/species harvest. Primary sources for this information were the CHART, Washington Conservation Commission Reports on Salmonid Limiting Factors, Subbasin Summary Reports of the NWPPC, and land use/land cover GIS layers from the U.S. Geological Survey.

Table J2. Summary of Initial CHART Scores and Ratings of Conservation Value for Habitat Areas in HUC5 Watersheds Occupied by the Middle Columbia River Steelhead ESU

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors) 1	2	3	4	5	6	Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
	Upper Yakima	Upper Yakima River	1703000101	2	2	2	2	2	2	12*	Moderate-high HUC5 score; PCEs support one of four TRT demographically independent populations in the Yakima River group; CHART noted thate lake systems were likely a unique habitat type in this HUC5; CHART also concluded that additional areas upstream of Cle Elum, Kachess, and Keechelus dams may be essential for ESU conservation; upper reaches of watershed are in a FEMAT key watershed for at-risk anadromous salmonids; Unoccupied habitat areas above Kachess and Keechelus dams may be essential for conservation.	High*
	Upper Yakima	Teanaway River	1703000102	3	2	2	2	2	2	13	Moderate-high HUC5 score; extensive PCEs support one of four TRT demographically independent populations in the Yakima River group; CHART noted unique geological conditions in this HUC5	High
	Upper Yakima	Middle Upper Yakima River	1703000103	2	2	2	2	2	2	12	Moderate-high HUC5 score; PCEs support one of four TRT demographically independent populations in the Yakima River group; CHART noted that HUC5 supports a unique Swauk interior redband trout type; CHART extended distribution in Manastash River and determined that additional reaches in Wilson and Naneum Creeks may be essential for ESU conservation	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors) 1	2	3	4	5	6	Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
	Upper Yakima	Umtanum/Wenas	1703000104	2	1	2	2	1	2	10	Moderate HUC5 score; PCEs support one of four TRT demographically independent populations in the Yakima River group; tributary PCEs more limited than in upstream HUC5s but this HUC5 contains high value rearing/migration PCEs for the upstream HUC5s	Medium
	Naches	Little Naches River	1703000201	3	2	2	2	2	2	13	Moderate-high HUC5 score; PCEs support one of four TRT demographically independent populations in the Yakima River group; CHART noted that steelhead may get upstream of Bumping Lake Dam during rare flow events and also concluded that additional areas upstream of Bumping Lake Dam may be essential for ESU conservation	High
	Naches	Naches River/Rattlesnake Creek	1703000202	3	2	2	2	2	2	13	Moderate-high HUC5 score; PCEs support one of four TRT demographically independent populations in the Yakima River group; HUC5 contains high value rearing/migration PCEs for the upstream HUC5	High
	Naches	Naches River/Tieton River	1703000203	2	1	2	2	2	2	11	Moderate-high HUC5 score; PCEs support one of four TRT demographically independent populations in the Yakima River group; CHART concluded that additional areas upstream of Tieton Dam may be essential for ESU conservation; HUC5 contains high value rearing/migration PCEs for upstream HUC5s	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Lower Yakima	Ahtanum Creek	1703000301	2	2	2	2	2	2	12	Moderate-high HUC5 score; PCEs support one of four TRT demographically independent populations in the Yakima River group; CHART noted that fish may be genetically unique (with limited hatchery influence) and that Upper North Fork probably has best PCEs	High
	Lower Yakima	Upper Lower Yakima River	1703000302	1	1	2	2	2	2	10	Moderate HUC5 score; very limited PCEs in this HUC5; tributary habitats are of medium conservation value supporting one populations, and HUC5 contains high value rearing/migration PCEs supporting two populations spawning in upstream HUC5s; CHART noted limited hatchery influence	Medium
	Lower Yakima	Upper Toppenish Creek	1703000303	2	2	2	3	2	2	13	Moderate-high HUC5 score; PCEs support one of four TRT demographically independent populations in the Yakima River group; CHART noted that this HUC5 has a wide array of habitats supporting high elevation spawners and juveniles with summer persistence in pools of the shrub-steppe zone; CHART also noted limited hatchery influence	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Lower Yakima	Lower Toppenish Creek	1703000304	1	1	2	2	2	2	10	Moderate HUC5 score; PCEs more degraded here than upstream HUC5s; tributary habitats are of medium conservation value however HUC5 contains high value rearing/migration PCEs supporting three populations spawning in this and upstream HUC5s; CHART noted this HUC5 contains holding areas important for pre-spawning adults and noted limited hatchery influence	Medium
	Lower Yakima	Satus Creek	1703000305	2	2	2	3	2	2	13	Moderate-high HUC5 score; PCEs support one of four TRT demographically independent populations in the Yakima River group; CHART noted unique shrub-steppe habitat and limited hatchery influence in this HUC5	High
	Lower Yakima	Yakima River/Spring Creek	1703000306	1	1	1	2	2	2	9	Moderate HUC5 score; PCEs more degraded here than upstream HUC5s (i.e., dependence on agriculture-related return flows); tributary habitats are of medium conservation value supporting one popuation and HUC5 contains high value rearing/migration PCEs supporting four populations spawning in upstream HUC5s; CHART noted limited hatchery influence	Medium
	Lower Yakima	Yakima River/Cold Creek	1703000307							NS	Not scored since HUC5 consists solely of high value Columbia River corridor	High
	Middle Columbia/Lake Wallula	Upper Lake Wallula	1707010101							NS	Not scored since HUC5 consists solely of high value Columbia River corridor	High
	Middle Columbia/Lake Wallula	Lower Lake Wallula	1707010102							NS	Not scored since HUC5 consists solely of high value Columbia River corridor	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Middle Columbia/Lake Wallula	Glade Creek	1707010105	1	2	1	1	1	1	7	Moderate HUC5 score; PCEs support one TRT demographically independent population; CHART determined that this and other small tributaries to the Columbia River in this area may have always supported small spawning aggregations that could contribute to ESU conservation	Medium
	Middle Columbia/Lake Wallula	Upper Lake Umatilla	1707010106							NS	Not scored since HUC5 consists solely of high value Columbia River corridor	High
	Middle Columbia/Lake Wallula	Middle Lake Umatilla	1707010109							NS	Not scored since HUC5 consists solely of high value Columbia River corridor	High
	Middle Columbia/Lake Wallula	Alder Creek	1707010110	1	2	1	1	1	1	7	Moderate HUC5 score; PCEs support one TRT demographically independent population; CHART determined that this and other small tributaries to the Columbia River in this area may have always supported small spawning aggregations that could contribute to ESU conservation	Medium
	Middle Columbia/Lake Wallula	Pine Creek	1707010111	1	2	1	1	1	1	7	Moderate HUC5 score; HUC5 associated with a historic TRT demographically independent population; CHART determined that this and other small tributaries to the Columbia River in this area may have always supported small spawning aggregations that could contribute to ESU conservation	Medium

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Middle Columbia/Lake Wallula	Wood Gulch	1707010112	2	2	2	2	1	2	11	Moderate-high HUC5 score; HUC5 associated with a historic TRT demographically independent population; CHART determined that this and other small tributaries to the Columbia River in this area may have always supported small spawning aggregations that could contribute to ESU conservation; PCEs are more extensive in this HUC5 than in Glade, Alder and Pine creek HUC5s	High
	Middle Columbia/Lake Wallula	Rock Creek	1707010113	2	2	2	3	1	3	13	Moderate-high HUC5 score; PCEs in this HUC5 support one of five extant TRT demographically independent populations in the Cascade Eastern Slope Tributaries group; CHART determined that this and other small tributaries to the Columbia River in this area may have always supported small spawning aggregations that could contribute to ESU conservation; PCEs are more extensive in this HUC5 than in Glade, Alder and Pine creek HUC5s; CHART noted that this HUC5 is situated in an ecotone/transition area re: summer- and winter-run steelhead	High
	Middle Columbia/Lake Wallula	Lower Lake Umatilla	1707010114							NS	Not scored since HUC5 consists solely of high value Columbia River corridor	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Walla Walla	Upper Walla Walla River	1707010201	2	2	2	1	2	2	11	Moderate-high HUC5 score; extensive PCEs support one of three extant TRT demographically independent populations in the Walla Walla and Umatilla Rivers group; CHART noted that uppermost reaches (especially in South Fork) are in best condition; PCEs also overlap with AFS critical watershed	High
	Walla Walla	Mill Creek	1707010202	2	2	1	2	2	2	11	Moderate-high HUC5 score; extensive PCEs support one of three extant TRT demographically independent populations in the Walla Walla and Umatilla Rivers group; CHART noted that this HUC5 is the highest elevation watershed in the basin, the uppermost reaches (municipal water supply) are in best condition, and the HUC5 has had limited hatchery influence; PCEs overlap with AFS critical watershed	High
	Walla Walla	Upper Touchet River	1707010203	3	2	2	2	2	2	13	Moderate-high HUC5 score; extensive PCEs (especially spawning) support one of three extant TRT demographically independent populations in the Walla Walla and Umatilla Rivers group	High
	Walla Walla	Middle Touchet River	1707010204	2	1	2	1	2	2	10	Moderate HUC5 score; PCEs support one of three extant TRT demographically independent populations in the Walla Walla and Umatilla Rivers group; HUC5 contains tributary spawning as well as a high value rearing/migration corridor for upstream HUC5	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Walla Walla	Lower Touchet River	1707010207	1	1	1	1	2	2	8	Moderate HUC5 score; PCEs support one of three extant TRT demographically independent populations in the Walla Walla and Umatilla Rivers group; no tributary PCEs so rating is based on the mainstem being a high value rearing/migration corridor for upstream HUC5s	High
	Walla Walla	Cottonwood Creek	1707010208	1	1	1	1	1	2	7	Moderate HUC5 score; PCEs support one of three extant TRT demographically independent populations in the Walla Walla and Umatilla Rivers group; CHART noted that habitat quality is patchy and more degraded than upper watersheds; HUC5 contains a high value rearing/migration corridor for upstream HUC5	Medium
	Walla Walla	Pine Creek	1707010209	1	1	1	1	1	2	7	Moderate HUC5 score; PCEs support one of three extant TRT demographically independent populations in the Walla Walla and Umatilla Rivers group but are very limited in this HUC5	Low
	Walla Walla	Dry Creek	1707010210	1	1	1	1	1	2	7	Moderate HUC5 score; PCEs support one of three extant TRT demographically independent populations in the Walla Walla and Umatilla Rivers group; CHART noted that habitat quality is patchy and more degraded than upper watersheds	Medium

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Walla Walla	Lower Walla Walla River	1707010211	1	1	1	1	2	2	8	Moderate HUC5 score; PCEs support two of four TRT demographically independent populations in the Walla Walla and Umatilla Rivers group; CHART determined that tributary PCEs are of medium conservation value but the migration and rearing corridor for upstream HUC5s is high value	Medium
	Umatilla	Upper Umatilla River	1707010301	3	2	2	1	2	2	12	Moderate-high HUC5 score; PCEs support one of three extant TRT demographically independent populations in the Walla Walla and Umatilla Rivers group; CHART considered this one of the best of all HUC5s supporting this population; HUC5 contains index reaches for spawner surveys and is identified by ODFW as a priority area for this ESU; PCEs overlap with AFS critical watershed	High
	Umatilla	Meacham Creek	1707010302	3	2	2	1	2	2	12	Moderate-high HUC5 score; PCEs support one of three extant TRT demographically independent populations in the Walla Walla and Umatilla Rivers group; CHART considered this one of the best of all HUC5s supporting this population; HUC5 contains index reaches for spawner surveys and is identified by ODFW as a priority area for this ESU; PCEs overlap with AFS critical watershed	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Umatilla	Umatilla River/Mission Creek	1707010303	2	1	1	1	2	2	9	Moderate HUC5 score; PCEs support one of three extant TRT demographically independent populations in the Walla Walla and Umatilla Rivers group; HUC5 contains index reaches for spawner surveys and is identified by ODFW as a priority area for this ESU; HUC5 contains a high value rearing/migration corridor for upstream HUC5 but CHART considered tributary PCE quality as lower than upstream HUC5s	Medium
	Umatilla	Wildhorse Creek	1707010304	1	1	1	1	1	2	7	Moderate HUC5 score; PCEs support one of three extant TRT demographically independent populations in the Walla Walla and Umatilla Rivers group; identified by ODFW as a priority area for this ESU; CHART noted that this HUC5 has very limited PCE quantity and quality	Low
	Umatilla	Mckay Creek	1707010305	1	1	2	2	2	2	10	Moderate HUC5 score; PCEs support one of three extant TRT demographically independent populations in the Walla Walla and Umatilla Rivers group; identified by ODFW as a priority area for this ESU; limited spawning PCEs but CHART noted that this HUC5 is the primary coldwater source for rearing/migration PCEs in the lower Umatilla River	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Umatilla	Birch Creek	1707010306	2	2	2	1	2	2	11	Moderate-high HUC5 score; PCEs support one of three extant TRT demographically independent populations in the Walla Walla and Umatilla Rivers group; HUC5 contains index reaches for spawner surveys and is identified by ODFW as a priority area for this ESU and CHART noted that there are active restoration activities underway here	High
	Umatilla	Umatilla River/Alkali Canyon	1707010307	2	1	1	1	2	2	9	Moderate HUC5 score; PCEs support one of three extant TRT demographically independent populations in the Walla Walla and Umatilla Rivers group; no tributary PCEs so CHART concluded that HUC5 value is as a high value rearing/migration corridor for upstream HUC5s	High
	Umatilla	Stage Gulch	1707010308	1	0	1	1	1	2	6	Low-moderate HUC5 score; PCEs support one of three extant TRT demographically independent populations in the Walla Walla and Umatilla Rivers group; CHART noted that this HUC5 has very limited PCE quantity and quality	Low
	Umatilla	Lower Butter Creek	1707010310	1	1	1	1	1	2	7	Moderate HUC5 score; PCEs support one of three extant TRT demographically independent populations in the Walla Walla and Umatilla Rivers group; CHART noted that this HUC5 has very limited PCE quantity and quality	Low

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Umatilla	Lower Umatilla River	1707010313	2	0	1	1	2	2	8	Moderate HUC5 score; PCEs support one of three extant TRT demographically independent populations in the Walla Walla and Umatilla Rivers group; no tributary PCEs so CHART concluded that HUC5 value is as a high value rearing/migration corridor for upstream HUC5s, although PCEs are degraded (e.g., seasonal dewatering)	High
	Willow	Lower Willow Creek	1707010405							NS	Not scored or rated; anecdotal information indicates HUC5(s) may be occupied but unresolved by CHART	Unknown
	Middle Columbia/Hood	Upper Middle Columbia/Hood	1707010501	0	1	1	1	0	1	4	Low-moderate HUC5 score; tributary PCEs support one of five TRT demographically independent populations in the John Day group; while tributary PCEs are of low value, Columbia River reaches in HUC5 have high conservation value as rearing/migration corridor for all upstream HUC5s and populations	Low
	Middle Columbia/Hood	Fifteenmile Creek	1707010502	2	1	2	3	1	2	11	Moderate-high HUC5 score; PCEs support spawning for one of five extant TRT demographically independent populations in the Cascade Eastern Slope Tributaries group; CHART noted that PCEs support winter-run steelhead; PCEs overlap with a FEMAT key watershed for at-risk anadromous salmonids and an AFS critical watershed	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Middle Columbia/Hood	Fivemile Creek	1707010503	2	1	2	3	1	2	11	Moderate-high HUC5 score; PCEs support spawning for one of five extant TRT demographically independent populations in the Cascade Eastern Slope Tributaries group; CHART noted that PCEs support winter-run steelhead; PCEs overlap with a FEMAT key watershed for at-risk anadromous salmonids and an AFS critical watershed	High
	Middle Columbia/Hood	Middle Columbia/Mill Creek	1707010504	2	1	1	3	1	2	10	Moderate HUC5 score; tributary PCEs support spawning for one of five extant TRT demographically independent populations in the Cascade Eastern Slope Tributaries group; Columbia River reaches in this HUC5 contain high value rearing/migration PCEs and support nearly every extant population in this ESU; CHART noted that PCEs support winter-run steelhead; PCEs in this HUC5 also overlap with a FEMAT key watershed for at-risk anadromous salmonids and an AFS critical watershed	High
	Middle Columbia/Hood	Mosier Creek	1707010505	0	2	1	3	0	2	8	Moderate HUC5 score; PCEs support spawning for one of five extant TRT demographically independent populations in the Cascade Eastern Slope Tributaries group; CHART noted that PCEs support winter-run steelhead but PCEs are extremely limited in this HUC5	Medium

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Middle Columbia/Hood	White Salmon River	1707010509	1	2	1	2	1	2	9	Moderate HUC5 score; PCEs associated with one historic TRT population; limited PCEs and CHART noted that other HUC5s likely have higher conservation value for ESU in this TRT region; Watershed contains unoccupied habitat above Condit Dam that may be essential for conservation.	Medium
	Middle Columbia/Hood	Little White Salmon River	1707010510	1	2	0	2	1	2	8	Moderate HUC5 score; PCEs associated with one historic TRT population; very limited PCEs and CHART noted that other HUC5s likely have higher conservation value for ESU in this TRT region	Medium
	Middle Columbia/Hood	Middle Columbia/Grays Creek	1707010512	1	2	1	2	1	2	9	Moderate HUC5 score; very limited tributary PCEs and CHART noted that Klickitat and Deschutes HUC5s likely have higher conservation value for ESU in this TRT region; Columbia River reaches in HUC5 high conservation value as rearing/migration corridor for all upstream HUC5s	Medium
	Klickitat	Upper Klickitat River	1707010601	2	2	2	2	2	2	12	Moderate-high HUC5 score; PCEs support spawning for one of five extant TRT demographically independent populations in the Cascade Eastern Slope Tributaries group; CHART noted that PCEs are in generally good condition throughout this subbasin and this HUC5 may support winter-run steelhead in this HUC5	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Klickitat	Middle Klickitat River	1707010602	2	2	2	2	2	2	12	Moderate-high HUC5 score; PCEs support spawning for one of five extant TRT demographically independent populations in the Cascade Eastern Slope Tributaries group; CHART noted that PCEs are in generally good condition throughout this subbasin and this HUC5 may support winter-run steelhead in this HUC5	High
	Klickitat	Little Klickitat River	1707010603	2	1	2	2	2	2	11	Moderate-high HUC5 score; PCEs support spawning for one of five extant TRT demographically independent populations in the Cascade Eastern Slope Tributaries group; CHART noted that PCEs are in generally good condition throughout this subbasin, although fish passage may be a concern in some years in this HUC5	High
	Klickitat	Lower Klickitat River	1707010604	2	2	1	3	1	2	11	Moderate-high HUC5 score; PCEs support spawning for one of five extant TRT demographically independent populations in the Cascade Eastern Slope Tributaries group; CHART noted that PCEs are in generally good condition throughout this subbasin and this HUC5 likely support summer- and winter-run steelhead in this HUC5	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Upper John Day	Middle South Fork John Day	1707020103	2	2	2	3	1	2	12	Moderate-high HUC5 score; PCEs support one of five TRT demographically independent populations in this region; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence); HUC5 contains index reaches for spawner surveys and is identified by ODFW as a priority area for this ESU	High
	Upper John Day	Murderers Creek	1707020104	3	2	2	3	1	2	13	Moderate-high HUC5 score; PCEs support one of five TRT demographically independent populations in this region; HUC5 contains index reaches for spawner surveys and is identified by ODFW as a priority area for this ESU; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence); PCEs overlap with AFS critical watershed	High
	Upper John Day	Lower South Fork John Day	1707020105	3	2	2	3	1	2	13	Moderate-high HUC5 score; PCEs support one of five TRT demographically independent populations in this region; HUC5 contains index reaches for spawner surveys and is identified by ODFW as a priority area for this ESU; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence); PCEs overlap with AFS critical watershed	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Upper John Day	Upper John Day River	1707020106	3	2	2	3	2	2	14	High HUC5 score; PCEs support one of five TRT demographically independent populations in this region; HUC5 contains index reaches for spawner surveys and is identified by ODFW as a priority area for this ESU; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence); PCEs overlap with AFS critical watershed	High
	Upper John Day	Canyon Creek	1707020107	2	2	2	3	2	2	13	Moderate-high HUC5 score; PCEs support one of five TRT demographically independent populations in this region; HUC5 contains index reaches for spawner surveys and is identified by ODFW as a priority area for this ESU; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence)	High
	Upper John Day	Strawberry Creek	1707020108	2	1	2	3	2	2	12	Moderate-high HUC5 score; PCEs support one of five TRT demographically independent populations in this region; HUC5 contains index reaches for spawner surveys and is identified by ODFW as a priority area for this ESU; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence)	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Upper John Day	Beech Creek	1707020109	2	1	2	3	2	2	12	Moderate-high HUC5 score; PCEs support one of five TRT demographically independent populations in this region; HUC5 contains index reaches for spawner surveys and is identified by ODFW as a priority area for this ESU; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence); PCEs overlap with AFS critical watershed	High
	Upper John Day	Laycock Creek	1707020110	2	1	2	3	2	2	12	Moderate-high HUC5 score; PCEs support one of five TRT demographically independent populations in this region; HUC5 contains index reaches for spawner surveys and is identified by ODFW as a priority area for this ESU; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence); PCEs overlap with AFS critical watershed	High
	Upper John Day	Fields Creek	1707020111	2	1	2	3	2	2	12	Moderate-high HUC5 score; PCEs support one of five TRT demographically independent populations in this region; HUC5 contains index reaches for spawner surveys and is identified by ODFW as a priority area for this ESU; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence); CHART concluded that this HUC5 may have less production potential than others and noted that it is primarily important as a high value migration corridor; PCEs overlap with AFS critical watershed	Medium

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Upper John Day	Upper Middle John Day	1707020112	2	1	2	3	1	3	12	Moderate-high HUC5 score; PCEs support three of five TRT demographically independent populations in this region; HUC5 contains index reaches for spawner surveys; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence); PCEs overlap with AFS critical watershed	High
	Upper John Day	Mountain Creek	1707020113	2	1	2	3	1	2	11	Moderate-high HUC5 score; PCEs support three of five TRT demographically independent populations in this region; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence)	High
	Upper John Day	Rock Creek	1707020114	2	1	2	3	1	2	11	Moderate-high HUC5 score; PCEs support three of five TRT demographically independent populations in this region; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence); PCEs overlap with AFS critical watershed	High
	Upper John Day	John Day River/Johnson Creek	1707020115	2	1	1	3	1	3	11	Moderate-high HUC5 score; PCEs support three of five TRT demographically independent populations in this region; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence)	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	North Fork John Day	Upper North Fork John Day River	1707020201	3	2	2	3	1	2	13	Moderate-high HUC5 score; PCEs support one of five TRT demographically independent populations in this region; HUC5 contains index reaches for spawner surveys; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence); identified by ODFW as a priority area for this ESU; PCEs overlap with AFS critical watershed	High
	North Fork John Day	Granite Creek	1707020202	2	1	2	3	1	2	11	Moderate-high HUC5 score; PCEs support one of five TRT demographically independent populations in this region; HUC5 contains index reaches for spawner surveys; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence); identified by ODFW as a priority area for this ESU; PCEs overlap with AFS critical watershed	High
	North Fork John Day	North Fork John Day River/Big Creek	1707020203	3	2	1	3	1	2	12	Moderate-high HUC5 score; PCEs support one of five TRT demographically independent populations in this region; identified by ODFW as a priority area for this ESU; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence); identified by ODFW as a priority area for this ESU; PCEs overlap with AFS critical watershed	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	North Fork John Day	Desolation Creek	1707020204	3	2	2	3	2	2	14	High HUC5 score; PCEs support one of five TRT demographically independent populations in this region; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence); identified by ODFW as a priority area for this ESU	High
	North Fork John Day	Upper Camas Creek	1707020205	2	1	2	3	2	2	12	Moderate-high HUC5 score; PCEs support one of five TRT demographically independent populations in this region; HUC5 contains index reaches for spawner surveys; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence); identified by ODFW as a priority area for this ESU; PCEs overlap with AFS critical watershed	High
	North Fork John Day	Lower Camas Creek	1707020206	3	1	2	3	2	2	13	Moderate-high HUC5 score; PCEs support one of five TRT demographically independent populations in this region; HUC5 contains index reaches for spawner surveys; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence); identified by ODFW as a priority area for this ESU; PCEs overlap with AFS critical watershed	High
	North Fork John Day	North Fork John Day River/Potamus Creek	1707020207	3	1	2	3	1	3	13	Moderate-high HUC5 score; PCEs support two of five TRT demographically independent populations in this region; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence); identified by ODFW as a priority area for this ESU	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	North Fork John Day	Wall Creek	1707020208	3	1	2	3	2	2	13	Moderate-high HUC5 score; PCEs support one of five TRT demographically independent populations in this region; HUC5 contains index reaches for spawner surveys; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence)	High
	North Fork John Day	Cottonwood Creek	1707020209	2	2	1	3	1	2	11	Moderate-high HUC5 score; PCEs support one of five TRT demographically independent populations in this region; HUC5 contains index reaches for spawner surveys; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence)	High
	North Fork John Day	Lower North Fork John Day River	1707020210	2	2	1	3	1	3	12	Moderate-high HUC5 score; PCEs support two of five TRT demographically independent populations in this region; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence) but that this HUC5 may have less production potential than others; medium rating assigned to tributary PCEs but CHART noted HUC5 is primarily important as a high value migration corridor	Medium
	Middle Fork John Day	Upper Middle Fork John Day River	1707020301	2	1	2	3	2	2	12	Moderate-high HUC5 score; PCEs support one of five TRT demographically independent populations in this region; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence); identified by ODFW as a priority area for this ESU	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Middle Fork John Day	Camp Creek	1707020302	2	1	2	3	2	2	12	Moderate-high HUC5 score; PCEs support one of five TRT demographically independent populations in this region; HUC5 contains index reaches for spawner surveys; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence); identified by ODFW as a priority area for this ESU; PCEs overlap with AFS critical watershed	High
	Middle Fork John Day	Big Creek	1707020303	2	1	2	3	2	2	12	Moderate-high HUC5 score; PCEs support one of five TRT demographically independent populations in this region; HUC5 contains index reaches for spawner surveys; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence); identified by ODFW as a priority area for this ESU; PCEs overlap with AFS critical watershed	High
	Middle Fork John Day	Long Creek	1707020304	2	1	2	3	2	2	12	Moderate-high HUC5 score; PCEs support one of five TRT demographically independent populations in this region; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence); identified by ODFW as a priority area for this ESU; PCEs overlap with AFS critical watershed	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Middle Fork John Day	Lower Middle Fork John Day River	1707020305	2	1	1	2	0	2	8	Moderate HUC5 score; PCEs support one of five TRT demographically independent populations in this region; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence) but that this HUC5 may have less production potential than others and noted that it is primarily important as a high value migration corridor; identified by ODFW as a priority area for this ESU	Low
	Lower John Day	Lower John Day River/Kahler Creek	1707020401	2	1	1	3	2	3	12	Moderate-high HUC5 score; PCEs support all of five TRT demographically independent populations in this region; HUC5 contains index reaches for spawner surveys; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence)	High
	Lower John Day	Lower John Day River/Service Creek	1707020402	2	1	1	3	1	3	11	Moderate-high HUC5 score; PCEs support all of five TRT demographically independent populations in this region; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence) PCEs overlap with AFS critical watershed	High
	Lower John Day	Bridge Creek	1707020403	2	1	2	3	1	2	11	Moderate-high HUC5 score; PCEs support one of five TRT demographically independent populations in this region; HUC5 contains index reaches for spawner surveys; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence)	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Lower John Day	Lower John Day River/Muddy Creek	1707020404	2	1	1	3	1	3	11	Moderate-high HUC5 score; PCEs support all of five TRT demographically independent populations in this region; HUC5 contains index reaches for spawner surveys; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence)	High
	Lower John Day	Lower John Day River/Clarno	1707020405	0	1	1	2	1	3	8	Moderate HUC5 score; PCEs support all of five TRT demographically independent populations in this region; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence) but that this HUC5 may have less production potential than others; low rating assigned to tributary PCEs but CHART noted that this HUC5 is primarily important as a high value migration corridor	Low
	Lower John Day	Butte Creek	1707020406	2	1	1	2	1	2	9	Moderate HUC5 score; PCEs support one of five TRT demographically independent populations in this region; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence) but that this HUC5 may have less production potential than others	Medium
	Lower John Day	Pine Hollow	1707020407	2	1	2	3	1	2	11	Moderate-high HUC5 score; PCEs support one of five TRT demographically independent populations in this region; HUC5 contains index reaches for spawner surveys; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence)	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Lower John Day	Thirtymile Creek	1707020408	2	1	1	3	1	2	10	Moderate HUC5 score; PCEs support one of five TRT demographically independent populations in this region; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence) but that this HUC5 may have less production potential than others	Medium
	Lower John Day	Lower John Day River/Ferry Canyon	1707020409	0	1	1	2	1	3	8	Moderate HUC5 score; PCEs support all of five TRT demographically independent populations in this region; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence) but that this HUC5 may have less production potential than others; low rating assigned to tributary PCEs but CHART noted that this HUC5 is primarily important as a high value migration corridor. CHART concluded that HUC5 conservation value should be raised from Low to Medium given the comments from ODFW and the importance of spatial diversity of spawning habitats in these low elevation tributaries.	Medium

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Lower John Day	Lower John Day River/Scott Canyon	1707020410	0	1	1	2	1	3	8	Moderate HUC5 score; PCEs support all of five TRT demographically independent populations in this region; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence) but that this HUC5 may have less production potential than others; low rating assigned to tributary PCEs but CHART noted that this HUC5 is primarily important as a high value migration corridor. CHART concluded that HUC5 conservation value should be raised from Low to Medium given the comments from ODFW and the importance of spatial diversity of spawning habitats in these low elevation tributaries.	Medium
	Lower John Day	Upper Rock Creek	1707020411	1	1	2	3	2	2	11	Moderate-high HUC5 score; PCEs support one of five TRT demographically independent populations in this region; HUC5 contains index reaches for spawner surveys; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence)	High
	Lower John Day	Lower Rock Creek	1707020412	1	1	1	3	2	2	10	Moderate HUC5 score; PCEs support one of five TRT demographically independent populations in this region; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence) but that this HUC5 may have less production potential than others; high value rearing/migration corridor for upstream HUC5	Medium

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Lower John Day	Grass Valley Canyon	1707020413	2	1	1	2	1	2	9	Moderate HUC5 score; PCEs support one of five TRT demographically independent populations in this region; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence) but that this HUC5 may have less production potential than others	Medium
	Lower John Day	Lower John Day River/Mcdonald Ferry	1707020414	1	1	1	3	1	3	10	Moderate HUC5 score; PCEs support all of five TRT demographically independent populations in this region; CHART noted that PCEs likely support unique genetic resources (e.g., limited hatchery influence) but no tributary PCEs so CHART concluded that HUC5 is a high value rearing/migration corridor for upstream HUC5s	High
	Upper Deschutes	Deschutes River/ Mckenzie Canyon	1707030107							*	<u>Unoccupied HUC5</u>, but population expansion into this HUC5 possibly essential for conservation; High HUC5 score; Pelton Reregulating Dam, Pelton Dam, and Round Butte Dam are currently a barrier to expansion.; Agreement signed July 2004 to restore fish runs.	Possibly High
	Upper Deschutes	Squaw Creek	1707030108							*	<u>Unoccupied HUC5</u>, but population expansion into this HUC5 possibly essential for conservation; High HUC5 score; Pelton Reregulating Dam, Pelton Dam, and Round Butte Dam are currently a barrier to expansion.; Agreement signed July 2004 to restore fish runs.	Possibly High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Upper Deschutes	Lower Metolius River	1707030110							*	Unoccupied HUC5, but population expansion into this HUC5 possibly essential for conservation; High HUC5 score; Pelton Reregulating Dam, Pelton Dam, and Round Butte Dam are currently a barrier to expansion.; Agreement signed July 2004 to restore fish runs.	Possibly High
	Upper Deschutes	Deschutes River/ Haystack	1707030111							*	Unoccupied HUC5, but population expansion into this HUC5 possibly essential for conservation; High HUC5 score; Pelton Reregulating Dam, Pelton Dam, and Round Butte Dam are currently a barrier to expansion.; Agreement signed July 2004 to restore fish runs.	Possibly High
	Lower Deschutes	Headwaters Deschutes River	1707030601							*	Unoccupied HUC5, but population expansion into this HUC5 possibly essential for conservation; High HUC5 score; Pelton Reregulating Dam and Pelton Dam are currently a barrier to expansion; Agreement signed July 2004 to restore fish runs.	Possibly High
	Lower Deschutes	Upper Deschutes River	1707030603	2	2	1	1	1	3	10	Moderate HUC5 score; PCEs support spawning and rearing for two of five extant TRT demographically independent populations in this region; Deschutes River basin identified by ODFW as a priority area for this ESU; PCEs overlap with AFS critical watershed; ; Watershed contains unoccupied habitat above Pelton Reregulating Dam and Pelton Dam that may be essential for conservation; Agreement signed July 2004 to restore fish runs.	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Lower Deschutes	Mill Creek	1707030604	1	2	1	2	1	2	9	Moderate HUC5 score; PCEs support spawning and rearing for one of five extant TRT demographically independent populations in this region; Deschutes River basin identified by ODFW as a priority area for this ESU; PCEs overlap with AFS critical watershed	High
	Lower Deschutes	Beaver Creek	1707030605	2	1	1	2	1	2	9	Moderate HUC5 score; PCEs support spawning and rearing for one of five extant TRT demographically independent populations in this region; Deschutes River basin identified by ODFW as a priority area for this ESU; PCEs overlap with AFS critical watershed	High
	Lower Deschutes	Warm Springs River	1707030606	2	2	1	2	1	2	10	Moderate HUC5 score; PCEs support spawning and rearing for one of five extant TRT demographically independent populations in this region; Deschutes River basin identified by ODFW as a priority area for this ESU; PCEs overlap with AFS critical watershed	High
	Lower Deschutes	Middle Deschutes River	1707030607	2	3	2	1	3	3	14	High HUC5 score; PCEs support spawning and rearing for two of five extant TRT demographically independent populations in this region; HUC5 has high value tributary and mainstem habitats; Deschutes River basin identified by ODFW as a priority area for this ESU	High

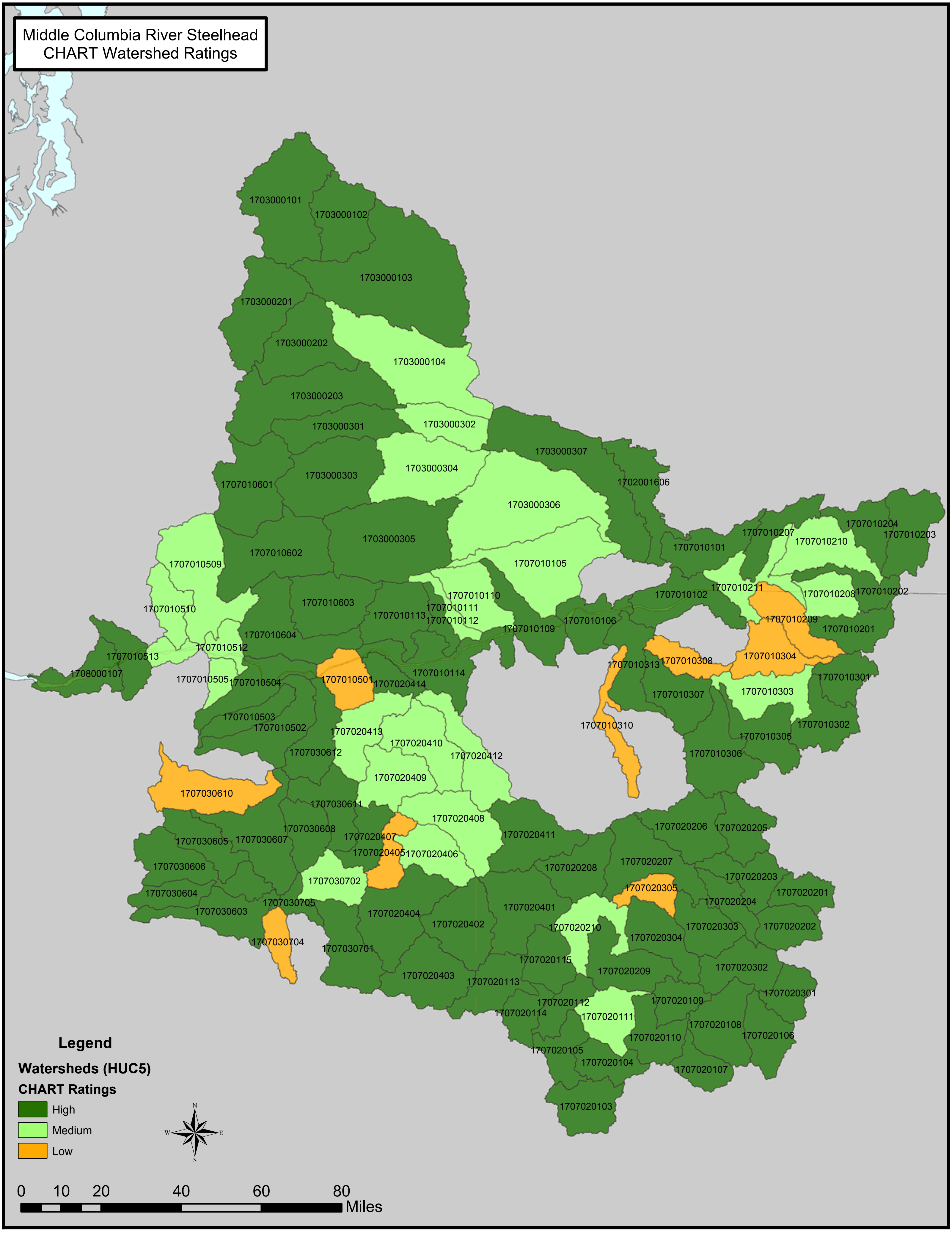
Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Lower Deschutes	Bakeoven Creek	1707030608	2	1	2	2	3	2	12	Moderate-high HUC5 score; PCEs support spawning and rearing for one of five extant TRT demographically independent populations in this region; CHART noted that this HUC5 is one of three key eastside tributaries for this population; Deschutes River basin identified by ODFW as a priority area for this ESU	High
	Lower Deschutes	White River	1707030610	0	1	0	1	0	2	4	Low-moderate HUC5 score; PCEs support spawning and rearing for one of five extant TRT demographically independent populations in this region; Deschutes River basin identified by ODFW as a priority area for this ESU; CHART noted that PCEs are extremely limited in this HUC5	Low
	Lower Deschutes	Buck Hollow Creek	1707030611	2	1	2	2	3	2	12	Moderate-high HUC5 score; PCEs support spawning and rearing for one of five extant TRT demographically independent populations in this region; CHART noted that this HUC5 is one of three key eastside tributaries for this population; Deschutes River basin identified by ODFW as a priority area for this ESU	High
	Lower Deschutes	Lower Deschutes River	1707030612	2	3	3	1	3	3	15	Highest HUC5 score in entire ESU; PCEs support spawning and rearing for two of five extant TRT demographically independent populations in this region; HUC5 has high value tributary and mainstem habitats; Deschutes River basin identified by ODFW as a priority area for this ESU	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	**2**	**3**	**4**	**5**	**6**			
	Trout	Upper Trout Creek	1707030701	3	1	2	2	3	2	13	Moderate-high HUC5 score; PCEs support spawning and rearing for one of five extant TRT demographically independent populations in this region; CHART noted that this HUC5 is one of three key eastside tributaries for this population; Deschutes River basin identified by ODFW as a priority area for this ESU	High
	Trout	Antelope Creek	1707030702	1	1	1	1	1	2	7	Moderate HUC5 score; PCEs support spawning and rearing for one of five extant TRT demographically independent populations in this region; CHART noted that this HUC5 has more limited PCE quantity and quality than other HUC5s in the subbasin; Deschutes River basin identified by ODFW as a priority area for this ESU	Medium
	Trout	Mud Springs Creek	1707030704	0	1	0	0	0	2	3	Low HUC5 score; PCEs support spawning and rearing for one of five extant TRT demographically independent populations in this region; CHART noted the extremely limited quantity and quality of PCEs in this HUC5 relative to others in the subbasin; Deschutes River basin identified by ODFW as a priority area for this ESU but PCEs are very limited in this HUC5	Low

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Trout	Lower Trout Creek	1707030705	1	1	2	1	2	2	9	Moderate HUC5 score; PCEs support spawning and rearing for one of five extant TRT demographically independent populations in this region; CHART noted that PCEs are limited here but of high value to support spawning/rearing PCEs for adjacent Upper Trout Creek HUC5; Deschutes River basin identified by ODFW as a priority area for this ESU	High
	Upper Columbia/Priest Rapids	Columbia River Zintel Canyon	1702001606							NS	Not scored since HUC5 consists solely of high value rearing/migration PCEs in Columbia River corridor; PCEs support all three TRT demographically independent populations in the Yakima River group	High
	Lower Columbia/ Sandy	Columbia Gorge Tributaries	1708000107							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Middle Columbia/ Hood	Middle Columbia/Eagle Creek	1707010513							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Multiple	Lower Columbia Corridor (Sandy/ Washougal to Ocean)	NA							NS	Area not scored since CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation	High

* Indicates that HUC5 contains blocked/inaccessible areas that the CHART concluded may be essential for ESU conservation. See Unit Description text for specific areas considered.

