Final Assessment of the National Marine Fisheries Service's Critical Habitat Analytical Review Teams (CHARTs) for Seven Salmon and Steelhead Evolutionarily Significant Units (ESUs) in California

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Executive summary

The National Marine Fisheries Service (NMFS) has conducted a series of comprehensive status reviews of west coast Pacific salmon and steelhead (Onchorhynchus spp.) populations over the past ten years pursuant to the U.S. Endangered Species Act (ESA). These reviews have identified numerous distinct population segments, referred to as Evolutionarily Significant Units (ESUs), that warranted listing as threatened or endangered species under the ESA. Status review updates were most recently completed in 2003 (NMFS 2003) and revised listing determinations for 27 salmon and steelhead/O. mykiss ESUs were proposed on June 14, 2004 (69 FR 33102). Final listing determinations for 16 (all salmon ESUs) of these 27 ESUs were published on June 28, 2005 (70 FR 37160). Also on June 28, 2005, NMFS invoked a 6-month extension for the final listing determinations for 10 O. mykiss ESUs (70 FR 37219). In February 2000, NMFS designated critical habitat for 19 salmon and steelhead ESUs, including 6 in California. As a result of subsequent litigation, however, the designations were vacated by court order in 2002 and remanded back to NMFS for further consideration. In December 2004, we published proposed critical habitat designations for 20 ESUs, including 7 in California (those addressed in this report). A draft of this report (NMFS 2004) provided preliminary biological assessments of occupied habitat value that were used in developing the proposed designations.

The ESA defines critical habitat as those specific areas within the geographic area occupied by the species, at the time of listing, containing physical and biological features essential to the conservation of the species that may require special management considerations; and occupied areas that are essential to the conservation of the species. By statute, ESA critical habitat designations must be based on the best scientific data available to the agency. Per section 4(b)(2) of the ESA, the agency must also consider economic impacts, impacts to national security, and other relevant impacts of designating any particular areas as critical habitat. The section of the ESA grants the Secretary of Commerce discretion to exclude any area from critical habitat if he determines that the benefits of exclusion outweigh the benefits of specifying such an area as part of the critical habitat. This discretion is limited, as the agency may not exclude areas that if excluded would result in the extinction of the species.

This final report provides background information on the critical habitat designation process under the ESA, including an overview of our approach for developing final geographical distribution maps and conservation assessments for 7 salmon and steelhead

ESUs in California, and ESU specific updated biological and conservation assessments for each of the 7 ESUs. The 7 ESUs addressed in this report include: California Coastal (CC) chinook, Northern California (NC) Steelhead, Central California coast (CCC) Steelhead, South-Central California coast (SCCC) Steelhead, Southern California (SC) Steelhead, Central Valley (CV) Spring run chinook, and Central Valley (CV) Steelhead. For each ESU, information on geographic distribution of occupancy (distribution mapping), habitat use (i.e. spawning, rearing, and migration), and habitat quality was compiled by NMFS' Southwest Region fishery biologists from a variety of sources and agencies, including the literature, agency records, and personal knowledge. We then incorporated this information into a geographical information system (GIS) and produced maps showing the stream reaches occupied by each ESU, areas of specific habitat use, and other statistical information used to assess the conservation value of occupied watersheds. Based on the biology and life history of each species, we also determined the physical or biological features essential for the conservation of each listed ESU. These were identified in an Advance Notice of Proposed Rulemaking (ANPR) published in September 2003 for which public comment was solicited (68 FR 55926). Relying on the biology and population structure of the species, we also identified "specific areas" in which these physical or biological features could be found. The specific areas used by for the 7 ESUs in California were CALWATER Hydrologic Subareas (HSAs). Within the boundaries of any HSA, there are both stream reaches and land areas that are not "occupied" by the species. We relied on these watershed boundaries only as a basis for aggregating occupied stream reaches into coherent units for which information was compiled and conservation value assessments could be made. These conservation assessments were used as part of the 4(b)2 exclusion process that we used to develop our final critical habitat designations for each ESU.

The Southwest Region established 3 Critical Habitat Analytical Review Teams (CHARTs) consisting of NMFS' fishery biologists and habitat specialists from our field offices in Sacramento, Santa Rosa, and Arcata, as well as the Regional office in Long Beach. Their first task was to compile all available information (e.g. distribution, relative abundance, habitat use, habitat quality, etc.) necessary to identify and map the occupied stream reaches for each of the seven salmon and steelhead ESUs under consideration, confirm that each occupied HSA contained the physical or biological features essential to conservation (i.e. spawning, rearing and/or migration habitat was present), and identify the activities in each HSA that may affect the physical or biological features and require special management. Their second task was to assess and rate the conservation value of each occupied HSA as "high," "medium," or "low." To arrive at these ratings they first considered a variety of data sources and employed a generally uniform scoring system based on the quality,

quantity, and distribution of physical or biological features associated with spawning, rearing, and migration in each HSA. Using their best professional judgment they rated the conservation value of the watersheds, riverine corridors, and estuarine areas comprising the HSAs which were occupied by each ESU. The results of the CHART's preliminary assessments for each ESU were compiled in a draft report prepared in November 2004 (NMFS 2004) which was used to support the proposed critical habitat designations. The preliminary assessment was supplemented by new information received during the public comment period on the proposed critical habitat designations for these 7 ESUs (60 FR 71880). The CHARTs were reconvened to review all new information regarding fish distribution, habitat use, and watershed conservation value. Based on a review of all new information, as well as the results of their preliminary findings (NMFS 2004), the CHARTs made changes in the distribution of occupied fish habitat and conservation value where appropriate and also reaffirmed their preliminary conclusions. The appendices to this main report contain the CHARTs final updated assessments for each of the 7 ESUs.

A summary of the CHARTs findings for each ESU follow below:

CC Chinook ESU. The CHART identified 45 occupied HSAs within the freshwater and estuarine range of the ESU. Eight HSAs were rated low in conservation value, 10 were rated medium, and 27 were rated high in conservation value. Essential features for spawning, rearing, and migration are contained in approximately 1,634 miles (2,614 km) of occupied stream habitat within these HSAs (see Appendix A).

NC Steelhead ESU. The CHART identified 50 occupied HSAs within the freshwater and estuarine range of the ESU. Nine HSAs were rated low in conservation value, 14 were rated medium, and 27 were rated high in conservation value. Essential features for spawning, rearing, and migration are contained in approximately 3,148 miles (5,036 km) of occupied stream habitat within these HSAs (see Appendix B).

CCC Steelhead ESU. The CHART identified 46 occupied HSAs within the freshwater and estuarine range of the ESU. Fourteen HSAs were rated low in conservation value, 13 were rated medium, and 19 were rated high in conservation value. Essential features for spawning, rearing, and migration are contained in approximately 1,832 miles (2,931 km) of occupied stream habitat within these HSAs (see Appendix C).

SCCC Steelhead ESU. The CHART identified 30 occupied HSAs within the freshwater and estuarine range of the ESU. Six HSAs were rated low in conservation value, 11 were rated medium, and 13 were rated high in conservation value. Essential features for spawning, rearing, and migration are contained in approximately 1,251 miles (2,002 km) of occupied stream habitat within these HSAs (see Appendix D)

SC Steelhead ESU. The CHART identified 32 occupied HSAs within the freshwater and estuarine range of the ESU. Five HSAs were rated low in conservation value, 6 were rated medium, and 21 were rated high in conservation value. Essential features for spawning, rearing, and migration are contained in approximately 741 miles (1,186 km) of occupied stream habitat within these HSAs (see Appendix E.)

CV Spring-run chinook ESU. The CHART identified 37 occupied HSAs within the freshwater and estuarine range of the ESU. Seven HSAs were rated low in conservation value, 3 were rated medium, and 27 were rated high in conservation value. Essential features for spawning, rearing, and migration are contained in approximately 1,373 miles (2,196 km) of occupied stream habitat within these HSAs (see Appendix F).

CV Steelhead ESU. The CHART identified 67 occupied HSAs within the freshwater and estuarine range of the ESU. Twelve HSAs were rated low in conservation value, 18 were rated medium, and 37 were rated high in conservation value. Essential features for spawning, rearing, and migration are contained in approximately 2,604 miles (4,166 km) of occupied stream habitat within these HSAs (see Appendix G).

I. Background

NMFS is responsible for determining whether species, subspecies, or distinct population segments of Pacific salmon and steelhead (*Oncorhynchus* spp.) are threatened or endangered and which areas constitute critical habitat for them under the U.S. ESA (16 U.S.C. 1531 et seq). To be considered for ESA listing, a group of organisms must constitute a "species." Section 3 of ESA defines species as follows: "any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature." The agency has determined that a group of Pacific salmon or steelhead populations qualifies as a distinct population segment if it is substantially reproductively isolated and represents an important component in the evolutionary legacy of the biological species. A group of populations meeting these criteria is considered an "evolutionarily significant unit" (ESU) (56 FR 58612, November 20, 1991). Over the past ten years, NMFS has conducted a series of comprehensive reviews of the status of West Coast populations of Pacific salmon and steelhead (*Oncorhynchus* spp.) pursuant to the U.S. Endangered Species Act (ESA) and has listed 26 ESUs as threatened or endangered under the ESA (see 50 C.F.R. §223.203 and §224.101) to date.

On February 16, 2000, NMFS published a final rule designating critical habitat for 19 ESUs of West Coast salmon and steelhead (65 FR 7764). These designations were subsequently challenged in the D.C. District Court, and later vacated by court order on April 30, 2002 (National Ass'n of Homebuilders v. Evans, 2002 WL 1205743 No. 00-CV-2799 (D.D.C.). In 2003, the Pacific Coast Federation of Fishermen's Associations and five co-plaintiffs filed a complaint with the D.C. District Court alleging NMFS' failure to designate critical habitat in a timely manner. On September 12, 2003, the court approved an agreement resolving that litigation and establishing a schedule for designation of critical habitat. The schedule provided for submission to the Federal Register of the proposed rule(s) designating critical habitat for 19 ESUs for which critical habitat had been vacated in additional to critical habitat for the Northern California steelhead ESU which was listed in June 2000. On July 13, 2004, the D.C. District Court approved an amendment to the agreement which required critical habitat proposals for ESUs under the jurisdiction of the Southwest Region of NMFS to be approved for publication in the Federal Register by November 30, 2004. On December 10, 2004, we published a proposed critical habitat designation for the 7 ESUs of salmon and steelhead in California (69 FR 71880). A second proposed rule was published shortly thereafter addressing the other 13 ESUs which occur in the Pacific Northwest.

As part of this critical habitat re-designation process, we established 3 CHARTs to compile and assess the best available scientific data to support the proposed critical habitat designations. This effort included mapping the distribution of occupied fish habitat, identifying and mapping fish habitat use, and assessing the conservation value of occupied habitat. The results of this assessment were summarized in a report prepared in support of the proposed critical habitat designations (NMFS 2004). Several additional analyses were also conducted (e.g. economic analysis of section 7 consultations, evaluation of DOD land and facility management plans, and discussions with Tribal governments) that were used, in conjunction with the preliminary conservation assessments in NMFS (2004), to identify potential critical habitat exclusions as part of the Section 4(b)(2) process under the ESA. Based on these assessments and the Section 4(b)2 process, we published proposed critical habitat designations for these 7 ESUs of salmon and steelhead in California (69 FR 71880) in accordance with the Court-ordered schedule.

The Southwest Region has now completed its final biological and conservation assessment for the following 7 ESUs in California: 1) California Coastal (CC) chinook, 2) Northern California (NC) steelhead, 3) Central California coast (CCC) steelhead, 4) South-Central California coast (SCCC) steelhead, 5) Southern California (SC) steelhead, 6) Central Valley (CV) spring run chinook, and 7) Central Valley (CV) steelhead. This assessment included a reconsideration of the CHART's preliminary conservation assessment findings (NMFS 2004), as well as a review and evaluation of all new information received during the proposed critical habitat public comment period concerning fish distribution, habitat use, and watershed conservation assessment. This report summarizes the CHARTs final assessments for each of these 7 ESUs (see Appendices A-G).

II. CRITICAL HABITAT UNDER THE ESA

The ESA directs that critical habitat be designated for threatened or endangered species at the time of listing (unless it is not determinable at that time) or within 1 year of listing (unless the agency determines that it is not prudent to do so). Agency regulations at 50 CFR 424.12(a)(1) specify that a designation of critical habitat is not prudent when one or both of the following situations exist: (i) the species is threatened by taking or other human activity, and identification of critical habitat can be expected to increase the degree of such threat to the species, or (ii) such designation of critical habitat would not be beneficial to the species. NMFS has not found either of these circumstances to exist for any listed salmon or steelhead ESUs.

A. Definitions

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 will 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 Act excludes 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 areas 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."

B. 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 several 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 "meta-populations" (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 meta-populations 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 meta-populations 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 meta-populations 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.

C. Geographical Area Occupied by the ESU and Specific Areas within the Geographical Area

In NMFS' previous critical habitat designations, we concluded that the limited availability of species distribution data prevented mapping salmon and steelhead critical habitat at a scale finer than occupied river basins. While efforts were underway in some geographic areas to address these data limitations, we indicated that "most have yet to be completed or

fail to depict salmon and steelhead habitats in a consistent manner or at a fine geographic scale"(65 FR 7764, February 16, 2000). Because of such data limitations, our February 2000 critical habitat designations indicated that the "geographical area occupied by the species (or ESU)" was best characterized by all occupied and accessible river reaches within the current range of the listed species.

In order to define "specific areas" within the geographical area occupied by the individual species (or ESUs), NMFS' 2000 designations relied on the U.S. Geological Survey's (USGS) identification of subbasins. 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 (or 4th field HUCs). In the agency's 2000 critical habitat designations (as well as its designations for SONCC and Central California coast coho), therefore, we identified as critical habitat all areas accessible to listed salmon or steelhead within specifically identified HUC4s for each ESU.

A major goal of our critical habitat re-designation effort for the 7 ESUs in California (as well as for 13 ESUs in the Pacific Northwest) was to improve our understanding of and more precisely identify those freshwater and estuarine areas that are occupied by the listed ESUs for which the designations are being developed. In the Pacific Northwest, Federal, state, and tribal fishery biologists have made substantial 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 are accessible and can be analyzed using geographic information systems (GIS) to produce consistent and fine-scale maps. As a result of these efforts, 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.