Figure J1. CHART Ratings of Conservation Value for Habitat Areas in HUC5 Watersheds Occupied by the Middle Columbia River Steelhead ESU



Middle Columbia River Steelhead
CHART Watershed Ratings
1703000101
1703000102
1703000103
1703000201
1703000202
1703000104
1703000203
1703000301
1703000302
1703000307
1703000304
1703000303
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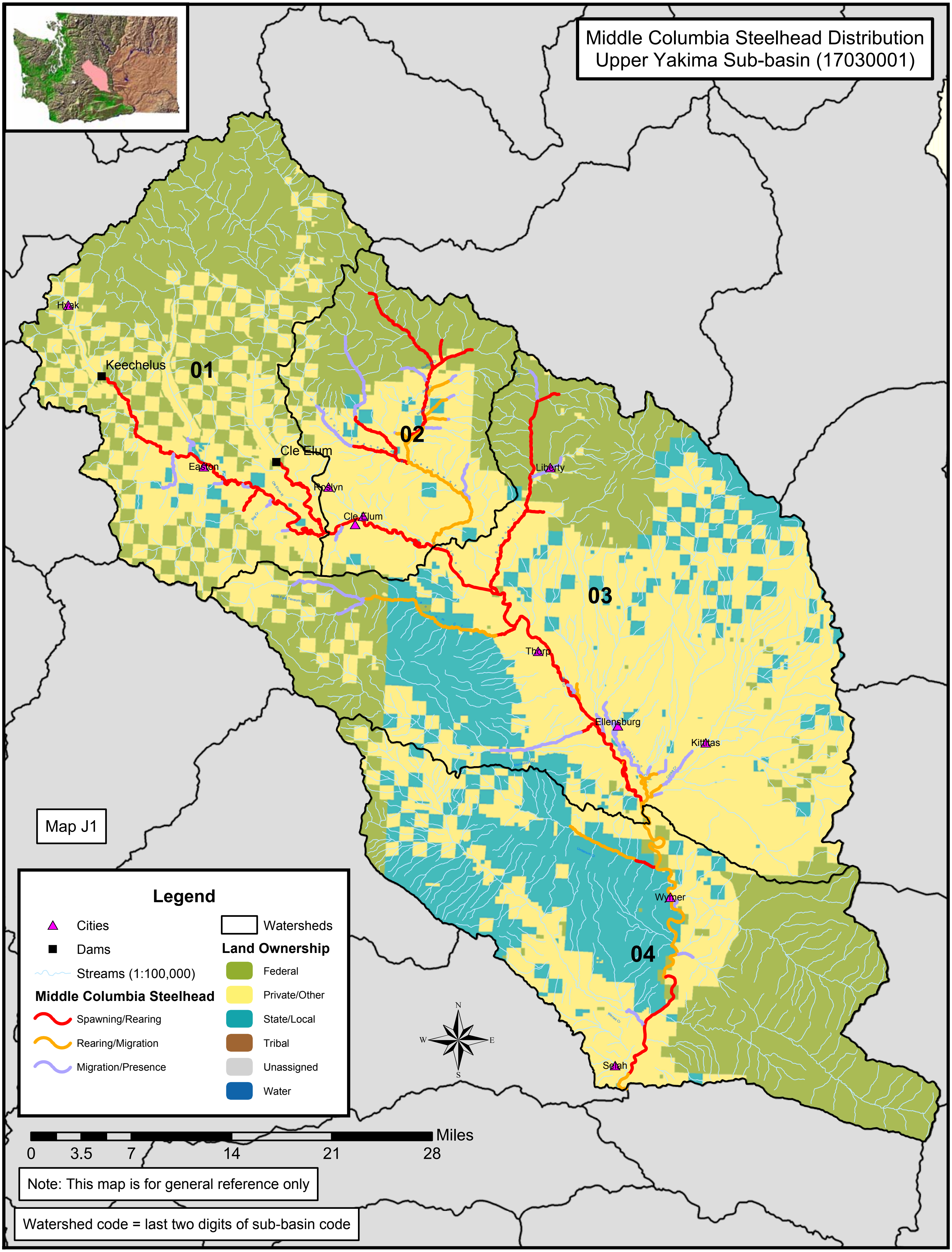
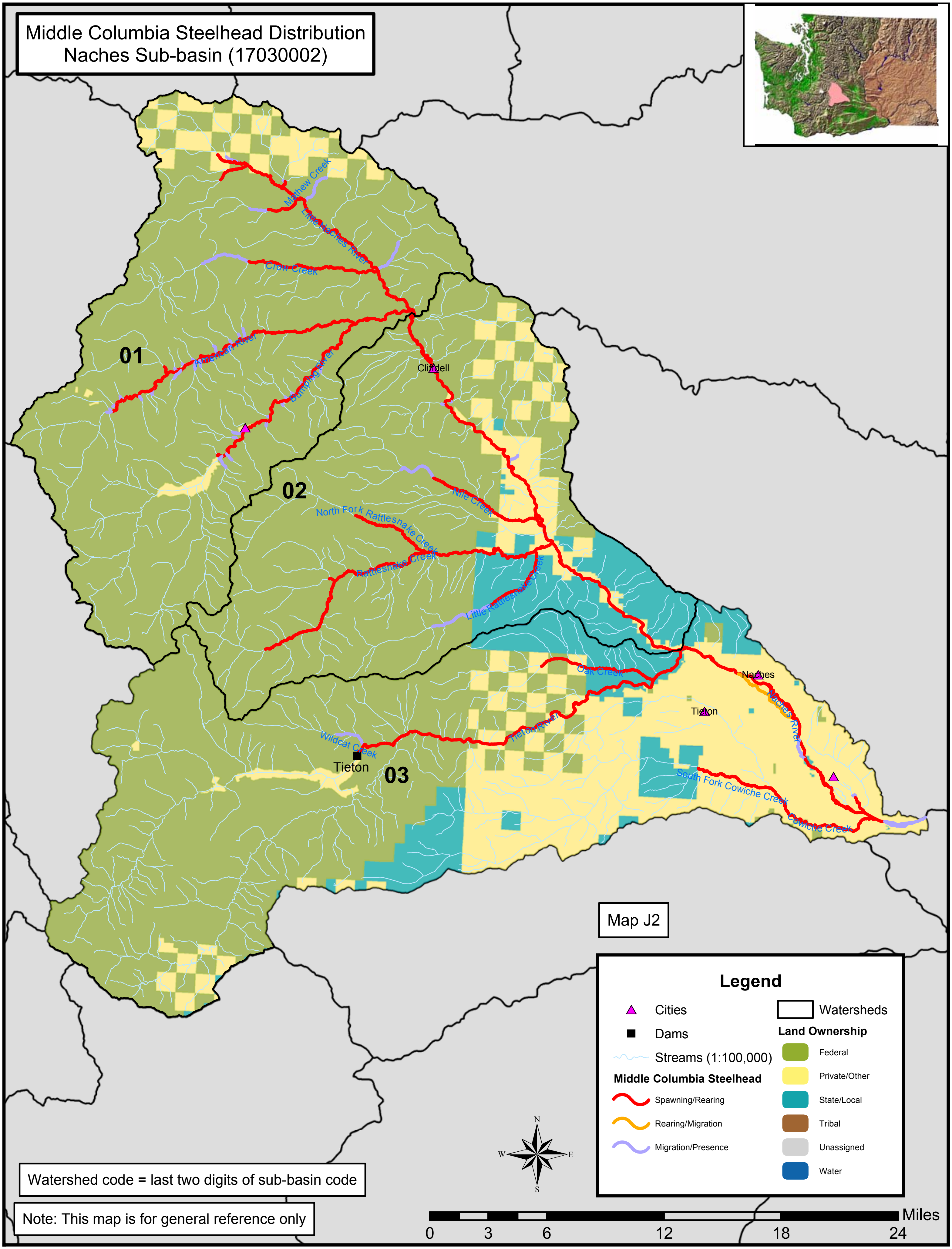
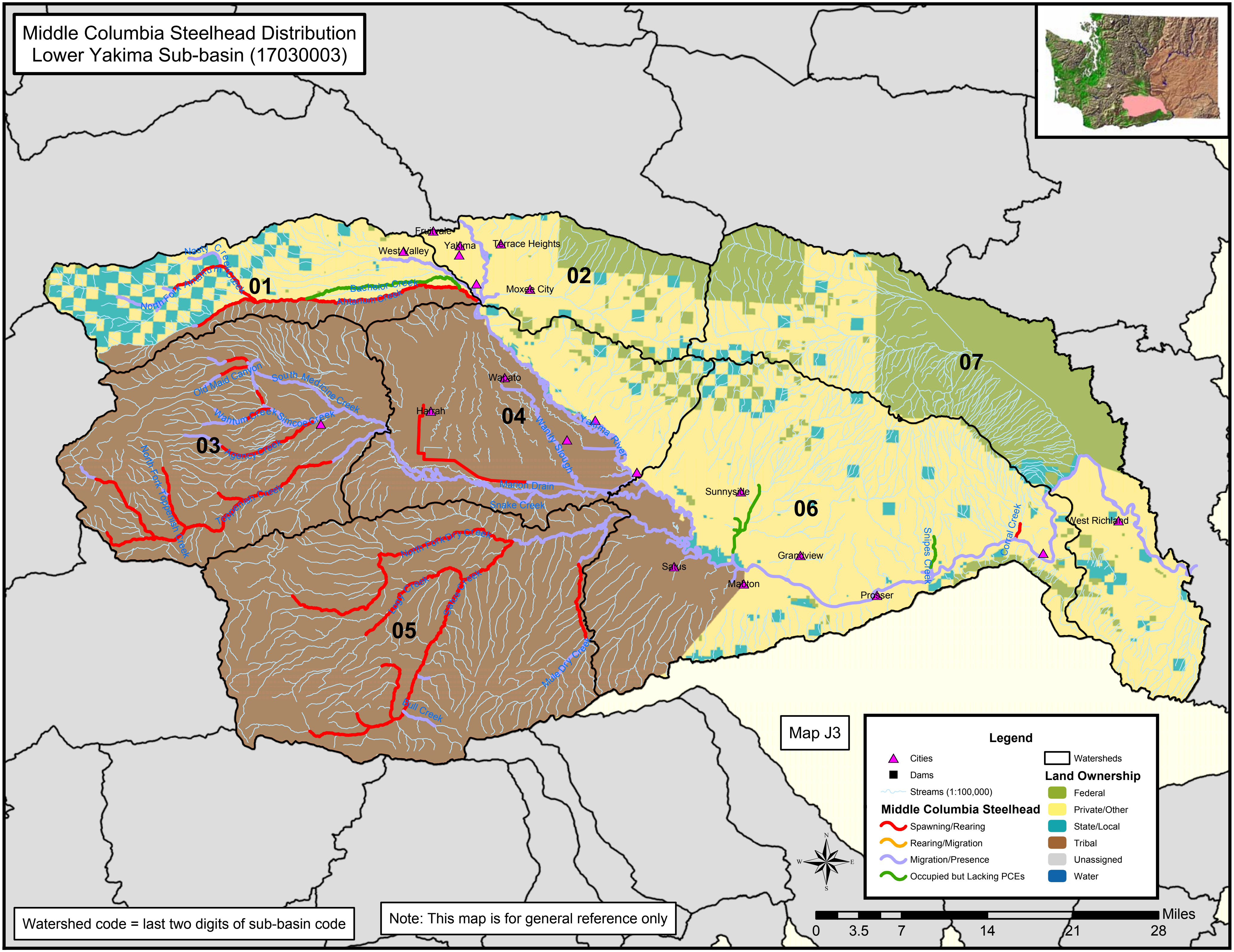
1707020113
1707020301
1707020112
1707020109
1707020114
1707020111
1707020108
1707020110
1707020106
1707020105
1707020104
1707020107
1707020103
Legend
Watersheds (HUC5)
CHART Ratings
High
Medium
Low
N
W
E
S
0
10
20
40
60
80
Miles

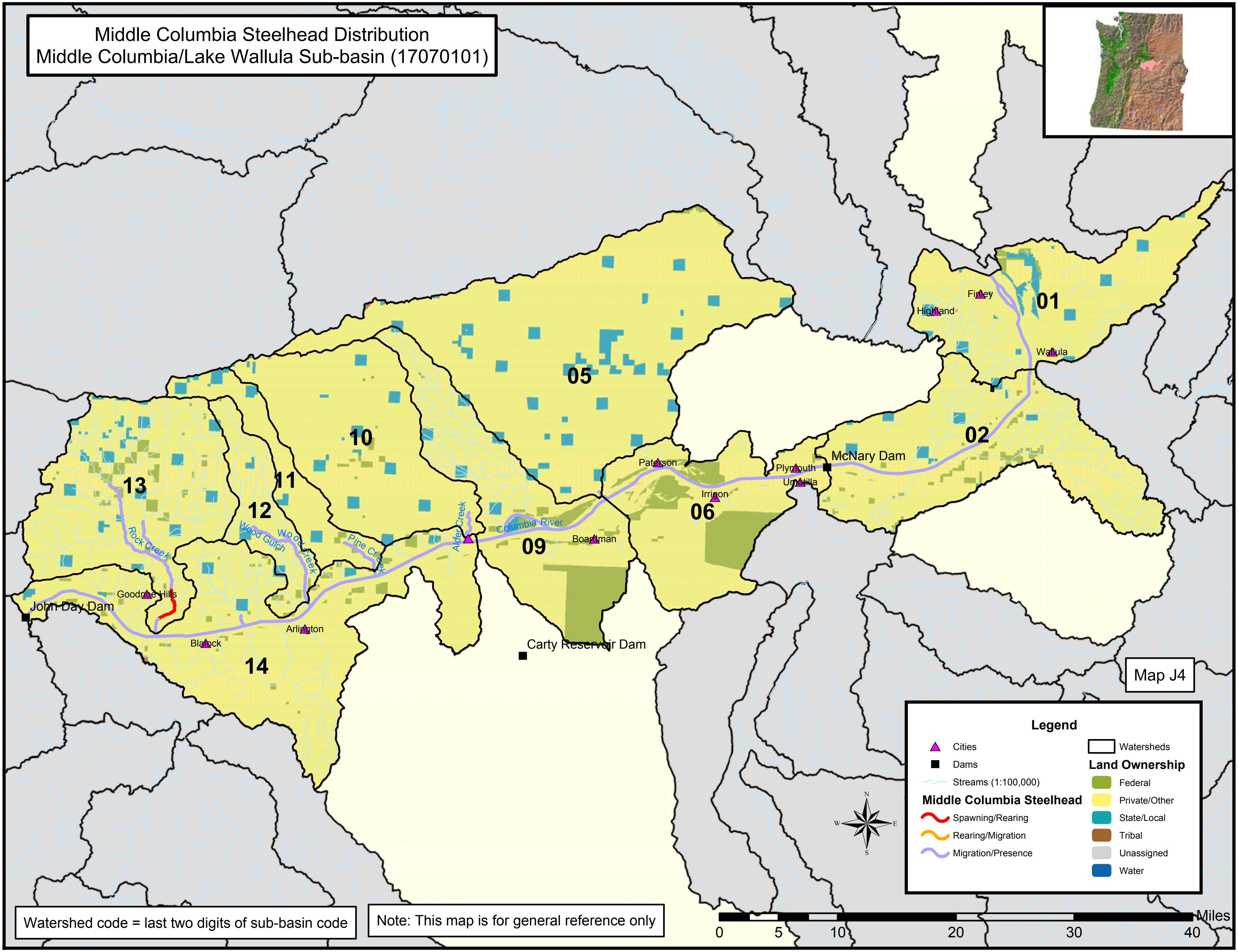


Middle Columbia Steelhead Distribution
Upper Yakima Sub-basin (17030001)
Hyak
Keechelus
01
02
03
04
Cle Elum
Easton
Roslyn
Cle Elum
Liberty
Thorp
Ellensburg
Kittitas
Wymer
Selah
Map J1
Legend
Cities
Dams
Streams (1:100,000)
Middle Columbia Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
Miles
0
3.5
7
14
21
28
Note: This map is for general reference only
Watershed code = last two digits of sub-basin code

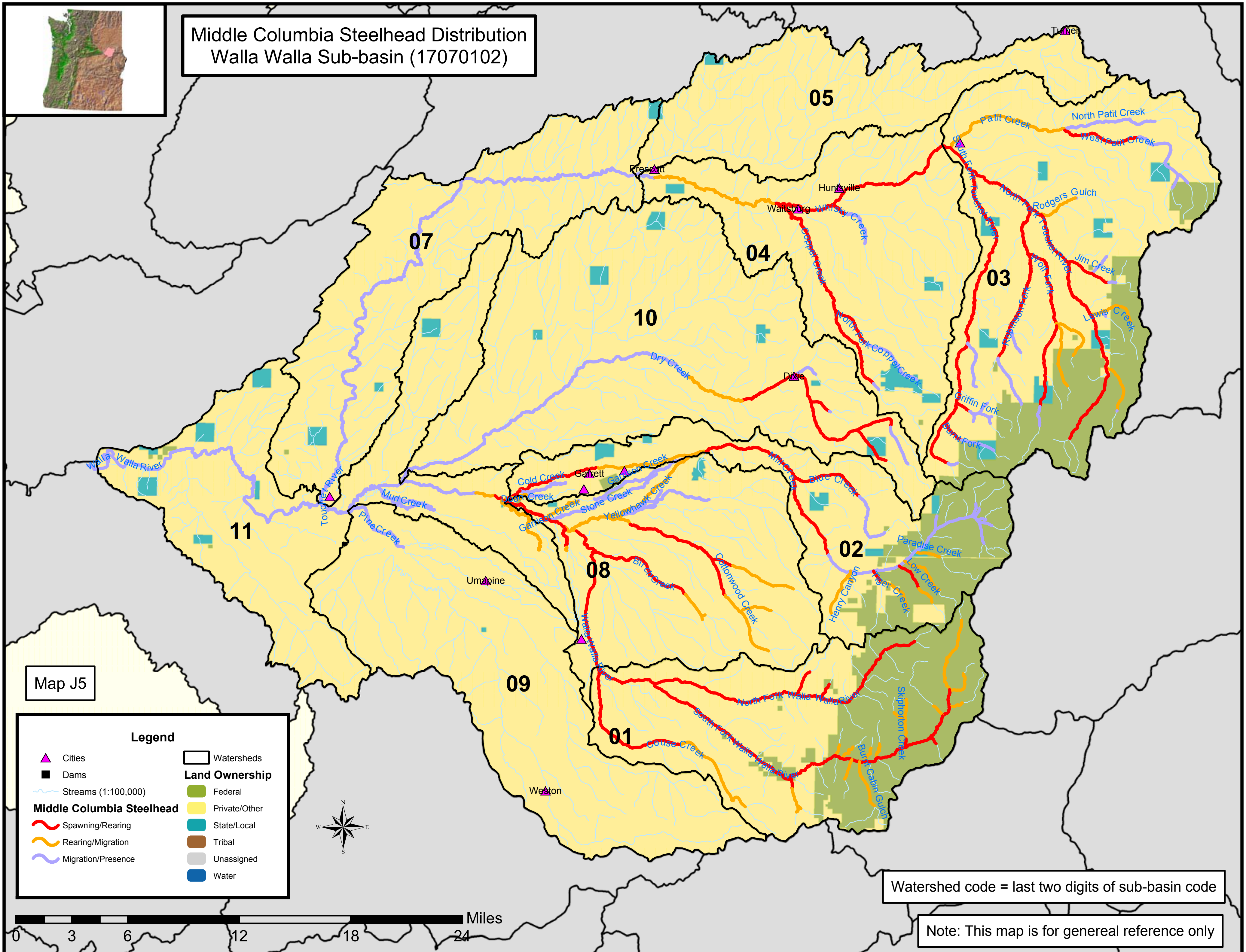


Middle Columbia Steelhead Distribution
Naches Sub-basin (17030002)
Mathew Creek
Little Naches River
Crow Creek
American River
Bumping River
Cliffdell
Nile Creek
North Fork Rattlesnake Creek
Rattlesnake Creek
Little Rattlesnake Creek
Oak Creek
Naches
Naches River
Tieton
Tieton River
Wildcat Creek
South Fork Cowiche Creek
Cowiche Creek
01
02
03
Map J2
Legend
Cities
Dams
Streams (1:100,000)
Middle Columbia Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only
0
3
6
12
18
24
Miles

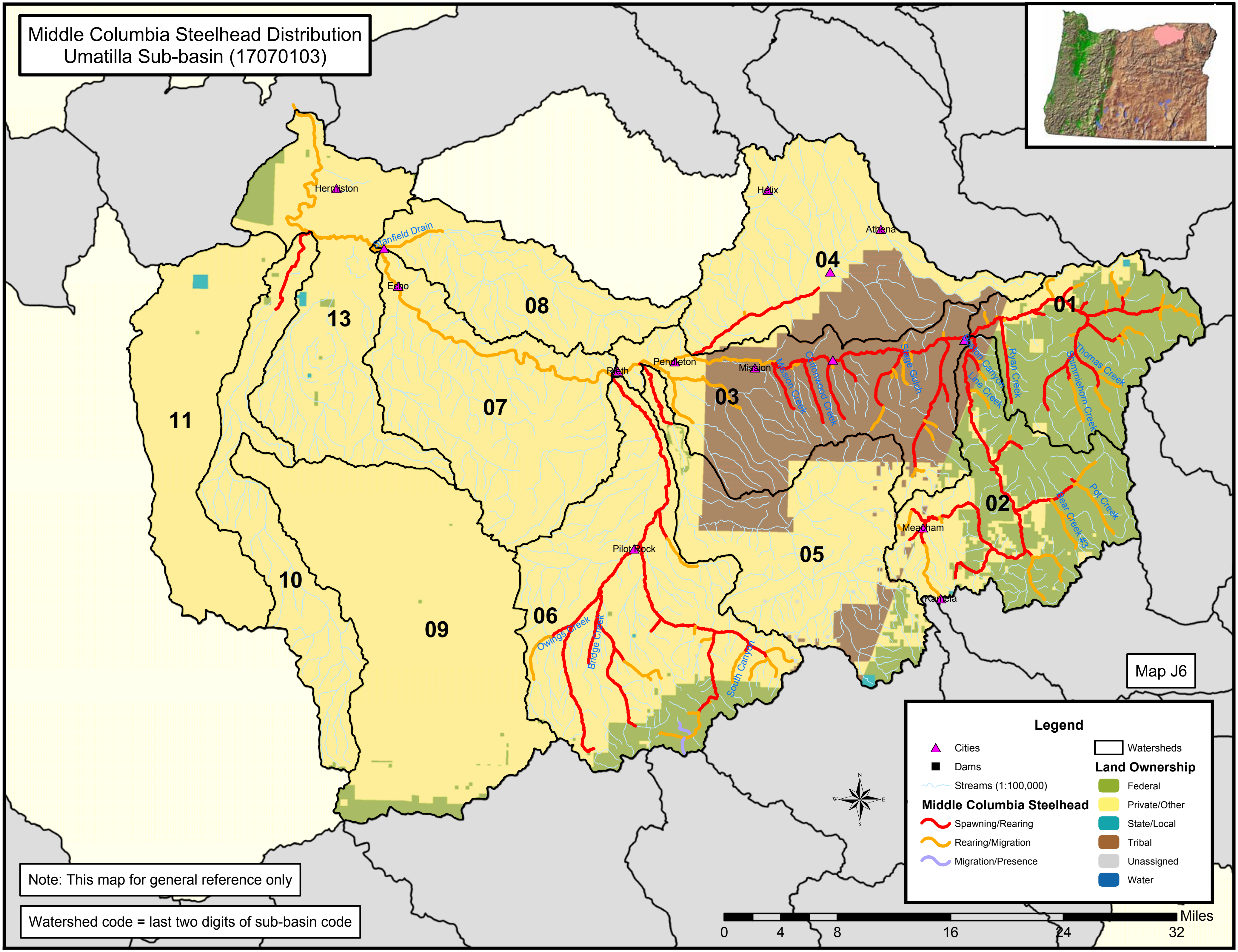

Middle Columbia Steelhead Distribution
Lower Yakima Sub-basin (17030003)
01
02
03
04
05
06
07
Fruitvale
Yakima
Terrace Heights
West Valley
Moxee City
Wapato
Harrah
Sunnyside
Grandview
Mabton
Prosser
West Richland
Bachelor Creek
Ahtanum Creek
North Fork Ahtanum Creek
Old Maid Canyon
South Medicine Creek
Wanity Slough
Yakima River
Marion Drain
Snake Creek
North Fork Toppenish Creek
Toppenish Creek
North Fork Dry Creek
Bull Creek
Mule Dry Creek
Snipes Creek
Corral Creek
Map J3
Legend
Cities
Dams
Streams (1:100,000)
Middle Columbia Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Occupied but Lacking PCEs
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Miles
0
3.5
7
14
21
28
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only



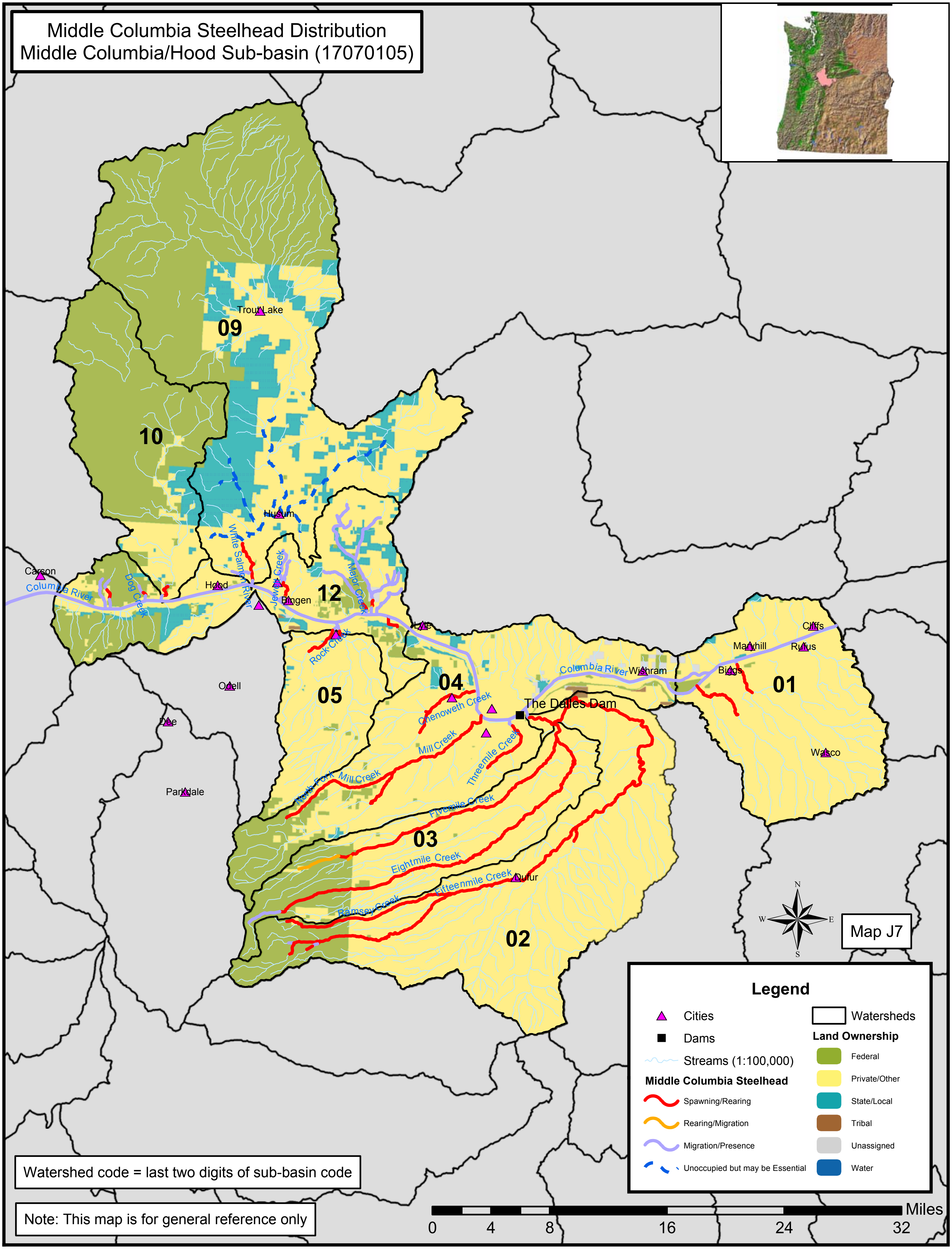
Middle Columbia Steelhead Distribution
Middle Columbia/Lake Wallula Sub-basin (17070101)
01
02
05
06
09
10
11
12
13
14
Finley
Highland
Wallula
McNary Dam
Paterson
Plymouth
Umatilla
Irrigon
Boardman
Columbia River
Alder Creek
Pine Creek
Wood Gulch
Wood Creek
Rock Creek
Goodnoe Hills
John Day Dam
Arlington
Blalock
Carty Reservoir Dam
Map J4
Legend
Cities
Dams
Streams (1:100,000)
Middle Columbia Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
0
5
10
20
30
40
Miles
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only



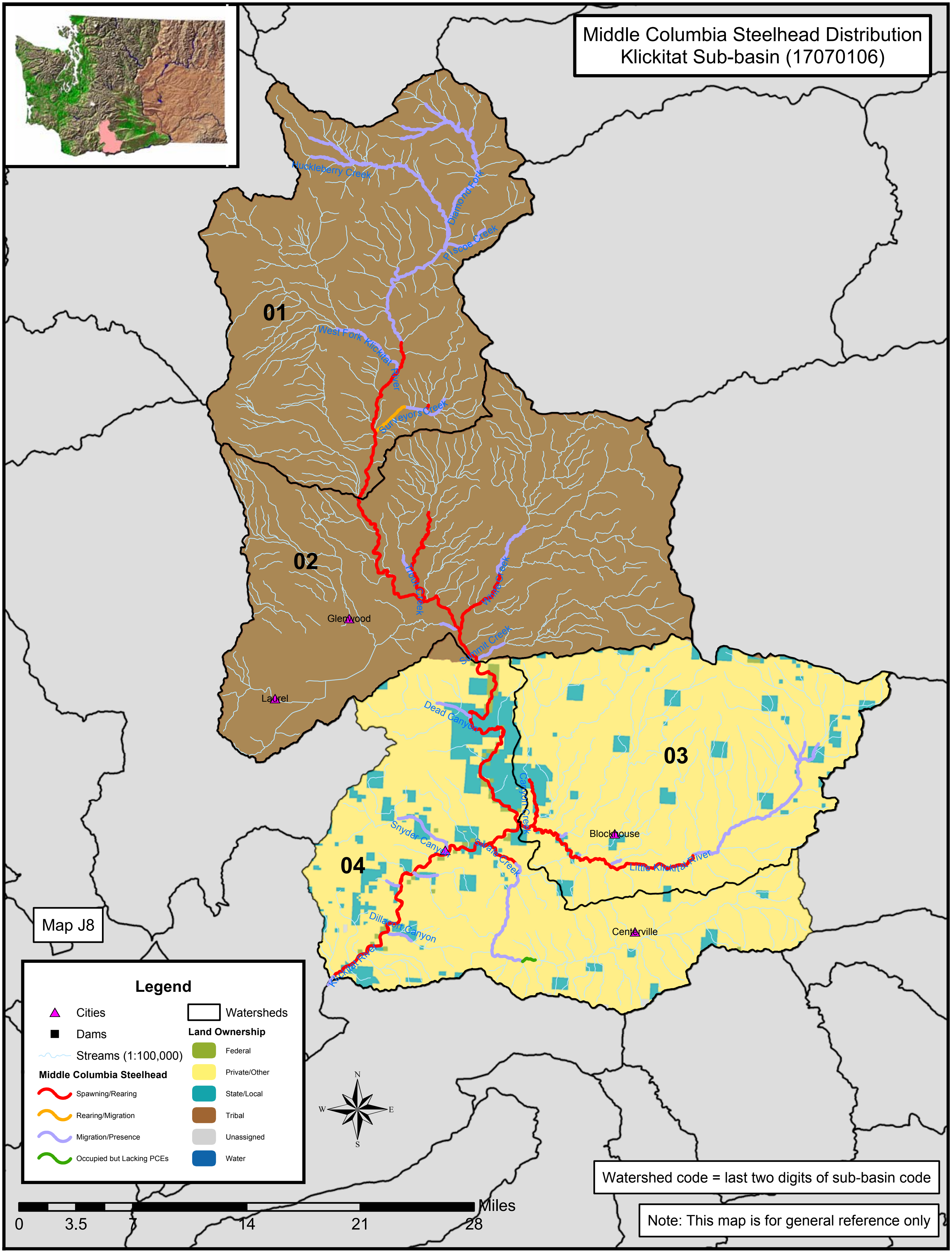
Middle Columbia Steelhead Distribution
Walla Walla Sub-basin (17070102)
Map J5
Legend
Cities
Dams
Streams (1:100,000)
Middle Columbia Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Miles
0
3
6
12
18
24
Watershed code = last two digits of sub-basin code
Note: This map is for genereal reference only
01
02
03
04
05
07
08
09
10
11
Prescott
Huntsville
Waitsburg
Dixie
Garrett
Umapine
Weston
Walla Walla River
Touchet River
Mud Creek
Pine Creek
Dry Creek
Cold Creek
Dean Creek
Garrison Creek
Stone Creek
Yellowhawk Creek
Mill Creek
Blue Creek
Birch Creek
Cottonwood Creek
Paradise Creek
Low Creek
Henry Canyon
Tiger Creek
North Fork Walla Walla River
South Fork Walla Walla River
Couse Creek
Skiphorton Creek
Burnt Cabin Gulch
Patit Creek
North Patit Creek
West Patit Creek
Whiskey Creek
Coppei Creek
North Fork Coppei Creek
Rodgers Gulch
Jim Creek
Wolf Fork
Robinson Fork
Lewis Creek
Griffin Fork
Burnt Fork