In California, similar mapping efforts had not been conducted by Federal, State or tribal co-managers on the scale that was needed, and therefore, ready made GIS fish distribution data layers were generally not available for the 7 ESUs in California. As described in NMFS (2004), the Southwest Region undertook a significant effort to compile available information and develop occupied habitat maps for all seven ESUs in California. In order to make this effort manageable, the data were compiled for stream hydrology at a scale of 1:100,000 rather than the 1:24,000 scale that was available for salmonid ESUs in the

Pacific Northwest. Fishery biologists in the Southwest Region were organized into CHARTs to compile and organize information available from the literature, personal knowledge, and many instances Federal and state agencies regarding the distribution, habitat use, and habitat quality for each of the seven ESUs. This information was organized into several databases and converted into GIS data layers for the analysis of data and generation of maps. As a result of this effort, the Southwest Region developed preliminary maps using standard GIS software which show the stream reaches occupied by each ESU. Additional information was compiled regarding the manner in which these occupied habitat reaches are thought to be used (e.g. spawning, rearing, migration) and then all of the available information was used by the CHARTs to develop conservation value assessments for all occupied watersheds. The CHARTs also reviewed all new information received during the public comment period for the proposed critical habitat designations, and revised fish distribution maps, habitat use maps, and conservation assessments in those cases where they believed it was warranted. We believe this approach has enabled us to more accurately delineate the "geographical area occupied by the species" referred to in the ESA's definition of critical habitat.

In addition to more accurately defining areas that are occupied, we also wanted to group the occupied stream reaches into finer scale "specific areas" than the HUC4s that were used in the 2000 critical habitat designations so that analysis of conservation value and economic impacts as part of the Section 4(b)(2) exclusion process could be accomplished on a finer scale. In the Pacific Northwest, smaller scale USGS watershed units have been delineated (eg. HUC5s or 5th field HUCs), and so these watershed units were used to organize critical habitat information systematically and at a scale that was relevant to the spatial distribution of salmon and steelhead. We believe organizing information at this scale is especially relevant for 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 areas encompassed by HUC4s or HUC5s (Washington Department of Fisheries et al. 1992, Kostow 1995, McElhany et al. 2000). Aggregating stream reaches into HUC5 watersheds allowed the agency to refine its interpretation of the "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. In California, it was not possible to use the USGS HUC5 watershed framework to organize biological and other types of information since they were not delineated for the entire geographic range occupied by the 7 ESUs subject to this re-designation effort. Instead, the Southwest Region relied on the State of California's CALWATER classification system for watershed mapping of ESUs in California. CALWATER

Hydrologic Subarea (HSA) units are approximately the same size as USGS HUC5s and so we decided to use the HSA unit as the "specific area" for aggregating biological information and making conservation assessments in California..

D. 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." NMFS 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. Although it was not their primary focus, the CHARTs were also asked to identify and make recommendations about whether unoccupied stream habitat (either habitat within specific HSAs that were otherwise partially occupied or HSAs that were entirely unoccupied) may be essential for conservation of individual ESUs. Where appropriate, these recommendations are summarized in the Appendices to this report.

E. Marine Areas

The Southwest Region did not consider marine areas as part of the designations for ESUs in California.

F. Lateral Extent

In past designations, NMFS described the lateral extent of critical habitat in various ways ranging from fixed distances to "functional" zones defined by important riparian functions (65 FR 7764, February 16, 2000). Both approaches presented difficulties, and this was highlighted in several comments (most of which requested that we focus on aquatic areas only) received in response to the ANPR (68 FR 55926; September 29, 2003). Designating a set riparian zone width will (in some places) accurately reflect the distance from the stream on which PCEs might be found, but in other cases may over- or understate the distance. Designating a functional buffer avoids that problem, but makes it difficult for Federal agencies to know in advance what areas are critical habitat. To address these issues we proposed to define the lateral extent of designated critical habitat as the width of the stream channel defined by its bankfull elevation (69 FR 71880). Bankfull elevation is the level at which water begins to leave the channel and move into the floodplain (Rosgen, 1996) and is reached at a discharge which generally has a recurrence interval of 1 to 2

years on the annual flood series (Leopold et al., 1992). Such an interval is commensurate with nearly all of the juvenile freshwater life phases of most salmon and steelhead ESUs. Therefore, it is reasonable to assert that this lateral extent is regularly "occupied" with a high degree of certainty. Moreover, the bankfull elevation can be readily discerned for a variety of stream reaches and stream types using recognizable water lines (e.g., marks on rocks) or vegetation boundaries (Rosgen, 1996). If bankfull elevation is not evident on either bank, the ordinary high-water line (as defined by the U.S. Army Corps of Engineers (Corps) in 33 CFR 329.11) was proposed to serve as the lateral extent of critical habitat (69 FR 71880).

As we have underscored in previous critical habitat designations, however, Federal agencies must still be aware that the quality of aquatic habitat within stream channels is intrinsically related to the adjacent riparian zones and floodplain, to surrounding wetlands and uplands, and to non-fish-bearing streams above occupied stream reaches. Human activities that occur outside the stream can modify or destroy physical and biological features of the stream. In addition, human activities that occur within and adjacent to reaches upstream (e.g., road failures) or downstream (e.g., dams) of designated stream reaches can also have demonstrable effects on physical and biological features of designated reaches.

In estuarine areas we believe that extreme high water is the best descriptor of lateral extent. As noted above for stream habitat areas, human activities that occur outside the area inundated by ordinary or extreme high water can modify or destroy physical and biological features of the nearshore habitat areas and Federal agencies must be aware of these important habitat linkages as well.

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

Agency regulations 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 the agency 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 developed a list of PCEs specific to salmon and steelhead and relevant to determining whether occupied stream reaches within a HUC5 or HSA fit the definition of "critical habitat." The ESUs share many of the same life history characteristics, and therefore, many of the same PCEs. These PCEs include sites essential to support one or more life stages of the ESU (i.e. 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 include the following:

1. **Freshwater spawning sites** with sufficient water quantity and quality and adequate substrate to support spawning, incubation and larval development
2. **Freshwater rearing sites** with sufficient water quantity and floodplain connectivity to form and maintain physical habitat conditions and allow salmonid development and mobility; sufficient water quality to support growth and development; food and nutrient resources such as terrestrial and aquatic invertebrates and forage fish; and natural cover such as shade, submerged and overhanging large wood, log jams, beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks
3. **Freshwater migration corridors** free of obstruction and excessive predation with adequate water quantity to allow for juvenile and adult mobility; cover, shelter, and holding areas for juveniles and adults; and adequate water quality to allow for survival
4. **Estuarine areas** that provide uncontaminated water and substrates; food and nutrient sources to support growth and development; and connected shallow water areas and wetlands to cover and shelter juveniles
5. **Marine areas** with sufficient water quality to support salmonid growth, development, and mobility; food and nutrient resources such as marine invertebrates and forage fish; and nearshore marine habitats with adequate depth, cover, and marine vegetation to provide cover and shelter

H. Special Management Considerations or Protection

NMFS 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 NMFS biologists the agency identified a number of management activities

that may affect the PCEs. Spence et al. (1996) also 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 by agency biologists, include: (1) forestry (2) rangeland management including grazing, (3) water withdrawals for agriculture and other purposes, (4) road building/maintenance, (5) channel modifications/diking, (6) urbanization, (7) sand and gravel mining, (8) mineral mining, (9) water diversions for hydroelectric dams, (10) irrigation impoundments and withdrawals, (11) wetland loss/removal, (12) flood control and streambank stabilization activities, and (14) exotic/invasive species introductions and management. In addition to these, the harvest of salmonid prey species (e.g., herring, anchovy, and sardines) may present another potential habitat-related management 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).

III. Critical Habitat Analytical Review Teams (CHARTs)

To develop information essential for the re-designation of critical habitat for the 7 ESUs in California, the Southwest Region formed several CHARTs comprised of agency fishery biologists. The CHARTs compiled all available information regarding the distribution and habitat use for the 7 ESUs, worked with the GIS specialists to develop maps depicting the spatial distribution of each ESU overlaid on stream hydrography at a scale of 1:100,000, verified that PCE's occurred in each occupied HSA, verified the existence of management activities that may affect the PCEs, and finally performed conservation assessments for all occupied watersheds, including riverine reaches and estuarine areas within each ESU. The CHARTs preliminary findings for each ESU were summarized in the NMFS (2004). The CHARTs were also reconvened after the close of the public comment period on the proposed critical habitat designations to consider all new information received during the public comment period, reassess fish distribution and habitat use information, and to make final HSA watershed conservation assessments. The CHARTs also provided input into the Section 4(b)2 exclusion process. The CHARTs assessment process consisted of four phases. Completion of Phases 1-3 resulted in the preliminary conservation assessments that were used to develop the proposed critical habitat designations, while phase 4 resulted in the final conservation assessments contained in this report. A description of the 4 phases follow below:

A. CHART Phase 1.

In Phase 1, the CHARTs were provided an orientation to the statutory and regulatory aspects of ESA critical habitat and discussed ways to identify, compile and organize the best available scientific data relevant to assessing potential critical habitat for each ESU. Over a period of several months, the CHART biologists identified and compiled all the available information and worked closed with GIS staff to develop databases and associated GIS products that would be used in the eventual scoring and conservation rating of occupied watershed units. CHART biologists also were oriented to a multi-factor scoring system that provided a consistent framework within which the teams could process information that would ultimately inform its conservation value rating of each watershed or area, and also provided an opportunity to modify the system as necessary to fit the available information for the ESUs they were addressing. The basis for using this factor-based scoring system was threefold. 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 facilitated the ultimate CHART rating of each watershed's conservation value. Third, it provided a generally uniform and systematic way to assess the overall conservation value of component watersheds and areas for each ESU under consideration. The scoring system used by the CHARTs is shown in Table 1.

B. CHART Phase 2

In Phase 2, each CHART met to review and discuss the information compiled and organized in Phase 1. Subsequently, they proceeded to (1) verify the presence of PCEs in each HSA (i.e. spawning, rearing and/or migration habitat), (2) identify management actions that may affect the PCEs, and (3) apply the framework scoring system. 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 the PCEs in a particular HSA could be affected by human actions and whether such actions are actually occurring in that HSA (based on their experience in ESA section 7 consultations).

C. CHART Phase 3

In Phase 3, the CHARTs met to discuss the watershed scores generated in Phase 2, along with additional considerations, with the objective of assigning a high, medium, or low conservation value[1] to each watershed unit/HSA (the conservation value of a given HSA is the relative importance of the HSA to conservation of the ESU). The additional considerations included the relationship of each HSA to other HSAs in the ESU and the significance to the ESU of the population occupying each HSA. As an example of the first additional consideration, an HSA with a particular raw score might receive a medium rating if it is in close proximity to several other high-scoring HSAs that support the ESU, while another HSA with that same raw score might receive a high rating if it is one of only a few HSAs supporting an ESU, or if the other HSAs have low scores. As another example of the first consideration, 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 an HSA that contains a rearing and migration corridor for fish from a high-valued spawning area might receive a high rating even though it has a medium score.[2] The second consideration involves population characteristics and is relevant because some populations have a higher conservation value to the ESU than others. Thus a HSA that received a medium score might nevertheless be rated high if it supports a unique or significant population within the ESU. In other words, the scores provided a judgment about the value of each HSA in isolation, while the additional considerations allowed the CHARTs to evaluate the relative contribution of each HSA and come up with an overall rating.

Based on the raw scores and the additional considerations, high-value watersheds/HSAs were those deemed to have a high likelihood of promoting ESU conservation, while low-value watersheds/HSAss were expected to contribute to conservation in only a minor way.

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[1] 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."

[2] The CHARTs discussed this concept at length and were unanimous in concluding that this was a logical assertion to make for anadromous salmon and steelhead. 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.

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 final 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 allows the agency to designate 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 for several ESUs. 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 HSAs considered included those that are entirely blocked (e.g., areas above impassable dams). They also included HSAs with some occupied stream reaches, as well as other reaches that were historically occupied, but that have been rendered inaccessible due to manmade obstructions.

D. CHART Phase 4

Following the close of the public comment period on the proposed critical habitat designations for these 7 ESUs, the CHARTs were reconvened to review and evaluate all new information received concerning fish distribution, habitat use, and watershed conservation value. The tasks were to determine whether changes in fish distribution, habitat use, and watershed conservation value were warranted, and if so, to make those changes. In addition to considering new information, the CHARTs were asked to reaffirm their previous conclusions (NMFS 2004). The final results of the CHARTs assessments are contained in the 7 Appendices to this report. In addition, the CHARTs reviewed other public comments and also provided input into the Section 4(b)2 exclusion process that we conducted in developing the final critical habitat designations.

IV. Final Findings of CHARTs

Final findings based on the CHART assessments for each of the 7 ESUs are attached as a series of Appendices to this report. Each appendix contains a general description of each ESU organized by the watershed units that were assessed and includes information on areas of occupancy, habitat use, PCEs, special management considerations, conservation scores and ratings, and a series of maps depicting the geographic distribution of fish within each HSA.

V. References

CALFED Bay-Delta Program. 2003. California Bay-Delta Authority 2003 Annual Report. (Available at http://www.baydeltawatershed.org/).

California Spatial Information Library. 2004. GIS-related Data for State of California. (http://www.gis.ca.gov/).

Cooper, A.B., and M. Manger. 1999. The dangers of ignoring metapopulation structure for the conservation of salmonids. Fish. Bull. 97: 213-226.

For the Sake of the Salmon. 2004. Watershed Groups in California, Oregon, and Washington (http://www.4sos.org/wsgroups/wsgroups.asp)

Ford, M.J. 1998. Testing models of migration and isolation among populations of chinook salmon (Oncorhynchus tschawytscha). Evolution 52: 539-557.

Forest Ecosystem Management Assessment Team (FEMAT). 1993. Forest ecosystem management: an ecological, economic, and social assessment. Report of the Forest Ecosystem Management Assessment Team. U.S. Government Printing Office 1993-793-071.

Groot, C. and L. Margolis (editors). 1991. Pacific salmon life histories. Univ. B.C. Press, Vancouver, B.C., 564 p.

Hanski, I., and M. E. Gilpin. 1997. Metapopulation biology: ecology, genetics, and evolution. Academic Press, San Diego, CA, 512 p.

Kostow, K. (editor). 1995. Biennial Report on the Status of Wild Fish in Oregon. OR. Dep. Fish Wildl. Rep., 217 p. + app. December 1995. (Available at: http://www.dfw.state.or.us/ODFWhtml/Research%26Reports/WildFishRead.html)

Levins, R. 1969. Some demographic and genetic consequences of environmental heterogeneity for biological control. Bull. Entomol. Soc. Am. 15: 237-240.

McElhany, P., M.H. Ruckelshaus, M.J. Ford, T.C. Wainwright, and E.P. Bjorkstedt. 2000. Viable salmonid populations and the recovery of evolutionarily significant units.

U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-42, 156p. Available on the Internet at: http://www.nwfsc.noaa.gov/publications/techmemos/tm42/tm42.pdf

Montgomery, D.R., G.E. Grant, and K. Sullivan. 1995. Watershed Analysis as a Framework for Implementing Ecosystem Management. Water Resources Bulletin, American Water Resources Association. June 1995. Vol. 31, No. 3:369-386.

National Marine Fisheries Service (NMFS). 1996. Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Watershed Scale. August 1996. (Available at http://www.nwr.noaa.gov/1habcon/habweb/habguide/matrix_1996.pdf)

NMFS 1999. The Habitat Approach: Implementation of Section 7 of the Endangered Species Act for Actions Affecting the Habitat of Pacific Anadromous Salmonids, dated August 26, 1999. (Available at http://www.nwr.noaa.gov/1habcon/habweb/habpub.htm)

NMFS 2004. Preliminary Findings of National Marine Fisheries Service's Critical Habitat Development and Review Teams for Seven Salmon and O. mykiss ESUs in California. Main Report and 7 Appendices. Prepared by NMFS Southwest Region.

National Research Council. 1996. Upstream: Salmon and Society in the Pacific Northwest. Committee on Protection and Management of Pacific Northwest Anadromous Salmonids. National Academy Press, Washington, D.C.

Northwest Power Planning Council. 1999. Technical Guide for Subbasin Planners. Council Document 2001-20. (Available at http://www.nwppc.org/library/2001/2001-20.htm)

Oregon Plan for Salmon and Watersheds. 2001. 2001 Update on the Oregon Plan for Salmon and Watersheds. (Available at: http://www.oregon-plan.org/archives/2001AnnReport/index.html)

Pacific Fishery Management Council. 1999. Amendment 14 to the Pacific Coast Salmon Plan (1997), Appendix A: Identification and Description of Essential Fish Habitat, Adverse Impacts, and Recommended Conservation Measures for Salmon. (Available at http://www.pcouncil.org/salmon/salfmp/a14.html)

Policansky, D., and J. J. Magnuson. 1998. Genetic metapopulations, and ecosystem management of fisheries. Ecol. Apps. 8: S119-S123.

Puget Sound Shared Strategy. 2002. A Shared Strategy For Recovery of Salmon In Puget Sound. Revised Draft, June 29, 2001 with Step Dates Revised September 25, 2002. (Available at: http://www.sharedsalmonstrategy.org/files/SharedStrategyDraft9.25.02.pdf)

Quinn, T.P. 1993. A review of homing and straying of wild and hatchery-produced salmon. Fish. Res. 18: 29-44.

Regional Ecosystem Office. 2003. GIS Data for Northwest Forest Plan. (Available at: http://www.reo.gov/)

Ruckelshaus, M., K. Currens, R. Fuerstenberg, W. Graeber, K. Rawson, N. Sands, J. Scott, J. Doyle. 2001. Independent Populations of Chinook Salmon in Puget Sound. April 2001 Memo from Puget Sound Technical Recovery Team.

Schlosser, I.J., and P.L. Angermeier. 1995. Spatial variation in demographic processes of lotic fishes: conceptual models, empirical evidence, and implications for conservation. In J.L. Nielsen (ed.), Evolution and the aquatic ecosystem: defining unique units in population conservation, p. 392-401. Am. Fish. Soc. Symp. Bethesda, Maryland.

Seaber, P.R., F.P. Kapinos, and G.L. Knapp. 1986. Hydrologic Unit Maps. U.S. Geological Survey Water-Supply Paper 2294.

Spence, B.C., G.A. Lomnicky, R.M. Hughes, and R.P. Novitzki. 1996. An ecosystem approach to salmonid conservation. TR-4501-96-6057. ManTech Environmental Research Services Corp., Corvallis, Oregon. (Available at http://www.nwr.noaa.gov/1habcon/habweb/habguide/ManTech/front.htm)

Taylor, E.B. 1991. A review of local adaptation in Salmonidae, with particular reference to Pacific and Atlantic salmon. Aquaculture 98: 185-205.

Tilman, D., and C.L. Lehman. 1997. Habitat destruction and species extinctions. In D. Tilman and P. Kareiva (eds.), Spatial Ecology, p. 233-249. Princeton University Press, Princeton, NJ.

Utter, F., G. Milner, G. Stahl, and D. Teel. 1989. Genetic population structure of chinook salmon, Oncorhynchus tshawytscha, in the Pacific Northwest. Fish. Bull. 87: 239-264.

Washington Department of Fisheries, Washington Department of Wildlife, and Western Washington Treaty Indian Tribes. 1992. 1992 Washington State Salmon and Steelhead Stock Inventory. March 1993. (Available at: http://wdfw.wa.gov/fish/sassi/sassi.htm)

Wood, C. C. 1995. Life history variation and population structure in sockeye salmon. In J. L. Nielsen (editor), Evolution and the aquatic ecosystem: defining unique units in population conservation. Am. Fish. Soc. Symp. 17:195-216.

Table 1. Factors and Associated Criteria Considered by 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.

Appendix A
Final CHART Assessment for the California Coastal (CC) Chinook ESU

ESU Description

The CC chinook ESU was listed as a threatened species in 1999 (64 FR 50394). Following completion of an updated status review (NMFS 2003a) and review of hatchery populations located within the range of the ESU (NMFS 2003b), NMFS proposed that the ESU remain listed as a threatened species and that seven hatchery populations be included as part of the ESU (69 FR 33102; June 14, 2004). On June 28, 2005, NMFS finalized this proposed listing determination (70 FR 37160). The ESU includes all naturally spawned populations of chinook salmon in rivers and streams from immediately south of Klamath River to, and including, the Russian River, as well as the seven small hatchery populations. Major watersheds occupied by this ESU include Redwood Creek, Mad River, Eel River, several smaller coastal watersheds, and the Russian River. A Technical Recovery Team has developed a preliminary model of the historic and extant population structure of this ESU. Additional technical recovery planning work is underway that will identify viability criteria for independent populations and the ESU as a whole.

CHART Area Assessments

The preliminary CHART assessment for this ESU (NMFS 2004b) was prepared in support of our December 10, 2004 critical habitat proposal (69 FR 71880). This final CHART assessment considered new information received during the public comment period regarding fish distribution, habitat use, and the conservation value of occupied habitat areas. Based on information from timber landowners on the north coast, minor changes in fish distribution were made by the CHART in four watersheds (110810, 110820, 110920, and 110930). These changes in distribution did not result in any changes in the occupancy or conservation value of Hydrologic Subarea HSA within the freshwater and estuarine range of this ESU.

The final CHART assessment for the CC chinook ESU addressed 45 occupied CALWATER HSAs which are nested in 8 CALWATER Hydrologic Units (HUs) or subbasins (Figures A1 and A2). The HSAs were chosen as freshwater critical habitat units because they present a convenient and systematic way to organize the CHART's

watershed assessments for this ESU. In addition to the 45 HSA watershed units, conservation assessments were made for Humboldt Bay and the Eel River Estuary. Information presented below for HUs within the range of this ESU (size, counties, total stream miles, occupied stream miles, and habitat use) were generated from GIS data sets compiled by NMFS Southwest Region and can be found in Table A1.

Unit 1. Redwood Creek Subbasin (HU 1107)

The Redwood Creek HU is located in the northern portion of the ESU and includes the Redwood Creek drainage. The HU encompasses approximately 294 mi^2 and occurs completely within Humboldt County. The HU contains 3 HSAs, all of which are occupied, and 343 stream miles (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 107 miles of occupied riverine and estuarine habitat in the occupied HSAs (Table A1). The CHART concluded that these occupied riverine and estuarine areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) and identified several management activities that may affect the PCEs. Table A2 summarizes the total miles of occupied riverine/estuarine habitat for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map A1 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The team did not identify any unoccupied habitat in this subbasin that may be essential for the conservation of the ESU.

Unit 2. Trinidad Subbasin (HU 1108)

The Trinidad HU is located in the northern portion of the ESU and includes Big Lagoon and Little River. The HU encompasses approximately 131 mi^2 and occurs completely within Humboldt County. This HU contains 2 HSAs, both of which are occupied, and 161 stream miles (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 27miles of occupied riverine/estuarine habitat in the 2 occupied HSAs (Table A1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) and identified management activities that may affect the PCEs. Table A2 summarizes the total miles of occupied riverine and/or estuarine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map A2 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The team did not identify any unoccupied habitat in this

subbasin that may be essential for the conservation of the ESU.

Unit 3. Mad River Subbasin (HU 1109)

The Mad River HU is located in the northern portion of the ESU and includes the Mad River drainage. The HU encompasses approximately 499 mi^2 and occurs in portions of Humboldt and Trinity Counties. This HU contains 4 HSAs, 3 of which are occupied, and a total of 661 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 53 miles of occupied riverine/estuarine habitat in the 3 occupied HSAs (Table A1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) and identified management activities that may affect the PCEs. Table A2 summarizes the total miles of occupied riverine and/or estuarine habitat identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map A3 depicts the specific areas in this HU that are occupied by the ESU and under consideration for critical habitat designation. The team did not identify any unoccupied habitat in this subbasin that may be essential for the conservation of the ESU.

Unit 4. Eureka Plain Subbasin (HU 1110)

The Eureka Plain HU is located in the vicinity of Eureka and surrounds Humboldt Bay. The HU encompasses approximately 224 mi^2 and occurs completely within Humboldt County. This HU contains a single HSA which is occupied and a total of 269 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 72 miles of occupied riverine and/or estuarine habitat in the occupied HSA (Table A1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. The CHART also evaluated Humboldt Bay into which most of the freshwater stream in this subbasin drain as a separate habitat unit. Humboldt Bay contains approximately 25 mi^2 of estuarine habitat which the CHART found contained PCEs for rearing and migration and was of high conservation value. Table A2 summarizes the total miles of occupied riverine and/or estuarine habitat in the HSA that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map A4 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The team did not identify any unoccupied habitat in this subbasin that may be essential for the conservation of the ESU.

Unit 5. Eel River Subbasin HU (1111)

The Eel River HU is located in north central portion of the ESU and includes the Eel River and Van Duzen River drainages. The HU encompasses approximately 3,682 mi^2 and occurs in portions of several counties including: Humboldt, Trinity, Mendocino, Lake, Glenn, Colusa, and Tehama. This HU, which is the largest in this ESU, contains 19 occupied HSAs and 5,194 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 833 miles of occupied riverine and/or estuarine habitat in the occupied HSAs (Table A1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table A2 summarizes the total miles of occupied riverine and/or estuarine habitat identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map A5 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The team did not identify any unoccupied habitat in this subbasin that may be essential for the conservation of the ESU.

Unit 6. Cape Mendocino Subbasin (HU 1112)

The Cape Mendocino HU is located in the central portion of the ESU and includes the Bear River and Mattole River drainages. This HU encompasses approximately 499 mi^2 and occurs almost entirely in Humboldt County. This HU contains 3 HSAs, 2 of which are occupied, and 654 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 172 miles of occupied riverine and/or estuarine habitat in the 2 occupied HSAs (Table A1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table A2 summarizes the total miles of occupied riverine and/or estuarine habitat identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map A6 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The team did not identify any unoccupied habitat in this subbasin that may be essential for the conservation of the ESU.

Unit 7. Mendocino Coast Subbasin (HU 1112)

The Mendocino HU is located in the southern portion of the ESU in portions of Humboldt and Mendocino Counties and includes several smaller streams including the Ten Mile, Noyo, Albion, Navarro, and Garcia Rivers. This HU which encompasses approximately 1,599 mi^2 contains 18 HSAs, 7 of which are occupied, and 2,103 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 209 miles of occupied riverine and/or estuarine habitat in the 7 occupied HSAs (Table A1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table A2 summarizes the total miles of occupied riverine and estuarine habitat identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map A7 depicts the specific areas in this HU that are occupied by the ESU and were considered for the critical habitat designation. The team did not identify any unoccupied habitat in this subbasin that may be essential for the conservation of the ESU.

Unit 8. Russian River Subbasin (HU 1114)

The Russian River HU is located in Mendocino and Sonoma Counties in the southernmost portion of the ESU and includes the Russian River drainage and its tributaries. The HU encompasses approximately 1,482 mi^2 and 1,872 miles of streams (at 1:100,000 hydrography). The HU contains 11 HSAs with 10 in the range of the ESU, and 8 of which are occupied. Fish distribution and habitat use data compiled by NMFS biologists identify approximately 160 miles of occupied riverine/estuarine habitat in the 9 occupied HSAs (Table A1). The CHART concluded these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table A2 summarizes the total miles of occupied riverine and estuarine habitat identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map A8 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The team did not identify any unoccupied habitat in this subbasin that may be essential for the conservation of the ESU.

CHART Conservation Value Rating

Freshwater/Estuarine Areas

After reviewing the best available scientific data regarding the distribution and habitat use for the CC chinook ESU, the CHART concluded that most of the occupied HSAs were of high or medium conservation value to the ESU. Of the 45 occupied HSAs that were evaluated, 27 were rated as having high conservation value, 10 were rated as having medium conservation value, and 8 were rated as having low conservation value. In addition, Humboldt Bay and the Eel River Estuary were also rated as having a high conservation value. Table A3 summarizes the CHART's PCE/watershed scores and preliminary conservation value ratings of low, medium or high for each watershed. Figure A9 depicts the spatial distribution of conservation ratings for the occupied HSAs within the range of the ESU.

Marine Areas

NMFS determined that marine areas did not warrant consideration as critical habitat for this ESU.

References and Sources of Information

NMFS 2003a. Updated Status of Federally Listed ESUs of West Coast Salmon and Steelhead. West Coast Salmon Biological Review Team; Northwest Fisheries Science Center and Southwest Fisheries Science Center. July 2003.

NMFS 2003b. Hatchery Broodstock Summaries and Assessments for Chum, Coho, and Chinook Salmon and Steelhead Stocks within ESUs listed under the ESA. Salmon and Steelhead Hatchery Assessment Group/NMFS; Northwest Fisheries Science Center and Southwest Fisheries Science Center.

NMFS 2004b. Draft Findings of NMFS' Critical Habitat Development and Review Teams (CHARTs) for 7 Salmon and O. mykiss ESUs in California. Main Report and 7 appendices. Prepared by NMFS Southwest Region.