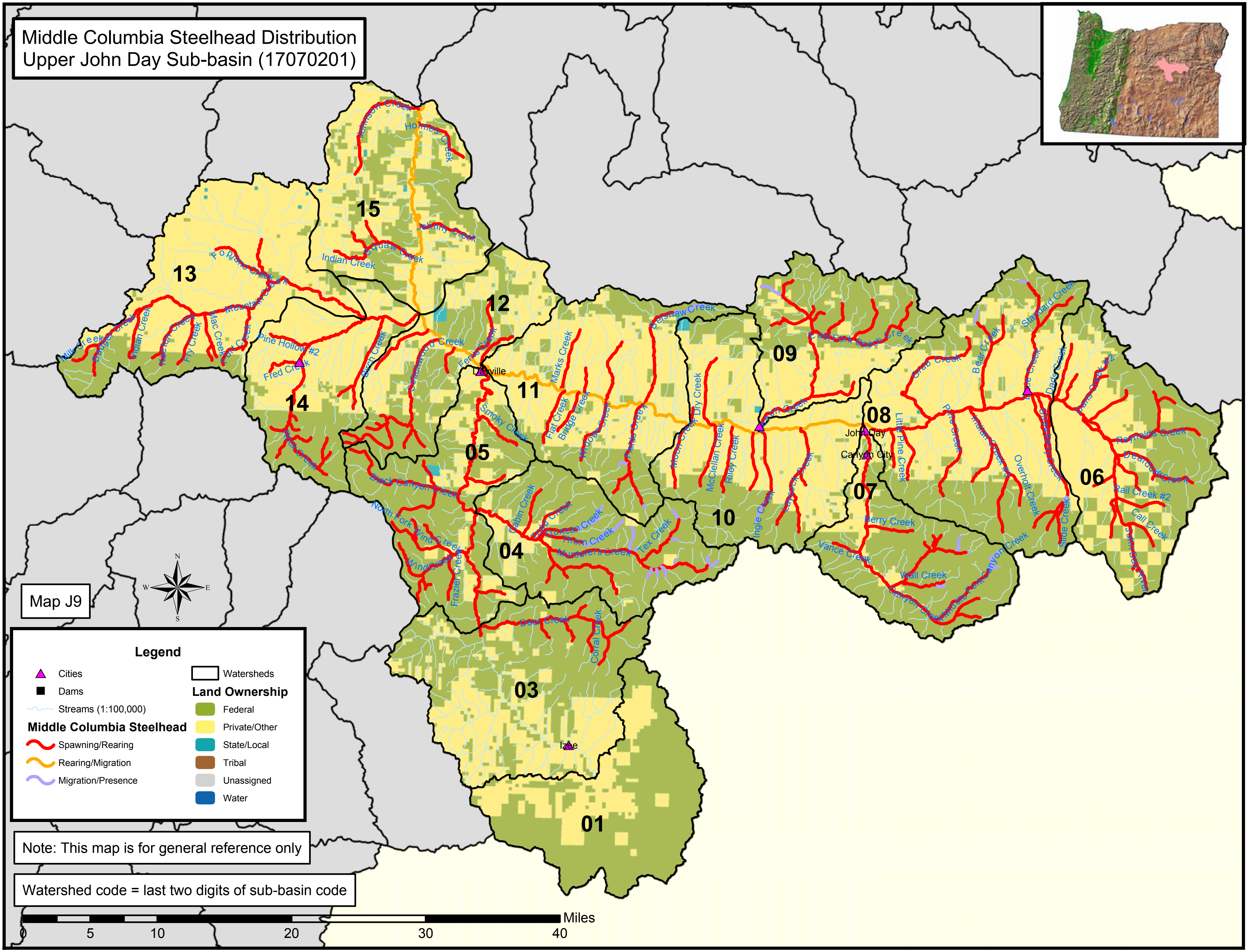


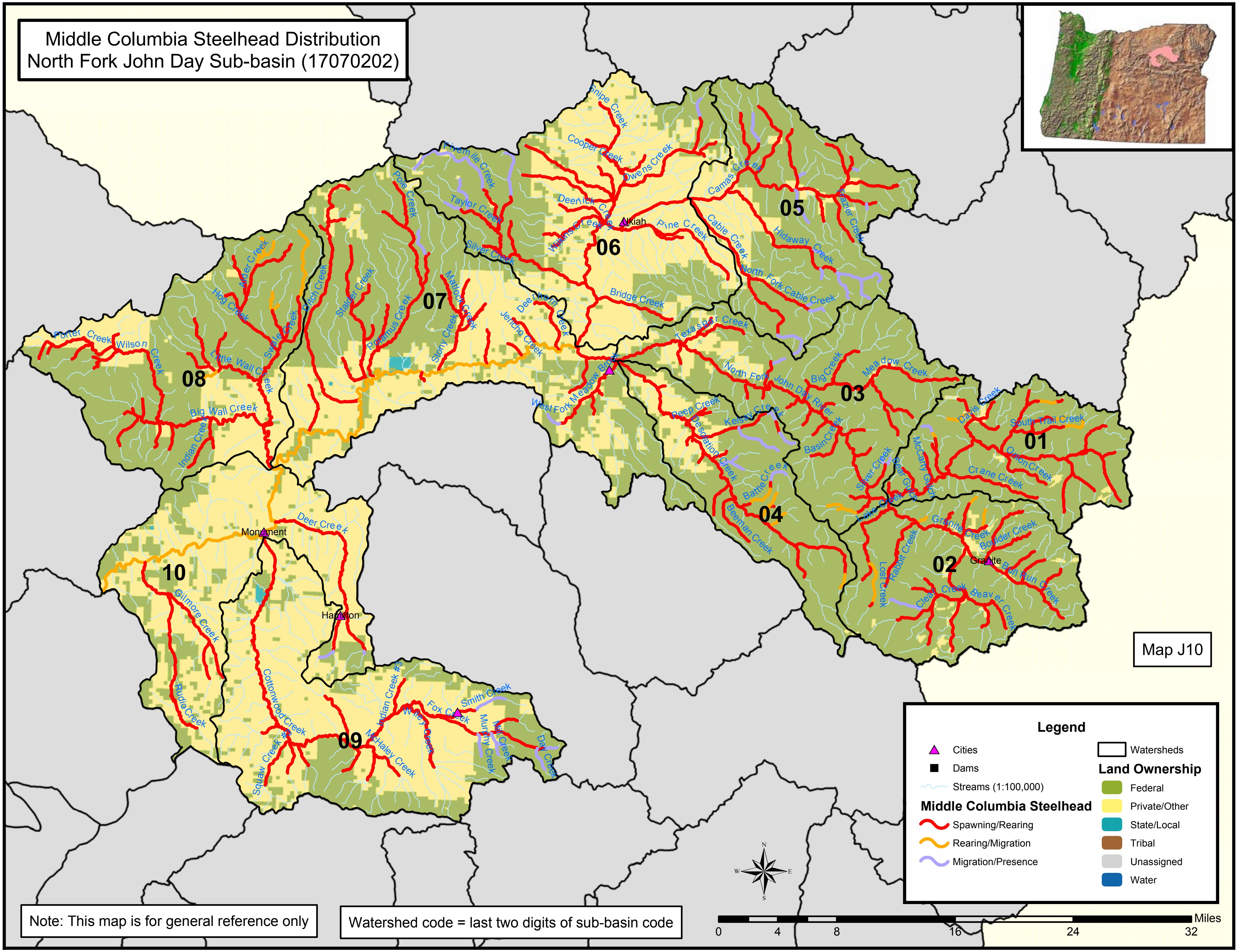
Middle Columbia Steelhead Distribution
Umatilla Sub-basin (17070103)
Hermiston
Stanfield Drain
Echo
Helix
Athena
Pendleton
Mission
Pilot Rock
Meacham
Owings Creek
Bridge Creek
South Canyon
Mission Creek
Cottonwood Creek
Ryan Creek
Thomas Creek
Shimmiehorn Creek
Line Creek
Pot Creek
Bear Creek
01
02
03
04
05
06
07
08
09
10
11
13
Map J6
Legend
Cities
Dams
Streams (1:100,000)
Middle Columbia Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Note: This map for general reference only
Watershed code = last two digits of sub-basin code
0 4 8 16 24 32
Miles

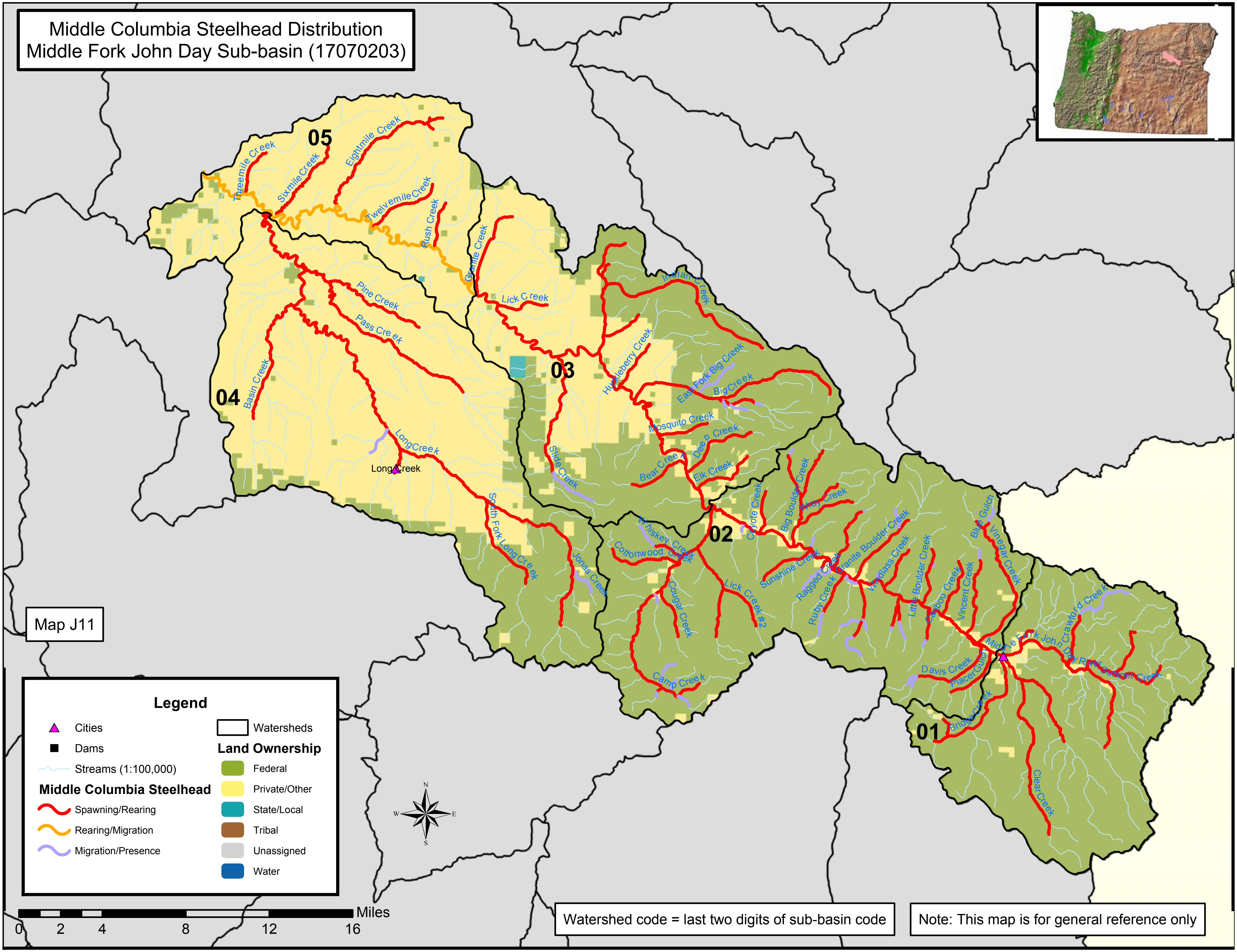

Middle Columbia Steelhead Distribution
Middle Columbia/Hood Sub-basin (17070105)
Trout Lake
09
10
Husum
White Salmon River
Jewett Creek
Major Creek
12
Carson
Columbia River
Dog Creek
Hood
Bingen
Lyle
Rock Creek
05
04
Odell
Dee
Parkdale
Chenoweth Creek
The Dalles Dam
Mill Creek
Threemile Creek
North Fork Mill Creek
Fivemile Creek
03
Eightmile Creek
Fifteenmile Creek
Dufur
Ramsey Creek
02
Columbia River
Wishram
Maryhill
Cliffs
Rufus
Biggs
01
Wasco
N
W
E
S
Map J7
Legend
Cities
Dams
Streams (1:100,000)
Middle Columbia Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Unoccupied but may be Essential
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only
Miles
0
4
8
16
24
32

Middle Columbia Steelhead Distribution
Klickitat Sub-basin (17070106)



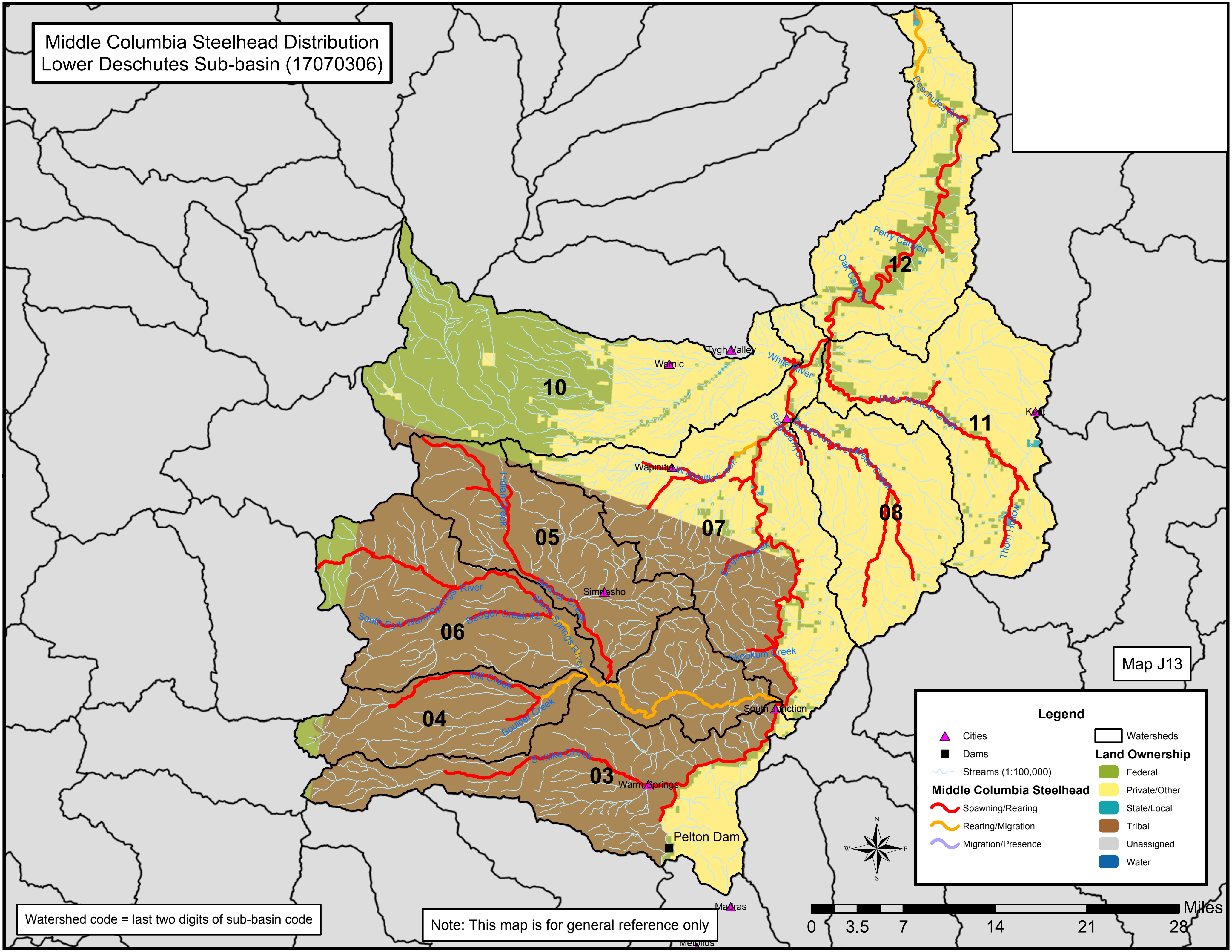

Middle Columbia Steelhead Distribution
Upper John Day Sub-basin (17070201)
Map J9
Legend
Cities
Dams
Streams (1:100,000)
Middle Columbia Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Note: This map is for general reference only
Watershed code = last two digits of sub-basin code
0
5
10
20
30
40
Miles
N
S
E
W
01
03
04
05
06
07
08
09
10
11
12
13
14
15
Dayville
John Day
Canyon City
Izee
Johnson Creek
Holmes Creek
Johnny Creek
Indian Creek
Mill Creek
Indian Creek
Fry Creek
Mac Creek
Pine Hollow #2
Fred Creek
Birch Creek
Cottonwood Creek
Smoky Creek
Black Canyon Creek
North Fork Wind Creek
Wind Creek
Frazier Creek
Cabin Creek
Murderers Creek
Tex Creek
Deer Creek
Corral Creek
Marks Creek
Flat Creek
Bridge Creek
Belshaw Creek
Dry Creek
McClellan Creek
Riley Creek
Ingle Creek
Moon Creek
East Fork Beech Creek
Berry Creek
Vance Creek
Wall Creek
Canyon Creek
Little Pine Creek
Pine Creek
Indian Creek
Overholt Creek
Bear Creek
Grub Creek
Standard Creek
Dads Creek
Reynolds Creek
Deardorff Creek
Rail Creek #2
Call Creek
Slide Creek


Middle Columbia Steelhead Distribution
North Fork John Day Sub-basin (17070202)
Map J10
Legend
Cities
Dams
Streams (1:100,000)
Middle Columbia Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Note: This map is for general reference only
Watershed code = last two digits of sub-basin code
Miles
0
4
8
16
24
32
N
S
E
W
01
02
03
04
05
06
07
08
09
10
Ukiah
Monument
Hamilton
Granite
Snipe Creek
Cooper Creek
Owens Creek
Camas Creek
Hidaway Creek
Cable Creek
North Fork Cable Creek
Pine Creek
Bridge Creek
Texas Bar Creek
North Fork John Day River
Big Creek
Meadow Creek
Davis Creek
South Trail Creek
Onion Creek
Crane Creek
McCarty Gulch
Bear Gulch
Silver Creek
Basin Creek
Granite Creek
Boulder Creek
Bull Run Creek
Beaver Creek
Clear Creek
Rabbit Creek
Lost Creek
Deep Creek
Kelsay Creek
Desolation Creek
Battle Creek
Beeman Creek
West Fork Meadow Brook
Jericho Creek
Stony Creek
Potamus Creek
Stalder Creek
Ditch Creek
Pole Creek
Taylor Creek
Silver Creek
Alder Creek
Hog Creek
Swale Creek
Little Wall Creek
Big Wall Creek
Indian Creek
Porter Creek
Wilson Creek
Deer Creek
Gilmore Creek
Rudio Creek
Cottonwood Creek
Squaw Creek
McHaley Creek
Indian Creek
Fox Creek
Smith Creek
Murphy Creek
Mill Creek
Day Creek

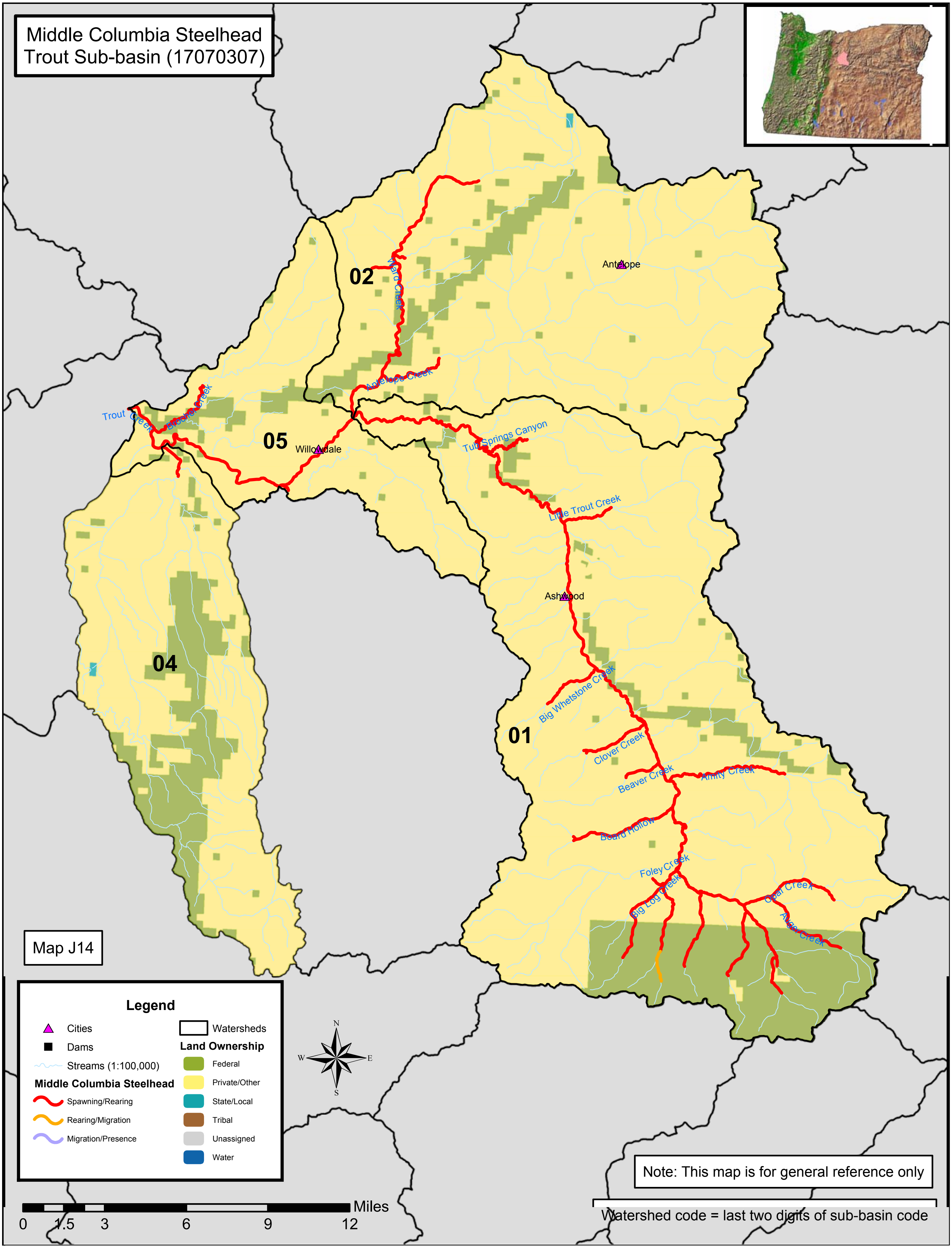


Middle Columbia Steelhead Distribution
Middle Fork John Day Sub-basin (17070203)
Map J11
Legend
Cities
Dams
Streams (1:100,000)
Middle Columbia Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Miles
0
2
4
8
12
16
N
S
E
W
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only
01
02
03
04
05
Long Creek
Threemile Creek
Sixmile Creek
Eightmile Creek
Twelvemile Creek
Rush Creek
Granite Creek
Lick Creek
Pine Creek
Pass Creek
Basin Creek
Long Creek
South Fork Long Creek
Jonas Creek
Indian Creek
Huckleberry Creek
East Fork Big Creek
Big Creek
Mosquito Creek
Deep Creek
Bear Creek
Elk Creek
Slide Creek
Whiskey Creek
Cottonwood Creek
Cougar Creek
Lick Creek #2
Camp Creek
Coyote Creek
Big Boulder Creek
Wray Creek
Sunshine Creek
Ragged Creek
Ruby Creek
Granite Boulder Creek
Windlass Creek
Little Boulder Creek
Caribou Creek
Vincent Creek
Blue Gulch
Vinegar Creek
Davis Creek
Placer Gulch
Bridge Creek
Middle Fork John Day River
Crawford Creek
Clear Creek

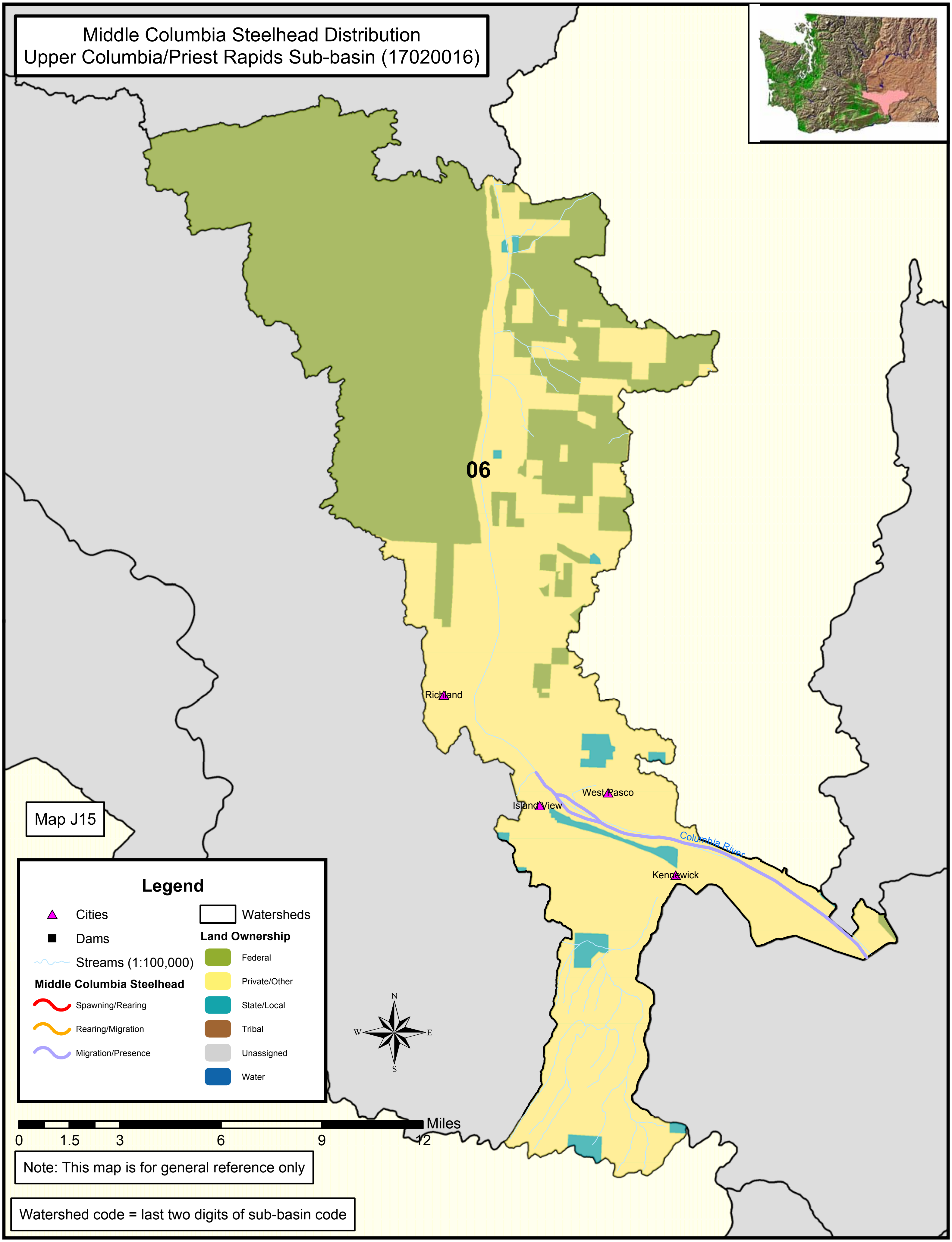

Middle Columbia Steelhead Distribution
Lower John Day Sub-basin (17070204)
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only
Map J12
Legend
Cities
Dams
Streams (1:100,000)
Middle Columbia Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Miles
0
4
8
16
24
32
Rock Creek
Moro
Olex
Mikkalo
Grass Valley
Condon
Hardman
Mayville
Shaniko
Fossil
Kinzua
Spray
Kimberly
Grass Valley Canyon
Rosebush Creek
Hay Creek
Scott Canyon
Little Ferry Canyon
Ferry Canyon
Jackknife Creek
Dry Creek
John Day River
Thirtymile Creek
Lost Valley Creek
Rock Creek
Juniper Creek
Lone Rock Creek
Pine Hollow
Long Hollow Creek
Big Pine Hollow
Butte Creek
Deep Creek
Brown Creek
Buckhorn Creek
Stahl Canyon
Chapin Creek
Tupper Creek
Straw Fork
Sorefoot Creek
Cove Creek
Pine Creek
Steers Canyon
Service Creek
Camp Creek
Wheeler Creek
Alder Creek
Kahler Creek
East Bologna Canyon
Left Hand Creek
Parrish Creek
Rowe Creek
Shoofly Creek
Girds Creek
Little Muddy Creek
Cherry Creek
Dry Creek #3
Bear Creek
West Branch Bridge Creek
Dodds Creek
Gable Creek
Johnson Creek #2
Bridge Creek
14
13
10
12
09
08
11
07
06
05
04
02
01
03



Middle Columbia Steelhead Distribution
Lower Deschutes Sub-basin (17070306)
12
11
10
08
07
05
06
04
03
Deschutes River
Ferry Canyon
Oak Canyon
White River
Buck Hollow Creek
Bakeoven Creek
Thorn Hollow
Tygh Valley
Wamic
Wapinitia
Kent
Simnasho
Indian Creek
Beaver Creek
Warm Springs River
South Fork Warm Springs River
Badger Creek
Mill Creek
Boulder Creek
Shitike Creek
Eagle Creek
Skookum Creek
South Junction
Warm Springs
Pelton Dam
Madras
Metolius
Map J13
Legend
Cities
Dams
Streams (1:100,000)
Middle Columbia Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Miles
0
3.5
7
14
21
28
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only



Middle Columbia Steelhead Trout Sub-basin (17070307)
02
05
04
01
Antelope
Willowdale
Ashwood
Trout Creek
Ward Creek
Antelope Creek
Tub Springs Canyon
Little Trout Creek
Big Whetstone Creek
Clover Creek
Beaver Creek
Amity Creek
Board Hollow
Foley Creek
Big Log Creek
Opal Creek
Auger Creek
Map J14
Legend
Cities
Dams
Streams (1:100,000)
Middle Columbia Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
0
1.5
3
6
9
12
Miles
Note: This map is for general reference only
Watershed code = last two digits of sub-basin code



Middle Columbia Steelhead Distribution
Upper Columbia/Priest Rapids Sub-basin (17020016)
06
Richland
West Pasco
Island View
Columbia River
Kennewick
Map J15
Legend
Cities
Dams
Streams (1:100,000)
Middle Columbia Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
W
E
S
0
1.5
3
6
9
12
Miles
Note: This map is for general reference only
Watershed code = last two digits of sub-basin code

Appendix K
CHART Assessment for the
Lower Columbia River Steelhead ESU

CHART Participants

The CHART for this ESU consisted of the following NOAA Fisheries biologists: Ben Meyer (CHART Leader), Michelle Day, Patty Dornbusch, Dan Guy, Lynne Krasnow, Lance Kruzic, Nancy Munn, Mindy Simmons, Cathy Tortorici, and Rich Turner. This CHART assessment also benefitted from review and comments from the Oregon Department of Fish and Wildlife and the Washington Department of Fish and Wildlife.

ESU Description

The Lower Columbia River steelhead ESU was listed as threatened in 1997 (62 FR43937; August 18, 1997). The ESU includes all naturally spawned populations of steelhead in streams and tributaries to the Columbia River between the Cowlitz and Wind Rivers, Washington (inclusive), and the Willamette and Hood Rivers, Oregon (inclusive). Excluded are steelhead in the upper Willamette River Basin above Willamette Falls and steelhead from the Little and Big White Salmon Rivers in Washington. We have recently conducted a review to update the ESU's status, taking into account new information, evaluating component resident rainbow trout populations, and considering the net contribution of artificial propagation efforts in the ESU. We have proposed that Lower Columbia River *O. mykiss* remain listed as threatened (69 FR 33102; June 14, 2004). Additionally, we have proposed that the listing include resident populations of *O. mykiss* below impassible barriers (natural and manmade) that co-occur with anadromous populations. We have also proposed that the listing include ten artificial propagation programs considered part of the ESU. The final listing determination for all *O. mykiss* ESUs was extended by six months (70 FR 37219, June 28, 2005), therefore the CHART's assessment focused on the anadromous range of *O. mykiss*.

The following brief description is based largely on life history information and excerpts from the report of the Lower Columbia Fish Recovery Board (LCFRB 2003) and the Willamette/Lower Columbia River Technical Recovery Team's (TRT) recent review of historical population structure for this ESU (Myers et al. 2003). In the lower Columbia basin, migrating adult steelhead can occur in the Columbia River year-round, but peaks in migratory activity and differences in reproductive ecotype lend themselves to classifying steelhead into two races: summer and winter steelhead. Summer steelhead return to fresh water from May to October, and enter the Columbia in a sexually immature condition, requiring several months in fresh water to reach sexual maturity and spawn. Winter steelhead enter fresh water from November to April, and return as sexually mature individuals that spawn shortly thereafter.

Some rivers have both summer and winter steelhead, while others have only one race. Where both runs occur in the same stream, summer steelhead tend to spawn higher in the watershed than do winter forms, perhaps suggesting that summer steelhead tend to exist where winter runs do not fully utilize available habitat. In rivers where both winter and summer forms occur, they are often separated by a seasonal hydrologic barrier, such as a waterfall. Coastal streams are predominantly winter steelhead, whereas interior subbasins are dominated by summer steelhead. Historically, winter steelhead may have been excluded from interior Columbia River subbasins by Celilo Falls.

Steelhead spawn in clear, cool, well-oxygenated streams with suitable gravel and water velocity. Adult fish waiting to spawn or in the process of spawning are vulnerable to disturbance and predation in areas without suitable cover. Cover types include overhanging vegetation, undercut banks, submerged vegetation, submerged objects such as logs and rocks, deep water, and turbulence. Spawning occurs earlier in areas of lower elevation and where water temperature is warmer than in areas of higher elevation and cooler water temperature. Spawning occurs from January through May, and precise spawn timing is related to stream temperature. Adult steelhead, unlike salmon, do not necessarily die after spawning but return to the ocean. However, repeat spawning is not common among steelhead migrating several hundred miles or more upstream from the ocean.

Steelhead eggs hatch in 35–50 days depending on water temperature. Following hatching, alevins remain in the gravel 2 to 3 weeks until the yolk-sac is absorbed. Steelhead are spring spawners, so they spawn at a time when temperatures are typically cold, but increasing. Their spawning time must optimize avoidance of competing risks from gravel-bed scour during high flow and increasing water temperatures that can become lethal to eggs as the warm season arrives.

Fry emergence is principally determined by the time of egg deposition and the water temperature during the incubation period. Fry emergence may occur from May through August in the Yakima River subbasin. In the lower Columbia, emergence timing differs slightly between steelhead races and among subbasins. The different emergence times between races may be a function of spawning location within the watershed (and hence water temperature) or a result of genetic differences of the races. Generally, emergence occurs from March into July, with peak emergence time generally in April and May.

Following emergence, fry usually move into shallow and slow-moving margins of the stream. Fry tend to occupy shallow riffle habitats and as they grow, they inhabit areas with deeper water, a wider range of velocities, and larger substrate.

Steelhead exhibit a great deal of variability in smolt age and ocean age. The dominant age class of outmigrating steelhead smolts in the lower Columbia River is age 2. In the lower Columbia River, outmigration of steelhead smolts generally occurs from March to June, with peak migration usually in April or May.

Recovery Planning Status

The Willamette-Lower Columbia River TRT has identified 23 historical demographically independent populations of Lower Columbia River steelhead: 18 Western Cascade Range tributaries populations (the Cispus River winter-run, Tilton River winter-run, Upper Cowlitz River winter-run, Lower Cowlitz River winter-run, North Fork Toutle River winter-run, South Fork Toutle River winter-run, Coweeman River winter-run, Kalama River winter-run, Kalama River winter-run, Kalama River summer-run, North Fork Lewis River winter-run, East Fork Lewis River winter-run, North Fork Lewis River summer-run, East Fork Lewis River summer-run, Clackamas River winter-run, Salmon Creek winter-run, Sandy River winter-run, Washougal River winter-run, Washougal River summer run populations); and five Columbia River Gorge tributaries populations (the Lower Gorge tributaries winter-run, Upper Gorge tributaries winter-run, Wind River summer-run, Hood River winter-run, and Hood River summer-run populations) (Myers et al. 2003). The TRT has identified two life-history types (summer- and winter-run steelhead) and two ecological spawning zones (Cascade and Columbia Gorge) (McElhany et al. 2002). Recovery planning will likely emphasize the need for a geographical distribution of viable populations across the range of such strata in the ESU (Ruckelshaus et al. 2002, McElhany et al. 2003). A draft recovery plan for the Washington management unit of this ESU was completed by the Lower Columbia Fish Recovery Board (LCFRB 2004) and released by NMFS for public comment in April 2005. NMFS expects to use this plan as an interim regional recovery plan until a plan for the whole ESU is completed. A preliminary draft plan for Oregon areas of the ESU is expected by the end of 2005. The CHART considered LCFRB plan and the TRT products in rating each habitat area, but did not have the benefit of regional recovery plans throughout the range of this ESU. We anticipate that, as recovery planning proceeds, we will have better information and may revise our recommendations regarding critical habitat designation.

CHART Area Assessments

The CHART assessment for this ESU addressed nine subbasins containing 41 occupied watersheds, as well as the lower Columbia River rearing/migration corridor. As noted above, the lower Columbia River steelhead ESU inhabits two ecological zones (Cascade and Columbia Gorge) and contains two life history types (summer- and winter-run steelhead), resulting in a total of four strata for this ESU: Cascade summer- and winter-run populations, and Columbia Gorge summer- and winter-run populations (McElhany et al. 2002). Therefore, as part of its assessment the CHART considered the conservation value of each HUC5 in the context of the populations within these strata. Information is presented below by USGS subbasin because they present a convenient and systematic way to organize the CHART's watershed assessments for this ESU and their names are generally more recognizable because they typically identify major river systems.

Middle Columbia/Hood Subbasin (HUC4# 17070105)

The Middle Columbia/Hood subbasin is located in the eastern portion of the Columbia River gorge of Oregon and Washington. Occupied watersheds in this subbasin are contained in Hood River, Multnomah, and Wasco counties in Oregon, and Klickitat and Skamania counties in Washington. The subbasin contains 13 watersheds, six of which are occupied by this ESU. Occupied watersheds encompass approximately 842 mi^2 and 1,015 miles of streams. Fish distribution and habitat use data from the Oregon Department of Fish and Wildlife (ODFW) and Washington Department of Fish and Wildlife (WDFW) identify approximately 303 miles of occupied riverine habitat in the watersheds, including a 23-mile segment of the Columbia River (ODFW 2003a,b; WDFW 2003). Myers et al. (2003) identified a single ecological zone (Columbia Gorge) containing two summer-run (Wind River and Hood River) and three winter-run (Upper Gorge Tributaries, Lower Gorge Tributaries, and Hood River) historical demographically independent populations in this subbasin. The Wind River summer-run and Hood River winter-run populations have been classified by the TRT as "core" populations (i.e., historically abundant and "may offer the most likely path to recovery") (McElhany et al. 2003). Also, the TRT classified the Hood River winter-run steelhead as a genetic legacy population, i.e., one of "the most intact representatives of the genetic character of the ESU" (McElhany et al. 2003).

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table K1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map K1 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART also determined that the occupied HUC5 watersheds in this subbasin ranged from high to low conservation value to the ESU. Of the six HUC5s reviewed, four were rated as having high, one was rated as having medium, and one was rated as having low conservation value. The CHART noted that two HUC5s (Middle Columbia/Eagle Creek and Middle Columbia/Grays Creek) contain a high value rearing and migration corridor in the Columbia River connecting high value upstream watersheds with downstream reaches and the ocean. Table K2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure K1 shows the overall distribution of ratings by HUC5 watershed.

Lower Columbia/Sandy Subbasin (HUC4# 17080001)

The Lower Columbia/Sandy subbasin is located in the western portion of the Columbia River gorge of Oregon and Washington. Occupied watersheds in this subbasin are contained in Clackamas, Columbia, and Multnomah counties in Oregon, and Clark and Skamania counties in Washington. The subbasin contains nine watersheds, all of which are occupied by this ESU. Occupied watersheds encompass approximately 1,076 mi^2 and 1,316 miles of streams. Fish distribution and habitat use data from the Oregon Department of Fish and Wildlife (ODFW) and Washington Department of Fish and Wildlife (WDFW) identify approximately 513 miles of occupied riverine habitat in the watersheds, including a 26-mile segment of the Columbia River (ODFW 2003a,b; WDFW 2003). Myers et al. (2003) identified two ecological zones (Cascade and Columbia Gorge) containing one summer-run (Washougal River) and four winter-run (Lower Gorge Tributaries, Washougal River, Salmon Creek, and Sandy River) historical demographically independent populations in this subbasin. The Washougal River summer-run and Sandy River winter-run steelhead have been classified by the TRT as "core" populations, i.e., historically abundant and "may offer the most likely path to recovery" (McElhany et al. 2003). Also, the TRT classified the Washougal River summer-run steelhead as a genetic legacy population, i.e., one of "the most intact representatives of the genetic character of the ESU" (McElhany et al. 2003).

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table K1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map K2 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART also determined that the occupied HUC5 watersheds in this subbasin are of high or medium conservation value to the ESU. Of the nine HUC5s reviewed, four were rated as having high and five were rated as having medium conservation value. The CHART also noted that one HUC5 (Columbia Gorge Tributaries) contains a high value rearing and migration corridor in the Columbia River connecting high value upstream watersheds with downstream reaches and the ocean. Table K2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure K1 shows the overall distribution of ratings by HUC5 watershed.

Lewis Subbasin (HUC4# 17080002)

The Lewis subbasin is located in southwest Washington and contained in Clark, Cowlitz, and Skamania counties (a very small and unoccupied portion in the uppermost watershed is contained in Yakima County). The subbasin contains six watersheds, two of which are currently occupied by this ESU and the remaining four are now blocked by Merwin Dam and others upstream. Occupied watersheds encompass approximately 456 mi^2 and 561 miles of streams. Fish distribution and habitat use data from the Washington Department of Fish and Wildlife (WDFW) identify approximately 248 miles of occupied riverine habitat in the watersheds (WDFW 2003). Myers et al. (2003) identified a single ecological zone (Cascade) containing two summer-run (North Fork Lewis River and East Fork Lewis River) and two winter-run (North Fork Lewis River and East Fork Lewis River) historical demographically independent populations in this subbasin. The TRT has classified the North Fork Lewis River winter-run steelhead as a "core" population (historically abundant and "may offer the most likely path to recovery") and the East Fork Lewis River summer-run population as a genetic legacy population (one of "the most intact representatives of the genetic character of the ESU") (McElhany et al. 2003).

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table K1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map K3 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART also determined that both of the occupied HUC5 watersheds in this subbasin were of high conservation value to the ESU. Table K2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure K1 shows the overall distribution of ratings by HUC5 watershed.

The CHART also discussed whether inaccessible reaches above Merwin, Yale and Swift dams may be essential to the conservation of this ESU. The CHART believed that these unoccupied areas may be important because they once supported a TRT core population and they contain non-inundated habitats that are likely in good condition relative to other more urbanized watersheds in the Cascade region (Lower Columbia Fish Recovery Board 2003, McElhany et al. 2003). The CHART also noted that the TRT concluded that "given the limited amount of spawning habitat currently accessible it is unlikely that an independent self-sustaining [summer-run] population could exist" (Myers et al. 2003). On the other hand the CHART noted that there is currently a substantial amount of habitat still accessible throughout the range of this ESU. Therefore, the CHART concluded that the ESU would likely benefit if the extant populations had access to spawning/rearing habitat upstream but that it was unclear whether these areas are essential for conservation.

Lower Columbia/Clatskanie Subbasin (HUC4# 17080003)

The Lower Columbia/Clatskanie subbasin is located in southwest Washington and northwest Oregon. The only occupied watershed in this subbasin (Kalama River) is contained in Cowlitz and Skamania counties in Washington. This watershed encompasses approximately 237 mi^2 and 258 miles of streams. Fish distribution and habitat use data from the Washington Department of Fish and Wildlife (WDFW) identify approximately 133 miles of occupied riverine habitat in the watersheds (WDFW 2003). Myers et al. (2003) identified one ecological zone (Cascade) containing two historical demographically independent populations in this subbasin: Kalama River summer- and winter-run steelhead. The Kalama River summer-run population has been classified by the TRT as a "core" population, i.e., historically abundant and "may offer the most likely path to recovery" (McElhany et al. 2003).

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table K1 summarizes the total number of occupied reaches identified for the Kalama River HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watershed. Map K4 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART also determined that the Kalama River HUC5 watershed was of high conservation value to the ESU. Table K2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure K1 shows the overall distribution of ratings by HUC5 watershed.

Upper Cowlitz Subbasin (HUC4# 17080004)

The Upper Cowlitz subbasin is located in southwest Washington and contained in Lewis, Pierce, Skamania, and Yakima counties. The subbasin contains five watersheds, all of which are occupied by this ESU. Occupied watersheds encompass approximately 1,026 mi^2 and 1,282 miles of streams. Fish distribution and habitat use data from the Washington Department of Fish and Wildlife (WDFW) identify approximately 170 miles of occupied riverine habitat in the watersheds (WDFW 2003). All of this habitat is located upstream of impassable dams (Mayfield and Mossyrock) and only accessible to anadromous fish via trap and haul operations. Myers et al. (2003) identified one ecological zone (Cascade) containing two winter-run historical demographically independent populations in this subbasin (Upper Cowlitz River and Cispus River). Both populations have been classified by the TRT as "core" populations, i.e., historically abundant and "may offer the most likely path to recovery" (McElhany et al. 2003). In addition, the TRT classified the Upper Cowlitz River winter-run population as a genetic legacy population, i.e., one of "the most intact representatives of the genetic character of the ESU."

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table K1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map K5 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART also determined that the occupied HUC5 watersheds in this subbasin were all of high conservation value to the ESU. Table K2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure K1 shows the overall distribution of ratings by HUC5 watershed.

Lower Cowlitz Subbasin (HUC4# 17080005)

The Lower Cowlitz subbasin is located in southwest Washington and contained in Cowlitz, Lewis, and Skamania counties. The subbasin contains eight watersheds, all of which are occupied by this ESU. Occupied watersheds encompass approximately 1,465 mi^2 and 1,510 miles of streams. Fish distribution and habitat use data from the Washington Department of Fish and Wildlife (WDFW) identify approximately 785 miles of occupied riverine habitat in the watersheds (WDFW 2003). Habitat in two HUC5 watersheds – Tilton River and Riffe Reservoir – is located upstream of impassable dams (Mayfield and Mossyrock) and only accessible to anadromous fish via trap and haul operations. Data from WDFW identified very little steelhead distribution in the Riffe Reservoir HUC5 watershed (and did not identify the Riffe and Mayfield lakes as occupied habitat). However, the CHART determined that these lakes are occupied and contain PCEs for rearing/migrating juveniles based on information regarding migrants described in Wade (2000) as well as their own knowledge of trap and haul operations in this subbasin. Myers et al. (2003) identified one ecological zone (Cascade) containing seven historical demographically independent populations of winter-run steelhead in this subbasin: Cispus River, Upper Cowlitz River, Lower Cowlitz River, Tilton River, North Fork Toutle River, South Fork Toutle River, and Coweeman River. Three populations (Cispus River, Upper Cowlitz River, and North Fork Toutle River) have been classified by the TRT as "core" populations, i.e., historically abundant and "may offer the most likely path to recovery" (McElhany et al. 2003). In addition, the TRT classified the Upper Cowlitz River winter-run steelhead as a genetic legacy population, i.e., some of "the most intact representatives of the genetic character of the ESU."

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table K1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map K6 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART determined that the occupied HUC5 watersheds in this subbasin were of high or medium conservation value to the ESU. Of the eight HUC5s reviewed, three were rated as having high and five were rated as having medium conservation value to the ESU. The CHART also noted that four HUC5s (Riffe Reservoir, Jackson Prairie, East Willapa, and Coweeman River) contained high value rearing and migration corridors connecting high value upstream watersheds with downstream reaches and the ocean. Table K2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure K1 shows the overall distribution of ratings by HUC5 watershed.

Middle Willamette Subbasin (HUC4# 17090007)

The portion of the Middle Willamette River subbasin occupied by this ESU is downstream of Willamette Falls and includes a single HUC5 watershed (Abernethy Creek) as well as a short segment (approximately 1 mile) of the Willamette River downstream of Willamette Falls. Occupied portions of this subbasin within the ESU's range are contained in Clackamas County, Oregon. The Abernethy Creek watershed encompasses approximately 136 mi^2 and 171 miles of streams. Fish distribution and habitat use data from the Oregon Department of Fish and Wildlife (ODFW) identify approximately 26 miles of occupied riverine habitat in the subbasin (ODFW 2003a,b). Myers et al. (2003) identified one ecological zone (Cascade) containing a single historical demographically independent population in this subbasin: Clackamas River winter-run steelhead. This population has been classified by the TRT as a "core" population, i.e., historically abundant and "may offer the most likely path to recovery" (McElhany et al. 2003).

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in the Abernethy Creek watershed contain one or more PCEs for this ESU. Table K1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map K8 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART also determined that the Abernethy Creek HUC5 watershed was of low conservation value to the ESU. Table K2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure K1 shows the overall distribution of ratings by HUC5 watershed.

Clackamas Subbasin (HUC4# 17090011)

The Clackamas subbasin is a Cascade Range drainage of the lower Willamette River and is contained in Clackamas and Marion counties, Oregon. The subbasin contains six watersheds, all of which are occupied by this ESU. Occupied watersheds encompass approximately 942 mi^2 and 1,109 miles of streams. Fish distribution and habitat use data from the Oregon Department of Fish and Wildlife (ODFW) identify approximately 274 miles of occupied riverine habitat in the watersheds (ODFW 2003a,b). Myers et al. (2003) identified a single ecological zone (Cascade) containing a single historical demographically independent population in this subbasin: Clackamas River winter-run steelhead. This population has been classified by the TRT as a "core" population, i.e., historically abundant and "may offer the most likely path to recovery" (McElhany et al. 2003).

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table K1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map K8 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART also determined that all of the occupied HUC5 watersheds in this subbasin were of high conservation value to the ESU. Table K2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure K1 shows the overall distribution of ratings by HUC5 watershed.

Lower Willamette Subbasin (HUC4# 17090012)

The Lower Willamette subbasin is located at the confluence of the Willamette and Columbia rivers in Northwest Oregon. Occupied watersheds in this subbasin are contained in Clackamas, Multnomah, and Washington counties, Oregon. The subbasin contains three watersheds, all of which are occupied by this ESU. Two of the HUC5 watersheds (Columbia Slough/Willamette River and Scappoose Creek) do not contain spawning PCEs for this ESU but instead are used solely for rearing and migration. Occupied watersheds encompass approximately 408 mi^2 and 448 miles of streams. Fish distribution and habitat use data from the Oregon Department of Fish and Wildlife (ODFW) identify approximately 88 miles of occupied riverine habitat in the watersheds (ODFW 2003a,b). Myers et al. (2003) identified a single ecological zone (Cascade) containing one historical demographically independent population of winter-run steelhead in this subbasin (Clackamas River). This population has been classified by the TRT as a "core" population, i.e., historically abundant and "may offer the most likely path to recovery" (McElhany et al. 2003).

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table K1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map K9 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART also determined that the occupied HUC5 watersheds in this subbasin were of high conservation value. The CHART also noted that Coulmbia Slough and Smith and Bybee Lakes may provide important rearing habitat for juvenile steelhead. Table K2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure K1 shows the overall distribution of ratings by HUC5 watershed.

Lower Columbia River Corridor

The lower Columbia River rearing and migration corridor consists of that segment from the mouth of the Columbia River at the Pacific Ocean upstream to an imaginary line connecting the confluences of the Sandy River (Oregon) and Washougal River (Washington). This corridor overlaps with the following counties: Clatsop, Columbia, and Multnomah counties in Oregon, and Clark, Cowlitz, Pacific, and Wahkiakum counties in Washington. Fish distribution and habitat use data from ODFW and WDFW identify approximately 118 miles of occupied riverine and estuarine habitat in this corridor (ODFW 2003a,b; WDFW 2003). Table K1 summarizes the total number of occupied reaches in this corridor containing rearing or migration PCEs, as well as management activities that may affect the PCEs.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the lower Columbia River corridor was of high conservation value to the ESU. Other upstream reaches of the Columbia River corridor (within Middle Columbia/Hood subbasin and Lower Columbia/Sandy subbasins above) are also high value for rearing/migration. The CHART noted that the lower Columbia River corridor connects every watershed and population in this ESU with the ocean and is used by rearing/migrating juveniles and migrating adults. The Columbia River estuary is a particularly important area for this ESU as both juveniles and adults make the critical physiological transition between life in freshwater and marine habitats (ISAB 2000, Marriott et al. 2002).

Marine Areas

NOAA Fisheries' analysis focused on freshwater and estuarine habitats upstream of the mouth of the Columbia River. While marine areas are occupied by this ESU, within this vast area the agency has not identified "specific areas within the geographical area occupied by the species . . . on which are found those physical or biological features . . . essential to the conservation of the species."

Changes to the CHART's Initial Assessments

The CHART reviewed the public and peer reviewer comments received on the Team's initial findings for this ESU as well as new information relevant to evaluating habitat areas for this ESU. As a result, the CHART did not change conservation value ratings for any watershed within the geographical area occupied by this ESU. However, based on public comments and new information reviewed the CHART identified changes to the delineation of occupied habitat areas in two watersheds (Middle Columbia/ Grays Creek and Lower Lewis River HUC5). The proposed critical habitat designation (69 FR 74572, December 14, 2004) summarizes the comments and responses pertaining to the CHART's initial determinations for this ESU. And Tables K1 and K2 reflect the final CHART assessments, including the following changes in habitat area delineations:

Subbasin	Watershed code	Watershed name	Changes from Initial CHART Assessment
Middle Columbia/ Hood	1707010512	Middle Columbia/ Grays Creek	Added 4 miles (6.4 km) of occupied habitat areas.
Lewis	1708000206	Lower Lewis River	Removed 1 mile (1.6 km) of unoccupied stream reach.

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Table L1. Summary of Occupied Areas, PCEs, and Management Activities Affecting PCEs for the Lower Columbia River Steelhead ESU

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs) Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*	Unoccupied but may be essential (mi)**	Management Activities***
	Middle Columbia/Hood	East Fork Hood River	1707010506	70.9	0	0		A, C, F, I, R
	Middle Columbia/Hood	West Fork Hood River	1707010507	35.3	0	0		A, F, R
	Middle Columbia/Hood	Hood River	1707010508	22.3	1.1	0		A, C, D, F, R, I, U
	Middle Columbia/Hood	Wind River	1707010511	70.1	3.8	52.3		F, R, U
	Middle Columbia/Hood	Middle Columbia/Grays Creek	1707010512	5.2	0.1	17.3		R, U
	Middle Columbia/Hood	Middle Columbia/Eagle Creek	1707010513	7.7	1.1	16.1		D, R, U
	Lower Columbia/Sandy	Salmon River	1708000101	28	0.7	0		F, C, R
	Lower Columbia/Sandy	Zigzag River	1708000102	36.5	0	0		F, C, R
	Lower Columbia/Sandy	Upper Sandy River	1708000103	35.6	0	0		F, R
	Lower Columbia/Sandy	Middle Sandy River	1708000104	36.7	0.1	0		D, R, U
	Lower Columbia/Sandy	Bull Run River	1708000105	6.8	0	0		D, F, R
	Lower Columbia/Sandy	Washougal River	1708000106	68.9	1.9	59		C, F, R, S, U, W
	Lower Columbia/Sandy	Columbia Gorge Tributaries	1708000107	17.1	8.5	61.4		C, D, F, R, U, W
	Lower Columbia/Sandy	Lower Sandy River	1708000108	27.9	4.3	0		A, C, F, R, U
	Lower Columbia/Sandy	Salmon Creek	1708000109	31.6	4.2	83.5		A, C, F, R, U, W
	Lewis	Upper Lewis River	1708000201	0	0	0	[mm]	
	Lewis	Muddy River	1708000202	0	0	0	[nn]	
	Lewis	Swift Reservoir	1708000203	0	0	0	[oo]	
	Lewis	Yale Reservoir	1708000204	0	0	0	[pp]	

[mm] The downstream dams Merwin, Yale, and Swift are barriers to fish distribution in this watershed. Unoccupied habitat areas above these dams may be essential to conservation.

[nn] The downstream dams Merwin, Yale, and Swift are barriers to fish distribution in this watershed. Unoccupied habitat areas above these dams may be essential to conservation.

[oo] Swift Dam, as well as the downstream dams Merwin and Yale, is currently a barrier to fish distribution in this watershed. Unoccupied habitat areas above these dams may be essential to conservation.

[pp] Yale Dam, as well as downstream Merwin Dam, is currently a barrier to fish distribution in this watershed. Unoccupied habitat areas above these dams may be essential to conservation.

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs)			Unoccupied but may be essential (mi)**	Management Activities***
				Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*		
	Lewis	East Fork Lewis River	1708000205	60.9	20.5	89.3		A, C, F, R, S, U, W
	Lewis	Lower Lewis River	1708000206	34.1	1	42.5		A, C, D, F, R, U, W
	Lower Columbia/Clatskanie	Kalama River	1708000301	58.5	1.2	73.3		C, F, R, U, W
	Upper Cowlitz	Headwaters Cowlitz River	1708000401	1.3	0	6.7		C, F, R
	Upper Cowlitz	Upper Cowlitz River	1708000402	0	0	36.8		C, F, R
	Upper Cowlitz	Cowlitz Valley Frontal	1708000403	0	0	59.4		A, F, R, U
	Upper Cowlitz	Upper Cispus River	1708000404	0	0	22.3		C, F, R
	Upper Cowlitz	Lower Cispus River	1708000405	0	0	43.8		C, F, R
	Cowlitz	Tilton River	1708000501	0	0	67.2		C, D, F, R, U
	Cowlitz	Riffe Reservoir	1708000502	0	0	30.7		A, C, D, F, R
	Cowlitz	Jackson Prairie	1708000503	51.1	1.4	85.4		A, C, D, F, R
	Cowlitz	North Fork Toutle River	1708000504	11.6	6	32.9		F, R
	Cowlitz	Green River	1708000505	35.1	0.5	35.5		F, R
	Cowlitz	South Fork Toutle River	1708000506	43.6	2.6	35.1		F, R
	Cowlitz	East Willapa	1708000507	78.5	22.1	120.5		A, C, F, R, U, W
	Cowlitz	Coweeman	1708000508	44.9	21.3	58.8		A, C, F, R, U, W
	Middle Willamette	Abernethy Creek	1709000704	19.4	6.7	0		A, C, D, R, U
	Clackamas	Collawash	1709001101	34	0	0		F, R
	Clackamas	Upper Clackamas	1709001102	53	0	0		F, R
	Clackamas	Oak Grove Fork	1709001103	4.2	0	0		D, F, G, R
	Clackamas	Middle Clackamas	1709001104	45.6	2.5	0.4		D, F, R
	Clackamas	Eagle Creek	1709001105	36.7	0	0		A, F, R
	Clackamas	Lower Clackamas River	1709001106	89.8	4.9	2.4		A, C, D, I, R, U, W

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs)			Unoccupied but may be essential (mi)**	Management Activities***
				Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*		
	Lower Willamette	Johnson Creek	1709001201	24.5	14.5	1.7		A, C, I, R, U, W
	Lower Willamette	Scappoose Creek	1709001202	0	21.3	0		A, C, F, I, R, U, W
	Lower Willamette	Columbia Slough/Willamette River	1709001203	0	26.2	0		A, C, R, U, W
	Multiple	Lower Columbia Corridor (Sandy/Washougal to Ocean)	NA	0	1.1	131.5[qq]		C, D, I, R, T, U, W

* Some streams classified as "Migration/Presence PCEs" may also include rearing or spawning PCEs, but the GIS data are still undergoing review to confirm additional habitat use types.
** These watersheds historically supported spawning and rearing PCEs. The CHART determined that these watersheds may be essential for conservation of the ESU. Since these watersheds are unoccupied, the CHART did not identify management activities.
*** This list is not exhaustive. It is intended to highlight key management activities affecting PCEs in each watershed. Activities identified are based on the general categories described by Spence et al. (1996) and summarized previously in the "Special Management Considerations or Protection" section of this report. Coding is as follows: F= forestry, G = grazing, A = agriculture, C = channel modifications/diking, R = road building/maintenance, U = urbanization, S = sand and gravel mining, M = mineral mining, D = dams, I = irrigation impoundments and withdrawals, T = river, estuary, and ocean traffic, W = wetland loss/removal, B = beaver removal, X = exotic/invasive species introductions, H = forage fish/species harvest. Primary sources for this information were the CHART and reports by LCFRB (2003), Subbasin Summary Reports of the NWPPC, and land use/land cover GIS layers from the U.S. Geological Survey.

[qq] The Lower Columbia River from the ocean upstream approximately 46.5 miles is considered to contain estuarine PCEs, in addition to migration and rearing (ISAB 2000).

Table K2. Summary of Initial CHART Scores and Ratings of Conservation Value for Habitat Areas in HUC5 Watersheds Occupied by the Lower Columbia River Steelhead ESU

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Middle Columbia/Hood	East Fork Hood River	1707010506	2	2	2	3	1	3	13	Moderate-high HUC5 score; habitat relatively more extensive in this HUC5 than in most other areas of the Gorge region (especially for winter-run fish); PCEs support one of three summer-run and one of three winter-run TRT historical steelhead populations (both core and genetic legacy populations) in the Gorge region; ODFW considers Hood River as a priority area for this ESU	High
	Middle Columbia/Hood	West Fork Hood River	1707010507	2	2	2	3	1	3	13	Moderate-high HUC5 score; habitat relatively more extensive in this HUC5 than in most other areas of the Gorge region (especially for summer-run fish); PCEs support one of three summer-run and one of three winter-run TRT historical steelhead populations (both core and genetic legacy populations) in the Gorge region; PCEs overlap with a FEMAT key watershed for at-risk anadromous salmonids; ODFW considers Hood River as a priority area for this ESU	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Middle Columbia/Hood	Hood River	1707010508	2	1	2	3	1	3	12	Moderate-high HUC5 score; PCEs support one of three summer-run and one of three winter-run TRT historical steelhead populations (both core and genetic legacy populations) in the Gorge region; HUC5 contains important connectivity reaches for upstream HUC5s (including one containing a FEMAT key watershed for at-risk anadromous salmonids); ODFW considers Hood River as a priority area for this ESU	High
	Middle Columbia/Hood	Wind River	1707010511	3	2	2	2	2	3	14	Highest HUC5 score for entire ESU; PCEs support one of three summer-run and one of three winter-run TRT historical populations in the Gorge region; passage over Shipherd Falls improved access to extensive summer-and winter-run habitat for the Gorge region; PCEs overlap with a FEMAT key watershed for at-risk anadromous salmonids	High
	Middle Columbia/Hood	Middle Columbia/Grays Creek	1707010512	0	2	2	1	1	2	8	Moderate HUC5 score; PCEs limited in this HUC5 and likely always were due to gradient barriers and small drainage size; HUC5 supports a TRT historical winter-run population but production likely low in this HUC5; mainstem Columbia River is high value connectivity corridor	Low

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Middle Columbia/Hood	Middle Columbia/Eagle Creek	1707010513	1	2	2	1	1	3	10	Moderate HUC5 score; PCEs in tributary habitat in HUC5 supports two TRT historical winter-run populations; downstream HUC5 likely more important to the Lower Gorge population and the Wind River HUC5 likely more important to the Upper Gorge population; mainstem Columbia River is high value connectivity corridor	Medium
	Lower Columbia/Sandy	Salmon River	1708000101	3	2	2	2	2	2	13	High HUC5 score; extensive PCEs support TRT core winter-run population; PCEs overlap with a FEMAT key watershed for at-risk anadromous salmonids; ODFW considers Salmon River as a priority area for this ESU	High
	Lower Columbia/Sandy	Zigzag River	1708000102	3	2	2	2	2	2	13	High HUC5 score; extensive PCEs support TRT core winter-run population	High
	Lower Columbia/Sandy	Upper Sandy River	1708000103	3	2	2	2	2	2	13	High HUC5 score; extensive PCEs support TRT core winter-run population	High
	Lower Columbia/Sandy	Middle Sandy River	1708000104	1	1	2	2	2	2	10	Moderate HUC5 score; PCEs support TRT core winter-run population quality impaired by Marmot Dam; HUC5 contains important connectivity reaches for upstream HUC5s (including one containing a FEMAT key watershed for at-risk anadromous salmonids)	Medium
	Lower Columbia/Sandy	Bull Run River	1708000105	1	1	2	2	2	2	10	Moderate HUC5 score; PCEs more limited due to dams in this HUC5, but still support TRT core winter-run fish	Medium
	Lower Columbia/Sandy	Washougal River	1708000106	2	1	2	3	2	3	13	Moderate-high HUC5 score; extensive PCEs support a TRT core and genetic legacy summer-run population as well as a winter-run population	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Lower Columbia/Sandy	Columbia Gorge Tributaries	1708000107	2	2	2	1	1	3	11	Moderate-high HUC5 score; tributary habitat in HUC5 supports at least one TRT historical core winter-run population; PCEs probably not as important to Washougal River population, and those supporting Lower Gorge population probably never were abundant/extensive due to migration barriers and drainage size; mainstem Columbia River is high value connectivity corridor supporting all upstream populations.	Medium
	Lower Columbia/Sandy	Lower Sandy River	1708000108	1	1	2	2	2	2	10	Moderate HUC5 score; PCEs less extensive and quality lower than upstream HUC5s, but still support TRT core winter-run fish	Medium
	Lower Columbia/Sandy	Salmon Creek	1708000109	2	1	2	0	1	3	9	Moderate HUC5 score; PCEs support a TRT winter-run population, but limited and degraded in this HUC5; not identified as a core population but HUC5 is only habitat for this population; other HUC5s supporting winter-run fish likely to have higher conservation value in the Cascade region	Medium
	Lewis	Upper Lewis River	1708000201							*	<u>Unoccupied HUC5</u>, but population expansion into this HUC5 possibly essential for conservation; The downstream dams Merwin, Yale, and Swift are barriers to fish distribution in this watershed; Unoccupied habitat areas above these dams may be essential to conservation; nearly the entire area is a FEMAT key watershed for at-risk anadromous salmonids	Possibly High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Lewis	Muddy River	1708000202							*	Unoccupied HUC5, but population expansion into this HUC5 possibly essential for conservation; The downstream dams Merwin, Yale, and Swift are barriers to fish distribution in this watershed; Unoccupied habitat areas above these dams may be essential to conservation; nearly the entire area is a FEMAT key watershed for at-risk anadromous salmonids	Possibly High
	Lewis	Swift Reservoir	1708000203							*	Unoccupied HUC5, but population expansion into this HUC5 possibly essential for conservation; Swift Dam, as well as downstream dams Merwin and Yale, is currently a barrier to fish distribution; Unoccupied habitat areas above these dams may be essential to conservation; HUC5 contains connectivity reaches to upstream to upstream areas that are FEMAT key watersheds for at-risk anadromous salmonids	Possibly High
	Lewis	Yale Reservoir	1708000204							*	Unoccupied HUC5, but population expansion into this HUC5 possibly essential for conservation; Yale Dam, as well as downstream Merwin Dam, is currently a barrier to fish distribution; Unoccupied habitat areas above these dams may be essential to conservation; HUC5 contains connectivity reaches to upstream to upstream areas that are FEMAT key watersheds for at-risk anadromous salmonids	Possibly High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Lewis	East Fork Lewis River	1708000205	3	1	2	3	2	3	14	Highest HUC5 score for entire ESU; PCEs support TRT summer- and winter-run populations; summer-run fish are a TRT genetic legacy population; PCEs overlap with a FEMAT key watershed for at-risk anadromous salmonids; improved access above falls likely makes PCEs more extensive now than historically	High
	Lewis	Lower Lewis River	1708000206	1	1	2	1	2	3	10	Moderate HUC5 score; PCEs support TRT summer- and winter-run populations; winter-run fish are a TRT core population; conservation of these PCEs will be especially important if historical habitats upstream are made accessible; Watershed contains unoccupied habitat areas above Merwin Dam that may be essential for conservation.	High
	Lower Columbia/ Clatskanie	Kalama River	1708000301	1	2	2	1	2	3	11	Moderate-high HUC5 score; supports summer- and winter-run Kalama River populations (including some reaches for N. Fork Lewis winter-run populations); summer-run Kalama River fish are a TRT core population	High
	Upper Cowlitz	Headwaters Cowlitz River	1708000401	2	2	1	3	2	2	12	Moderate-high HUC5 score; PCEs support winter-run fish via trap and haul; CHART believed it was important to emphasize conservation value of upper Cowlitz/Cispus HUC5s due to their historic importance and potential to promote conservation of the ESU (i.e., Upper Cowlitz River identified by TRT as a core and genetic legacy winter-run population)	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Upper Cowlitz	Upper Cowlitz River	1708000402	2	1	2	3	2	2	12	Moderate-high HUC5 score; PCEs support winter-run fish via trap and haul; CHART believed it was important to emphasize conservation value of upper Cowlitz/Cispus HUC5s due to their historic importance and potential to promote conservation of the ESU (i.e., Upper Cowlitz River identified by TRT as a core and genetic legacy winter-run population); PCEs overlap with a FEMAT key watershed for at-risk anadromous salmonids	High
	Upper Cowlitz	Cowlitz Valley Frontal	1708000403	2	1	2	3	2	2	12	Moderate-high HUC5 score; PCEs support winter-run fish via trap and haul; CHART believed it was important to emphasize conservation value of upper Cowlitz/Cispus HUC5s due to their historic importance and potential to promote conservation of the ESU (i.e., Upper Cowlitz River identified by TRT as a core and genetic legacy winter-run population)	High
	Upper Cowlitz	Upper Cispus River	1708000404	2	2	2	1	2	2	11	Moderate-high HUC5 score; PCEs support winter-run fish via trap and haul; CHART believed it was important to emphasize conservation value of upper Cowlitz/Cispus HUC5s due to their historic importance and potential to promote conservation of the ESU (i.e., Cispus River identified by TRT as a core winter-run population)	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Upper Cowlitz	Lower Cispus River	1708000405	2	2	2	1	2	2	11	Moderate-high HUC5 score; PCEs support winter-run fish via trap and haul; CHART believed it was important to emphasize conservation value of upper Cowlitz/Cispus HUC5s due to their historic importance and potential to promote conservation of the ESU (i.e., Cispus River identified by TRT as a core winter-run population)	High
	Cowlitz	Tilton River	1708000501	1	1	2	1	2	3	10	Moderate HUC5 score; PCEs support a TRT winter-run population via trap and haul; HUC5 is only habitat for a TRT historical winter-run population; other areas in Cowlitz River basin likely more important to ESU than this watershed	Medium
	Cowlitz	Riffe Reservoir	1708000502	1	1	1	3	2	2	10	Moderate HUC5 score; PCEs support two TRT historic winter-run populations (including core and genetic legacy populations) via trap and haul; PCEs degraded due to inundation; HUC5 primarily important as rearing/migration corridor for upstream populations	High
	Cowlitz	Jackson Prairie	1708000503	1	1	2	2	2	2	10	Moderate HUC5 score; PCEs support four TRT winter-run populations, including core and genetic legacy populations; HUC5 is important as a high value rearing/migration corridor connecting upstream HUC5s/populations with the ocean	Medium

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	**2**	**3**	**4**	**5**	**6**			
	Cowlitz	North Fork Toutle River	1708000504	2	1	2	2	2	2	11	Moderate-high HUC5 score; PCEs support a TRT core winter-run population but not as extensive as in Green River HUC5 ; CHART noted recolonization of area despite volcano-related impacts on PCEs	Medium
	Cowlitz	Green River	1708000505	3	1	2	2	2	2	12	Moderate-high HUC5 score; PCEs support a TRT core winter-run population and more extensive here than other HUC5s supporting this population; CHART noted recolonization of area despite volcano-related impacts on PCEs	High
	Cowlitz	South Fork Toutle River	1708000506	2	1	2	2	2	3	12	Moderate-high HUC5 score; PCEs support a TRT winter-run population (but not a core or genetic legacy population); CHART noted recolonization of area despite volcano-related impacts on PCEs	Medium
	Cowlitz	East Willapa	1708000507	2	1	2	2	2	3	12	Moderate-high HUC5 score; PCEs support spawning range of Lower Cowlitz River population as well as rearing/migration for all upstream populations (both core and legacy)	High
	Cowlitz	Coweeman	1708000508	2	1	2	1	2	3	11	Moderate-high HUC5 score; PCEs support spawning range of Cowlitz River winter-run population (but not a core or genetic legacy population); PCEs also support rearing/migration for all upstream populations (both core and legacy)	Medium

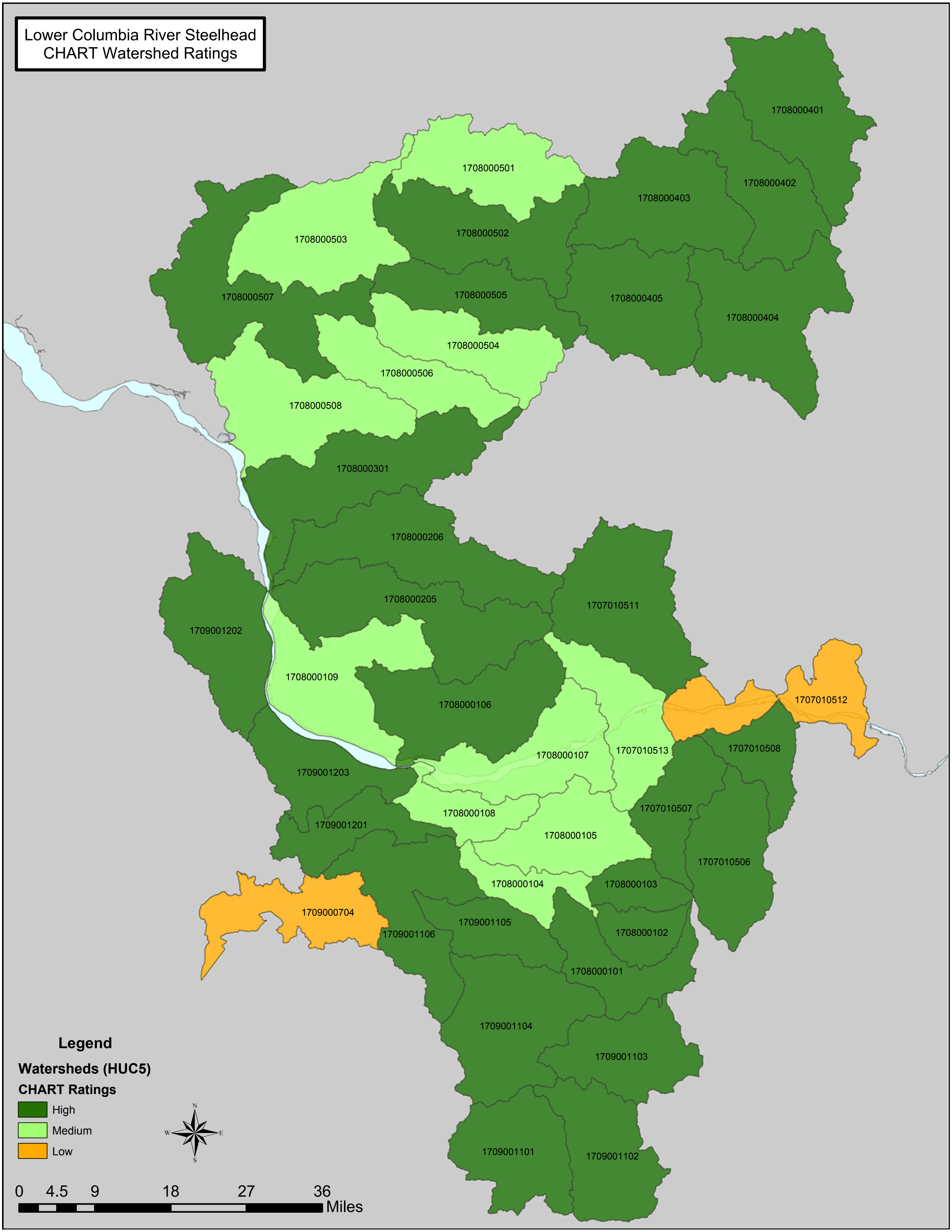
Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Middle Willamette	Abernethy Creek	1709000704	2	1	2	3	1	2	11	Moderate-high HUC5 score; PCEs support a TRT winter-run core population but are degraded with limited potential and likely not as important as in other watersheds supporting this population	Low
	Clackamas	Collawash	1709001101	2	2	2	2	2	2	12	Moderate-high HUC5 score; PCEs support a TRT core winter-run population; PCEs overlap with a FEMAT key watershed for at-risk anadromous salmonids; ODFW considers upper Clackamas River as a priority area for this ESU	High
	Clackamas	Upper Clackamas	1709001102	2	2	2	2	2	2	12	Moderate-high HUC5 score; PCEs support a TRT core winter-run population; PCEs overlap with a FEMAT key watershed for at-risk anadromous salmonids; ODFW considers upper Clackamas River as a priority area for this ESU	High
	Clackamas	Oak Grove Fork	1709001103	1	2	2	2	2	2	11	Moderate-high HUC5 score; PCEs more limited in this HUC5 but still support a TRT core winter-run population; PCEs overlap with a FEMAT key watershed for at-risk anadromous salmonids; ODFW considers upper Clackamas River as a priority area for this ESU	High
	Clackamas	Middle Clackamas	1709001104	1	1	2	2	2	2	10	Moderate HUC5 score; PCEs support a TRT core winter-run population; PCEs overlap with a FEMAT key watershed for at-risk anadromous salmonids; ODFW considers upper Clackamas River as a priority area for this ESU	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Clackamas	Eagle Creek	1709001105	1	2	2	2	2	2	11	Moderate-high HUC5 score; PCEs support a TRT core winter-run population but probably more degraded than those in other HUC5s supporting this population	High
	Clackamas	Lower Clackamas River	1709001106	3	1	2	2	2	2	12	Moderate-high HUC5 score; extensive PCEs support spawning/rearing as well as rearing/migration for upstream HUC5s; PCEs support a TRT core winter-run population as well as fish from ODFW priority areas upstream	High
	Lower Willamette	Johnson Creek	1709001201	2	1	2	3	2	2	12	Moderate-high HUC5 score; PCEs support a TRT winter-run core population; PCE quality degraded but CHART noted that HUC5 may provide important refuge habitat for Clackamas River population and may warrant consideration for unique adaptations; Willamette River is a high value rearing/migration corridor	High
	Lower Willamette	Scappoose Creek	1709001202	1	1	2	1	1	2	8	Moderate HUC5 score; Multnomah Channel of the Willamette River is an important rearing/migration corridor connecting high value upstream HUC5s in Willamette River (including a TRT core population) with downstream reaches and the ocean.	High