Federal Register Notices

64 FR 50394 - California Coastal Chinook listing determination

69 FR 33102 - Proposed Listing Determinations for 27 West Coast Salmon and Steelhead ESUs

69 FR 71880 - Proposed Critical Habitat Designations for 7 Salmon and Steelhead ESUs in California

70 FR 37160 - Final Listing Determinations for 16 ESUs of West Coast Salmon and Final 4(d) Protective Regulations for Threatened Salmonid ESUs

Table A1. California Coastal Chinook ESU: Occupancy, habitat use and area information by Hydrologic Unit and Hydrologic Subarea

HU NUMBER	HU NAME	Major Stream / Watershed in HU	HU Occupied (Y or N)	Acres in HU	Square Miles in HU	Stream Miles (1:100k) in HU	Occupied Stream Miles	Occupied Stream Miles (Spawning)	Occupied Stream Miles (Rearing)	Occupied Stream Miles (Migration)	County HU Falls within	Acres of County in HU	Square Miles of County in HU	Percent of HU by County	HSA NUMBER	HSA NAME	HSA Occupied (Y or N)	Acres in HSA	Square Miles in HSA	Stream Miles (1:100k) in the HSA
1107	Redwood Creek	Redwood Creek	Y	187,972	294	343	107	101	107	107	Humboldt	187,972	294	100%						
															110710	Orick	Y	75,374	118	139
															110720	Beaver	Y	69,135	108	121
															110730	Lake Prairie	Y	43,463	68	94
1108	Trinidad	Maple Creek-Little River	Y	83,640	131	161	27	27	27	27	Humboldt	83,640	131	100%						
															110810	Big Lagoon	Y	53,709	84	105
															110820	Little River	Y	29,931	47	56
1109	Mad River	Mad River	Y	319,477	499	661	53	53	53	53	Humboldt	217,897	341	68%						
											Trinity	101,580	159	32%	110910	Blue Lake	Y	37,137	58	85
															110920	North Fork Mad River	Y	30,042	47	65
															110930	Butler Valley	Y	160,363	251	346
															110940	Ruth	N	91,934	144	165
1110	Eureka Plain	Jacoby-Freshwater Elk River-Salmon-Humboldt Bay	Y	143,143	224	269	72	71	72	72	Humboldt	143,143	224	100%	111000	Eureka Plain	Y	143,143	224	269
1111	Eel River	Eel River-Van Duzen	Y	2,355,818	3682	5,194	833	753	743	795	Humboldt	765,835	1197	33%						
											Trinity	316,869	495	13%	111111	Ferndale	Y	92,968	145	202
											Mendocino	1,030,069	1610	44%	111112	Scotia	Y	44,094	69	86
											Lake	189,191	296	8%	111113	Larabee Creek	Y	56,338	88	129
											Glenn	53,779	84	2%	111121	Hydesville	Y	25,319	40	66
											Colusa	45	0	0%	111122	Bridgeville	Y	162,917	255	352
											Tehama	30	0	0%	111123	Yager Creek	Y	84,554	132	169
															111131	Weott	Y	95,234	149	195
															111132	Benbow	Y	264,408	413	565
															111133	Laytonville	Y	80,851	126	176
															111141	Sequoia	Y	120,122	188	240
															111142	Spy Rock	Y	213,922	334	418
															111150	North Fork Eel River	Y	180,319	282	380
															111161	Outlet Creek	Y	102,051	160	248
															111162	Tomki Creek	Y	127,908	200	253
															111163*	Lake Pillsbury	Y	223,107	349	653
															111171	Eden Valley	Y	164,031	256	362
															111172	Round Valley	Y	83,406	130	199
															111173	Black Butte River	Y	102,890	161	249
															111174	Wilderness	Y	131,377	205	253
1112	Cape Mendocino	Bear River Mattole River	Y	319,484	499	654	172	152	168	150	Humboldt	311,733	487	98%						
											Mendocino	7,751	12	2%	111210	Oil Creek	N	14,740	23	29
															111220	Capetown	Y	66,269	104	120
															111230	Mattole River	Y	238,476	373	505
1113	Mendocino Coast	Ten Mile-Noyo_big Albion-Navarro-Garcia	Y	1,022,913	1599	2,103	209	184	133	209	Mendocino	850,622	1330	83%						
											Sonoma	172,291	269	17%	111311	Usal Creek	N	26,825	42	52
															111312	Wages Creek	Y	37,669	59	67
															111313	Ten Mile River	Y	82,479	129	163
															111320	Noyo River	Y	105,964	166	205
															111330	Big River	Y	128,899	201	265
															111340	Albion River	Y	43,762	68	92
															111350	Navarro River	Y	201,945	316	414
															111361	Greenwood Creek	N	20,286	32	42
															111362	Elk Creek	N	18,069	28	44
															111363	Alder Creek	N	27,898	44	63
															111364	Brush Creek	N	11,372	18	22
															111370	Garcia River	Y	95,445	149	208
															111381	North Fork Gualala River	N	30,636	48	66
															111382	Rockpile Creek	N	22,389	35	42
															111383	Buckeye Creek	N	25,768	40	55
															111384	Wheatfield Fork	N	71,443	112	162
															111385	Gualala	N	62,248	97	128
															111390	Russian Gulch	N	9,817	15	15
1114	Russian River	Russian River	Y	948,105	1482	1,872	160	133	151	160	Mendocino	356,145	557	38%						
											Sonoma	587,992	919	62%	111411	Guerneville	Y	104,509	163	195
											Lake	3,560	6	0%	111412	Austin Creek	Y	39,834	62	81
											Napa	408	1	0%	111421	Laguna	N	55,404	87	93
															111422	Santa Rosa	Y	49,766	78	78
															111423	Mark West	Y	52,924	83	92
															111424	Warm Springs	Y	139,422	218	277
															111425	Geyserville	Y	132,891	208	226
															111426	Sulphur Creek	N	52,630	82	87
															111431	Ukiah	Y	200,336	313	457
															111432**	Coyote Valley	N	67,068	105	161
															111433	Forsythe Creek	Y	53,321	83	124

*111163 Is bisected by the ESU Boundary (Scott Dam). 46,517 acres (73 square miles) lie within the ESU, 106 stream miles lie within the ESU.

**111432 Is outside the ESU Boundary (Coyote Dam) although it is inside the HU Boundary

Table A2. Summary of Occupied Subbasins/Watersheds, PCE's and Management Activities Affecting PCE's for the California Coastal Chinook ESU

Map Code	Basin	Watershed	HSA Unit	Spawning/Rearing PCEs (mi)**	Rearing/Migration PCEs (mi)**	Presence/Migration Only PCEs (mi)**	Management Activities***
	Redwood Creek	Orick	110710	59	59	59	FR, FC, GM, WI, GR
	Redwood Creek	Beaver	110720	31	31	31	FR
	Redwood Creek	Lake Prairie	110730	17	17	17	FR, WI
	Trindad	Big Lagoon	110810	8	8	8	FR, NW
	Trindad	Little River-Albion-Big Salmon	110820	18	18	18	FR, AG, GR, WI, NW
	Mad River	Blue Lake	110910	21	21	21	
	Mad River	North Fork Mad River	110920	3	3	3	FR, AG, GR, WI
	Mad River	Butler Valley	110930	30	29	29	FR, AG, GR, SC
	Mad River	Ruth	110940				
	Eureka Plain	Eureka Plain	111000	72	72	72	UR, FC, RB, TR
	Eel River	Ferndale	111111	40	40	40	AG, FC, GM
	Eel River	Scotia	111112	28	28	28	GM, FR, ES
	Eel River	Larabee Creek	111113	9	9	9	AG, FR, WI
	Eel River	Hydesville	111121	21	21	21	FR, GM, ES, WI
	Eel River	Bridgevelle	111122	27	27	27	FR, ES
	Eel River	Yager Creke	111123	27	27	23	FR, AG, GR, ES
	Eel River	Weott	111131	48	48	48	FR, ES, WI
	Eel River	Benbow	111132	182	182	182	FR, UR, ES, WI
	Eel River	Laytonville	111133	60	60	60	FR, UR, ES, NW
	Eel River	Sequoia	111141	54	54	54	FR, UR, NH
	Eel River	Spy Rock	111142	69	69	69	AG, FR, ES, NH
	Eel River	North Fork Eel River	111150	4	4	4	AG, GR, WI, ES, PO
	Eel River	Outlet Creek	111161	60	41	45	UR, FR, WI, NW
	Eel River	Tomki Creek	111162	75	75	75	FR, WI, NW
	Eel River	Lake Pillsbury	111163	12	12	12	ES, NH, NW
	Eel River	Eden Valley	111171	40	36	36	FR, GR, WI
	Eel River	Round Valley	111172	31	33	33	AG, FR, WI
	Eel River	Black Butte River	111173	24	24	24	FR, GR, WI
	Eel River	Wilderness	111174	7	7	7	FR, PO
	Cape Mendocino	Oil Creek	111210				
	Cape Mendocino	Capetown	111220	30	30	30	AG, GR, FR, WI
	Cape Mendocino	Mattole River	111230	142	142	121	FR, AG, GR, WI
	Mendocino Coast	Usal Creek	111311				
	Mendocino Coast	Wages Creek	111312	5	5	5	FR
	Mendocino Coast	Ten Mile River	111313	49	49	49	FR, GR, PO
	Mendocino Coast	Noyo River	111320	30	41	41	FR, UR, NW
	Mendocino Coast	Big River	111330	35	35	35	FR, PO, WL
	Mendocino Coast	Albion River	111340	13	13	13	FR, UR, NW
	Mendocino Coast	Navarro River	111350	42	42	42	AG, WI, RB, GR
	Mendocino Coast	Greenwood Creek	111361				
	Mendocino Coast	Elk Creek	111362				
	Mendocino Coast	Alder Creek	111363				
	Mendocino Coast	Brush Creek	111364				
	Mendocino Coast	Garcia River	111370	24	25	25	FR, AG, WI
	Mendocino Coast	North Fork Gualala River	111381				

Map Code	Basin	Watershed	HSA Unit	Spawning/Rearing PCEs (mi)**	Rearing/Migration PCEs (mi)**	Presence/Migration Only PCEs (mi)**	Management Activities***
	Mendocino Coast	Rockpile Creek	111382				
	Mendocino Coast	Buckeye Creek	111383				
	Mendocino Coast	Wheatfield Fork	111384				
	Mendocino Coast	Gualala	111385				
	Mendocino Coast	Russian Gulch	111390				
	Russian River	Guerneville	111411	43	43	43	UR, FR, NW
	Russian River	Austin Creek	111412	3	3	3	UR, GR, NW
	Russian River	Laguna	111421				
	Russian River	Santa Rosa	111422	10	10	10	UR, AG, NW
	Russian River	Mark West	111423	4	4	4	UR, FC, AG , WI
	Russian River	Warm Springs	111424	14	14	14	AG, UR, WI
	Russian River	Geyserville	111425	36	36	36	AG, GM, GR, UR
	Russian River	Sulphur Creek	111426				
	Russian River	Ukiah	111431	36	36	36	UR, AG, FC, GM, NH
	Russian River	Forsythe Creek	111433	15	15	15	AG, FR, GR

*Total Stream Miles calculated from blueline streams represented on 1:100,000 USGS Topographic Maps

**Overlap of stream miles may occur betweeen the three habitat types.

***Management Activities Codes:

AG - Agriculture
CM - Channel Modification
ES - Exotic / Invasive Species
FC - Flood Control Channel
FR - Forestry
GM - Sand and Gravel Mining
GR - Grazing
HD - Hydroelectric Dam
NH - Non-hydro Dam
NW - Non-agriculture Withdrawls / Impoundments
PO - Poaching
RB - Road Building / Maintenance
SP Septic System Failure / Containation
TR - River, Estuary, Ocean Traffic
UR - Urbanization
WI - Agriculture Withdrawls / Impoundments
WL - Wetland Loss / Removal

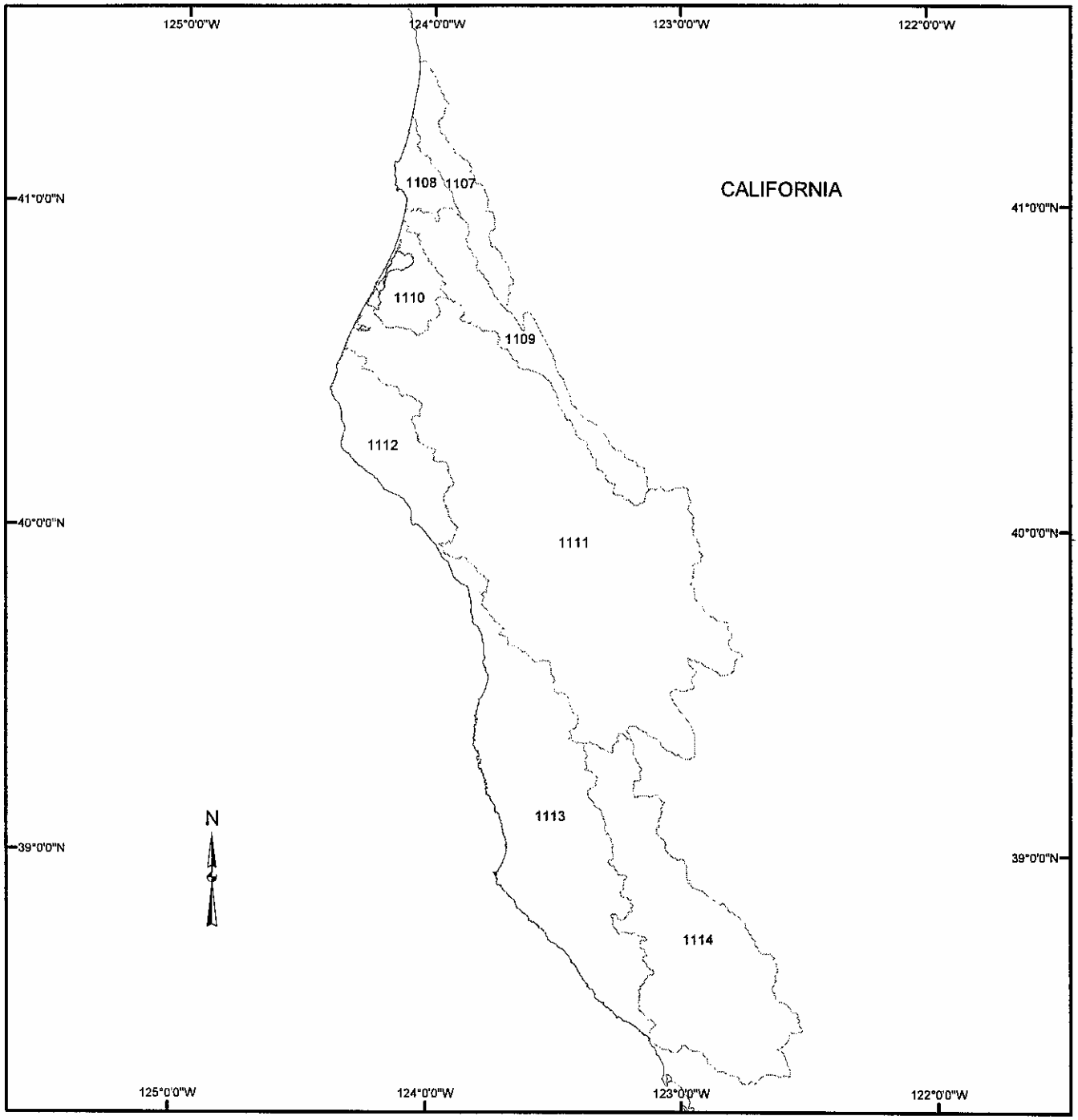
Table A3. Summary of Scores and Overall Rankings of Conservation Values for Critical Habitat for HSA watersheds occupied by the California Coastal Chinook ESU