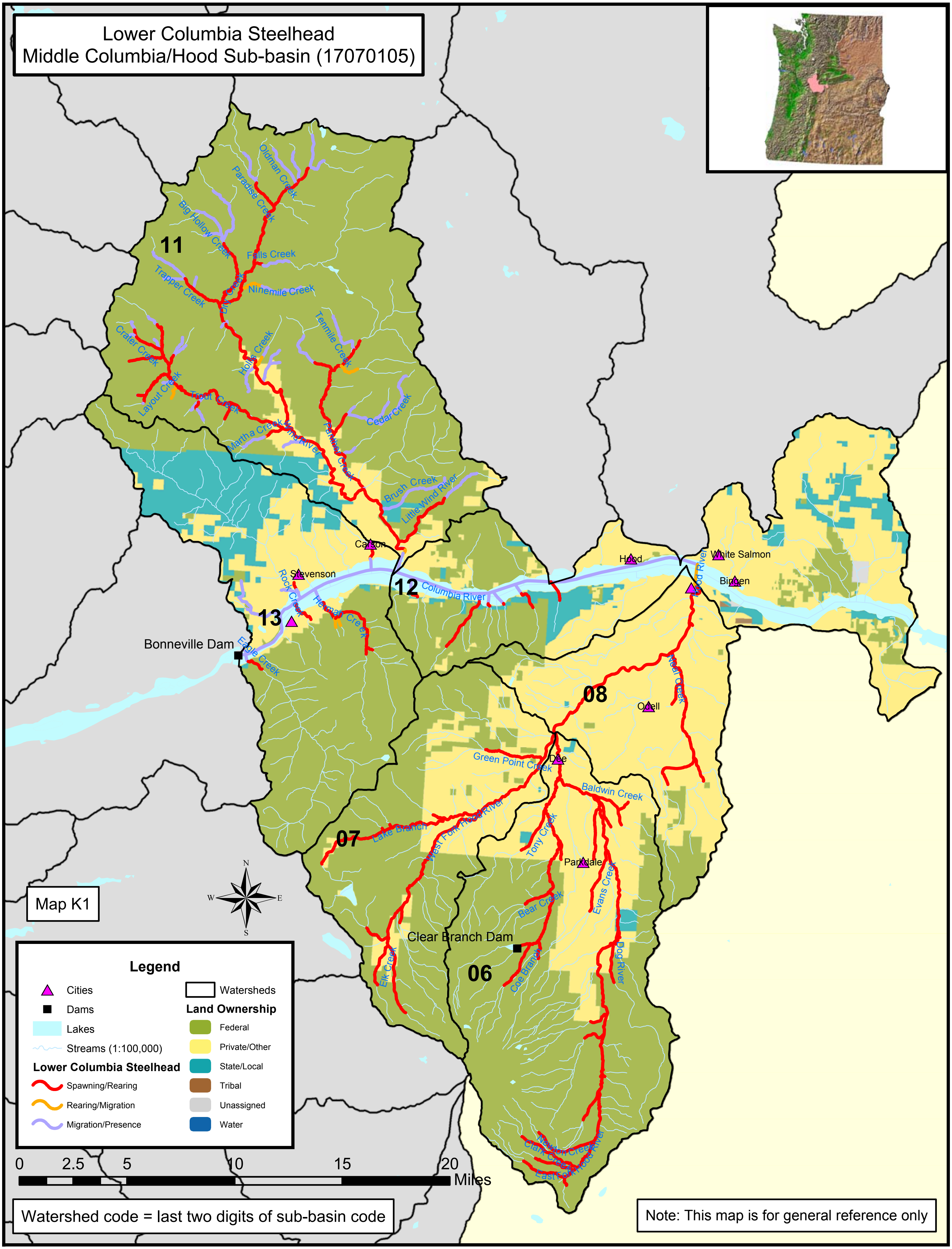
Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Lower Willamette	Columbia Slough/Willamette River	1709001203	1	0	2	3	2	3	11	Moderate-high HUC5 score; Lower Willamette River is a high value rearing/migration corridor connecting high value upstream HUC5s (in both Willamette and Columbia rivers) and TRT core/genetic legacy populations with downstream reaches and the ocean.	High
	Multiple	Lower Columbia Corridor (Sandy/ Washougal to Ocean)	NA							NS	Area not scored since many reaches are outside HUC5 boundaries. However, the CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation	High

* Indicates that HUC5 contains blocked/inaccessible areas that the CHART concluded may be essential for ESU conservation.

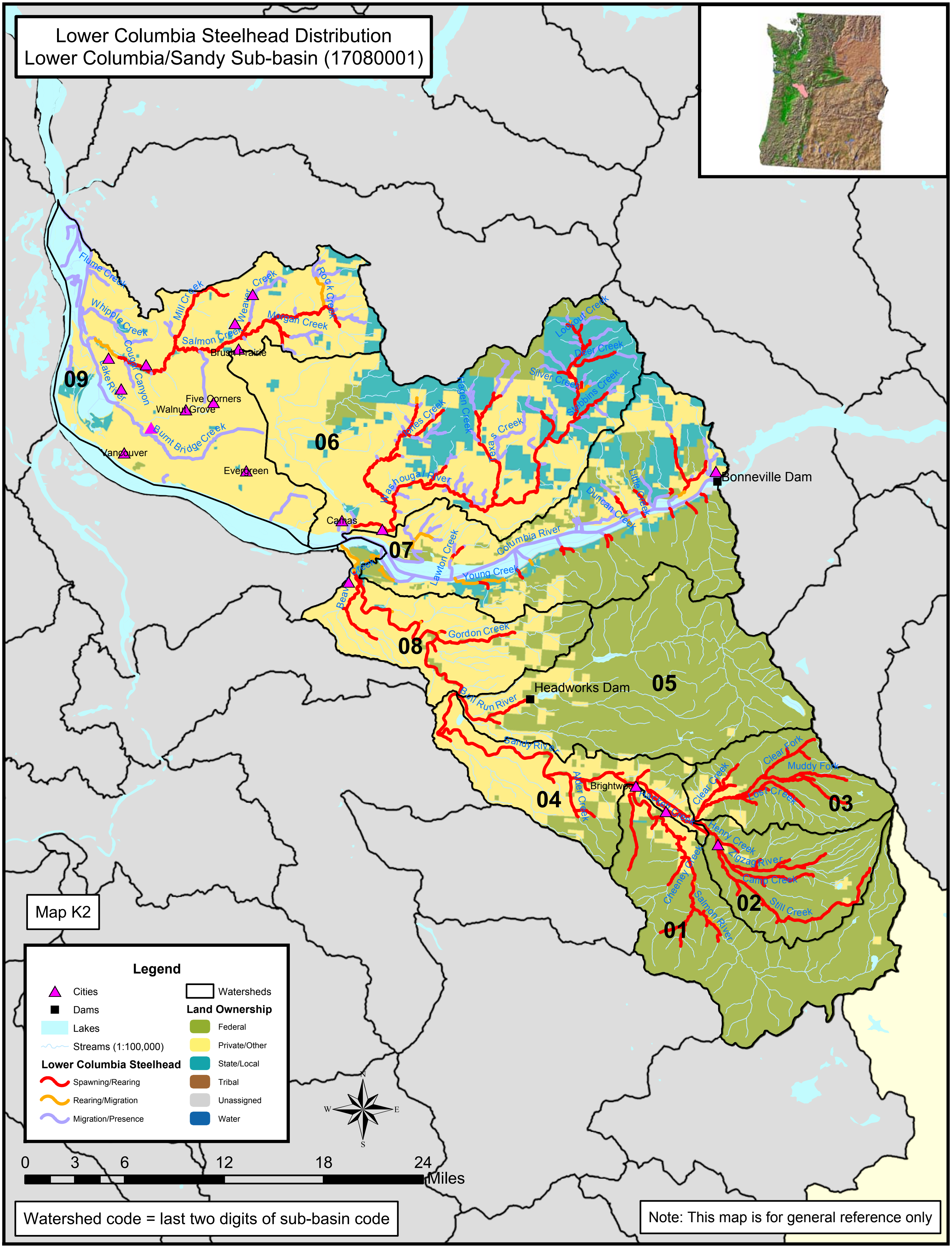
Figure K1. CHART Ratings of Conservation Value for Habitat Areas in HUC5 Watersheds Occupied by the Lower Columbia River Steelhead ESU



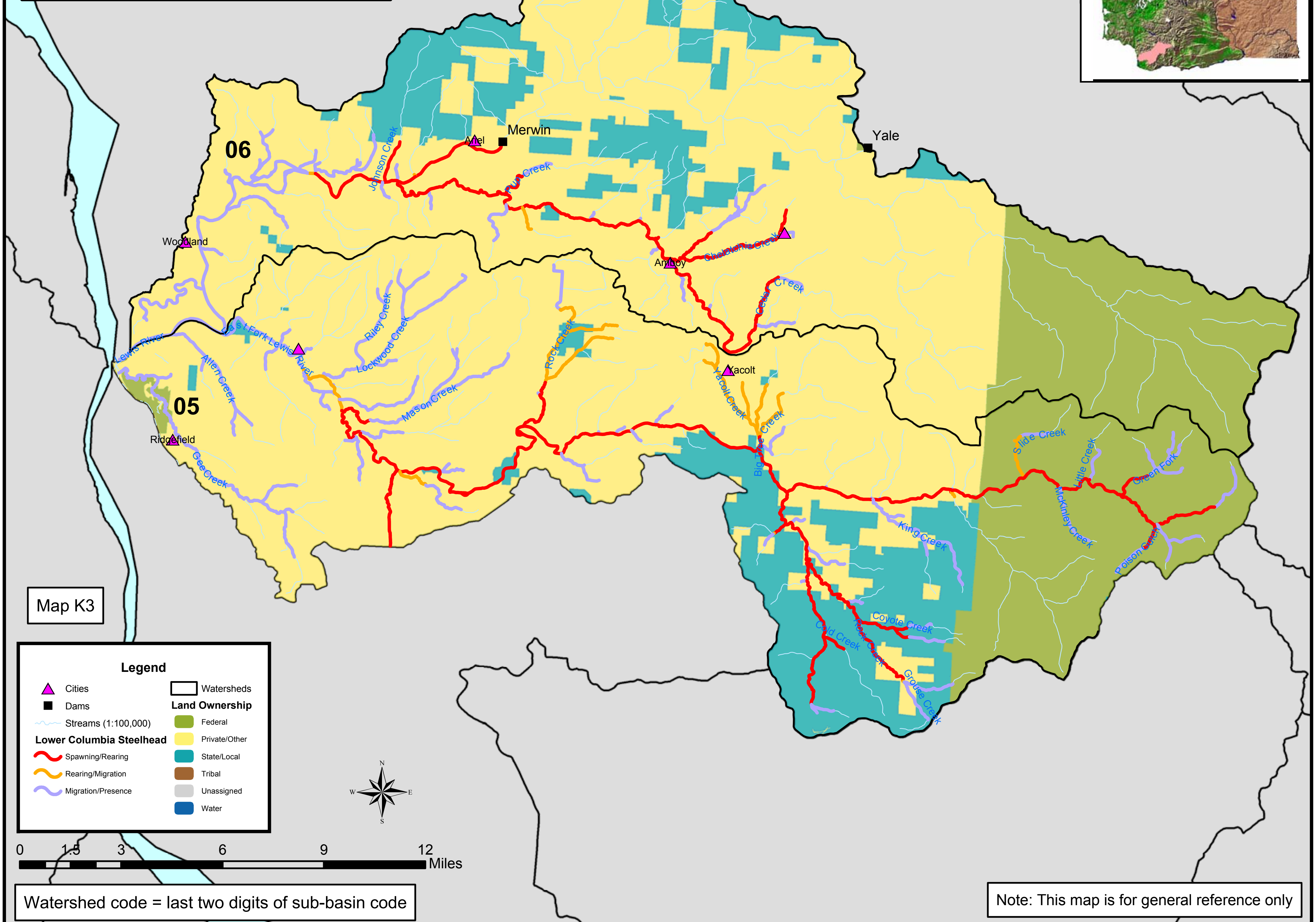
Lower Columbia River Steelhead
CHART Watershed Ratings
1708000401
1708000501
1708000402
1708000403
1708000503
1708000502
1708000507
1708000505
1708000405
1708000404
1708000504
1708000506
1708000508
1708000301
1708000206
1708000205
1707010511
1709001202
1708000109
1708000106
1707010512
1707010513
1708000107
1707010508
1709001203
1707010507
1708000108
1709001201
1708000105
1707010506
1708000104
1708000103
1709000704
1709001105
1709001106
1708000102
1708000101
1709001104
1709001103
1709001101
1709001102
Legend
Watersheds (HUC5)
CHART Ratings
High
Medium
Low
N
W
E
S
0
4.5
9
18
27
36
Miles

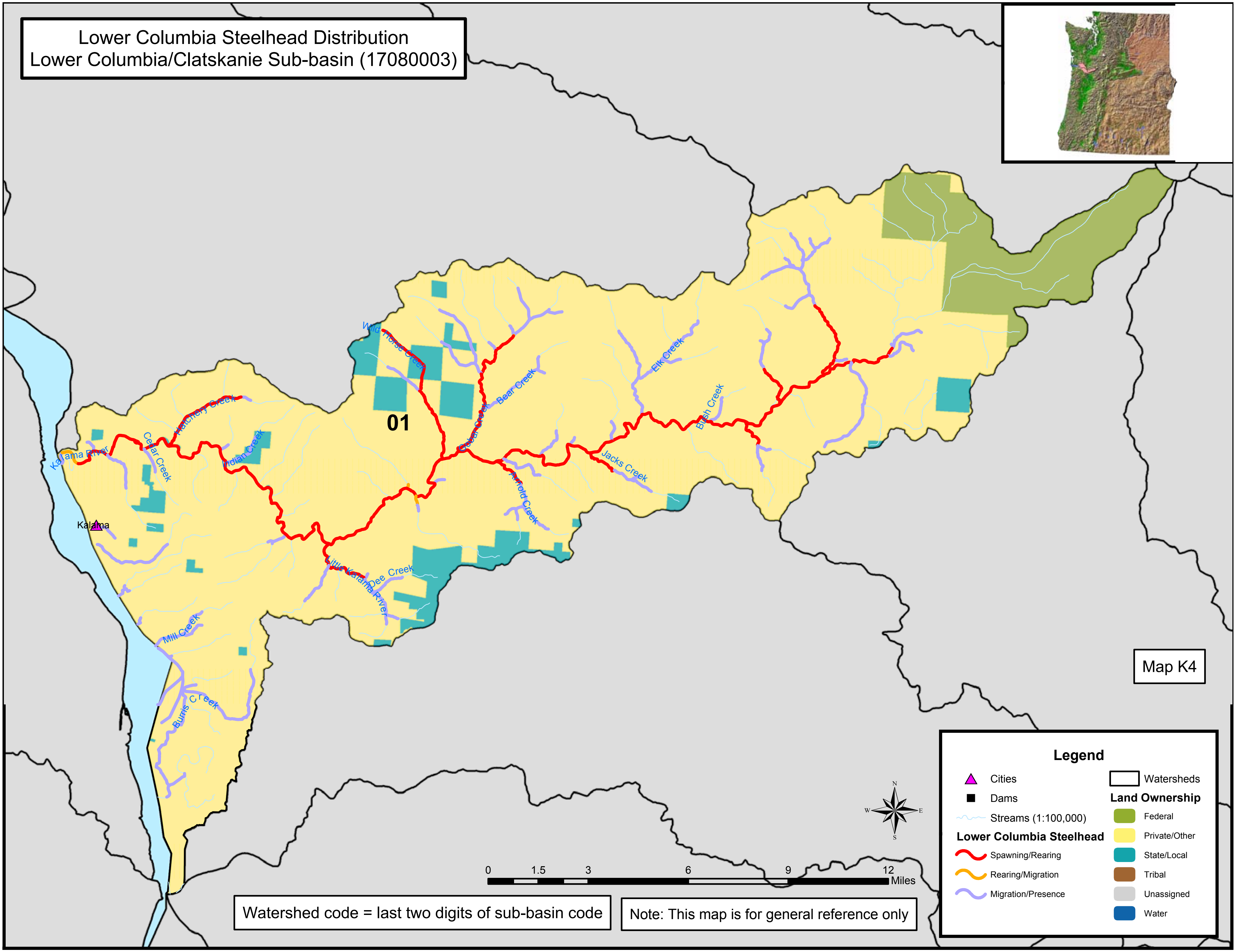


Lower Columbia Steelhead
Middle Columbia/Hood Sub-basin (17070105)
11
12
13
08
07
06
Oldman Creek
Paradise Creek
Big Hollow Creek
Falls Creek
Trapper Creek
Ninemile Creek
Dry Creek
Tenmile Creek
Crater Creek
Hollis Creek
Layout Creek
Trout Creek
Cedar Creek
Martha Creek
Wind River
Panther Creek
Brush Creek
Little Wind River
Carson
Stevenson
Rock Creek
Hermann Creek
Columbia River
Bonneville Dam
Eagle Creek
Hood
White Salmon
Bingen
Hood River
Neal Creek
Odell
Dee
Green Point Creek
Baldwin Creek
Lake Branch
West Fork Hood River
Tony Creek
Parkdale
Evans Creek
Bear Creek
Clear Branch Dam
Coe Branch
Dog River
Elk Creek
Newton Creek
Clark Creek
East Fork Hood River
Map K1
N
S
W
E
Legend
Cities
Dams
Lakes
Streams (1:100,000)
Lower Columbia Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
0
2.5
5
10
15
20
Miles
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only

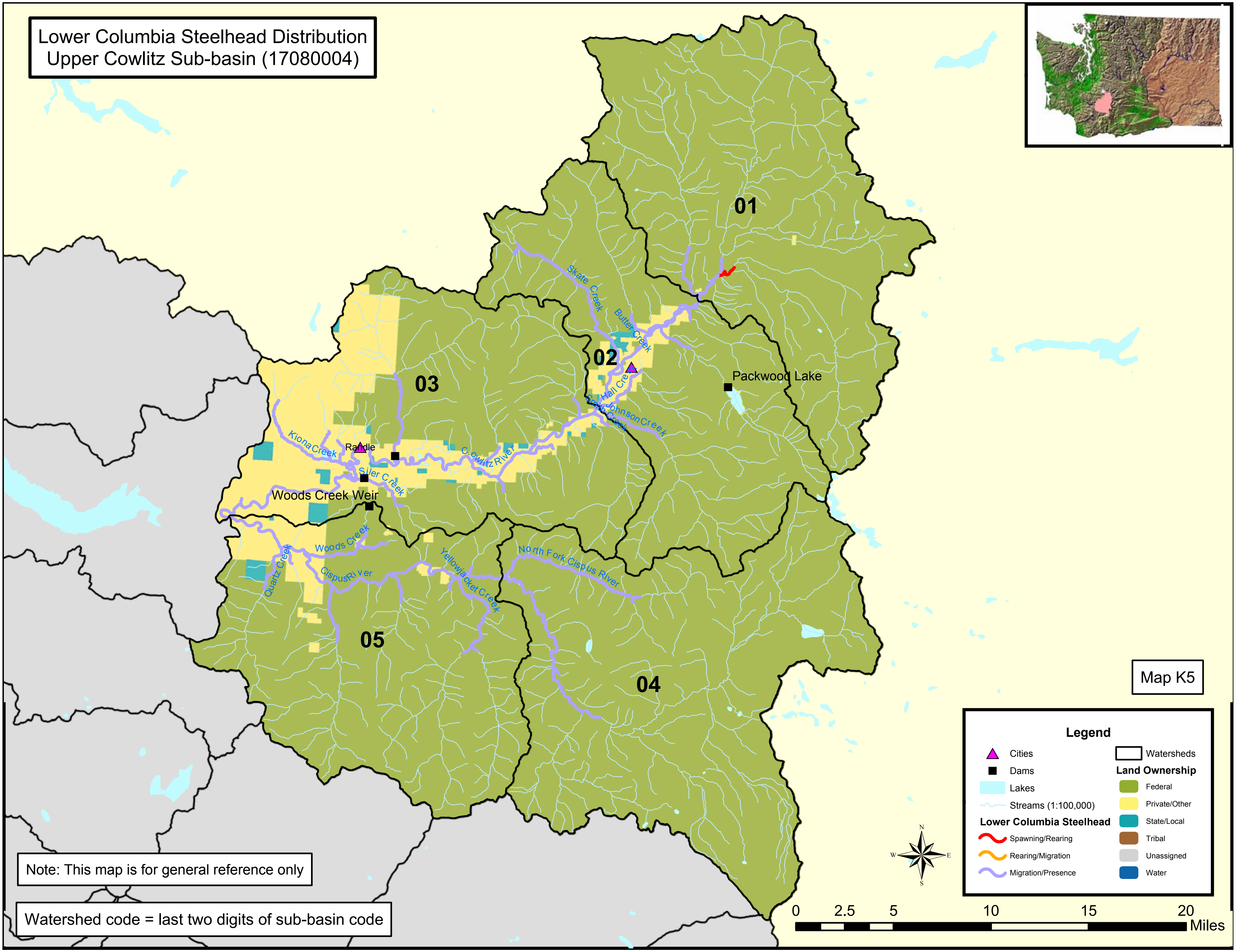

Lower Columbia Steelhead Distribution
Lower Columbia/Sandy Sub-basin (17080001)
Map K2
Legend
Cities
Dams
Lakes
Streams (1:100,000)
Lower Columbia Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
0 3 6 12 18 24 Miles
N S E W
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only
09
06
07
08
05
04
03
02
01
Flume Creek
Whipple Creek
Mill Creek
Weaver Creek
Rock Creek
Morgan Creek
Salmon Creek
Brush Prairie
Cougar Canyon
Lake River
Five Corners
Walnut Grove
Burnt Bridge Creek
Vancouver
Evergreen
Camas
Lookout Creek
Deer Creek
Silver Creek
Stebbins Creek
Hagen Creek
Jones Creek
Texas Creek
Washougal River
Little Creek
Duncan Creek
Bonneville Dam
Columbia River
Lawton Creek
Young Creek
Gordon Creek
Headworks Dam
Bull Run River
Sandy River
Alder Creek
Brightwood
Clear Fork
Muddy Fork
Clear Creek
Lost Creek
Henry Creek
Zigzag River
Camp Creek
Still Creek
Cheeney Creek
Salmon River

Lower Columbia Steelhead Distribution
Lewis Sub-basin (17080002)

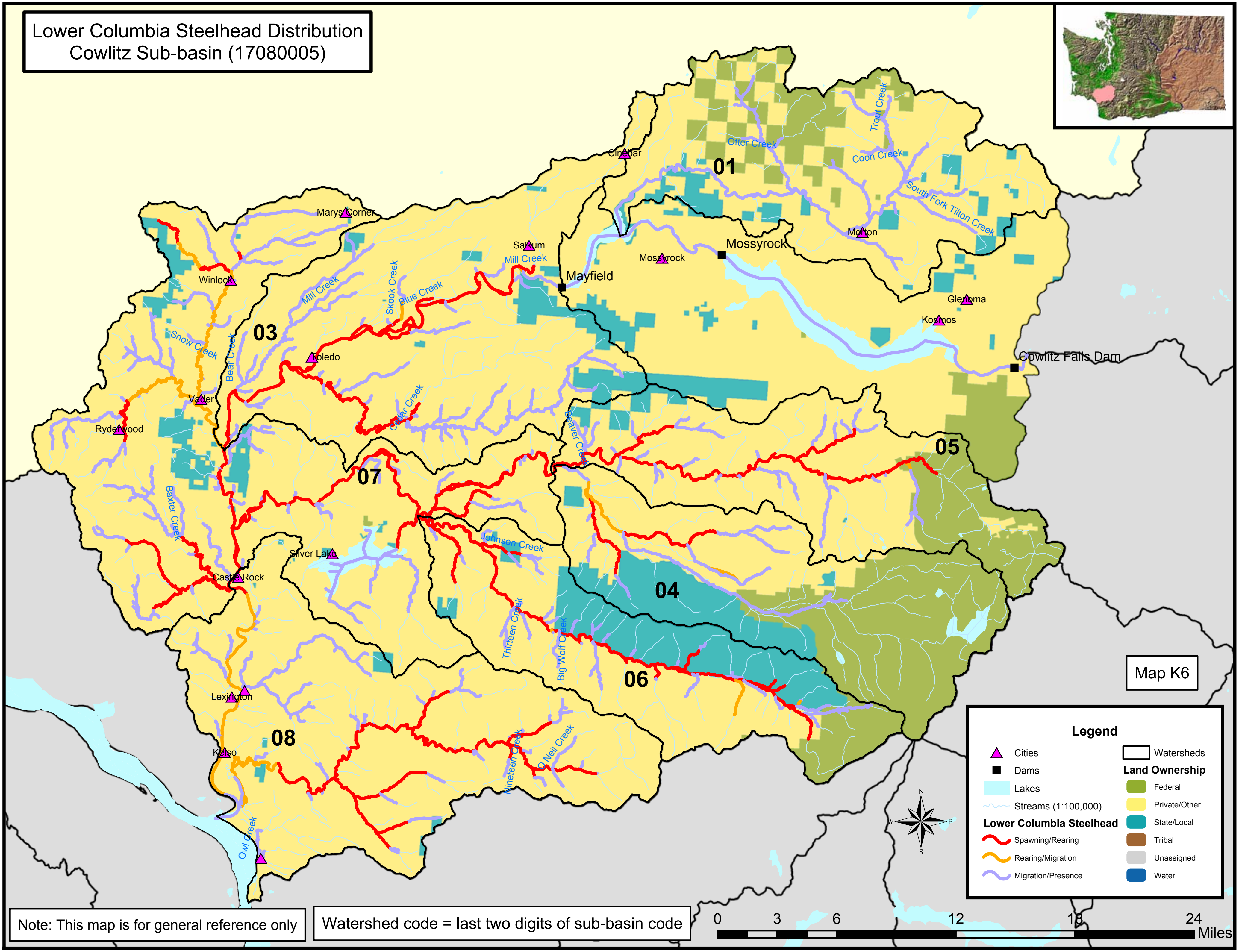




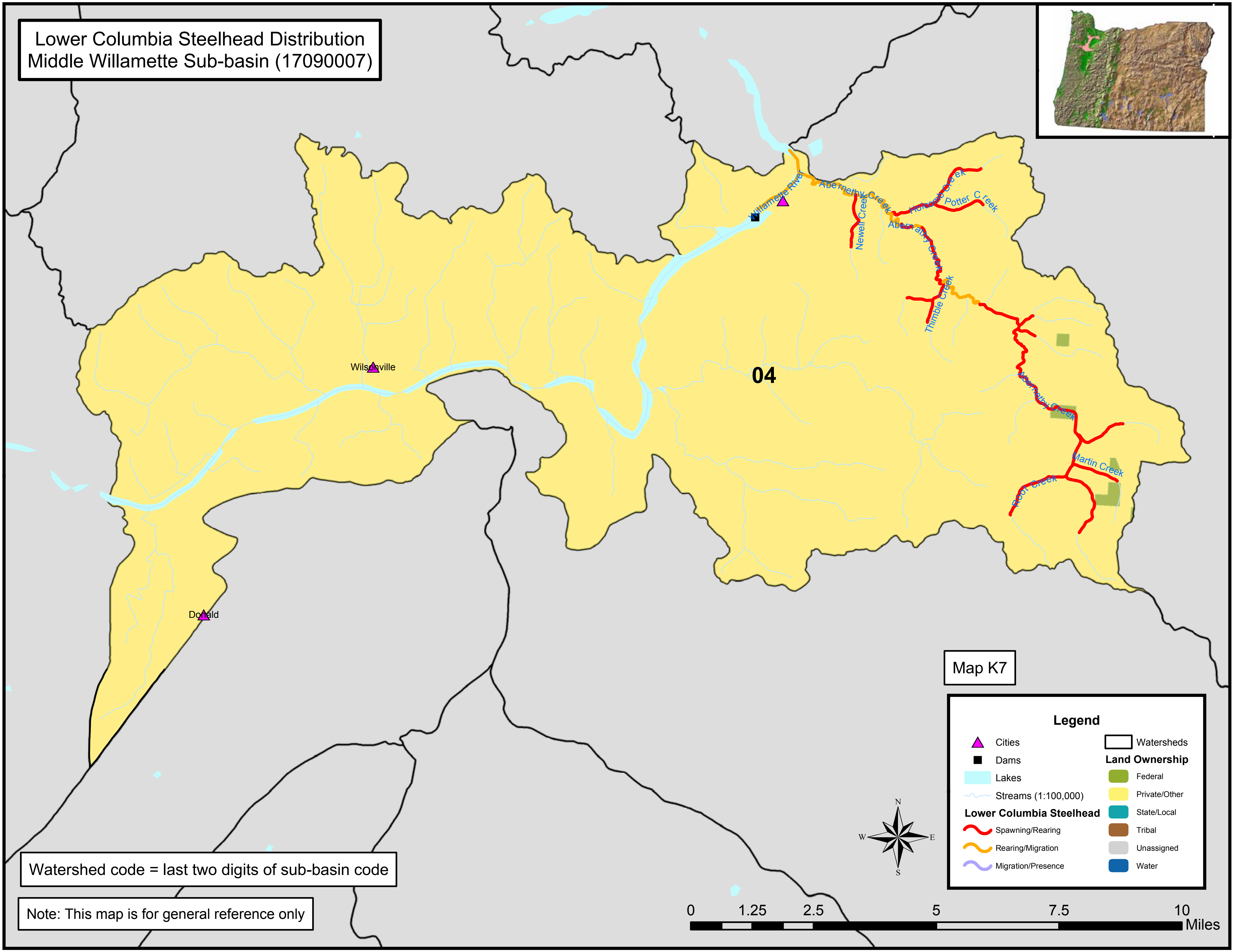
Lower Columbia Steelhead Distribution
Lower Columbia/Clatskanie Sub-basin (17080003)
01
Kalama
Kalama River
Cedar Creek
Hatchery Creek
Indian Creek
Wild Horse Creek
Cedar Creek
Bear Creek
Elk Creek
Bush Creek
Jacks Creek
Arnold Creek
Little Kalama River
Dee Creek
Mill Creek
Burris Creek
Map K4
Legend
Cities
Dams
Streams (1:100,000)
Lower Columbia Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
0 1.5 3 6 9 12 Miles
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only



Lower Columbia Steelhead Distribution
Upper Cowlitz Sub-basin (17080004)
01
02
03
04
05
Skate Creek
Butter Creek
Hall Creek
Johnson Creek
Packwood Lake
Kiona Creek
Randle
Cowlitz River
Siler Creek
Woods Creek Weir
Woods Creek
Quartz Creek
Cispus River
Yellowjacket Creek
North Fork Cispus River
Map K5
Legend
Cities
Dams
Lakes
Streams (1:100,000)
Lower Columbia Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
W
E
S
0
2.5
5
10
15
20
Miles
Note: This map is for general reference only
Watershed code = last two digits of sub-basin code

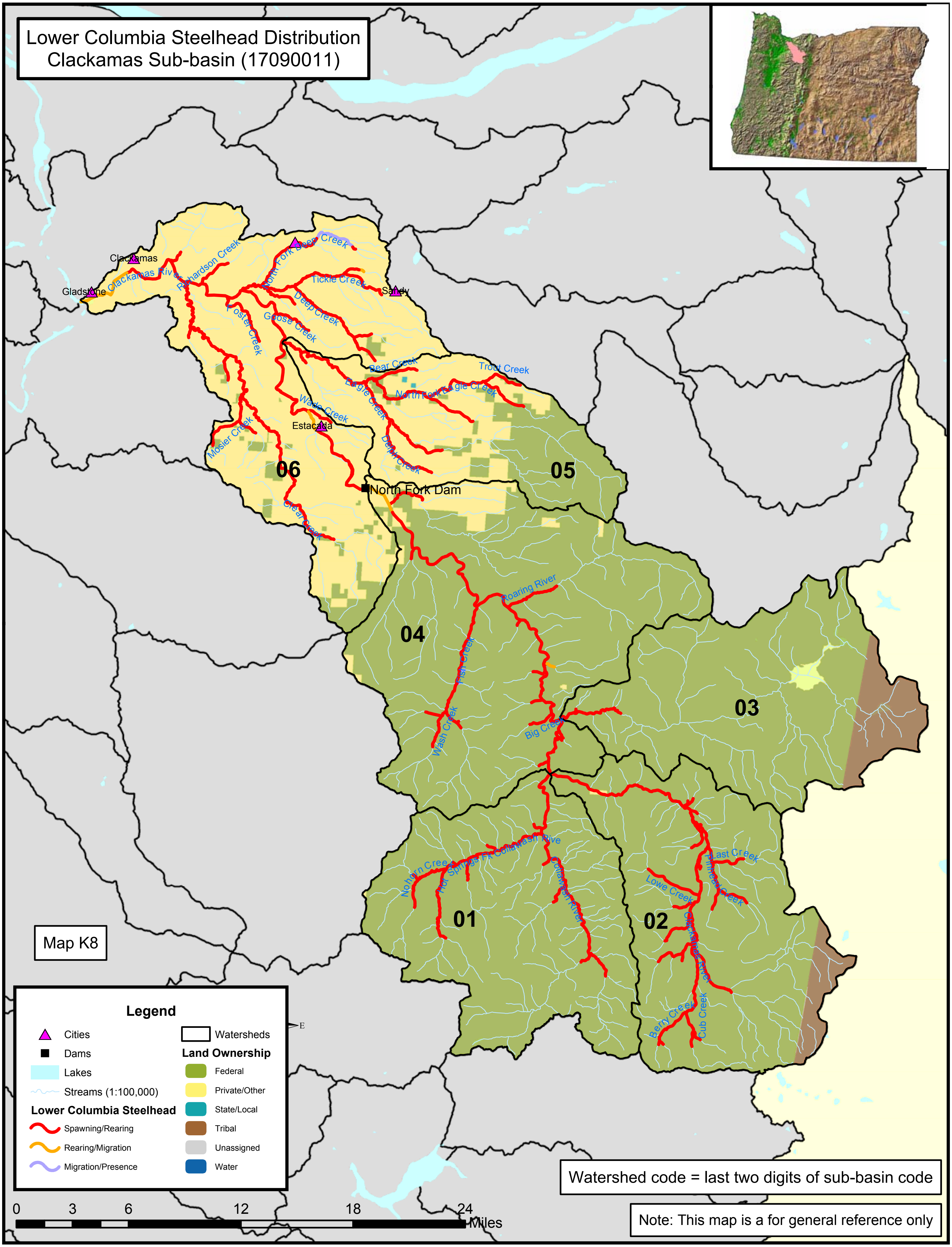


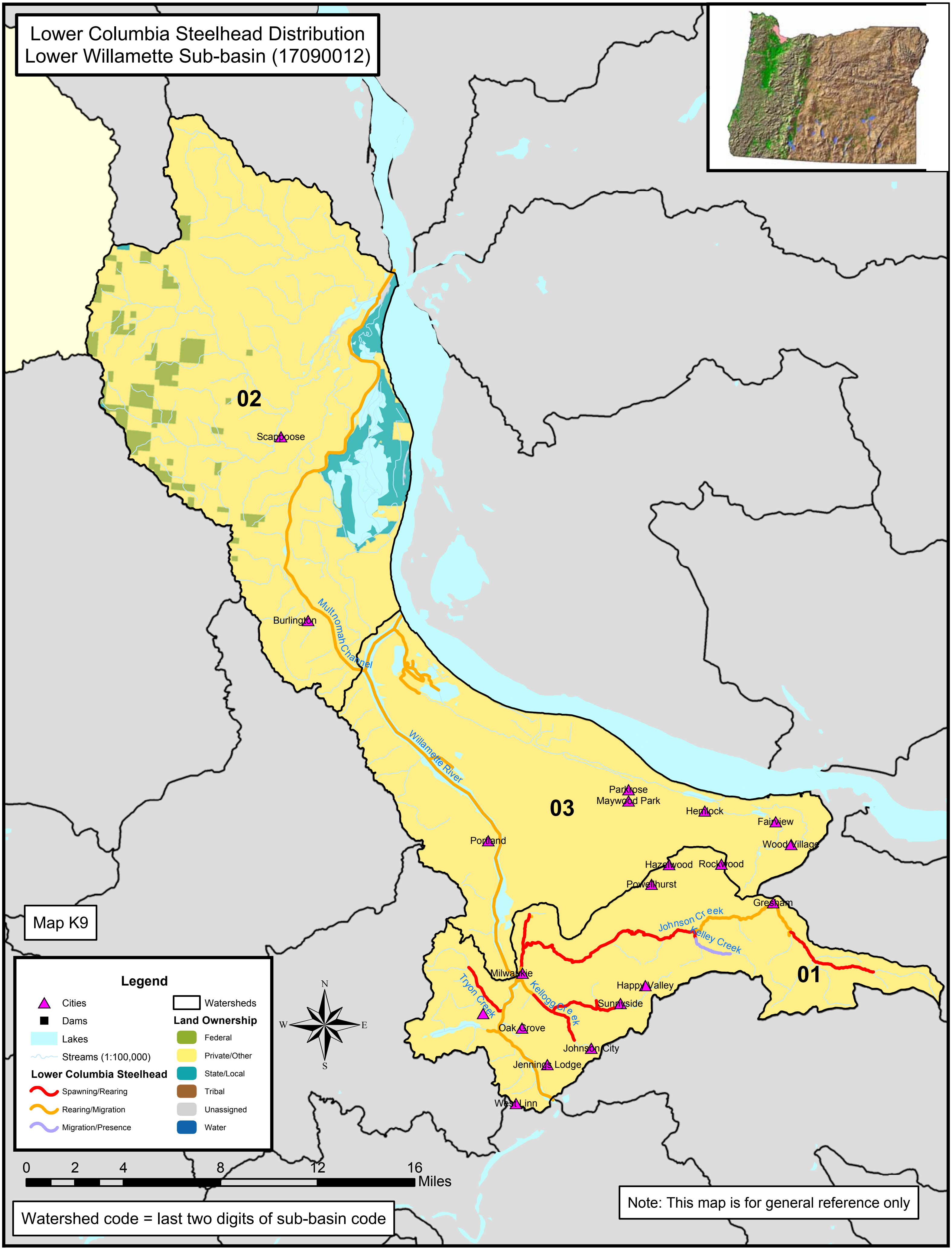
Lower Columbia Steelhead Distribution
Cowlitz Sub-basin (17080005)
01
03
04
05
06
07
08
Mossyrock
Mayfield
Cowlitz Falls Dam
Cinebar
Marys Corner
Salkum
Winlock
Toledo
Vader
Ryderwood
Mossyrock
Morton
Glenoma
Kosmos
Silver Lake
Castle Rock
Lexington
Kelso
Otter Creek
Trout Creek
Coon Creek
South Fork Tilton Creek
Mill Creek
Mill Creek
Skook Creek
Blue Creek
Snow Creek
Bear Creek
Cedar Creek
Beaver Creek
Baxter Creek
Johnson Creek
Thirteen Creek
Big Wolf Creek
Nineteen Creek
O Neil Creek
Owl Creek
Map K6
Legend
Cities
Dams
Lakes
Streams (1:100,000)
Lower Columbia Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
W
E
S
0
3
6
12
18
24
Miles
Note: This map is for general reference only
Watershed code = last two digits of sub-basin code



Lower Columbia Steelhead Distribution
Middle Willamette Sub-basin (17090007)
Wilsonville
Donald
04
Willamette River
Abernethy Creek
Newell Creek
Holcomb Creek
Potter Creek
Thimble Creek
Martin Creek
Root Creek
Map K7
Legend
Cities
Dams
Lakes
Streams (1:100,000)
Lower Columbia Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
0
1.25
2.5
5
7.5
10
Miles
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only

Lower Columbia Steelhead Distribution
Clackamas Sub-basin (17090011)





Lower Columbia Steelhead Distribution
Lower Willamette Sub-basin (17090012)
02
03
01
Scappoose
Burlington
Multnomah Channel
Willamette River
Portland
Parkrose
Maywood Park
Hemlock
Fairview
Wood Village
Hazelwood
Rockwood
Powellhurst
Gresham
Johnson Creek
Kelley Creek
Milwaukie
Tryon Creek
Kellogg Creek
Happy Valley
Sunnyside
Oak Grove
Johnson City
Jennings Lodge
West Linn
Map K9
Legend
Cities
Dams
Lakes
Streams (1:100,000)
Lower Columbia Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
E
S
W
0 2 4 8 12 16 Miles
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only

Appendix L
CHART Assessment for the
Upper Willamette River Steelhead ESU

CHART Participants

The CHART for this ESU consisted of the following NOAA Fisheries biologists: Ben Meyer (CHART Leader), Michelle Day, Patty Dornbusch, Dan Guy, Lynne Krasnow, Lance Kruzic, Nancy Munn, Mindy Simmons, Cathy Tortorici, and Rich Turner. This CHART assessment also benefitted from review and comments from the Oregon Department of Fish and Wildlife.