Map Code	Basin	Watershed	Calwater Unit	Total Score (0-18)	Comments / Other Considerations	Conservation Value
	Redwood Creek	Orick	110710	14		High
	Redwood Creek	Beaver	110720	13		High
	Redwood Creek	Lake Prairie	110730	11		Medium
	Trindad	Big Lagoon	110810	9		Low
	Trindad	Little River-Albion_Big Salmon	110820	13		High
	Mad River	Blue Lake	110910	14		High
	Mad River	North Fork Mad River	110920	12		High
	Mad River	Butler Valley	110930	11		High
	Mad River	Ruth	110940	0		Not Occupied
	Eureka Plain	Eureka Plain	111000	13		High
	Eel River	Ferndale	111111	11		Medium
	Eel River	Scotia	111112	11		Medium
	Eel River	Larabee Creek	111113	10		Medium
	Eel River	Hydesville	111121	14		High
	Eel River	Bridgevelle	111122	9		Low
	Eel River	Yager Creke	111123	12		High
	Eel River	Weott	111131	13		High
	Eel River	Benbow	111132	14		High
	Eel River	Laytonville	111133	14		High
	Eel River	Sequoia	111141	13		High
	Eel River	Spy Rock	111142	12		High
	Eel River	North Fork Eel River	111150	13		High
	Eel River	Outlet Creek	111161	15		High
	Eel River	Tomki Creek	111162	13		High
	Eel River	Lake Pillsbury	111163	12		High
	Eel River	Eden Valley	111171	10		Medium
	Eel River	Round Valley	111172	12		High
	Eel River	Black Butte River	111173	9		Low
	Eel River	Wilderness	111174	8		Low
	Cape Mendocino	Oil Creek	111210	0		Not Occupied
	Cape Mendocino	Capetown	111220	12		High
	Cape Mendocino	Mattole River	111230	15		High
	Mendocino Coast	Usal Creek	111311	0		Not Occupied
	Mendocino Coast	Wages Creek	111312	7		Low
	Mendocino Coast	Ten Mile River	111313	13		High
	Mendocino Coast	Noyo River	111320	11		Medium
	Mendocino Coast	Big River	111330	11		Medium

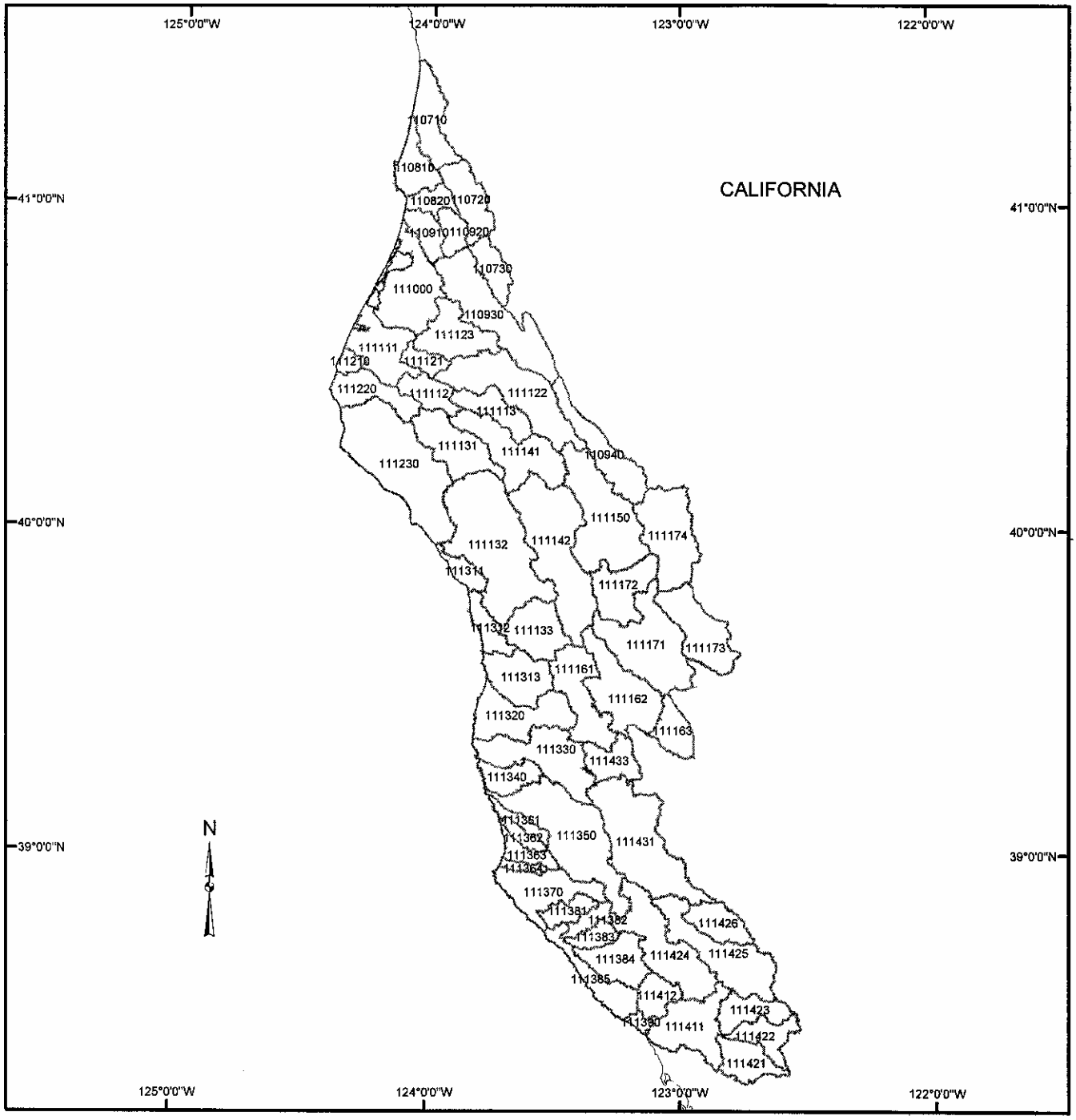
	Mendocino Coast	Albion River	111340	10		Medium
	Mendocino Coast	Navarro River	111350	7		Low
	Mendocino Coast	Greenwood Creek	111361	0		Not Occupied
	Mendocino Coast	Elk Creek	111362	0		Not Occupied
	Mendocino Coast	Alder Creek	111363	0		Not Occupied
	Mendocino Coast	Brush Creek	111364	0		Not Occupied
	Mendocino Coast	Garcia River	111370	15		High
	Mendocino Coast	North Fork Gualala River	111381	0		Not Occupied
	Mendocino Coast	Rockpile Creek	111382	0		Not Occupied
	Mendocino Coast	Buckeye Creek	111383	0		Not Occupied
	Mendocino Coast	Wheatfield Fork	111384	0		Not Occupied
	Mendocino Coast	Gualala	111385	0		Not Occupied
	Mendocino Coast	Russian Gulch	111390	0		Not Occupied
	Russian River	Guerneville	111411	12		High
	Russian River	Austin Creek	111412	4		Low
	Russian River	Laguna	111421	0		Not Occupied
	Russian River	Santa Rosa	111422	9		Low
	Russian River	Mark West	111423	11		Medium
	Russian River	Warm Springs	111424	12		High
	Russian River	Geyserville	111425	12		High
	Russian River	Sulphur Creek	111426	0		Not Occupied
	Russian River	Ukiah	111431	13		High
	Russian River	Forsythe Creek	111433	11		Medium
	Outside ESU	Lake Pillsbury	111163			High

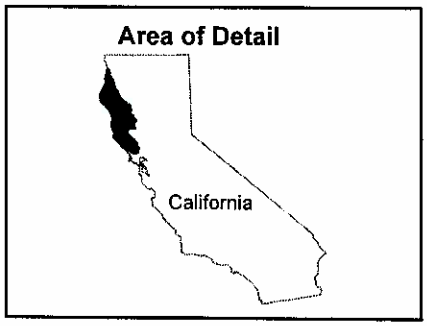
Figures A1 and A2: CALWATER Hydrologic Units and Hydrologic Subareas within the range of the California Coastal Chinook ESU

Map of the California Coastal O. tshawytscha ESU



Map of the California Coastal O. tshawytscha ESU





Subbasin Boundaries

State Boundary

Maps A1 through A8: California Coast Chinook ESU - Occupied Habitat Areas (Units) Considered for Critical Habitat Designation

A1 - Unit 1107 (Redwood Creek)

A2 - Unit 1108 (Trinidad)

A3 - Unit 1109 (Mad River)

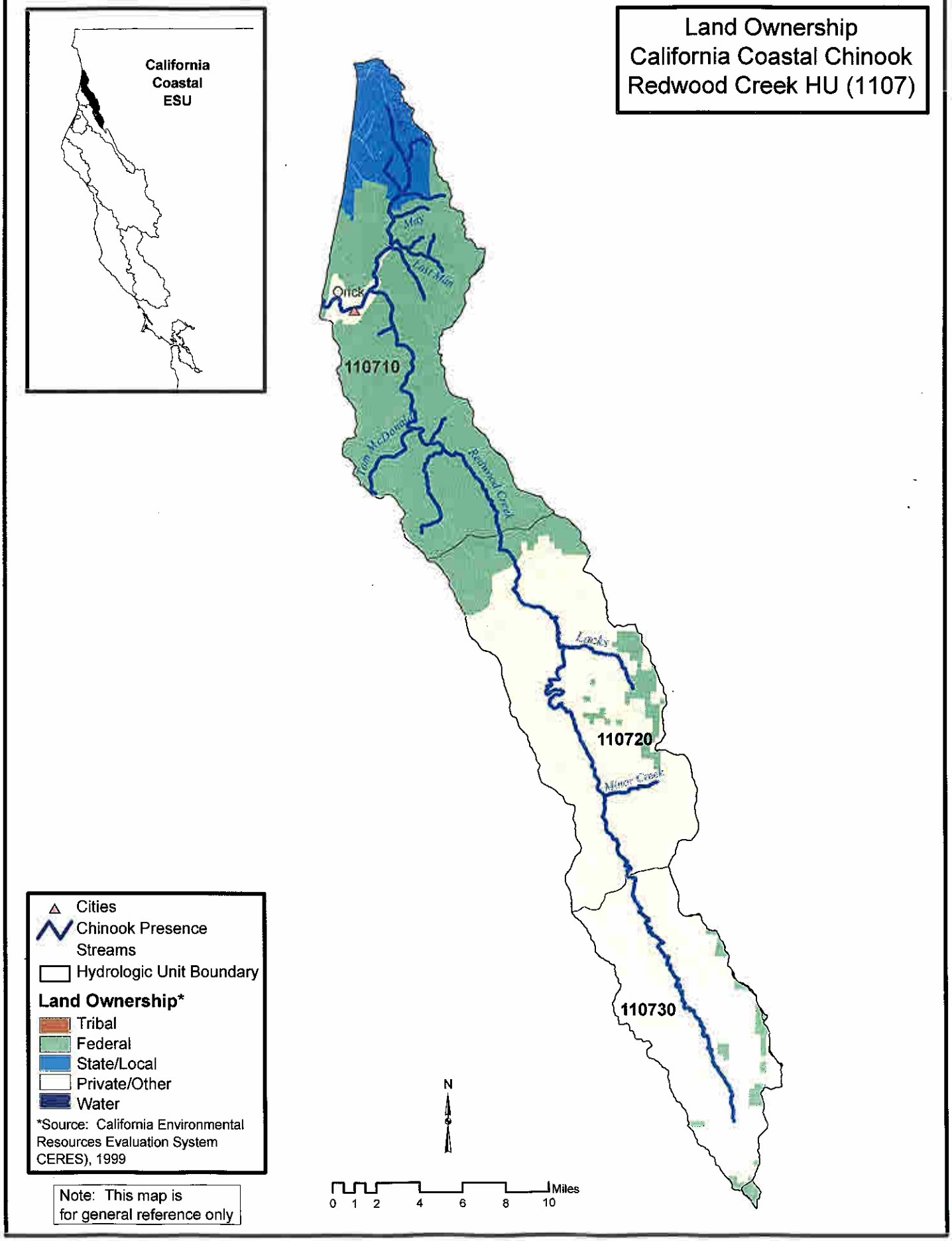
A4 - Unit 1110 (Eureka Plain)

A5 - Unit 1111 (Eel River)

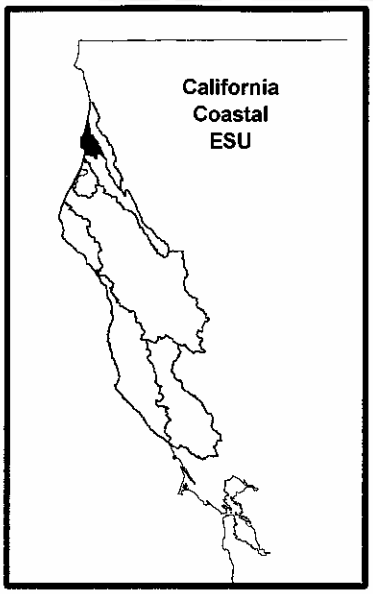
A6 - Unit 1112 (Cape Mendocino)