ESU Description

The Upper Willamette River steelhead ESU was listed as a threatened species in 1999 (64 FR 14517; March 25, 1999). The ESU includes all naturally spawned populations of winter-run steelhead in the Willamette River, Oregon, and its tributaries upstream from Willamette Falls to the Calapooia River (inclusive). The agency recently conducted a review to update the ESU's status, taking into account new information, evaluating component resident rainbow trout populations, and considering the net contribution of artificial propagation efforts in the ESU. We have proposed that Upper Willamette River *O. mykiss* remain listed as threatened (69 FR 33102; June 14, 2004). Additionally, we have proposed that the listing include resident populations of *O. mykiss* below impassible barriers (natural and manmade) that co-occur with anadromous populations. The final listing determination for all *O. mykiss* ESUs was extended by six months (70 FR 37219, June 28, 2005), therefore the CHART's assessment focused on the anadromous range of *O. mykiss*.

The following description is based largely on excerpts from the Willamette/Lower Columbia River Technical Recovery Team's (TRT) recent review of historical population structure for this ESU (Myers et al. 2003). Of the three temporal runs of steelhead currently found in the Upper Willamette River ESU only the late-run winter steelhead is considered to be native. The same flow conditions at Willamette Falls that only provided access for spring-run Chinook salmon also provided an isolating mechanism for this unique run time of steelhead. The predominant tributaries to the Willamette River that historically supported winter steelhead all drain the Cascade Range. The TRT has identified most of these drainages as a historically demographically independent population (DIP): Molalla, North Santiam, South Santiam, and Calapooia rivers. Steelhead populations in the upper Willamette River basin have been strongly influenced by extensive hatchery transfers of fish throughout the ESU and the introduction of summer-run steelhead (facilitated by the laddering of Willamette Falls). Summer-run steelhead are still stocked in the upper Willamette River, but the stocking of winter-run steelhead in the Willamette River has been discontinued (although non-native winter-run fish still return).

It is generally agreed that steelhead did not historically emigrate farther upstream than the Calapooia River. Although there are no obvious physical barriers separating populations upstream of the Calapooia from those lower in the basin, resident *O. mykiss* in these upper basins are quite distinctive both phenotypically and genetically and are not considered part of the ESU. Hatchery summer steelhead occur in the Willamette Basin, but are an out-of-basin stock that is not included as part of the ESU. Also, the TRT reviewed evidence of steelhead using westside tributaries to the Willamette River and concluded that "with the exception of the Tualatin River, there is little evidence to suggest that sustained spawning aggregations of steelhead may have existed historically in the westside tributaries of the Willamette River basin. Furthermore, it is unlikely that these tributaries, individually or collectively were large enough to constitute a DIP.

Late-run upper Willametter River winter steelhead are considered an ocean-maturing type of steelhead in that they enter fresh water with well-developed gonads and typically spawn shortly thereafter. Maturing fish enter the Willamette River beginning in January and February, but do not ascend to their spawning areas until late March or April. Spawning takes place from April to June, typically peaking in May and occurs in both mainstem and tributary habitats in the major Cascade drainages identified above. Presently, native steelhead are distributed in a few, relatively small, naturally spawning aggregations.

The juvenile life-history characteristics of Upper Willamette River steelhead are summarized (where known) in ODFW (1990) and Olsen et al. (1992). In the subbasins reviewed, egg/alevin incubation and fry emergence occurred from April to August. Juveniles spend two winters rearing in freshwater before emigrating to the ocean from March to July. Upper Willamette River winter steelhead typically spawn as 4 year olds after two years in the ocean.

Recovery Planning Status

The Willamette-Lower Columbia River TRT has identified four historical demographically independent populations of Upper Willamette River steelhead: the Mollala River, North Santiam River, South Santiam River, and Calapooia River populations (Myers et al. 2003). The TRT also notes that spawning winter-run steelhead have been observed in the Westside tributaries to the Upper Willamette River, however, the Westside tributaries are not considered to have historically constituted a demographically independent population (Myers et al. 2003). The TRT has determined that the Upper Willamette River *O. mykiss* ESU populations comprise a single life-history type (winter-run fish) and ecological zone (Willamette River) (McElhany et al. 2002). Recovery planning will likely emphasize the need for a geographical distribution of viable populations across the geographical range of the four populations in this ESU (Ruckelshaus et al. 2002, McElhany et al. 2003). A preliminary draft recovery plan for this ESU is expected by the end of 2005. This plan will be based on the Willamette subbasin plan, which was completed in May 2004. The CHART considered the TRT products in rating each watershed, but did not have the benefit of a recovery plan. We anticipate that, as recovery planning proceeds, we will have better information and may revise our recommendations for regarding critical habitat designation.

CHART Area Assessments
The CHART assessment for this ESU addressed 7 subbasins containing 34 occupied watersheds, as well as the lower Willamette/Columbia River rearing/migration corridor As noted above, the Upper Willamette River steelhead ESU consists of a single stratum due to it being a single run type (winter-run fish) that spawns within a single ecological zone (Willamette River). Therefore, as part of its assessment the CHART considered the conservation value of each HUC5 in the context of the populations within this stratum. Information is presented below by USGS subbasin because they present a convenient and systematic way to organize the CHART's watershed assessments for this ESU and their names are generally more recognizable because they typically identify major river systems.

Upper Willamette Subbasin (HUC4# 17090003)
The Upper Willamette subbasin contains both eastside and westside drainages as well as the mainstem Willamette River upstream of its confluence with the Santiam River. The subbasin is contained

in the following Oregon counties: Benton, Linn, and Polk. Some areas of the subbasin also occur in Lane and Lincoln counties but these are outside the range of the ESU. The subbasin contains six watersheds, three of which are occupied by this ESU and encompass approximately 765 mi^2 and 953 miles of streams. Fish distribution and habitat use data from the Oregon Department of Fish and Wildlife (ODFW) identify approximately 241 miles of occupied riverine habitat in the watersheds (ODFW 2003A,B). Myers et al. (2003) identified possibly two demographically independent populations in this subbasin (the CHART questioned the South Santiam population's presence here), but only one with spawning habitat (Calapooia River). Myers et al.

(2003) also noted that there is considerable debate about the origin of naturally spawning winter-run steelhead currently found in several westside tributaries. These authors went on to state that (with the exception of the Tualatin River) "there is little evidence to suggest that sustained spawning aggregations of steelhead may have existed historically in the westside tributaries of the Willamette River basin. Furthermore, it is unlikely that these tributaries, individually or collectively were large enough to constitute a DIP [demographically independent population]."

The CHART concluded that, despite uncertainites regarding the population status of steelhead in the watersheds in this subbasin, both likely contain one or more PCEs for this ESU. Table L1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map L1 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that one of the occupied HUC5 watersheds (Calapooia River) in this subbasin was of high and two were of medium conservation value to the ESU. The CHART also concluded that all reaches of the Willamette River within this subbasin constitute a high value rearing and migration corridor for the Calapooia River population with downstream reaches and the ocean. The CHART noted that, given the limited number of populations in this ESU, westside habitats in this subbasin may provide some conservation benefits to the ESU (e.g., as a buffer against a catastrophic event affecting Cascade watersheds). In that context, the CHART concluded that the Luckiamute River HUC5 may have the highest potential conservation benefit in this subbasin and therefore assigned it a provisional medium conservation value. Table L2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure L1 shows the overall distribution of ratings by HUC5 watershed. Among the key considerations identified in Table L2, the CHART noted that the Calapooia River HUC5 was the only one identified as having spawning habitat supporting a demographically independent population in this subbasin.

North Santiam River Subbasin (HUC4# 17090005)

The North Santiam River subbasin is a Cascade Range drainage of the Upper Willamette River and contained in Clackamas, Linn, and Marion counties, Oregon. The subbasin contains six watersheds, three of which are occupied by this ESU and encompass approximately 315 mi^2 and 340 miles of streams. Fish distribution and habitat use data from ODFW identify approximately 137 miles of occupied riverine habitat in these watersheds (ODFW 2003A,B). Myers et al. (2003) identified one demographically independent population (North Santiam River) in this subbasin. Historically accessible areas in the three uppermost watersheds of this subbasin are now blocked by Big Cliff and Detroit dams but may have been productive steelhead habitat (Parkhurst 1950). The CHART concluded that all of the occupied areas likely contain one or more PCEs for this ESU. Table L1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map L2 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watersheds in this subbasin were of high conservation value to the ESU. Table L2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure L1 shows the overall distribution of ratings by HUC5 watershed. Among the key considerations identified in Table M2, the CHART noted that there are very few populations in this ESU and that the TRT has classified the North Santiam River steelhead as both a core population (historically abundant and "may offer the most likely path to recovery") as well as a genetic legacy population (one of the "the most intact representatives of the genetic character of the ESU") (McElhany et al. 2003). Similarly, ODFW considered the upper North Santiam River and Little North Santiam River as priority areas for steelhead, noting that these areas had high production potential and monitoring potential, but low habitat restoration potential (Oregon Plan for Salmon and Watersheds 2001). Also, occupied reaches in Little North Santiam HUC5 overlap with a FEMAT key watershed for at-risk anadromous salmonids (FEMAT 1994).

The CHART also considered whether the three inaccessible HUC5s (Upper North Santiam, North Fork Breitenbush River, and Detroit Reservoir/Blowout Divide Creek) may be essential to the conservation of this ESU but concluded that, in contrast to Willamette River spring Chinook, it is less certain whether these inaccessible HUC5s may be essential for the conservation of the Upper Willamette River steelhead ESU.

South Santiam River Subbasin (HUC4# 17090006)

The South Santiam River subbasin is a Cascade Range drainage of the Upper Willamette River and contained in Linn County, Oregon. The subbasin contains eight watersheds, six of which are occupied by this ESU and encompass approximately 766 mi^2 and 860 miles of streams. Fish distribution and habitat use data from ODFW identify approximately 230 miles of occupied riverine habitat in these watersheds (ODFW 2003A,B). Two watersheds in the upper Middle Santiam River (Quartzville Creek and Middle Santiam River) are blocked by Green Peter Dam. Myers et al. (2003) identified one demographically independent population (South Santiam River) in this subbasin. The CHART concluded that all of the occupied areas likely contain one or more PCEs for this ESU. Table L1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map L3 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watersheds in this subbasin were of high conservation value to the ESU. Table L2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure M1 shows the overall distribution of ratings by HUC5 watershed. Among the key considerations identified in Table L2, the CHART noted that there are very few populations in this ESU and that the TRT has classified the South Santiam River steelhead as both a core population (historically abundant and "may offer the most likely path to recovery") as well as a genetic legacy population (one of the "the most intact representatives of the genetic character of the ESU") (McElhany et al. 2003). Similarly, ODFW considered the upper South Santiam River as a priority area for steelhead, noting that this area had high production potential and monitoring potential, and moderate habitat restoration potential (Oregon Plan for Salmon and Watersheds 2001). This assessment also noted that the Upper South Santiam "is at such low abundance that an extirpation warning is warranted" (Oregon Plan for Salmon and Watersheds 2001).

Middle Willamette River Subbasin (HUC4# 17090007)

The Middle Willamette River subbasin encompasses most of the valley floor reaches of the Willamette River upstream of Willamette Falls and is contained in the following Oregon counties: Clackamas, Marion, Polk, Yamhill, and Washington. The subbasin consists of four watersheds, all of which are occupied by this ESU and encompass approximately 712 mi^2 and 922 miles of streams. Fish distribution and habitat use data from ODFW identify approximately 177 miles of occupied riverine habitat (all rearing/migration) in these watersheds (ODFW 2003A,B). Myers et al. (2003) identified one demographically independent population (North Santiam River) that spawns in this subbasin, although three populations use this subbasin for rearing/migration. The CHART concluded that all of the occupied areas likely contain one or more PCEs for this

ESU. Table L1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map L4 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watersheds in this subbasin were of low conservation value to the ESU. However, that assessment pertained solely to the tributary streams in these watersheds (e.g., Ash, Rickreall, and Harvey creeks), not the mainstem Willamette River nor the Mill Creek reaches connecting to the North Santiam River. The CHART concluded that all reaches of the Willamette River within this subbasin constitute a high value rearing and migration corridor. These high value reaches connect all populations and HUC5s in this ESU with downstream reaches and the ocean. Table L2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure L1 shows the overall distribution of ratings by HUC5 watershed.

Yamhill River Subbasin (HUC4# 17090008)

The Yamhill River subbasin is a Coast Range drainage of the middle Willamette River and is contained primarily in Polk, Tillamook, and Yamhill counties, Oregon (with very small and unoccupied portions in Lincoln and Washington counties as well). The subbasin contains seven watersheds, all of which are occupied by this ESU and encompass approximately 772 mi^2 and 966 miles of streams. Fish distribution and habitat use data from ODFW identify approximately 319 miles of occupied riverine habitat (all rearing/migration) in these watersheds (ODFW 2003A,B). Myers et al. (2003) did not identify a demographically independent population in this subbasin. These authors noted that there is considerable debate about the origin of naturally spawning winter-run steelhead currently found in several westside tributaries and went on to state that (with the exception of the Tualatin River) "there is little evidence to suggest that sustained spawning aggregations of steelhead may have existed historically in the westside tributaries of the Willamette River basin. Furthermore, it is unlikely that these tributaries, individually or collectively were large enough to constitute a DIP [demographically independent population]."

The CHART concluded that, despite uncertainites regarding the population status of steelhead in the watersheds in this subbasin, they likely contain one or more PCEs for this ESU. Table L1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration reaches, as well as management activities that may affect these reaches in the watersheds. Map L5 depicts the specific areas in this subbasin occupied by the ESU, but is unclear whether these areas qualify for consideration as critical habitat for this ESU. However, the CHART noted that, given the limited number of populations in this ESU, habitat in this subbasin may provide some conservation benefits to the ESU (e.g., as a buffer against a catastrophic event affecting Cascade watersheds). In that context, the CHART concluded that the Upper South Yamhill River HUC5 may have the highest potential conservation value in this subbasin and therefore assigned it a medium conservation value while habitat areas in the remaining six watersheds warrant a low conservation value to the ESU. Table L2 summarizes the CHART's watershed scores and conservation value ratings, and Figure L1 shows the overall distribution of ratings by HUC5 watershed.

Molalla/Pudding River Subbasin (HUC4# 17090009)

The Molalla/Pudding River subbasin is an eastside drainage of the middle Willamette River and contained in Clackamas and Marion counties, Oregon. The subbasin contains six watersheds occupied by this ESU and encompasses approximately 875 mi^2 and 1,057 miles of streams. Fish distribution and habitat use data from ODFW identify approximately 284 miles of occupied riverine habitat in these watersheds (ODFW 2003A,B). The CHART concluded that all of the occupied areas likely contain one or more PCEs for this ESU. Table L1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map L6 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watersheds in this subbasin ranged from high to low conservation value to the ESU. Of the six HUC5s reviewed, one was rated as having high (Upper Molalla River HUC5), two were rated as having medium and three were rated as having low conservation value. The CHART elevated the Abiqua Creek/Pudding River HUC5 from a Low to Medium conservation value, noting that recent data from a watershed assessment indicate that this HUC5 has some of the highest-quality habitat in the Pudding River subbasin (M. Simmons, NOAA Fisheries, pers. com). The CHART also made related changes based on this information and lowered the conservation values for two HUC5s (Butte Creek/Pudding River and Rock Creek Pudding River HUC5s) because the data indicate that the Abiqua Creek/Pudding River HUC5 has higher redd densities and more fish than these two HUC5s. Table L2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure L1 shows the overall distribution of ratings by HUC5 watershed. Among the key considerations identified in Table L2, the CHART noted that ODFW considered the Molalla River as a priority area for steelhead, noting that this area had high production potential and monitoring potential, and moderate habitat restoration potential (Oregon Plan for Salmon and Watersheds 2001).

Tualatin River Subbasin (HUC4# 17090010)

The Tualatin River subbasin is a Coast Range drainage of the middle Willamette River and contained in Clackamas, Columbia, Multnomah, Tillamook, Washington, and Yamhill counties. The subbasin contains five watersheds, all of which are occupied by this ESU and encompass approximately 709 mi^2 and 889 miles of streams. Fish distribution and habitat use data from ODFW identify approximately 298 miles of occupied riverine habitat in these watersheds (ODFW 2003A,B). Myers et al. (2003) did not identify a demographically independent population in this subbasin. These authors noted that there is considerable debate about the origin of naturally spawning winter-run steelhead currently found in several westside tributaries and went on to state that (with the exception of the Tualatin River) "there is little evidence to suggest that sustained spawning aggregations of steelhead may have existed historically in the westside tributaries of the Willamette River basin. Furthermore, it is unlikely that these tributaries, individually or collectively were large enough to constitute a DIP [demographically independent population]."

The CHART concluded that, despite uncertainites regarding the population status of steelhead in the watersheds in this subbasin, they likely contain one or more PCEs for this ESU. Table L1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration reaches, as well as management activities that may affect these reaches in the watersheds. Map L7 depicts the specific areas in this subbasin occupied by the ESU, but is unclear whether these areas qualify for consideration as critical habitat for this ESU. However, the CHART noted that, given the limited number of populations in this ESU, habitat in this subbasin may provide some conservation benefits to the ESU (e.g., as a buffer against a catastrophic event affecting Cascade watersheds). In that context, the CHART concluded that the Gales Creek HUC5 may have the highest potential conservation benefit in this subbasin and therefore assigned it a medium conservation value, while habitat areas in the remaining four watersheds warrant a low conservation value to the ESU. The CHART noted that Gales Creek was the one westside watershed with some evidence of possible historic use by steelhead (Parkhurst et al. 1950 as described in Myers et al.

2003). Table L2 summarizes the CHART's watershed scores and conservation value ratings, and Figure L1 shows the overall distribution of ratings by HUC5 watershed.

Lower Willamette/Columbia River Corridor

The lower Willamette/Columbia River rearing and migration corridor consists of that segment from the confluence of the Willamette and Clackamas rivers to the Pacific Ocean. This corridor also includes the Multnomah Channel portion of the Lower Willamette River. Watersheds downstream of the Clackamas River subbasin (Johnson Creek and Columbia Slough/Willamette River HUC5s) are outside the spawning range of this ESU and likely used in a limited way as juvenile rearing habitat for this ESU. Fish distribution and habitat use data from ODFW identify approximately 138 miles of occupied riverine and estuarine habitat in this corridor (ODFW 2003a,b).

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the lower Willamette/Columbia River corridor was of high conservation value to the ESU. The CHART noted that this corridor connects every watershed and population in this ESU with the ocean and is used by rearing/migrating juveniles and migrating adults. The Columbia River estuary is a particularly important area for this ESU as both juveniles and adults make the critical physiological transition between life in freshwater and marine habitats (ISAB 2000, Marriott et al. 2002).

Marine Areas

NOAA Fisheries' analysis focused on freshwater and estuarine habitats upstream of the mouth of the Columbia River. While marine areas are occupied by this ESU, within this vast area the agency has not identified "specific areas within the geographical area occupied by the species . . . on which are found those physical or biological features . . . essential to the conservation of the species."

Changes to the CHART's Initial Assessments

The CHART reviewed the public and peer reviewer comments received on the Team's initial findings for this ESU as well as new information relevant to evaluating habitat areas for this ESU. As a result, the CHART changed conservation value ratings for three watersheds (all in the Molalla/Pudding subbasin) within the geographical area occupied by this ESU. There were no public comments or new information to indicate changes in the delineation of occupied habitat areas for this ESU. The proposed critical habitat designation (69 FR 74572, December 14, 2004) summarizes the comments and responses pertaining to the CHART's initial determinations for this ESU. And Tables L1 and L2 reflect the final CHART assessments, including the following changes in habitat area delineations:

Subbasin	Watershed code	Watershed name	Changes from Initial CHART Assessment
Molalla/ Pudding	1709000901	Abiqua Creek/ Pudding River	Changed conservation rating from Low to Medium.
Molalla/ Pudding	1709000902	Butte Creek/ Pudding River	Changed conservation rating from Medium to Low.
Molalla/ Pudding	1709000903	Rock Creek/ Pudding River	Changed conservation rating from Medium to Low.

References and Sources of Information

References cited above as well as key reports and data sets reviewed by the CHART include the following:

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Busby, P., T. Wainwright, G. Bryant, L. Lierheimer, R. Waples, F. Waknitz, and I. Lagomarsino. 1996. Status review of west coast steelhead from Washington, Idaho, Oregon and California. NOAA Tech. Memo NMFSNWFSC- 27, August 1996.

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Table M1. Summary of Occupied Areas, PCEs, and Management Activities Affecting PCEs for the Upper Willamette River Steelhead ESU

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs)			Unoccupied but may be essential (mi)**	Management Activities***
				Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*		
	Upper Willamette	Calapooia River	1709000303	56.3	16.4	0		A, F, R, U
	Upper Willamette	Oak Creek	1709000304	0	34.4	0		A, R, U
	Upper Willamette	Luckiamute River	1709000306	31.5	102	0		A
	North Santiam	Upper North Santiam River	1709000501	0	0	0	[a]	
	North Santiam	North Fork Breitenbush River	1709000502	0	0	0	14.9 [a]	
	North Santiam	Detroit Reservoir/ Blow Out Divide Creek	1709000503	0	0	0	10.5 [a]	
	North Santiam	Middle North Santiam River	1709000504	27.9	0	0		A, D, F, R
	North Santiam	Little North Santiam River	1709000505	27.9	0	0		A, F, M
	North Santiam	Lower North Santiam River	1709000506	43.6	37.3	0		A, D, F, I, S, U
	South Santiam	Hamilton Creek/South Santiam River	1709000601	27.5	30.5	5.4		A, C, D, F, I, R, U
	South Santiam	Crabtree Creek	1709000602	37.7	8.8	0		A, C, F, R
	South Santiam	Thomas Creek	1709000603	19.4	22.7	0		A, D, F, R
	South Santiam	Quartzville Creek	1709000604	0	0	0	34 [b]	
	South Santiam	Middle Santiam River	1709000605	0	0	0	14.4 [b]	
	South Santiam	South Santiam River	1709000606	32.9	0.3	0		D, F
	South Santiam	South Santiam River / Foster Reservoir	1709000607	11.7	8	0		D, F
	South Santiam	Wiley Creek	1709000608	22.9	1.9	0		F
	Middle Willamette	Mill Creek/Willamette River	1709000701	21.2	10.5	0		A, C, I, R, U
	Middle Willamette	Rickreall Creek	1709000702	11.6	49.2	0		A, R, U
	Middle Willamette	Willamette River/Chehalem Creek	1709000703	3	60.8	0		A, C, R, U, W
	Middle Willamette	Abernethy Creek	1709000704	0	20.4	0		A, C, R, U, W
	Yamhill	Upper South Yamhill River	1709000801	40.2	36.8	0		A, F
	Yamhill	Willamina Creek	1709000802	22.5	11	0		A, F

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs) Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*	Unoccupied but may be essential (mi)**	Management Activities***
	Yamhill	Mill Creek/South Yamhill River	1709000803	5.3	13.2	0		A
	Yamhill	Lower South Yamhill River	1709000804	3.1	46.1	0		A, C, R, U
	Yamhill	Salt Creek/South Yamhill River	1709000805	0	9.3	0		A
	Yamhill	North Yamhill River	1709000806	34.7	54.1	0		A, U
	Yamhill	Yamhill River	1709000807	0	43	0		A, R, U
	Molalla/ Pudding	Abiqua Creek/Pudding River	1709000901	35.2	22.5	0		A, F, R
	Molalla/ Pudding	Butte Creek/Pudding River	1709000902	17.3	34.5	0		A, F, R
	Molalla/ Pudding	Rock Creek/Pudding River	1709000903	6.4	0	0		A, I, R
	Molalla/ Pudding	Senecal Creek/Mill Creek	1709000904	0	29.5	0		A, U
	Molalla/ Pudding	Upper Molalla River	1709000905	72.9	0	0		A, F, R
	Molalla/ Pudding	Lower Molalla River	1709000906	17.2	48.5	0		A, C, F, R, U
	Tualatin	Dairy Creek	1709001001	50.6	57.8	0		A, C, F, R, U
	Tualatin	Gales Creek	1709001002	39.3	15.2	0		A, C, F, R, U
	Tualatin	Scoggins Creek	1709001003	20.3	5.4	0.7		A, C, D, F, R, U
	Tualatin	Rock Creek/Tualatin River	1709001004	23.1	13.7	21		A, C, R, U
	Tualatin	Lower Tualatin River	1709001005	13.1	8.9	28.8		A, C, R, U
	Lower Willamette	Johnson Creek	1709001201	0	6.3	0		A, C, I, R, U, W
	Lower Willamette	Scappoose Creek	1709001202	0	21.7	0		A, C, F, I, R, U, W
	Lower Willamette	Columbia Slough/ Willamette River	1709001203	0	18.5	0		A, C, R, U, W
	Multiple	Lower Columbia Corridor (Sandy/Washougal to Ocean)	NA	0	0	98.2[c]		C, D, I, R, T, U, W

[a] Big Cliff and Detroit dams are a barrier to fish distribution in this watershed. Unoccupied habitat areas above these dams may be essential to conservation.

[b] Green Peter Dam is a barrier to fish distribution in this watershed. Unoccupied habitat areas above these dams may be essential to conservation.

[c] The Lower Columbia River from the ocean upstream approximately 46.5 miles is considered to contain estuarine PCEs, in addition to migration and rearing (ISAB 2000).

* Some streams classified as "Migration/Presence PCEs" may also include rearing or spawning PCEs, but the GIS data are still undergoing review to confirm additional habitat use types.

** These watersheds historically supported spawning and rearing PCEs. The CHART determined that these watersheds may be essential for conservation of the ESU. Since these watersheds are unoccupied, the CHART did not identify management activities.

** This list is not exhaustive. It is intended to highlight key management activities affecting PCEs in each watershed. Activities identified are based on the general categories described by Spence et al. (1996) and summarized previously in the "Special Management Considerations or Protection" section of this report. Coding is as follows: F= forestry, G = grazing, A = agriculture, C = channel modifications/diking, R = road building/maintenance, U = urbanization, S = sand and gravel mining, M = mineral mining, D = dams, I = irrigation impoundments and withdrawals, T = river, estuary, and ocean traffic, W = wetland loss/removal, B = beaver removal, X = exotic/invasive species introductions, H = forage fish/species harvest. Primary sources for this information were the CHART and reports by Bastasch et al. (2003), Hulse et al. (2002), Pearson (2003), ODFW (1990a-f, 1992), and land use/land cover GIS layers from the U.S. Geological Survey.

Table L2. Summary of Initial CHART Scores and Ratings of Conservation Value for Habitat Areas in HUC5 Watersheds Occupied by the Upper Willamette River Steelhead ESU

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)					Total HUC5 Score (0-15)[3]	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5			
	Upper Willamette	Calapooia River	1709000303	3	1	1	1	3	9	Moderate HUC5 score; HUC5 contains all spawning PCEs for one of only four demographically independent populations in this ESU	High
	Upper Willamette	Oak Creek	1709000304	3	1	1	1	2	8	Moderate HUC5 score; CHART concluded that tributaries are low value relative to other HUC5s, but rearing/migration PCEs in Willamette corridor are highly essential for upstream HUC5s (Calapooia River population)	Medium
	Upper Willamette	Luckiamute River	1709000306	3	1	1	1	2	8	Not identified as supporting a historically independent population; relatively widespread habitat may make this HUC5 potentially more important than other westside HUC5s in this subbasin	Medium
	North Santiam	Upper North Santiam River	1709000501						*	Unoccupied HUC5, but population expansion into this HUC5 possibly essential for conservation; Big Cliff and Detroit dams are a barrier to fish distribution in this watershed; High HUC5 score	Possibly High

[3] PCE/watershed scores were derived using the CHART scoring process described in the introduction to this report. The CHART employed an earlier 5-factor version of the scoring matrix for three ESUs (Columbia River chum salmon and Upper Willamette River chinook salmon and steelhead) therefore the maximum possible score for these ESUs was 15 points.