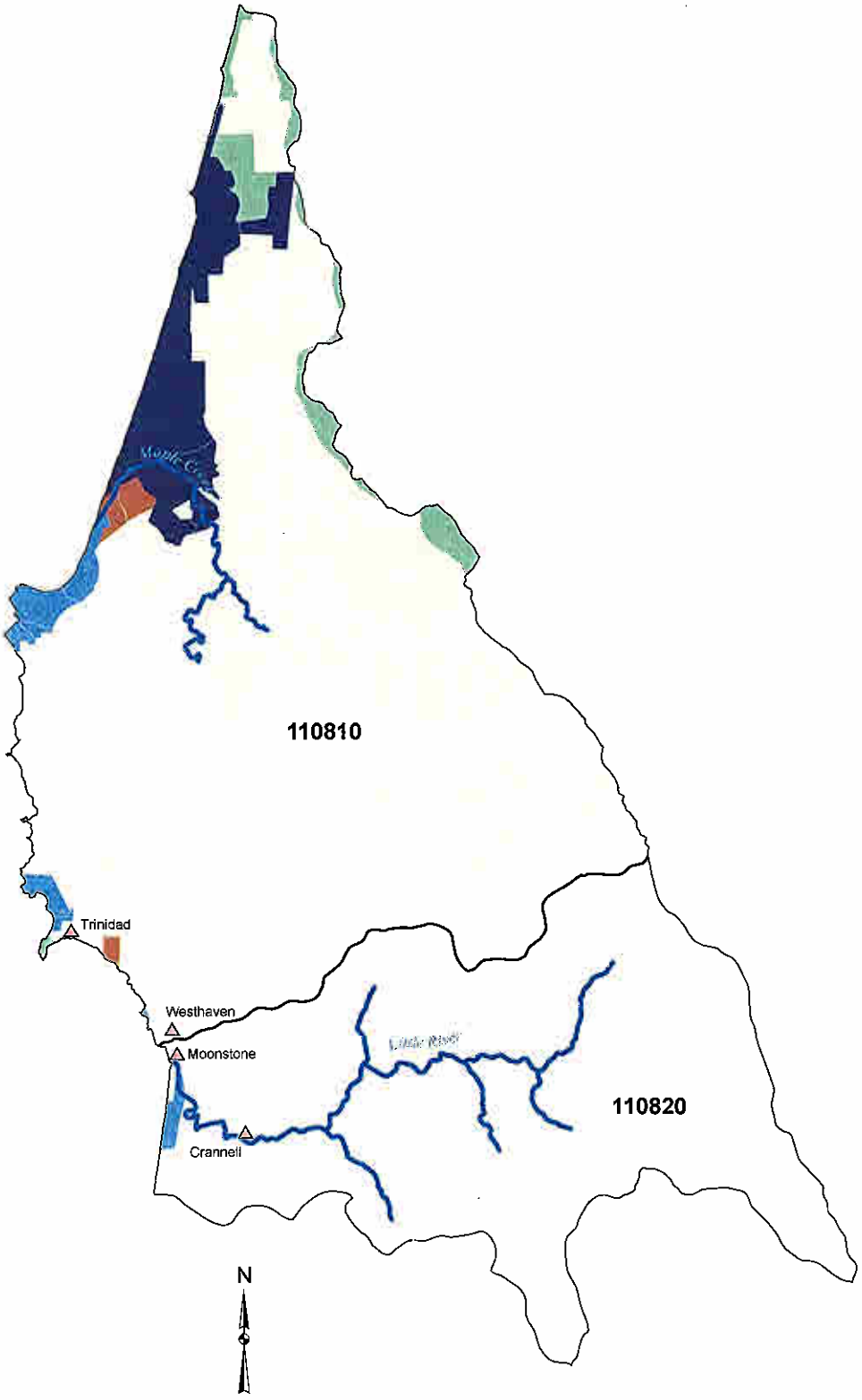
A7 - Unit 1113 (Mendocino Coast)

A8 - Unit 1114 (Russian River)


Land Ownership
California Coastal Chinook
Redwood Creek HU (1107)
California
Coastal
ESU
Orick
May
East Mill
110710
Tom McDonald
Redwood Creek
Lacks
110720
Minor Creek
110730
Cities
Chinook Presence
Streams
Hydrologic Unit Boundary
Land Ownership*
Tribal
Federal
State/Local
Private/Other
Water
*Source: California Environmental Resources Evaluation System CERES), 1999
Note: This map is for general reference only
N
0 1 2 4 6 8 10
Miles

Land Ownership
California Coastal Chinook
Trinidad HU (1108)



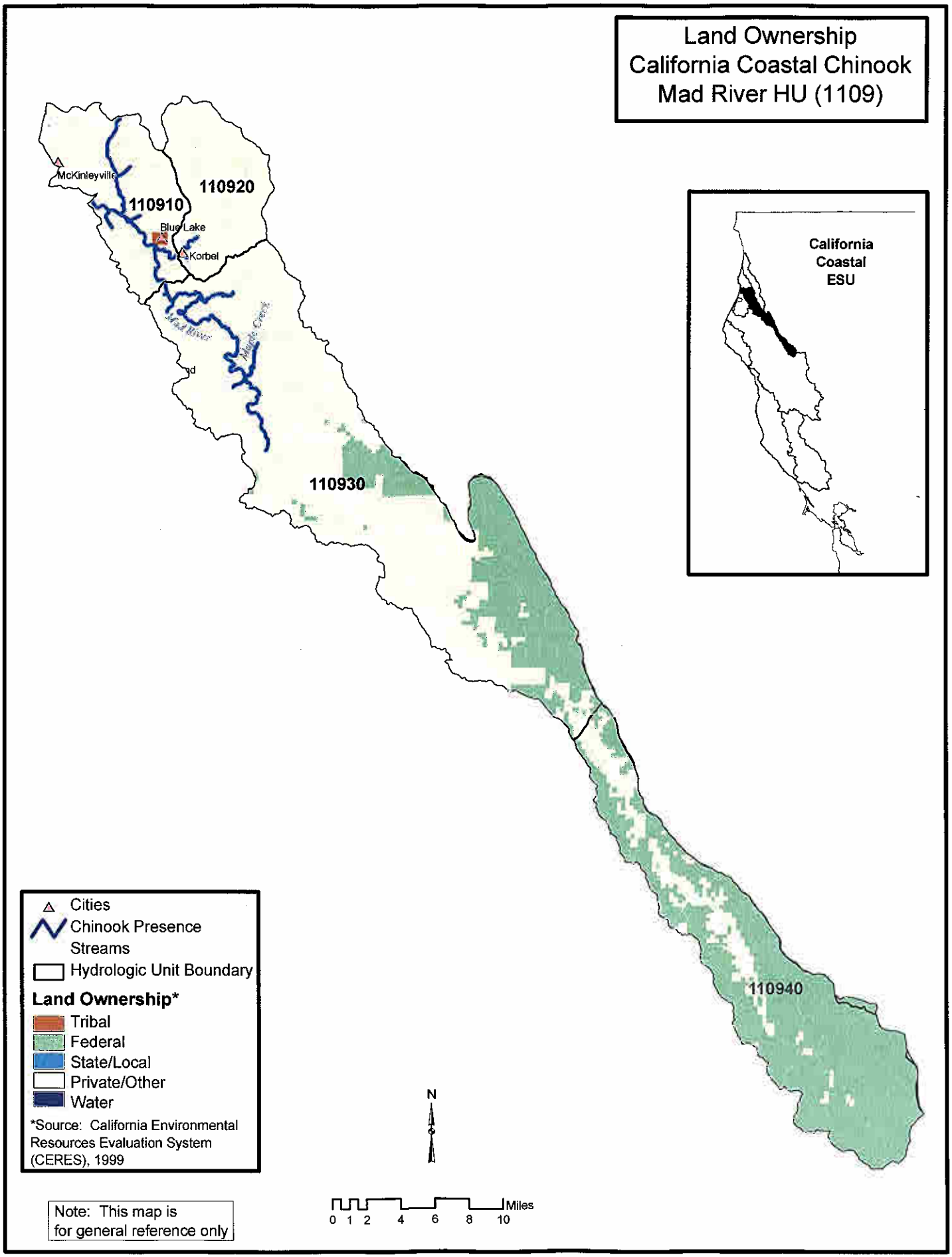


Cities
Chinook Presence Streams
Hydrologic Unit Boundary

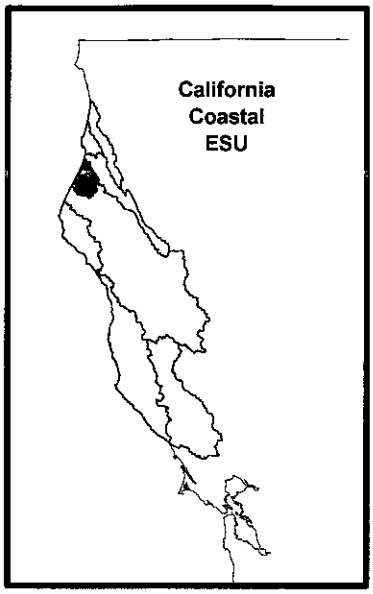
Land Ownership*
- Tribal
- Federal
- State/Local
- Private/Other
- Water

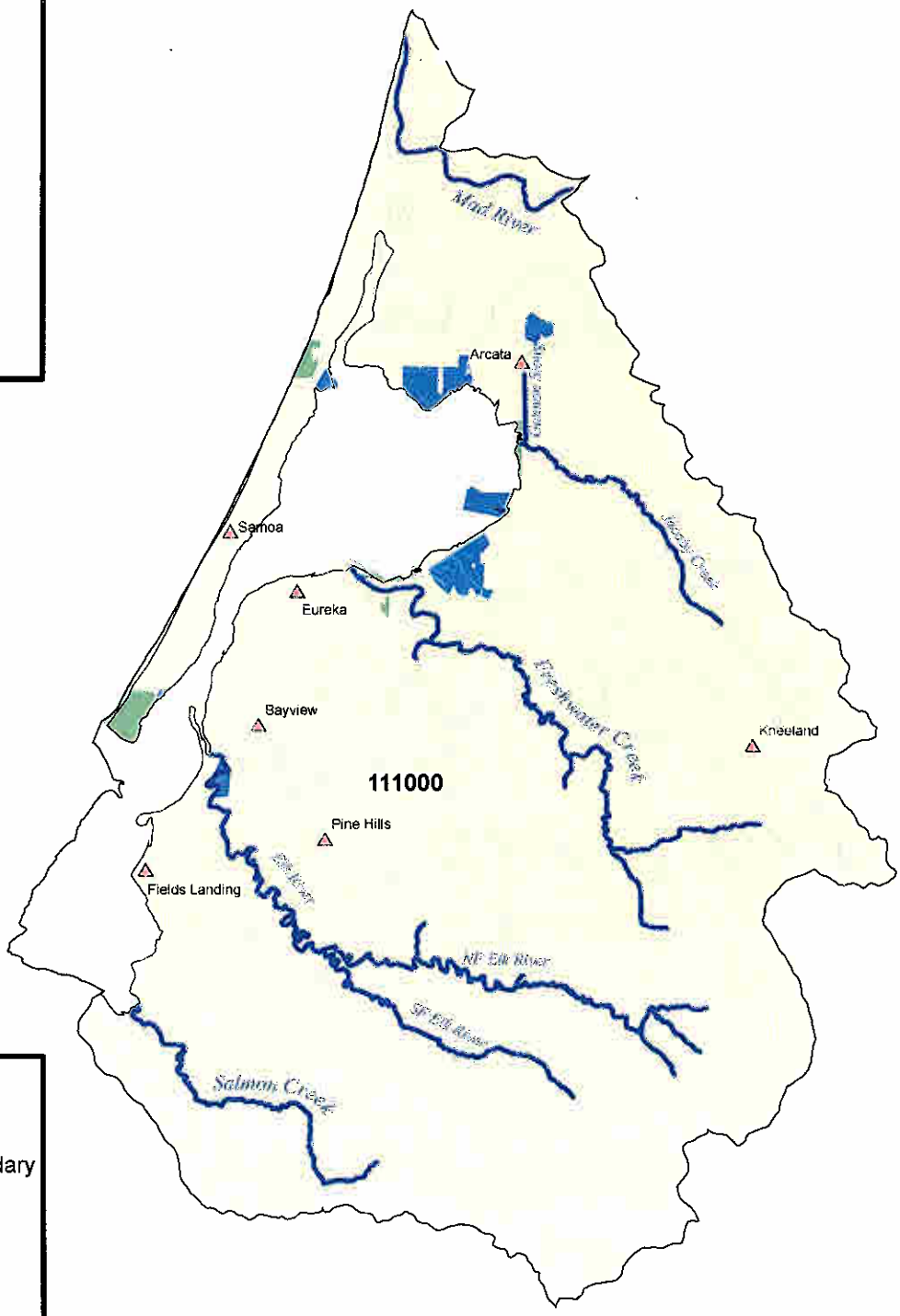
*Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is for general reference only


Land Ownership
California Coastal Chinook
Mad River HU (1109)
McKinleyville
110920
110910
Blue Lake
Korbel
Mad River
Maple Creek
110930
110940
California
Coastal
ESU
Cities
Chinook Presence
Streams
Hydrologic Unit Boundary
Land Ownership*
Tribal
Federal
State/Local
Private/Other
Water
*Source: California Environmental Resources Evaluation System (CERES), 1999
N
0 1 2 4 6 8 10
Miles
Note: This map is for general reference only

Land Ownership
California Coastal Chinook
Eureka Plain HU (1110)





- Cities
- Chinook Presence Streams
- Hydrologic Unit Boundary

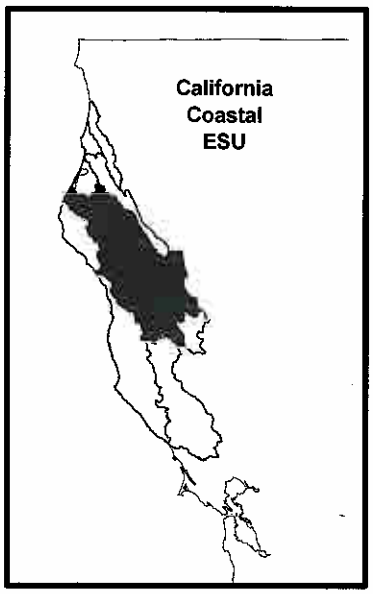
Land Ownership*

- Tribal
- Federal
- State/Local
- Private/Other
- Water

*Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is for general reference only

Land Ownership
California Coastal Chinook
Eel River HU (1111)



Fortuna
Garberville
Covelo
Laytonville
Willits

111111
111121
111123
111112
111122
111113
111131
111141
111150
111174
111142
111132
111172
111133
111173
111171
111161
111162
111163
111163