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)					Total HUC5 Score (0-15)[3]	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5			
	North Santiam	North Fork Breitenbush River	1709000502						*	Unoccupied HUC5, but population expansion into this HUC5 possibly essential for conservation; Big Cliff and Detroit dams are a barrier to fish distribution in this watershed; High HUC5 score	Possibly High
	North Santiam	Detroit Reservoir/ Blow Out Divide Creek	1709000503						*	Unoccupied HUC5, but population expansion into this HUC5 possibly essential for conservation; Big Cliff and Detroit dams are a barrier to fish distribution in this watershed; High HUC5 score	Possibly High
	North Santiam	Middle North Santiam River	1709000504	3	1	1	2	2	9	Moderate HUC5 score; PCEs support a TRT core and legacy population and ODFW considers North Santiam as priority area for steelhead	High
	North Santiam	Little North Santiam River	1709000505	3	2	3	2	2	12	High HUC5 score; PCEs support a TRT core and legacy population and ODFW considers North Santiam as priority area for steelhead; PCEs are in a FEMAT key watershed	High
	North Santiam	Lower North Santiam River	1709000506	3	1	1	2	2	9	Moderate HUC5 score; PCEs support a TRT core and legacy population and ODFW considers North Santiam as priority area for steelhead; high value connectivity reaches for upstream HUC5s	High
	South Santiam	Hamilton Creek/South Santiam River	1709000601	3	1	1	2	2	9	Moderate HUC5 score; PCEs support a TRT core and legacy population; high value connectivity reaches for all HUC5s in this subbasin	High
	South Santiam	Crabtree Creek	1709000602	3	1	1	2	2	9	Moderate HUC5 score; PCEs support a TRT core and legacy population	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)					Total HUC5 Score (0-15)[3]	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5			
	South Santiam	Thomas Creek	1709000603	3	1	1	2	2	9	Moderate HUC5 score; PCEs support a TRT core and legacy population	High
	South Santiam	Quartzville Creek	1709000604						*	Unoccupied HUC5, but population expansion into this HUC5 possibly essential for conservation; Green Peter Dam is a barrier to fish distribution in this watershed; High HUC5 score	Possibly High
	South Santiam	Middle Santiam River	1709000605						*	Unoccupied HUC5, but population expansion into this HUC5 possibly essential for conservation; Green Peter Dam is a barrier to fish distribution in this watershed; High HUC5 score	Possibly High
	South Santiam	South Santiam River	1709000606	3	2	3	2	2	12	High HUC5 score; PCEs support a TRT core and legacy population and ODFW considers upper South Santiam as priority area for steelhead	High
	South Santiam	South Santiam River / Foster Reservoir	1709000607	3	2	2	2	2	11	High HUC5 score; PCEs support a TRT core and legacy population and ODFW considers upper South Santiam as priority area for steelhead	High
	South Santiam	Wiley Creek	1709000608	3	1	1	2	2	9	Moderate HUC5 score; PCEs support a TRT core and legacy population	High
	Middle Willamette	Mill Creek/ Willamette River	1709000701	1	1	1	0	2	5	Low HUC5 score; spawning PCEs may support one TRT population (North Santiam River); primary importance of this HUC5 is as connectivity corridor for upstream HUC5s in North Santiam subbasin	Low
	Middle Willamette	Rickreall Creek	1709000702	2	1	1	1	2	7	Low-moderate HUC5 score; PCEs in Willamette corridor are highly essential and support three TRT populations	Low

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)					Total HUC5 Score (0-15)[3]	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5			
	Middle Willamette	Willamette River/ Chehalem Creek	1709000703	3	1	1	1	2	8	Moderate HUC5 score; no spawning PCEs in HUC5 and CHART concluded that tributaries are low value, but the Willamette corridor is highly essential	Low
	Middle Willamette	Abernethy Creek	1709000704	2	1	1	1	2	7	Low-moderate HUC5 score; no spawning PCEs in HUC5 and CHART concluded that tributaries are low value, but the Willamette corridor is highly essential	Low
	Yamhill	Upper South Yamhill River	1709000801	3	2	1	1	2	9	Not identified as supporting a historically independent population; relatively widespread habitat may make this HUC5 potentially more important than other westside HUC5s in this subbasin	Medium
	Yamhill	Willamina Creek	1709000802	3	1	1	1	2	8	Not identified as supporting a demographically independent population	Low
	Yamhill	Mill Creek/South Yamhill River	1709000803	2	1	1	1	2	7	Not identified as supporting a demographically independent population	Low
	Yamhill	Lower South Yamhill River	1709000804	2	1	1	1	2	7	Not identified as supporting a demographically independent population	Low
	Yamhill	Salt Creek/South Yamhill River	1709000805	1	1	1	0	1	4	Not identified as supporting a demographically independent population	Low
	Yamhill	North Yamhill River	1709000806	3	1	1	1	2	8	Not identified as supporting a demographically independent population	Low
	Yamhill	Yamhill River	1709000807	3	1	1	1	2	8	Not identified as supporting a demographically independent population	Low

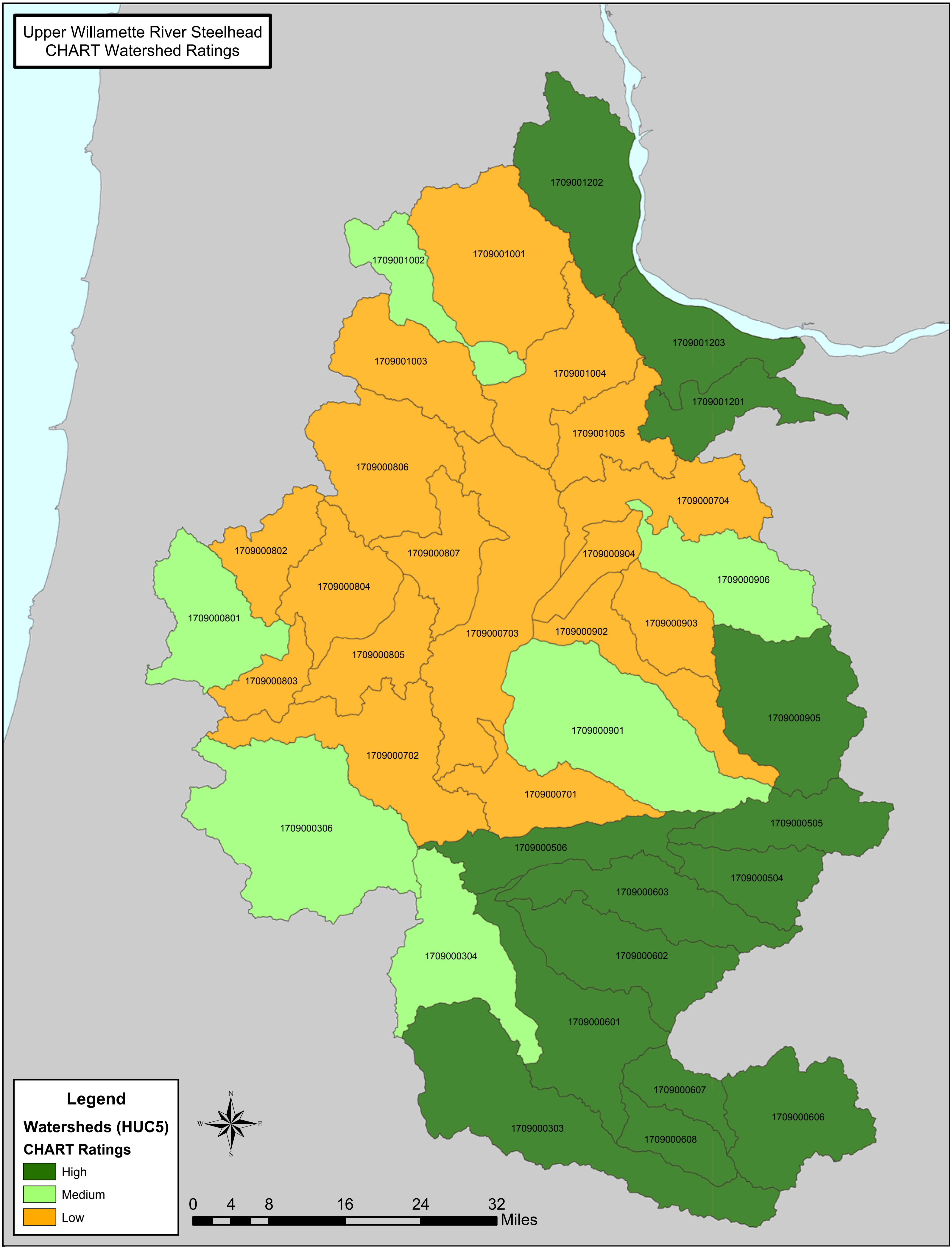
Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)					Total HUC5 Score (0-15)[3]	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5			
	Molalla/Pudding	Abiqua Creek/ Pudding River	1709000901	3	1	1	1	2	8	Moderate HUC5 score; PCEs support a TRT demographically independent population and ODFW considers Mollala River as priority area for steelhead; CHART elevated this HUC5 from a Low to Medium coonservation value, noting that recent data from a watershed assessment indicate that this HUC5 has the highest-quality spawning and rearing habitat, the highest redd densities, and the largest winter steelhead run in the Pudding River subbasin.	Medium
	Molalla/Pudding	Butte Creek/ Pudding River	1709000902	3	1	1	1	2	8	Moderate HUC5 score; PCEs support a TRT demographically independent population and ODFW considers Mollala River as priority area for steelhead. CHART reduced this HUC5 from a Medium to Low coonservation value, noting that recent data from a watershed assessment indicate that this HUC5 is likely lower in conservation value than the nearby Abiqua Creek HUC5.	Low
	Molalla/Pudding	Rock Creek/ Pudding River	1709000903	3	1	1	1	2	8	Moderate HUC5 score; PCEs support a TRT demographically independent population and ODFW considers Mollala River as priority area for steelhead. CHART reduced this HUC5 from a Medium to Low coonservation value, noting that recent data from a watershed assessment indicate that this HUC5 is likely lower in conservation value than the nearby Abiqua Creek HUC5.	Low

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)					Total HUC5 Score (0-15)[3]	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5			
	Molalla/Pudding	Senecal Creek/ Mill Creek	1709000904	3	1	1	1	2	8	Moderate HUC5 score; PCEs support a TRT demographically independent population and ODFW considers Mollala River as priority area for steelhead; no spawning PCEs and limited tributary habitat; CHART determined that this HUC5 had relatively lower PCE quality and quantity than others supporting this population; connectivity reaches are of medium value to Rock Creek/Pudding River and Butte Creek/Pudding River HUC5s upstream	Low
	Molalla/Pudding	Upper Molalla River	1709000905	3	2	1	1	2	9	Moderate HUC5 score; PCEs support a TRT demographically independent population and ODFW considers Mollala River as priority area for steelhead; CHART considered that this HUC5 likely has best PCE quality of all supporting this population	High
	Molalla/Pudding	Lower Molalla River	1709000906	3	1	1	1	2	8	Moderate HUC5 score; PCEs support a TRT demographically independent population and ODFW considers Mollala River as priority area for steelhead	Medium
	Tualatin	Dairy Creek	1709001001	3	1	1	1	2	8	Not identified as supporting a demographically independent population	Low
	Tualatin	Gales Creek	1709001002	3	2	1	1	2	9	Not identified as supporting a historically independent population; relatively widespread habitat may make this HUC5 potentially more important than other westside HUC5s in this subbasin	Medium
	Tualatin	Scoggins Creek	1709001003	2	1	1	1	2	7	Not identified as supporting a demographically independent population	Low

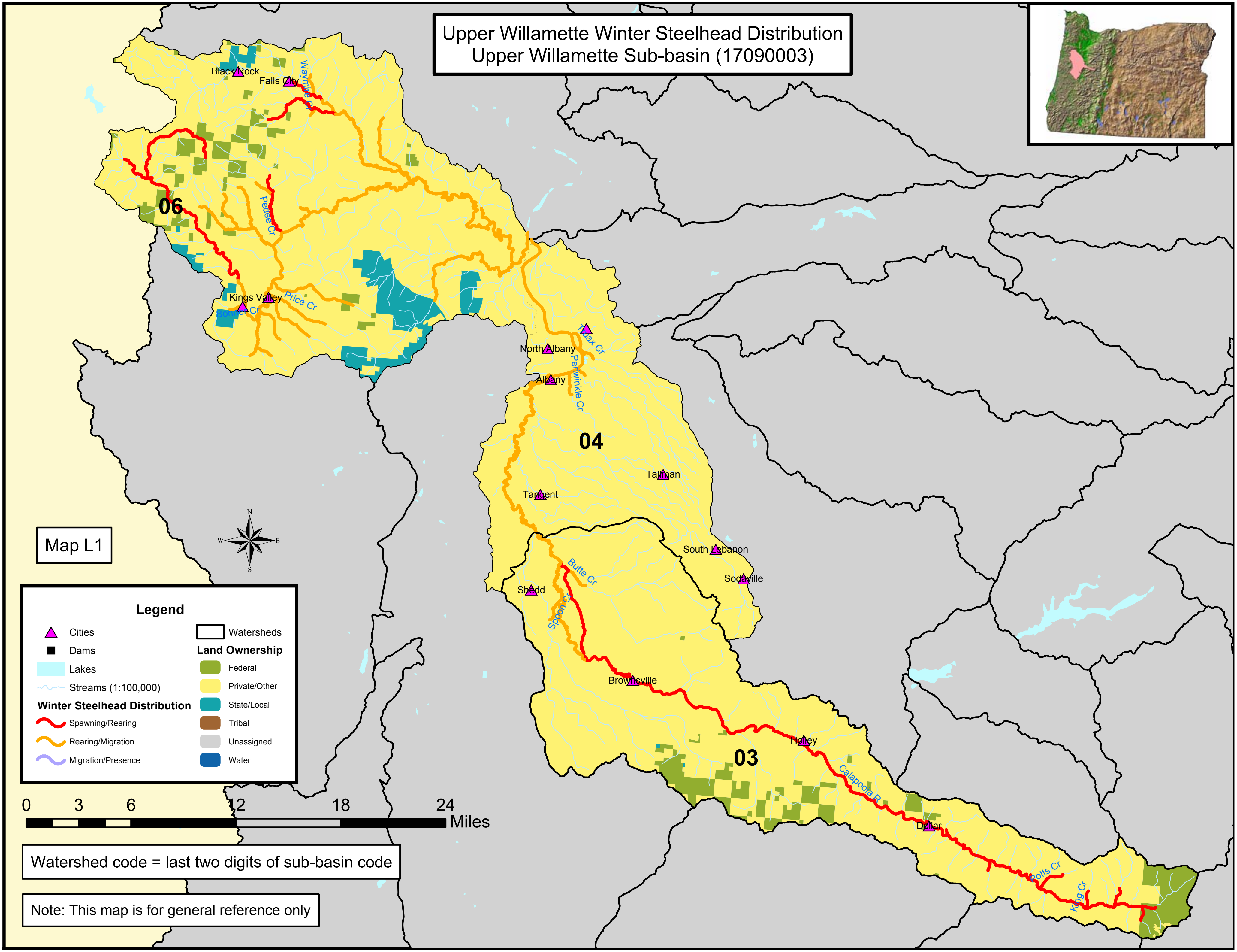
Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)					Total HUC5 Score (0-15)[3]	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5			
	Tualatin	Rock Creek/ Tualatin River	1709001004	2	1	1	1	2	7	Not identified as supporting a demographically independent population	Low
	Tualatin	Lower Tualatin River	1709001005	2	1	1	1	2	7	Not identified as supporting a demographically independent population	Low
	Lower Willamette	Johnson Creek	1709001201						NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Lower Willamette	Scappoose Creek	1709001202						NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Lower Willamette	Columbia Slough/Willamette River	1709001203						NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Multiple	Lower Willamette/Columbia River Corridor	NA						NS	Area not scored since many reaches are outside HUC5 boundaries. However, The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation	High

* Indicates that HUC5 contains blocked/inaccessible areas that the CHART concluded may be essential for ESU conservation.

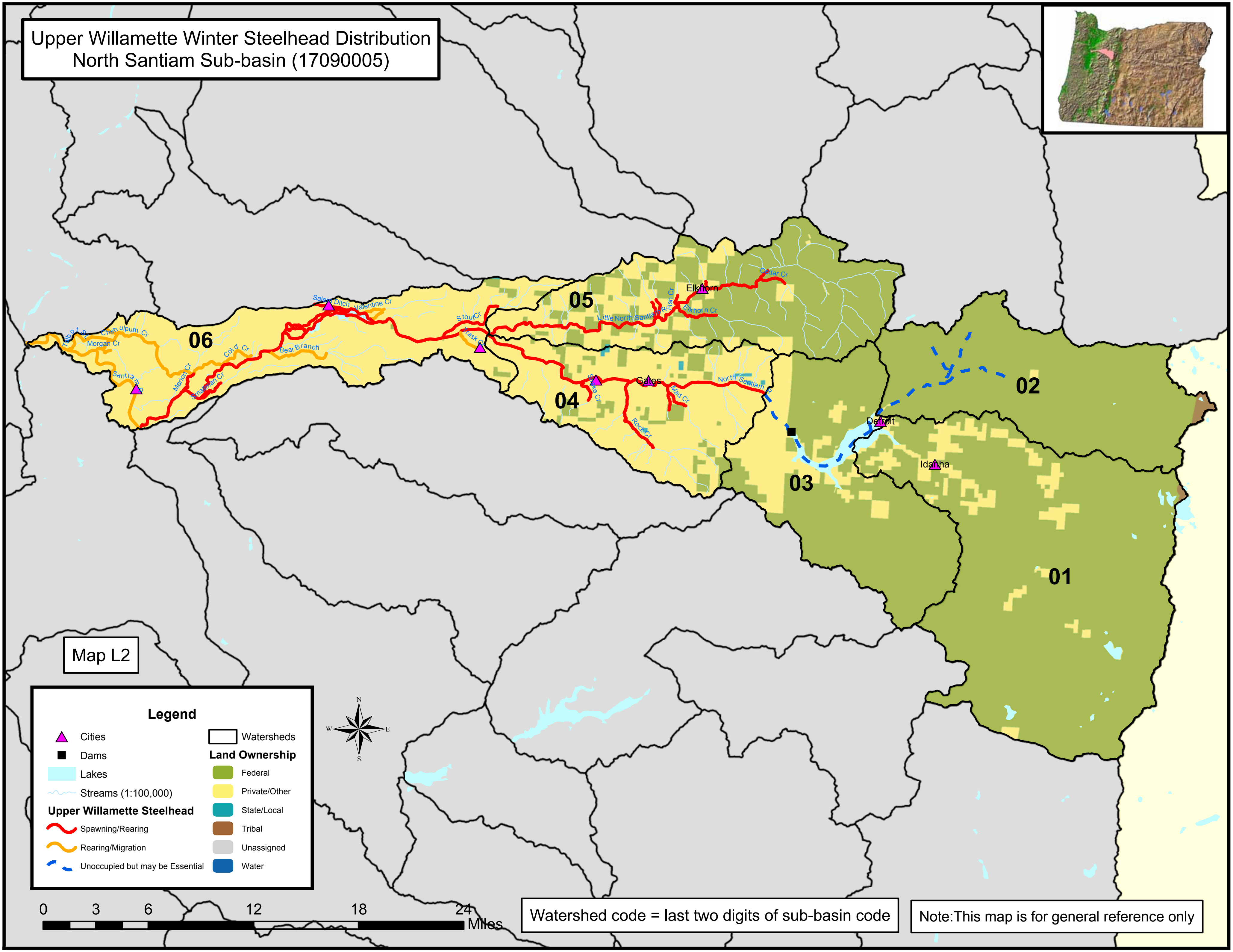
Figure L1. CHART Ratings of Conservation Value for Habitat Areas in HUC5 Watersheds Occupied by the Upper Willamette River Steelhead ESU



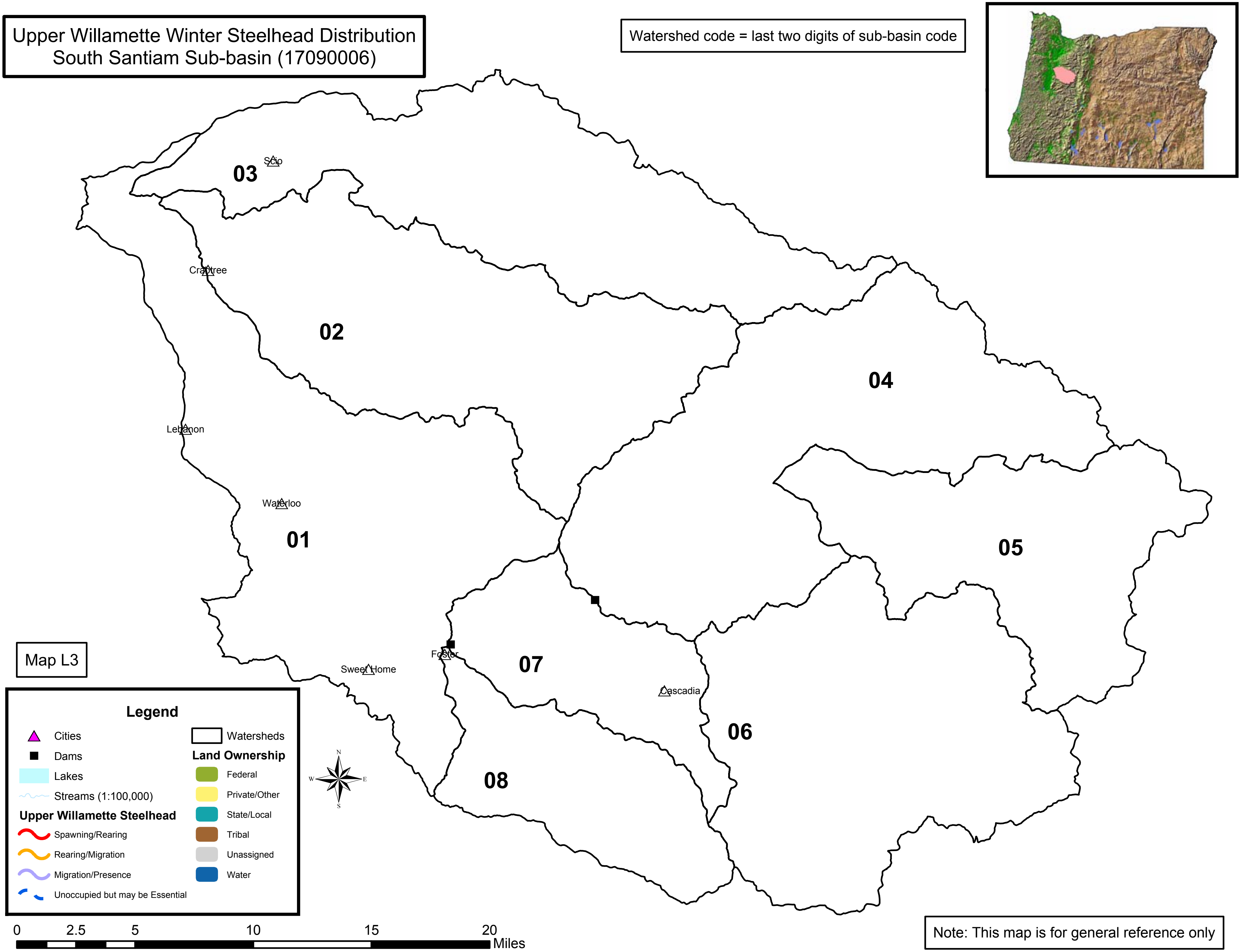
Upper Willamette River Steelhead
CHART Watershed Ratings
1709001202
1709001002
1709001001
1709001003
1709001004
1709001203
1709001201
1709001005
1709000806
1709000704
1709000802
1709000807
1709000904
1709000906
1709000804
1709000801
1709000903
1709000902
1709000703
1709000805
1709000803
1709000905
1709000901
1709000702
1709000701
1709000306
1709000505
1709000506
1709000504
1709000603
1709000602
1709000304
1709000601
1709000607
1709000606
1709000303
1709000608
Legend
Watersheds (HUC5)
CHART Ratings
High
Medium
Low
N
S
E
W
0
4
8
16
24
32
Miles



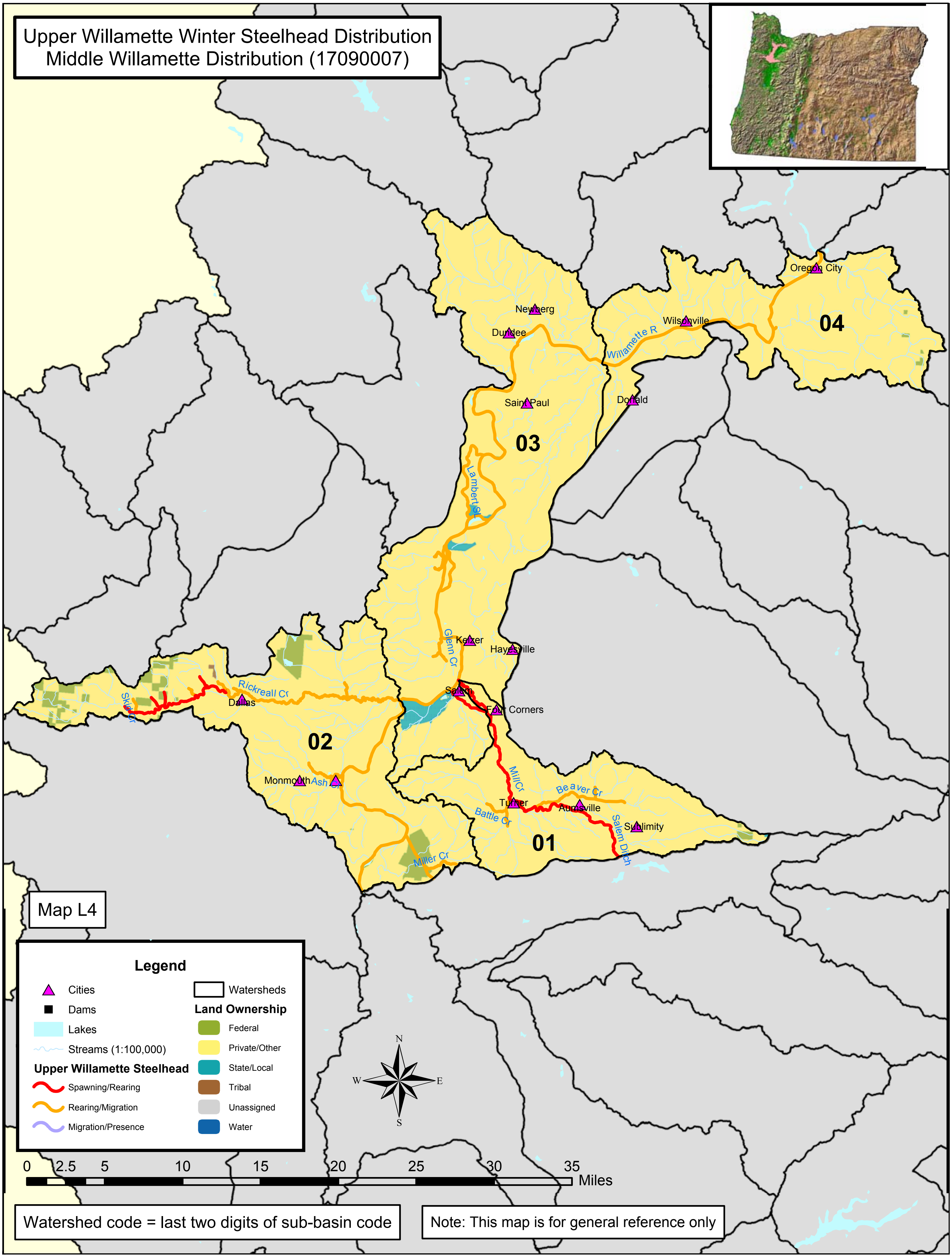
Upper Willamette Winter Steelhead Distribution
Upper Willamette Sub-basin (17090003)
Map L1
Legend
Cities
Dams
Lakes
Streams (1:100,000)
Winter Steelhead Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
0 3 6 12 18 24
Miles
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only
06
04
03
Black Rock
Falls City
Waymire Cr
Pedee Cr
Kings Valley
Price Cr
Bonner Cr
Truax Cr
North Albany
Albany
Periwinkle Cr
Tallman
Tangent
South Lebanon
Sodaville
Shedd
Butte Cr
Spoon Cr
Brownsville
Holley
Calapooia R
Dollar
Potts Cr
King Cr
N
S
E
W

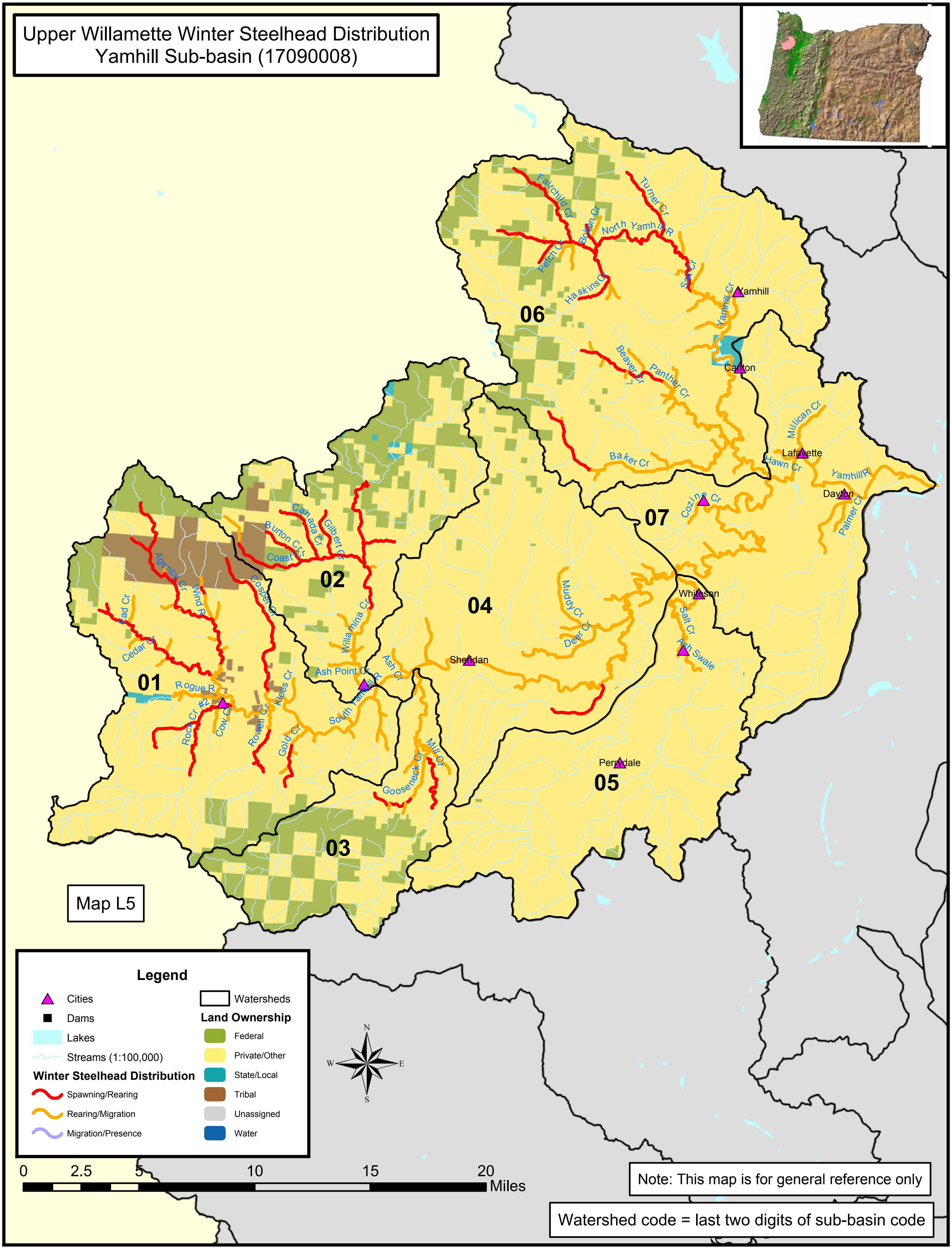


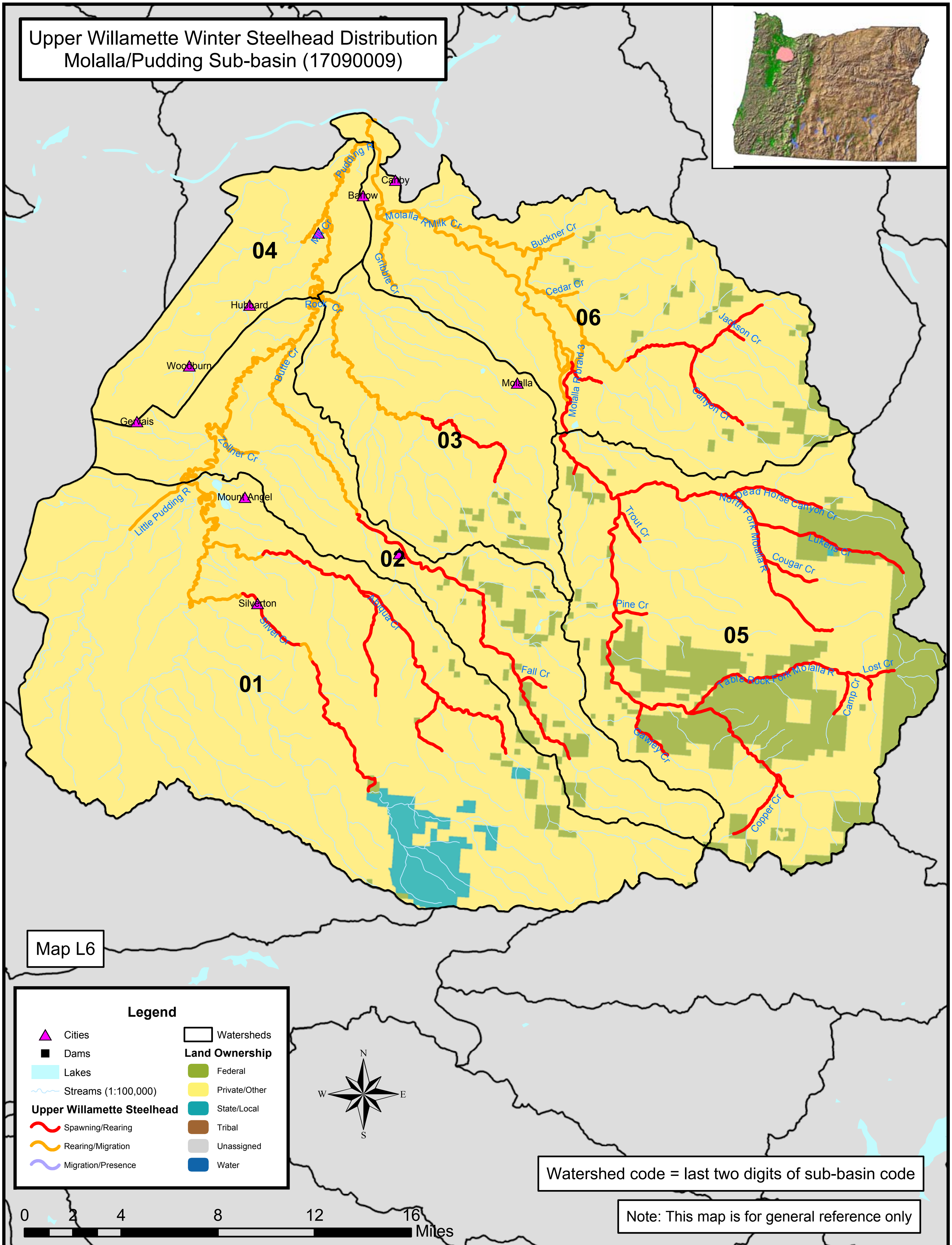
Upper Willamette Winter Steelhead Distribution
North Santiam Sub-basin (17090005)
Map L2
01
02
03
04
05
06
Elkhorn
Gates
Detroit
Idanha
Cedar Cr
Fish Cr
Elkhorn Cr
Little North Santiam R
Stout Cr
Salem Ditch
Valentine Cr
Chehulpum Cr
Morgan Cr
Cold Cr
Bear Branch
Mad Cr
Rock Cr
North Santiam
Legend
Cities
Dams
Lakes
Streams (1:100,000)
Upper Willamette Steelhead
Spawning/Rearing
Rearing/Migration
Unoccupied but may be Essential
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
0
3
6
12
18
24
Miles
Watershed code = last two digits of sub-basin code
Note:This map is for general reference only



Upper Willamette Winter Steelhead Distribution
South Santiam Sub-basin (17090006)
Watershed code = last two digits of sub-basin code
03
02
01
04
05
06
07
08
Scio
Crabtree
Lebanon
Waterloo
Sweet Home
Foster
Cascadia
Map L3
Legend
Cities
Dams
Lakes
Streams (1:100,000)
Upper Willamette Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Unoccupied but may be Essential
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
0
2.5
5
10
15
20
Miles
Note: This map is for general reference only


Upper Willamette Winter Steelhead Distribution
Middle Willamette Distribution (17090007)
Newberg
Dundee
Wilsonville
Oregon City
04
Willamette R
Saint Paul
Donald
03
Lambert Sl
Glenn Cr
Keizer
Hayesville
Rickreall Cr
Dallas
Salem
Four Corners
02
Monmouth
Ash Cr
Mill Cr
Beaver Cr
Turner
Aumsville
Battle Cr
Salem Ditch
Sublimity
01
Miller Cr
Map L4
Legend
Cities
Dams
Lakes
Streams (1:100,000)
Upper Willamette Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
W
E
S
0 2.5 5 10 15 20 25 30 35
Miles
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only


Upper Willamette Winter Steelhead Distribution
Yamhill Sub-basin (17090008)
Map L5
Legend
Cities
Dams
Lakes
Streams (1:100,000)
Winter Steelhead Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
0
2.5
5
10
15
20
Miles
N
S
E
W
Note: This map is for general reference only
Watershed code = last two digits of sub-basin code
01
02
03
04
05
06
07
Yamhill
Carlton
Lafayette
Dayton
Whiteson
Sheridan
Perrydale
Fairchild Cr
Turner Cr
Bolton Cr
North Yamhill R
Petch Cr
Haskins Cr
Salt Cr
Yamhill Cr
Beaver Cr
Panther Cr
Baker Cr
Millican Cr
Hawn Cr
Yamhill R
Palmer Cr
Cozine Cr
Canada Cr
Burton Cr
Gilbert Cr
Coast Cr
Agency Cr
Wind R
Gooseneck Cr
Willamina Cr
Muddy Cr
Deer Cr
Ash Swale
Cedar Cr
Rogue R
Ash Point Cr
Ash Cr
South Yamhill R
Rock Cr
Cow Cr
Rowell Cr
Klees Cr
Gold Cr
Mill Cr



Upper Willamette Winter Steelhead Distribution
Molalla/Pudding Sub-basin (17090009)
04
03
02
01
05
06
Canby
Barlow
Hubbard
Woodburn
Gervais
Mount Angel
Silverton
Molalla
Pudding R
Mill Cr
Rock Cr
Butte Cr
Zollner Cr
Little Pudding R
Silver Cr
Abiqua Cr
Fall Cr
Molalla R
Milk Cr
Gribble Cr
Buckner Cr
Cedar Cr
Jackson Cr
Canyon Cr
Molalla R braid 3
Trout Cr
Dead Horse Canyon Cr
North Fork Molalla R
Lukens Cr
Cougar Cr
Pine Cr
Table Rock Fork Molalla R
Lost Cr
Camp Cr
Gawley Cr
Copper Cr
Map L6
Legend
Cities
Dams
Lakes
Streams (1:100,000)
Upper Willamette Steelhead
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
0
2
4
8
12
16
Miles
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only

Upper Willamette Winter Steelhead Distribution
Tualatin Sub-basin (17090010)
Map L7
01
02
03
04
05
Scoggins Dam
Glenwood
Banks
North Plains
Forest Grove
Cornelius
Hillsboro
Gaston
Rockcreek
Oak Hills
Cedar Mill
Cedar Hills
West Slope
Aloha
Beaverton
Raleigh Hills
Metzger
Tigard
King City
Rivergrove
Tualatin
Sherwood
East Fork Dairy Cr
Denny Cr
Whisky Cr
Burgholzer Cr
Mendenhall Cr
Paisley Canyon
Gales Cr
South Fork Gales Cr
Bateman Cr
Sadd Cr
West Fork Dairy Cr
Clear Cr
Roderick Cr
East Fork McKay Cr
Jackson Cr
Warble Gulch
Abbey Cr
Dairy Cr
McKay Cr
Dawson Cr
Rock Cr
Beaverton Cr
Butternut Cr
Johnson Cr
Scoggins Cr
Roaring Cr
McFee Cr
Chicken Cr
Rock Cr
Tualatin R
Legend
Cities
Dams
Lakes
Streams (1:100,000)
Winter Steelhead Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
S
E
W
0
2
4
8
12
16
Miles
Note: This map is for general reference only
Watershed code = last two digits of sub-basin code

Appendix M. CHART Conclusions Regarding Areas Under Consideration for Exclusion from Critical Habitat

The CHARTs considered whether excluding from critical habitat designation particular areas with certain economic impacts would significantly impede conservation. The CHARTs considered these areas both alone or in combination with other eligible areas. In making this determination, the CHARTs considered such factors as the role the particular area plays in the conservation of the population(s), the uniqueness or importance to the population(s), any recovery planning emphasis on the area, and similar considerations. The CHARTs' final conclusions, summarized in the table below, were obtained via discussions with each CHART during meetings conducted in the Spring of 2005.

			Conservation Value Rating			
ESU	**Watershed Name**	**Watershed Code**	**Benefit of designating watershed**	**Benefit of designating connectivity corridor**	**Would Exclusion Significantly Impede Conservation?**	**Comments**
Puget Sound Chinook Salmon	Bellingham Bay	1711000201	L		No	Based on exclusion of entire watershed.
	Samish River	1711000202	L		No	Based on exclusion of entire watershed.
	Birch Bay	1711000204	L		No	Based on exclusion of entire watershed.
	Baker River	1711000508	M		No	Based on exclusion of entire watershed.
	Lake Sammamish	1711001202	M		No	Based on exclusion of entire watershed.
	Sammamish River	1711001204	M	M	No	Based on exclusion of entire watershed.
	Upper Green River	1711001301	M		Yes	CHART concluded that excluding this watershed would siginficantly impede conservation, noting the significant restoration efforts being made here by the Muckleshoot Tribe and others.
	Prairie	1711001601	L		No	Based on exclusion of entire watershed.
	Prairie	1711001602	L	L	No	Based on exclusion of entire watershed.