Cities
Chinook Presence Streams
Hydrologic Unit Boundary

Land Ownership*

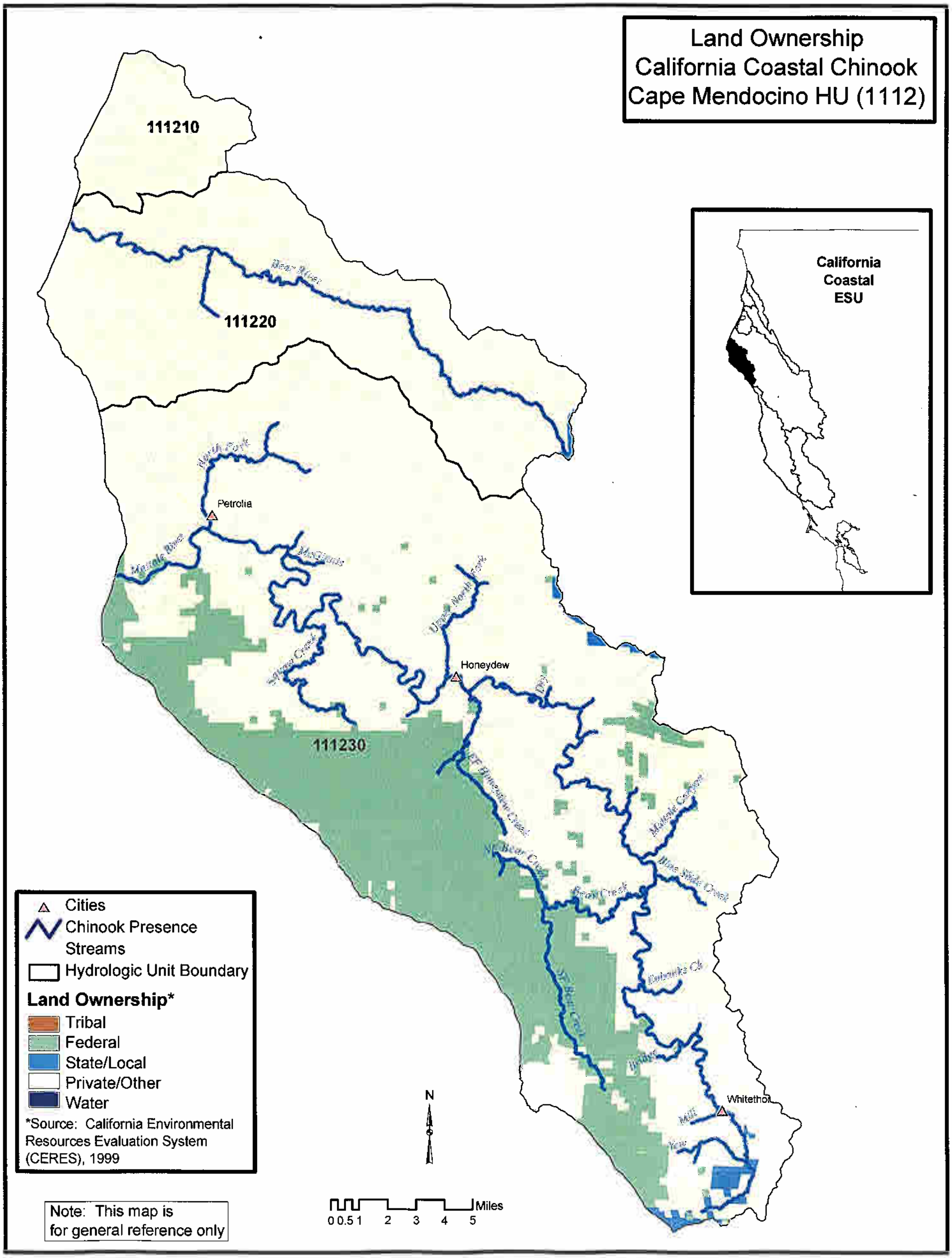
Tribal
Federal
State/Local
Private/Other
Water

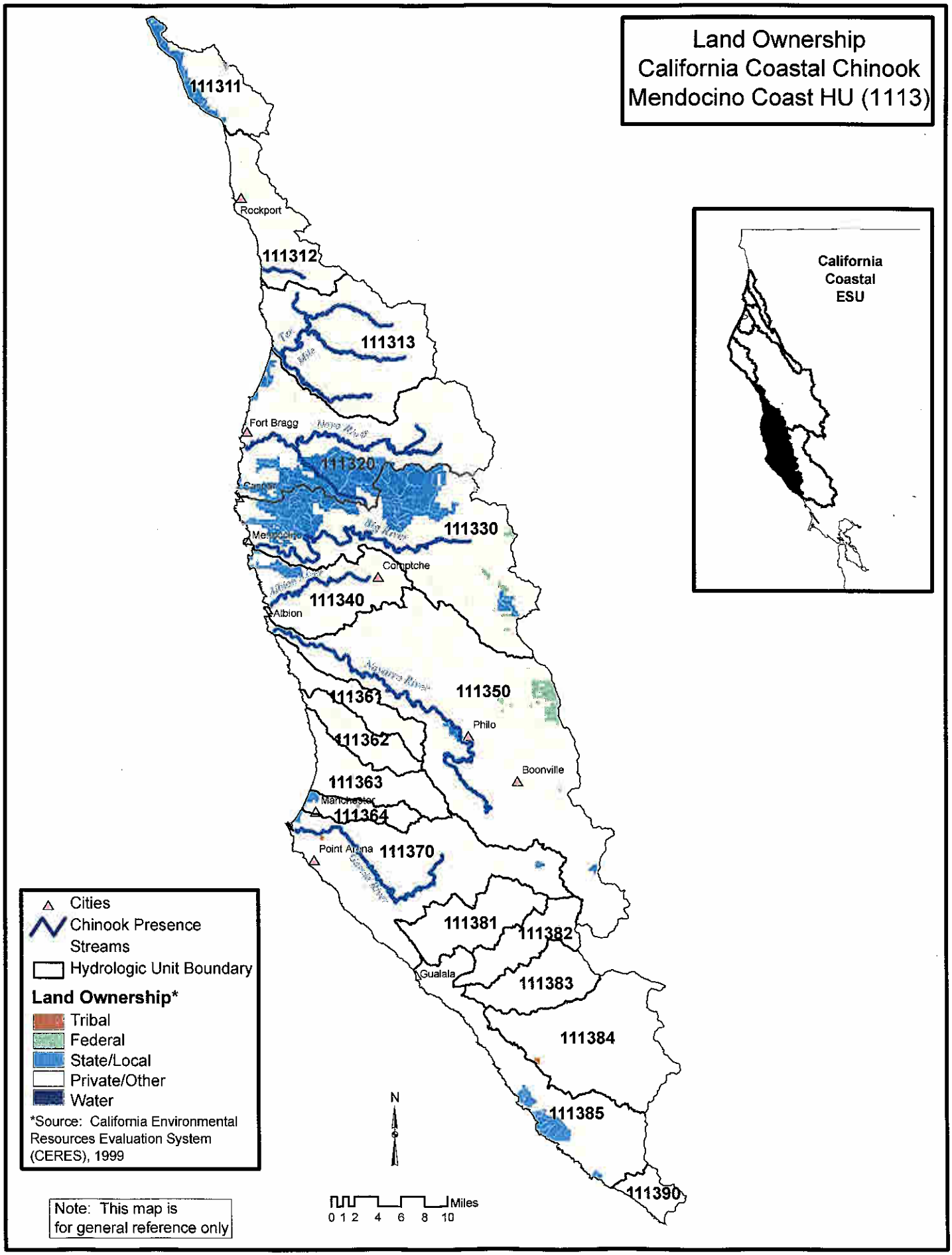
*Source: California Environmental Resources Evaluation System (CERES), 1999

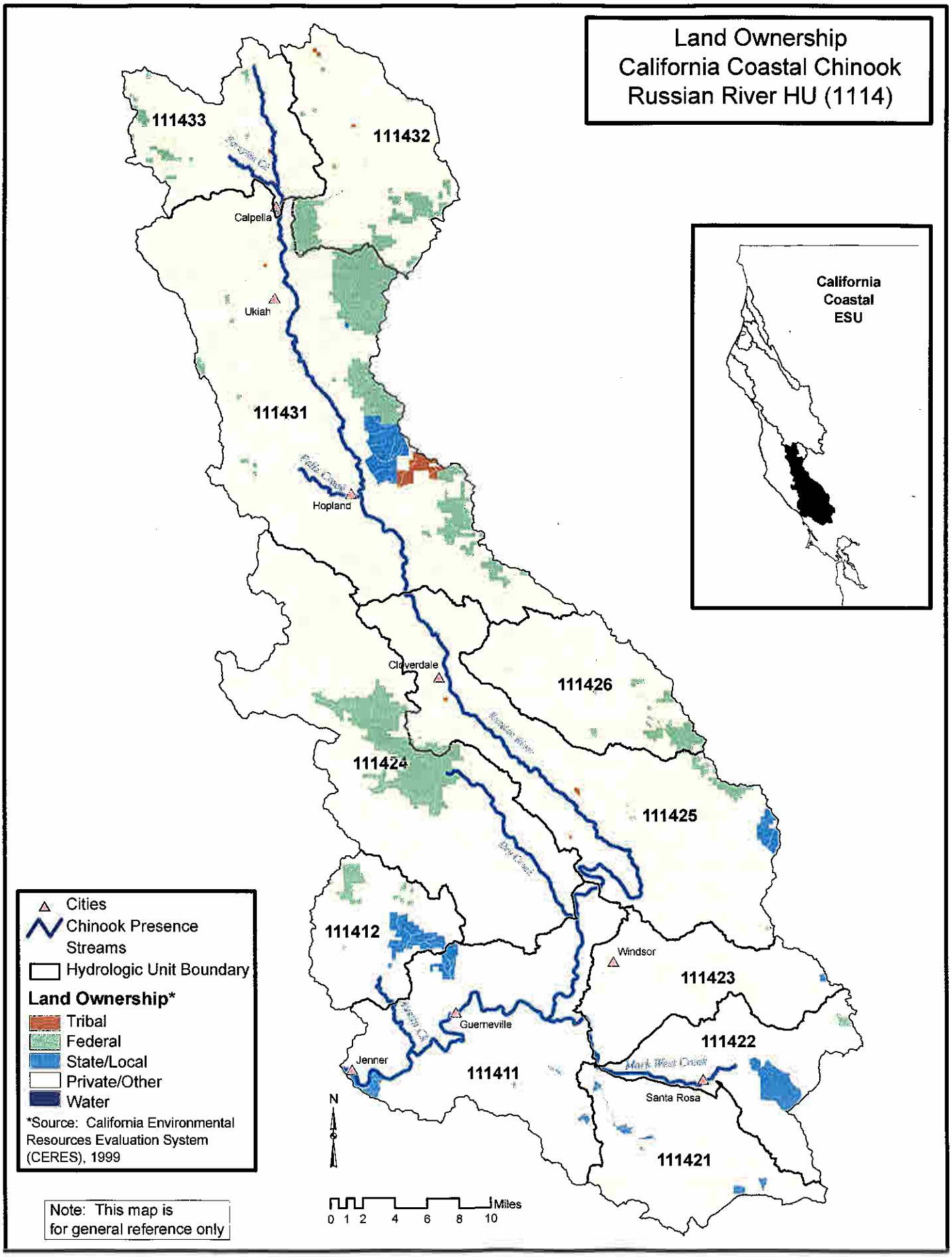
N

0 1 2 4 6 8 10 Miles

Note: This map is for general reference only


Land Ownership
California Coastal Chinook
Cape Mendocino HU (1112)
California
Coastal
ESU
111210
111220
111230
Bear River
North Fork
Petrolia
Mattole River
Honeydew
Whitethorn
Cities
Chinook Presence
Streams
Hydrologic Unit Boundary
Land Ownership*
Tribal
Federal
State/Local
Private/Other
Water
*Source: California Environmental
Resources Evaluation System
(CERES), 1999
Note: This map is
for general reference only
N
0 0.5 1 2 3 4 5
Miles

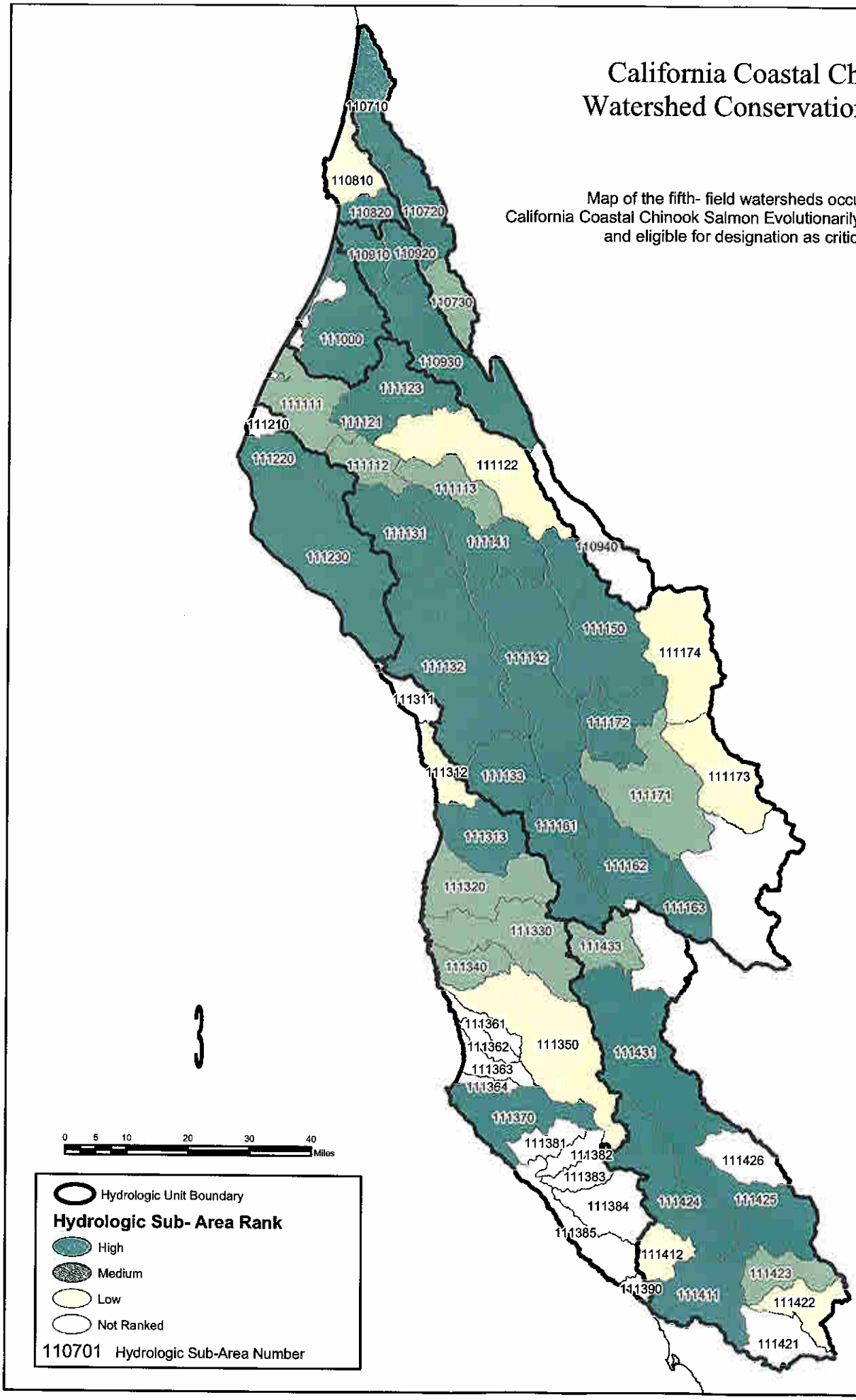

Land Ownership
California Coastal Chinook
Mendocino Coast HU (1113)
California
Coastal
ESU
111311
Rockport
111312
111313
Fort Bragg
111320
Mendocino
111330
Comptche
111340
Albion
111350
111361
Philo
111362
Boonville
111363
Manchester
111364
Point Arena
111370
111381
111382
Gualala
111383
111384
111385
111390
Cities
Chinook Presence Streams
Hydrologic Unit Boundary
Land Ownership*
Tribal
Federal
State/Local
Private/Other
Water
*Source: California Environmental Resources Evaluation System (CERES), 1999
N
Miles
0 1 2 4 6 8 10
Note: This map is for general reference only


Land Ownership
California Coastal Chinook
Russian River HU (1114)
111433
111432
111431
111426
111424
111425
111412
111423
111422
111411
111421
Calpella
Ukiah
Hopland
Cloverdale
Windsor
Guerneville
Jenner
Santa Rosa
California
Coastal
ESU
Cities
Chinook Presence
Streams
Hydrologic Unit Boundary
Land Ownership*
Tribal
Federal
State/Local
Private/Other
Water
*Source: California Environmental Resources Evaluation System (CERES), 1999
N
0 1 2 4 6 8 10
Miles
Note: This map is for general reference only

Map A9. Final CHART Conservation Value Ratings for CALWATER HSA Watersheds occupied by the California Coast Chinook ESU

California Coastal Chinook Watershed Conservation Rating

Map of the fifth- field watersheds occupied by the California Coastal Chinook Salmon Evolutionarily Significant Unit (ESU) and eligible for designation as critical habitat.