			Conservation Value Rating			
ESU	**Watershed Name**	**Watershed Code**	**Benefit of designating watershed**	**Benefit of designating connectivity corridor**	**Would Exclusion Significantly Impede Conservation?**	**Comments**
	Lower West Hood Canal Frontal	1711001802	L		No	Based on exclusion of entire watershed.
	Big Quilcene River	1711001806	L		No	Based on exclusion of entire watershed.
	West Kitsap	1711001808	L		No	Based on exclusion of entire watershed.
	Kennedy/Goldsborough	1711001900	L		No	Based on exclusion of entire watershed.
	Puget	1711001901	L		No	Based on exclusion of entire watershed.
	Prairie	1711001902	L		No	Based on exclusion of entire watershed.
	Puget Sound/East Passage	1711001904	L		No	Based on exclusion of entire watershed.
	Port Angeles Harbor	1711002004	M		No	Based on exclusion of entire watershed.
	Lake Washington	1711001203	M	H	No	Based on exclusion of tributaries only.
Lower Columbia River Chinook Salmon	Little White Salmon River	1707010510	M		No	Based on exclusion of entire watershed.
	Washougal River	1708000106	M		Yes	CHART concluded that excluding this watershed would significantly impede conservation, noting that the Lower Columbia Fish Recovery Board's interim recovery plan emphasizes achieving a high viability level for Washougal River fall chinook.
	Salmon Creek	1708000109	L		No	Based on exclusion of entire watershed.
	Kalama River	1708000301	M		Yes	CHART concluded that excluding this watershed would significantly impede conservation, noting that the Kalama River is important because it supports both fall- and spring-run fish, represents a substantial amount of the remaining spring-run habitat for this ESU, and is emphasized in the Lower Columbia River Fish Recovery Board's interim recovery plan.

			Conservation Value Rating			
ESU	**Watershed Name**	**Watershed Code**	**Benefit of designating watershed**	**Benefit of designating connectivity corridor**	**Would Exclusion Significantly Impede Conservation?**	**Comments**
	Beaver Creek/Columbia River	1708000302	L		No	Based on exclusion of entire watershed.
	Germany/Abernathy		M		No	Based on exclusion of entire watershed.
	Tilton River	1708000501	M		No	Based on exclusion of entire watershed.
	Youngs River	1708000601	M		No	Based on exclusion of entire watershed.
	Abernethy Creek	1709000704	L		No	Based on exclusion of entire watershed.
	Eagle Creek	1708000304 1709001105	L		No	Based on exclusion of entire watershed.
	Middle Columbia/Grays Creek	1707010512	M	H	No	Based on exclusion of tributaries only.
	North Fork Toutle River	1708000504	M	H	No	Based on exclusion of tributaries only.
	Johnson Creek	1709001201	M	H	Yes	CHART concluded that excluding this watershed would significantly impede conservation, citing comments by City of Portland and noting that this watershed provides important refuge habitat for Clackamas River chinook as well as unique habitat conditions (especially year-round thermal conditions) that promote adaptations and ESU diversity in an urbanized watershed.
Upper Willamette River Chinook Salmon	Salmon Creek	1709000104	M		No	Based on exclusion of entire watershed.
	Row River	1709000201	L	L	No	Based on exclusion of entire watershed.
	Mosby Creek	1709000202	L		No	Based on exclusion of entire watershed.
	Upper Coast Fork Willamette River	1709000203	L		No	Based on exclusion of entire watershed.

			Conservation Value Rating			
ESU	**Watershed Name**	**Watershed Code**	**Benefit of designating watershed**	**Benefit of designating connectivity corridor**	**Would Exclusion Significantly Impede Conservation?**	**Comments**
	Lower Coast Fork Willamette River	1709000205	L	L	No	Based on exclusion of entire watershed.
	Long Tom River	1709000301	L		No	Based on exclusion of entire watershed.
	Marys River	1709000305	M		Yes	CHART concluded that exclusion would significantly impede conservation, noting that the Mary's provides extensive rearing habitat (especially for overwintering) that is critical for maintaining and restoring ESU life history diversity.
	Blue River	1709000404	M		No	Based on exclusion of entire watershed.
	Mohawk River	1709000406	M		No	Based on exclusion of entire watershed.
	Lower South Yamhill River	1709000804	L		No	Based on exclusion of entire watershed.
	Salt Creek/South Yamhill River	1709000805	L		No	Based on exclusion of entire watershed.
	North Yamhill River	1709000806	L		No	Based on exclusion of entire watershed.
	Yamhill River	1709000807	L	L	No	Based on exclusion of entire watershed.
	Abiqua Creek/Pudding River	1709000901	M		No	Based on exclusion of entire watershed.
	Rock Creek/Pudding River	1709000903	L		No	Based on exclusion of entire watershed.
	Eagle Creek	1709001105	L		No	Based on exclusion of entire watershed.

			Conservation Value Rating			
ESU	Watershed Name	Watershed Code	Benefit of designating watershed	Benefit of designating connectivity corridor	Would Exclusion Significantly Impede Conservation?	Comments
	Hills Creek Reservoir	1709000105	M	H	Yes	CHART concluded that exclusion would significantly impede conservation, noting that this watershed supports a local-origin, core population which may have been the largest in the entire subbasin. The primary reason this watershed was not assigned a High conservation value rating is due to reservoir inundation.
	Middle Fork Willamette/Lookout Point	1709000107	M	H	Yes	CHART concluded that exclusion would significantly impede conservation, noting that this watershed supports a local-origin, core population which may have been the largest in the entire subbasin. Lost Creek represents the only unregulated stream with chinook spawning in this area. The primary reason this watershed was not assigned a High conservation value rating is due to reservoir inundation.
	Muddy Creek	1709000302	L	H	No	Based on exclusion of tributaries only.
	Oak Creek	1709000304	L	H	No	Based on exclusion of tributaries only.
	Mill Creek/Willamette River	1709000701	L	H	No	Based on exclusion of tributaries only.
	Rickreall Creek	1709000702	L	H	No	Based on exclusion of tributaries only.
	Willamette River/Chehalem Creek	1709000703	L	H	No	Based on exclusion of tributaries only.
	Abernethy Creek	1709000704	L	H	No	Based on exclusion of tributaries only.
	Butte Creek/Pudding River	1709000902	L	M	No	Based on exclusion of tributaries only.
	Senecal Creek/Mill Creek	1709000904	L	M	No	Based on exclusion of tributaries only.

			Conservation Value Rating			
ESU	**Watershed Name**	**Watershed Code**	**Benefit of designating watershed**	**Benefit of designating connectivity corridor**	**Would Exclusion Significantly Impede Conservation?**	**Comments**
Upper Columbia River Spring-run Chinook Salmon	Middle Methow River	1702000806	M	H	Yes	CHART concluded that exclusion would significantly impede conservation, noting that spawning has been observed in this watershed once flows were restored to Wolf Creek. The lower reaches of Wolf Creek, Beaver Creek, and other tributaries in this watershed also provide important winter juvenile rearing habitat.
	Lower Methow River	1702000807	M	H	No	Based on exclusion of tributaries only.
	Lake Entiat	1702001002	M	H	No	Based on exclusion of tributaries only.
	Icicle/Chumstick	1702001104	M	H	No	Based on exclusion of tributaries only.
	Lower Wenatchee River	1702001105	M	H	No	Based on exclusion of tributaries only.
Hood Canal Summer-run Chum Salmon	Skokomish River	1711001701	M		Yes	CHART concluded that exclusion would significantly impede conservation, noting that the watershed has long term stability (e.g., lack of development as well as drought and flood protection from dam) that reinforce the TRT's ecological diversity and spatial diversity parameters.
	Upper West Hood Canal Frontal	1711001807	M		Yes	CHART concluded that exclusion would sigificantly impede conservation given that fish in the Little Quilcene River are part of a larger, essential population in this ESU.
Columbia River Chum Salmon	North Fork Toutle River	1708000504	M	M	No	Based on exclusion of entire watershed.
	Green River	1708000505	M		No	Based on exclusion of entire watershed.
Ozette Lake Sockeye Salmon	No areas considered for exclusion.					

			Conservation Value Rating			
ESU	Watershed Name	Watershed Code	Benefit of designating watershed	Benefit of designating connectivity corridor	Would Exclusion Significantly Impede Conservation?	Comments
Upper Columbia River Steelhead	Foster Creek	1702000503	L		No	Based on exclusion of entire watershed.
	Lower Chelan	1702000903	M		No	Based on exclusion of entire watershed.
	RattleSnake Creek	1702001204	L		No	Based on exclusion of entire watershed.
	Lower Crab Creek	1702001509	M		Yes	CHART concluded that exclusion would significantly impede conservation, noting that this watershed contains 24 miles of spawning habitat with significant potential use for conservation and recovery. Steelhead in this area may also exhibit life-history traits uniquely adapted to high temperatures.
	Upper Okanogan River	1702000601	M	H	Yes	CHART concluded that exclusion would significantly impede conservation, noting that steelhead cannot rely on habitat in the mainstem Okanogan year-round due to degraded conditions. These degraded conditions make tributary habitats especially important to support juvenile rearing. This area of the Okanogan also provides important tributary rearing habitat for juveniles from all upstream areas.

			Conservation Value Rating			
ESU	**Watershed Name**	**Watershed Code**	**Benefit of designating watershed**	**Benefit of designating connectivity corridor**	**Would Exclusion Significantly Impede Conservation?**	**Comments**
	Okanogan River/Bonaparte Creek	1702000602	M	H	Yes	CHART concluded that exclusion would significantly impede conservation, noting that steelhead cannot rely on habitat in the mainstem Okanogan year-round due to degraded conditions. These degraded conditions make tributary habitats especially important to support juvenile rearing. This area of the Okanogan provides important tributary rearing habitat for juveniles from all upstream areas.
	Lower Okanogan River	1702000605	M	H	Yes	CHART concluded that exclusion would significantly impede conservation, noting that the limited remaining tributary habitats (e.g., Loup Loup Creek) are crucial for this population especially in light of deteriorated mainstem conditions.
	Lake Entiat	1702001002	M	H	No	Based on exclusion of tributaries only.
	Icicle/Chumstick	1702001104	M	H	Yes	CHART concluded that exclusion would significantly impede conservation, noting that Icicle Creek has good steelhead spawning habitat in the headwaters and is an important focus of current recovery efforts.
Snake River Steelhead	Flat Creek	1706010704	L		No	Based on exclusion of entire watershed.
	Pataha Creek	1706010705	L		No	Based on exclusion of entire watershed.
	Lower Palouse River	1706010808	L		No	Based on exclusion of entire watershed.
	Road Creek	1706020107	L		No	Based on exclusion of entire watershed.

ESU	Watershed Name	Watershed Code	Conservation Value Rating: Benefit of designating watershed	Conservation Value Rating: Benefit of designating connectivity corridor	Would Exclusion Significantly Impede Conservation?	Comments
	Squaw Creek	1706020128	M		Yes	CHART concluded that exclusion would significantly impede conservation, noting that Squaw Creek is a very large stream with a good amount of steelhead habitat and is very important for thermal refugia. The Thompson Creek mine that caused much of the habitat degradation is in remediation.
	Pahsimeroi River/Falls Creek	1706020202	M	M	No	Based on exclusion of entire watershed.
	Napias Creek	1706020319	M		No	Based on exclusion of entire watershed.
	Agency Creek	1706020404	M		No	Based on exclusion of entire watershed.
	Big Mallard Creek	1706020707	L		No	Based on exclusion of entire watershed.
	Rice Creek	1706020917	M		No	Based on exclusion of entire watershed.
	Little Salmon River/Hard Creek	1706021002	M	M	Yes	CHART concluded that exclusion would significantly impede conservation, noting that habitat is limiting in the Little Salmon River and this watershed maintains connectivity of rearing and migration habitats for both upstream and downstream watersheds and is a major source of cold water for the Little Salmon River basin.
	Three Mile Creek	1706030512	L		No	Based on exclusion of entire watershed.
	Upper Orofino Creek	1706030613	L		No	Based on exclusion of entire watershed.
	Jim Ford Creek	1706030614	M		Yes	CHART concluded that exclusion would significantly impede conservation, noting good habitat quality and that substantial restoration activities are underway here (e.g., by Nez Perce Tribe).

			Conservation Value Rating			
ESU	**Watershed Name**	**Watershed Code**	**Benefit of designating watershed**	**Benefit of designating connectivity corridor**	**Would Exclusion Significantly Impede Conservation?**	**Comments**
	Upper Sweetwater Creek	1706030630	M		Yes	CHART concluded that exclusion would significantly impede conservation, noting that Sweetwater Creek provides the best spawning and rearing habitat in Lapwai Creek for A-run steelhead. Also, Lapwai Creek is one of the few remaining watersheds still producing A-run steelhead.
	Salmon River/Slate Creek	1706020113	M	H	Yes	CHART concluded that exclusion would significantly impede conservation, noting that Thompson Creek is a very large stream with a good amount of steelhead habitat. The mine that caused much of the habitat degradation is in remediation. Slate Creek is also a large stream and very important as a thermal refugium.
	Yankee Fork/Jordan Creek	1706020125	M	H	Yes	CHART concluded that exclusion would significantly impede conservation, noting that, notwithstanding considerable past degradation from mining (e.g., the Hecla-Grouse Creek Mine in upper Jordan Creek is in remediation), the Yankee Fork supports good steelhead production and there are several miles of rearing habitat. Tributaries provide important thermal refugia and the area is also the site of numerous restoration efforts by the Shoshone-Bannock Tribes.

			Conservation Value Rating			
ESU	**Watershed Name**	**Watershed Code**	**Benefit of designating watershed**	**Benefit of designating connectivity corridor**	**Would Exclusion Significantly Impede Conservation?**	**Comments**
	Panther Creek/Trail Creek	1706020322	M	H	Yes	CHART concluded that exclusion would significantly impede conservation, noting relatively extensive tributary habitat for this population and substantial restoration activities underway (e.g., streamside incubators established in two tributaries).
	South Fork Clearwater River/Peasley Creek	1706030503	L	H	No	Based on exclusion of tributaries only.
	Lower Clearwater River	1706030601	L	H	No	Based on exclusion of tributaries only.
Middle Columbia River Steelhead	Pine Creek	1707010209	L		No	Based on exclusion of entire watershed.
	Wildhorse Creek	1707010304	L		No	Based on exclusion of entire watershed.
	Stage Gulch	1707010308	L		No	Based on exclusion of entire watershed.
	Lower Butter Creek	1707010310	L		No	Based on exclusion of entire watershed.
	White Salmon River	1707010509	M		Yes	CHART concluded that exclusion would significantly impede conservation, noting that the White Salmon River is an important focus of restoration efforts.
	Little White Salmon River	1707010510	M		No	Based on exclusion of entire watershed.
	White River	1707030610	L		No	Based on exclusion of entire watershed.
	Mud Springs Creek	1707030704	L		No	Based on exclusion of entire watershed.
	Yakima River/Spring Creek	1703000306	M	H	Yes	CHART concluded that exclusion would significantly impede conservation, noting that the tributaries in this watershed provide important thermal refugia for juveniles.

			Conservation Value Rating			
ESU	**Watershed Name**	**Watershed Code**	**Benefit of designating watershed**	**Benefit of designating connectivity corridor**	**Would Exclusion Significantly Impede Conservation?**	**Comments**
	Cottonwood Creek	1707010208	M	H	Yes	CHART concluded that exclusion would significantly impede conservation, noting that tributaries in this watershed contain important rearing and migration habitat for upstream areas (e.g., Yellowjacket Creek) and active restoration efforts are ongoing.
	Lower Walla Walla River	1707010211	M	H	No	Based on exclusion of tributaries only.
	Middle Columbia/Grays Creek	1707010512	M	H	No	Based on exclusion of tributaries only.
	Lower John Day River/Clarno	1707020405	L	H	No	Based on exclusion of tributaries only.
Lower Columbia River Steelhead	Bull Run River	1708000105	M		No	Based on exclusion of entire watershed.
	Salmon Creek	1708000109	M		No	Based on exclusion of entire watershed.
	Tilton River	1708000501	M		No	Based on exclusion of entire watershed.
	Abernethy Creek	1709000704	L		No	Based on exclusion of entire watershed.
	Middle Columbia/Grays Creek	1707010512	L	H	No	Based on exclusion of tributaries only.
	Columbia Gorge Tributaries	1708000107	M	H	Yes	CHART concluded that excluding this watershed would significantly impede conservation, noting that the Lower Columbia Fish Recovery Board's interim recovery plan emphasizes achieving a high viability level for lower Gorge tributaries.

			Conservation Value Rating			
ESU	**Watershed Name**	**Watershed Code**	**Benefit of designating watershed**	**Benefit of designating connectivity corridor**	**Would Exclusion Significantly Impede Conservation?**	**Comments**
	North Fork Toutle River	1708000504	M	H	Yes	CHART concluded that exclusion would significantly impede conservation, noting that this is one of only two watersheds supporting a TRT core winter-run population.
Upper Willamette River Steelhead	Luckiamute River	1709000306	M		Yes	CHART concluded that exclusion would significantly impede conservation, noting that the relatively widespread habitat in the Luckiamute River may help buffer extinction risks should a catastrophic event harm the Cascade (eastside) tributary populations.
	Willamina Creek	1709000802	L		No	Based on exclusion of entire watershed.
	Mill Creek/South Yamhill River	1709000803	L		No	Based on exclusion of entire watershed.
	Lower South Yamhill River	1709000804	L	M	No	Based on exclusion of tributaries only.
	Salt Creek/South Yamhill River	1709000805	L		No	Based on exclusion of entire watershed.
	North Yamhill River	1709000806	L		No	Based on exclusion of entire watershed.
	Abiqua Creek/Pudding River	1709000901	M		Yes	CHART concluded that exclusion would significantly impede conservation, noting that a recent watershed assessment underscores that this watershed contains the largest steelhead run and best spawning and rearing habitat in the Pudding River subbasin.
	Rock Creek/Pudding River	1709000903	L		No	Based on exclusion of entire watershed.
	Dairy Creek	1709001001	L		No	Based on exclusion of entire watershed.
	Scoggins Creek	1709001003	L		No	Based on exclusion of entire watershed.

			Conservation Value Rating			
ESU	**Watershed Name**	**Watershed Code**	**Benefit of designating watershed**	**Benefit of designating connectivity corridor**	**Would Exclusion Significantly Impede Conservation?**	**Comments**
	Rock Creek/Tualatin River	1709001004	L	M	No	Based on exclusion of entire watershed.
	Lower Tualatin River	1709001005	L	M	No	Based on exclusion of entire watershed.
	Mill Creek/Willamette River	1709000701	L	H	No	Based on exclusion of tributaries only.
	Rickreall Creek	1709000702	L	H	No	Based on exclusion of tributaries only.
	Willamette River/Chehalem Creek	1709000703	L	H	No	Based on exclusion of tributaries only.
	Abernethy Creek	1709000704	L	H	No	Based on exclusion of tributaries only.
	Yamhill River	1709000807	L	M	No	Based on exclusion of tributaries only.
	Butte Creek/Pudding River	1709000902	L	M	No	Based on exclusion of tributaries only.
	Senecal Creek/Mill Creek	1709000904	L	M	No	Based on exclusion of tributaries only.

Appendix N. CHART Conclusions Regarding ESA Section 7 Leverage

The following table identifies, for each ESU, those watersheds that met the following "low leverage" profile identified by NOAA Fisheries habitat biologists:

- less than 25 percent of the land area in federal ownership
- no hydropower dams, and
- no consultations likely to occur on instream work.

We chose these attributes because federal lands, dams and instream work all have a high likelihood of consultation and activities undergoing consultation have a potential to significantly affect the physical and biological features of salmon and steelhead habitat. Where federal lands are involved any activity occurring there must undergo a section 7 consultation if it may affect the species or the designated critical habitat. Salmon and steelhead habitat can be significantly affected by many activities occurring on federal lands, including grazing, timber harvest, roadbuilding, and mining (see, e.g., 2004 NFP BiOp). Dams generally are either federally operated or federally permitted by the U.S. Army Corps of Engineers or by the Federal Energy Regulatory Commission, triggering section 7 consultation. Dam operation can significantly affect salmon and steelhead in many ways, including by impeding passage, inundating habitat and changing flow and temperature regimes. Instream work generally requires a permit from the Corps. Instream work can significantly affect salmon and steelhead habitat in a number of ways, including by reducing channel complexity, increasing flows, diminishing connectivity between the stream channel and floodplain, and increasing sediment. Other types of activities also impact salmon and steelhead habitat, but their potential leverage was not deemed as predictable as those used in the above low leverage profile.

In addition to watersheds matching this profile, the CHARTs also reviewed all watersheds identified as low conservation value, but not exceeding an $85,000 economic threshold, to determine if they were low leverage and should be considered for exclusion. Data used to query these parameters were the same as those reported in NOAA Fisheries' final economic analysis (NMFS, 2005a). The table below also includes the CHART's assessment as to whether the watershed was in fact likely to be "low leverage," and the CHART's conclusion as to whether excluding a "low leverage" watershed would significantly impede the conservation of the ESU.

These findings were obtained via discussions with each CHART during final meetings conducted in the Spring of 2005. The CHARTs' conclusions were subsequently used in the agency's final ESA 4(b)(2) analysis (NMFS, 2005b).

References

NMFS, 2005a. Final Economic Analysis of Critical Habitat Designation for 12 West Coast Salmon and Steelhead ESUs. NOAA Fisheries Northwest Fisheries Science
Center Processed Report. August 2005. (Available from NOAA Fisheries at
http://www.nwr.noaa.gov/1salmon/salmesa/crithab/CHsite.htm)

NMFS, 2005b. Designation of Critical Habitat for West Coast Salmon and Steelhead: Final 4(b)(2) Report. NOAA Fisheries Northwest Region Report. August 2005. (Available from NOAA Fisheries at
http://www.nwr.noaa.gov/1salmon/salmesa/crithab/CHsite.htm)

ESU	Watershed Name	Watershed Code	Conservation Value Rating: Benefit of designating watershed	Conservation Value Rating: Benefit of designating connectivity corridor	Likely to be Low Leverage?	Comments
Puget Sound Chinook Salmon	No watersheds matched the profile for low leverage.					
Lower Columbia River Chinook Salmon	Beaver Creek/Columbia River	1708000302	Low		No	CHART noted that consultations were likely to yield significant leverage in this HUC5, and also noted several recent Corps of Engineers consultations here.
	Green River	1708000505	High		No	CHART noted that consultations were likely to yield significant leverage in this HUC5, noting the species' spawning habitat overlap with Federal lands in the upper watershed.
	South Fork Toutle River	1708000506	High		No	CHART noted that consultations were likely to yield significant leverage in this HUC5, noting the species' spawning habitat overlap with Federal lands in the upper watershed.
Upper Willamette River Chinook Salmon	Little Fall Creek	1709000108	Medium		No	CHART noted that consultations were likely to yield significant leverage in this HUC5, noting the species' spawning habitat overlap with Federal lands in the upper watershed.
	Mohawk River	1709000406	Medium		Yes	CHART concluded that this was a low leverage HUC5 and that exclusion would not significantly impede conservation. CHART noted that consultations are unlikely in this HUC5.

ESU	Watershed Name	Watershed Code	Conservation Value Rating: Benefit of designating watershed	Conservation Value Rating: Benefit of designating connectivity corridor	Likely to be Low Leverage?	Comments
	South Santiam River / Foster Reservoir	1709000607	High	High	No	CHART noted that consultations were likely to yield significant leverage in this HUC5, noting COE activities and recent Bureau of Land Management consultation in this area.
Upper Columbia River Spring-run Chinook Salmon	No watersheds matched the profile for low leverage.					
Hood Canal Summer-run Chum Salmon	No watersheds matched the profile for low leverage.					
Columbia River Chum Salmon	Green River	1708000505	Medium		Yes	CHART concluded that this was a low leverage HUC5 and that exclusion would not significantly impede conservation. CHART noted that consultations are unlikely to provide significant leverage given the species' limited amount of habitat in this HUC5.
	South Fork Toutle River	1708000506	Medium		No	CHART noted that consultations were likely to yield significant leverage in this HUC5 given the Federal lands in the upper watershed.
Ozette Lake Sockeye	Ozette Lake	1710010102	High		No	CHART noted that consultations were likely to yield significant leverage in this HUC5, noting that this is

ESU	Watershed Name	Watershed Code	Conservation Value Rating		Likely to be Low Leverage?	Comments
			Benefit of designating watershed	Benefit of designating connectivity corridor		
Salmon						the only HUC5 supporting the ESU and citing recent consultations with the National Park Service.
Upper Columbia River Steelhead	Foster Creek	1702000503	Low		Yes	CHART concluded that this was a low leverage HUC5 and that exclusion would not significantly impede conservation. CHART noted the limited amount of habitat and that consultations are unlikely in this HUC5.
Snake River Steelhead	Little Sheep Creek	1706010204	High	High	No	CHART noted that consultations were likely to yield significant leverage in this HUC5, noting the grazing, road maintenance, and motorized recreation activities here and also citing the Imnaha subbasin consultation addressing this HUC5.
	Phillips Creek/Willow Creek	1706010408	High		No	CHART noted that consultations were likely to yield significant leverage in this HUC5, noting in particular the restoration-related consultations here.
	Grande Ronde River/Cabin Creek	1706010411	High	High	No	CHART noted that consultations were likely to yield significant leverage in this HUC5, noting that consultations have and will likely continue to occur here (e.g., Forest Service vegetation management, diversion consolidations, etc.)
	Middle Wallowa River	1706010503	Medium	High	No	CHART noted that consultations were likely to yield significant leverage in this HUC5, noting that consultations have and will likely continue to occur

ESU	Watershed Name	Watershed Code	Conservation Value Rating: Benefit of designating watershed	Conservation Value Rating: Benefit of designating connectivity corridor	Likely to be Low Leverage?	Comments
						here (e.g., Wallowa Lake dam rehabilitation, diversion consolidations, etc.)
	Lower Wallowa River	1706010506	High	High	No	CHART noted that consultations were likely to yield significant leverage in this HUC5, noting Forest Service and Bonneville Power Administration consultations here, (e.g., herbicide application, restoration, culvert replacement, recreation).
	Alpowa Creek	1706010701	Medium		No	CHART noted that consultations were likely to yield significant leverage in this HUC5, noting that this was one of the earliest model watersheds and the restoration-related efforts here (e.g., Natural Resources Conservation Service's Conservation Reserve Enhancement Program).
	Snake River/ Steptoe Canyon Creek	1706010702	Low	High	Yes	CHART concluded that this was a low leverage HUC5 and that exclusion of tributaries would not significantly impede conservation CHART noted that most leverage is associated with the mainstem which would be designated as critical habitat.
	Deadman Creek	1706010703	Low		No	CHART noted that consultations were likely to yield leverage in this HUC5 (e.g., via Bonneville Power Administration's funding for restoration projects and Natural Resources Conservation Service's Conservation Reserve Enhancement Program),

ESU	Watershed Name	Watershed Code	Conservation Value Rating: Benefit of designating watershed	Conservation Value Rating: Benefit of designating connectivity corridor	Likely to be Low Leverage?	Comments
						although possibly not as significant as in other HUC5s.
	Flat Creek	1706010704	Low		Yes	CHART concluded that this was a low leverage HUC5 and that exclusion would not significantly impede conservation. CHART noted the limited amount of habitat and that consultations are unlikely in this HUC5.
	Pataha Creek	1706010705	Low		Yes	CHART concluded that this was a low leverage HUC5 and that exclusion would not significantly impede conservation. CHART noted that consultations are unlikely in this HUC5.
	Lower Tucannon River	1706010707	High	High	No	CHART noted that consultations were likely to yield significant leverage in this HUC5, noting that this was one of the earliest model watersheds and the restoration-related efforts here (e.g., Natural Resources Conservation Service's Conservation Reserve Enhancement Program) and efforts to fix instream structures and dams as well as easements.
	Lower Palouse River	1706010808	Low		Yes	CHART concluded that this was a low leverage HUC5 and that exclusion would not significantly impede conservation. CHART noted the limited amount of habitat and that consultations are unlikely in this HUC5.

ESU	Watershed Name	Watershed Code	Conservation Value Rating		Likely to be Low Leverage?	Comments
			Benefit of designating watershed	Benefit of designating connectivity corridor		
	Big Deer Creek	1706020321	Low		No	CHART noted that consultations were likely to yield significant leverage in this HUC5, noting mining consultations here associated with the Idaho Cobalt Mine.
	Wind River	1706020702	Low		No	CHART noted that consultations were likely to yield significant leverage in this HUC5, noting consultations here related to fire management, outfitter/guides, and herbicide spraying.
	Salmon River/China Creek	1706020901	High	High	No	CHART noted that consultations were likely to yield significant leverage in this HUC5, noting Bureau of Land Management has some grazing consultations and noxious weed spraying as well as bridge consultations and fire herbicide application.
	Eagle Creek	1706020902	High		No	CHART noted that consultations were likely to yield significant leverage in this HUC5, noting (as above) Bureau of Land Management has some grazing consultations and noxious weed spraying as well as bridge consultations and fire herbicide application.
	Deer Creek	1706020903	Medium		No	CHART noted that consultations were likely to yield significant leverage in this HUC5, noting (as above) Bureau of Land Management has some grazing consultations and noxious weed spraying as well as bridge consultations and fire herbicide application.

ESU	Watershed Name	Watershed Code	Conservation Value Rating: Benefit of designating watershed	Conservation Value Rating: Benefit of designating connectivity corridor	Likely to be Low Leverage?	Comments
	Salmon River/Cottonwood Creek	1706020904	High	High	No	CHART noted that consultations were likely to yield significant leverage in this HUC5, noting recent Corps of Engineers consultation and that Bureau of Land Management has some grazing consultations and noxious weed spraying as well as bridge consultations and fire herbicide application and guide/outfitter consultations.
	Rock Creek	1706020906	Medium		No	CHART noted that consultations were likely to yield significant leverage in this HUC5, noting recent Corps of Engineers consultation and road and grazing consultations in this HUC5.
	Cottonwood Creek	1706030513	Medium		No	CHART noted that consultations were likely to yield leverage in this HUC5 (noting recent consultations) although possibly not as significant as in other HUC5s.
	Clearwater River/Lower Orofino Creek	1706030513	Medium	High	No	CHART noted that consultations were likely to yield significant leverage in this HUC5, noting likely instream work-related consultations here.
	Upper Orofino Creek	1706030613	Low		Yes	CHART concluded that this was a low leverage HUC5 and that exclusion would not significantly impede conservation. CHART noted the limited amount of habitat and that consultations are unlikely in this HUC5.

ESU	Watershed Name	Watershed Code	Conservation Value Rating: Benefit of designating watershed	Conservation Value Rating: Benefit of designating connectivity corridor	Likely to be Low Leverage?	Comments
	Middle Lawyer Creek	1706030624	High		No	CHART noted that consultations were likely to yield leverage in this HUC5 (noting recent consultations and restoration-related proposals here) although possibly not as significant as in other HUC5s.
	Cottonwood Creek	1706030627	Medium		No	CHART noted that consultations were likely to yield significant leverage in this HUC5, noting consultations regarding Bureau of Land Management tracts and grazing issues, culvert/passage issues, and subdivision activity.
Middle Columbia River Steelhead	Satus Creek	1703000305	High		No	CHART noted that consultations were likely to yield leverage in this HUC5 (noting likely consultations regarding transportation, utilities, and irrigation corridors here) although possibly not as significant as in other HUC5s.
	Glade Creek	1707010105	Medium		Yes	CHART concluded that this was a low leverage HUC5 and that exclusion would not significantly impede conservation. CHART noted the limited amount of habitat and that consultations are unlikely in this HUC5 (although tribes may pursue restoration activities here).
	Alder Creek	1707010110	Medium		Yes	CHART concluded that this was a low leverage HUC5 and that exclusion would not significantly impede conservation. CHART noted the limited

ESU	Watershed Name	Watershed Code	Conservation Value Rating: Benefit of designating watershed	Conservation Value Rating: Benefit of designating connectivity corridor	Likely to be Low Leverage?	Comments
						amount of habitat and that consultations are unlikely in this HUC5 (although tribes may pursue restoration activities here).
	Pine Creek	1707010111	Medium		Yes	CHART concluded that this was a low leverage HUC5 and that exclusion would not significantly impede conservation. CHART noted the limited amount of habitat and that consultations are unlikely in this HUC5 (although tribes may pursue restoration activities here).
	Rock Creek	1707010113	High		Yes	CHART concluded that while this was a low leverage HUC5, exclusion may significantly impede conservation (noting recent Technical Recovery Team identification of a major population group here). CHART noted that consultations are unlikely in this HUC5 (although tribes may pursue restoration activities here).
	Lower Touchet River	1707010207	High	High	No	CHART noted that consultations were likely to yield significant leverage in this HUC5, noting consultations regarding flood protection/control here.
	Umatilla River/Alkali Canyon	1707010307		High	No	CHART noted that consultations were likely to yield leverage in this HUC5 (mainstem-related activities) and that this was a vital connectivity corridor with

ESU	Watershed Name	Watershed Code	Conservation Value Rating		Likely to be Low Leverage?	Comments
			Benefit of designating watershed	Benefit of designating connectivity corridor		
						upstream HUC5s as well.
	Stage Gulch	1707010308	Low		Yes	CHART concluded that this was a low leverage HUC5 and that exclusion would not significantly impede conservation. CHART noted the limited amount of habitat and that consultations are unlikely in this HUC5.
	Lower Butter Creek	1707010310	Low		Yes	CHART concluded that this was a low leverage HUC5 and that exclusion would not significantly impede conservation. CHART noted the limited amount of habitat and that consultations are unlikely in this HUC5.
	Upper Klickitat River	1707010601	High		Yes	CHART concluded that while this was a low leverage HUC5, exclusion would significantly impede conservation, noting Technical Recovery Team identification of a major population group here.
	Lower Middle Fork John Day River	1707020305	Low	High	Yes	CHART concluded that this was a low leverage HUC5 and that exclusion of tributaries would not significantly impede conservation. CHART noted that most leverage is associated with the lower mainstem which would be designated as critical habitat.
	Butte Creek	1707020406	Medium		No	CHART noted that consultations were likely to yield

ESU	Watershed Name	Watershed Code	Conservation Value Rating: Benefit of designating watershed	Conservation Value Rating: Benefit of designating connectivity corridor	Likely to be Low Leverage?	Comments
						leverage in this HUC5 (noting likely consultations regarding transportation and sewage treatment here) although possibly not as significant as in other HUC5s.
	Pine Hollow	1707020407	High		No	CHART noted that consultations were likely to yield significant leverage in this HUC5, noting Bureau of Land Management consultations here related to grazing.
	Lower John Day River/Ferry Canyon	1707020409	Low	High	No	CHART noted that consultations were likely to yield significant leverage in this HUC5, noting Federal lands consultations along the mainstem.
	Lower John Day River/Scott Canyon	1707020410	Low	High	No	CHART noted that consultations were likely to yield significant leverage in this HUC5, noting Federal lands consultations along the mainstem.
	Grass Valley Canyon	1707020413	Medium		No	CHART noted that consultations were likely to yield significant leverage in this HUC5, noting likely consultations regarding grazing and Corps of Engineers permits here.
	Lower John Day River/Mcdonald Ferry	1707020414		High	No	CHART noted that consultations were likely to yield leverage in this HUC5 (mainstem-related activities) and that this was a vital connectivity corridor with upstream HUC5s as well.
	Mill Creek	1707030604	High	High	No	CHART noted that consultations were likely to yield

ESU	Watershed Name	Watershed Code	Conservation Value Rating: Benefit of designating watershed	Conservation Value Rating: Benefit of designating connectivity corridor	Likely to be Low Leverage?	Comments
						significant leverage in this HUC5, noting the recent pre-consultation with Bureau of Indian Affairs reagarding herbicide applications.
	Beaver Creek	1707030605	High		No	CHART noted that consultations were likely to yield significant leverage in this HUC5, noting the recent pre-consultation with Bureau of Indian Affairs reagarding herbicide applications.
	Warm Springs River	1707030606	High	High	No	CHART noted that consultations were likely to yield significant leverage in this HUC5, noting the recent pre-consultation with Bureau of Indian Affairs reagarding herbicide applications.
	Middle Deschutes River	1707030607	High	High	No	CHART noted that consultations were likely to yield significant leverage in this HUC5, noting that consultations with Bureau of Land Management are very likely to continue here.
	Bakeoven Creek	1707030608	High		No	CHART noted that consultations were likely to yield significant leverage in this HUC5, noting that consultations with Bureau of Land Management have occurred here as well as are very likely to continue here.
	Lower Deschutes River	1707030612	High	High	No	CHART noted that consultations were likely to yield significant leverage in this HUC5, noting that consultations with Bureau of Land Management are

ESU	Watershed Name	Watershed Code	Conservation Value Rating: Benefit of designating watershed	Conservation Value Rating: Benefit of designating connectivity corridor	Likely to be Low Leverage?	Comments
						very likely to continue here.
	Antelope Creek	1707030702	Medium		No	CHART noted that consultations were likely to yield significant leverage in this HUC5, noting consultations with Bureau of Land Management and Natural Resources Conservation Service.
	Mud Springs Creek	1707030704	Low		Yes	CHART concluded that this was a low leverage HUC5 and that exclusion of tributaries would not significantly impede conservation. CHART noted the limited amount of habitat in this HUC5 and that there had been no known consultations in this HUC5 and none were expected.
	Lower Trout Creek	1707030705	High		No	CHART noted that consultations were likely to yield significant leverage in this HUC5, noting that the Corps of Engineers have considerable instream activities here.
Lower Columbia River Steelhead	Green River	1708000505	High		No	CHART noted that consultations were likely to yield significant leverage in this HUC5, noting the species' spawning habitat overlap with Federal lands in the upper watershed.
	South Fork Toutle River	1708000506	Medium		No	CHART noted that consultations were likely to yield significant leverage in this HUC5, noting the species' spawning habitat overlap with Federal lands in the upper watershed.

ESU	Watershed Name	Watershed Code	Conservation Value Rating: Benefit of designating watershed	Conservation Value Rating: Benefit of designating connectivity corridor	Likely to be Low Leverage?	Comments
Upper Willamette River Steelhead	South Santiam River / Foster Reservoir	1709000607	High	High	No	CHART noted that consultations were likely to yield significant leverage in this HUC5, noting COE activities and recent Bureau of Land Management consultation in this area.
	Lower South Yamhill River	1709000804	Low	Medium	Yes	CHART concluded that this was a low leverage HUC5 and that exclusion of tributaries would not significantly impede conservation CHART noted that most leverage is associated with the mainstem which would be designated as critical habitat.