Appendix B
Final CHART Assessment for the Northern California (NC) Steelhead ESU

ESU Description

The NC Steelhead ESU was listed as a threatened species in 2000 (65 FR 36074; June 7, 2000). The ESU includes all naturally spawned populations of steelhead in coastal river basins from Redwood Creek south to, and including, the Gualala River. Major watersheds occupied by naturally spawning fish in this ESU include Redwood Creek, Mad River, Eel River, and several smaller coastal watersheds southward to the Gualala River. Steelhead within this ESU include both winter and summer run types, including what is presently considered to be the southernmost population of summer steelhead in the Middle Fork Eel River (NMFS 1996). The half-pounder life history also occurs within the range of this ESU, specifically in the Mad and Eel Rivers. Based on an updated status review (NMFS 2003a) and an assessment of hatchery populations located within the range of the ESU (NMFS 2003b), NMFS proposed that the ESU remain listed as a threatened species and that resident O. mykiss co-occurring with anadromous populations below impassible barriers (both natural and man-made) as well as two artificial propagation programs (Yager Creek Hatchery and North Fork Gualala River Hatchery) be included in the ESU (69 FR 33102; June 14, 2004). NMFS recently determined that a 6-month extension in making a final listing determination for this and all other west coast steelhead/O. mykiss ESUs was warranted (70 FR 37219; June 28, 2005). A Technical Recovery Team has developed a preliminary model of the historic and extant population structure of this ESU. Additional technical recovery planning work is underway that will identify viability criteria for independent populations and the ESU as a whole

CHART Area Assessments

The preliminary CHART assessment for this ESU (NMFS 2004b) was prepared to support our December 10, 2004, critical habitat proposal (69 FR 71880). This final CHART assessment considered new information received during the public comment period regarding fish distribution and habitat use. Based on information from timber landowners on the north coast, the CHART made changes in fish distribution and habitat use in 13 watersheds (110720, 110810, 110820, 110930, 111000, 111132, 111133,

111311, 111312, 111313, 111320, 111330, 111340) that included portions of Redwood Creek, Mad River, Eel River, and the Mendocino Coast. These changes reduced the occupied habitat for this ESU by approximately 20 stream miles, but did not result in any changes in the occupancy or conservation value of Hydrologic Subareas (HSAs) within the freshwater and estuarine range of this ESU.

The final CHART assessment for the NC Steelhead ESU addressed 7 CALWATER Hydrologic Units (HUs) or subbasins containing 50 occupied HSAs (Figures B1 and B2). The HSAs were chosen as freshwater critical habitat units because they present a convenient and systematic way to organize the CHART's watershed assessments for this ESU. In addition to the 50 occupied HSA watershed units, conservation value assessments were also made for Humboldt Bay and the Eel River estuary. Information presented below for individual HUs within the range of the ESU (size, counties, total stream miles, occupied stream miles, and habitat use) were generated from GIS data sets compiled by NMFS Southwest Region and can be found in Table B1.

Unit 1. Redwood Creek Subbasin (HU 1107)

The Redwood Creek HU is located in the northern portion of the ESU and includes the Redwood Creek drainage. The HU encompasses approximately 294 mi^2 and occurs completely within Humboldt County. The HU contains 3 HSAs, all of which are occupied, and 343 stream miles (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 144 miles of occupied riverine habitat in the 3 occupied HSAs (Table B1). The CHART concluded that these occupied HSAs contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) and identified several management activities that may affect the PCEs. Table B2 summarizes the total miles of occupied riverine/estuarine reaches for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map B1 depicts the specific areas in this HU and nested HSAs that are occupied by the ESU and were considered for critical habitat designation. The CHART did not identify any unoccupied habitat in this subbasin that may be essential for the conservation of the ESU.

Unit 2. Trinidad Subbasin (HU 1108)

The Trinidad HU is located in the northern portion of the ESU and includes Big Lagoon and Little River. The HU encompasses approximately 131 mi^2 and occurs completely within Humboldt County. This HU contains 2 HSAs, both of which are occupied, and

161 stream miles (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 69 miles of occupied riverine habitat in the occupied HSAs (Table B1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) and identified management activities that may affect the PCEs. Table B2 summarizes the total miles of occupied riverine and estuarine reaches identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map B2 depicts the specific areas in this HU and the nested HSAs that are occupied by the ESU and were considered for critical habitat designation. The CHART did not identify any unoccupied habitat in this subbasin that may be essential for the conservation of the ESU.

Unit 3. Mad River Subbasin (HU1109)

The Mad River HU is located in the northern portion of the ESU and includes the Mad River drainage. The HU encompasses approximately 499 mi^2 and occurs in portions of Humboldt and Trinity Counties. This HU contains 4 HSAs, all of which are occupied, and a total of 661 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 169 miles of occupied riverine habitat in the 4 occupied HSAs (Table B1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) and identified management activities that may affect the PCEs. Table B2 summarizes the total miles of occupied riverine and estuarine reaches identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map B3 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The CHART did not identify any unoccupied habitat in this subbasin that may be essential for the conservation of the ESU.

Unit 4. Eureka Plain Subbasin (HU 1110)

The Eureka Plain HU is located in the vicinity of Eureka, includes Humboldt Bay. The HU encompasses approximately 224 mi^2 and occurs completely within Humboldt County. This HU contains a single HSA which is occupied and a total of 269 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 123 miles of occupied riverine habitat in the occupied HSA (NMFS 2004a). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU

and identified management activities that may affect the PCEs. The CHART also evaluated Humboldt Bay into which most of the freshwater streams in this subbasin drain as a separate unit. Humboldt Bay contains approximately 25 mi^2 of estuarine habitat which the CHART found contained PCEs for rearing and migration and concluded was of high conservation value. Table B2 summarizes the total miles of occupied riverine and estuarine habitat for the HSA that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map B4 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The CHART did not identify any unoccupied habitat in this subbasin that may be essential for the conservation of the ESU.

Unit 5. Eel River Subbasin (HU 1111)

The Eel River HU is located in north central portion of the ESU and includes the Eel River and Van Duzen River drainages. The HU encompasses approximately 3,682 mi^2 and occurs in portions of several counties including: Humboldt, Trinity, Mendocino, Lake, Glenn, Colusa, and Tehama. This HU, which is the largest in this ESU, contains 19 occupied HSAs and 5,194 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 1,275 miles of occupied riverine habitat in the occupied HSAs (Table B1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table B2 summarizes the total miles of occupied riverine habitat identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map B5 depicts the specific areas in this HU and nested HSAs that are occupied by the ESU and were considered for the critical habitat designation. The CHART did not identify any unoccupied habitat in this subbasin that may be essential for the conservation of the ESU.

Unit 6. Cape Mendocino Subbasin (HU 1112)

The Cape Mendocino HU is located in the central portion of the ESU and includes the Bear River and Mattole River drainages. This HU encompasses approximately 499 mi^2 and occurs almost entirely in Humboldt County. This HU contains 3 HSAs, all of which are occupied, and 654 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 340 miles of occupied riverine habitat in the 3 occupied HSAs (Table B1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or

migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table B2 summarizes the total miles of occupied riverine and/or estuarine reaches identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map B6 depicts the specific areas in this HU and nested HSAs that are occupied by the ESU and were considered for critical habitat designation. The CHART did not identify any unoccupied habitat in this subbasin that may be essential for the conservation of the ESU.

Unit 7. Mendocino Coast Subbasin (HU 1112)

The Mendocino HU is located in the southern portion of the ESU within Mendocino and Sonoma Counties and includes several smaller streams including the Ten Mile, Noyo, Albion, Navarro, and Garcia Rivers. This HU which encompasses approximately 1,598 mi^2 contains 18 HSAs, all of which are occupied, and 2,103 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 1,028 miles of occupied riverine/estuarine habitat in the 18 HSAs (Table B1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table B2 summarizes the total miles of occupied riverine habitat identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map B7 depicts the specific areas in this HU and nested HSAs that are occupied by the ESU and were considered for critical habitat designation. The CHART did not identify any unoccupied habitat in this subbasin that may be essential for the conservation of the ESU.

CHART Final Conservation Value Ratings

Freshwater/Estuarine Areas

After reviewing the best available scientific data regarding the distribution and habitat use of the NC Steelhead ESU, the CHART concluded that most of the occupied HSAs were of high or medium conservation value to the ESU. Of the 50 occupied HSAs that were evaluated, 27 were rated as having high conservation value, 14 were rated as having medium conservation value, and 9 were rated as having low conservation value. In addition, both Humboldt Bay and the Eel River estuary were rated as having a high conservation value. Table B3 summarizes the CHARTs PCE/watershed scores and final

conservation value ratings (i.e. low, medium or high) for each HSA. Figure B8 depicts the overall spatial distribution of conservation scores for occupied HSAs within the ESU.

Marine Areas

NMFS determined that marine areas did not warrant consideration as critical habitat for this ESU.

References and Sources of Information

NMFS 1996. Status Review of West Coast Steelhead. Biological Review Team; Northwest Fisheries Science Center and Southwest Fisheries Science Center.

NMFS 2003a. Updated Status of Federally Listed ESUs of West Coast Salmon and Steelhead. West Coast Salmon Biological Review Team; Northwest Fisheries Science Center and Southwest Fisheries Science Center. July 2003.

NMFS 2003b. Hatchery Broodstock Summaries and Assessments for Chum, Coho, and Chinook Salmon and Steelhead Stocks within ESUs listed under the ESA. Salmon and Steelhead Hatchery Assessment Group/NOAA Fisheries; Northwest Fisheries Science Center and Southwest Fisheries Science Center.

NMFS 2004b. Draft Findings of NMFS's Critical Habitat Development and Review Teams (CHARTs) for 7 Salmon and O. mykiss ESUs in California. Main report and 7 appendices. Prepared by NMFS' Southwest Region.

Federal Register Notices

65 FR 36974 - Final Northern California Steelhead Listing Determination.

69 FR 33102 - Proposed Listing Determinations for 27 West Coast Salmon and Steelhead ESUs.

70 FR 37219 - 6-Month Extension of the Final Listing Determinations for 10 ESUs of West Coast Oncorhynchus mykiss.

Table B1. Northern California Steelhead ESU: Occupancy, habitat use and area information by Hydrologic Unit and Hydrologic Subarea

HU NUMBER	HU NAME	Major Stream / Watershed in HU	HU Occupied (Y or N)	Acres in HU	Square Miles in HU	Stream Miles (1:100k) in HU	Occupied Stream Miles	Occupied Stream Miles (Spawning)	Occupied Stream Miles (Rearing)	Occupied Stream Miles (Migration)	County HU Falls within	Acres of County in HU	Square Miles of County in HU	Percent of HU by County	HSA NUMBER	HSA NAME	HSA Occupied (Y or N)	Acres in HSA	Square Miles in HSA	Stream Miles (1:100k) in the HSA
1107	Redwood Creek	Redwood Creek		187,972	294	343	144	138	140	138	Humboldt	187,972	294	100%						
															110710	Orick	Y	75,374	118	129
															110720	Beaver	Y	69,135	108	121
															110730	Lake Prairie	Y	43,463	68	94
1108	Trinidad	Maple Creek-Little River		83,640	131	161	69	52	52	50	Humboldt	83,640	131	100%						
															110810	Big Lagoon	Y	53,709	84	105
															110820	Little River	Y	29,931	47	56
1109	Mad River	Mad River		319,477	499	661	169	132	136	132	Humboldt	217,897	341	68%						
											Trinity	101,580	159	32%	110910	Blue Lake	Y	37,137	58	85
															110920	North Fork Mad River	Y	30,042	47	65
															110930	Butler Valley	Y	160,363	251	346
															110940	Ruth	Y	91,934	144	165
1110	Eureka Plain	Jacoby-Freshwater Elk River-Salmon-Humboldt Bay		143,143	224	269	123	94	118	118	Humboldt	143,143	224	100%						
															111000	Eureka Plain	Y	143,143	224	269
1111	Eel River	Eel River-Van Duzen		2,355,818	3682	5,194	1275	1071	1221	1191	Humboldt	765,835	1197	33%						
											Trinity	316,869	495	13%	111111	Ferndale	Y	92,968	145	202
											Mendocino	1,030,069	1610	44%	111112	Scotia	Y	44,094	69	86
											Lake	189,191	296	8%	111113	Larabee Creek	Y	56,338	88	129
											Glenn	53,779	84	2%	111121	Hydesville	Y	25,319	40	66
											Colusa	45	0	0%	111122	Bridgeville	Y	162,917	255	352
											Tehama	30	0	0%	111123	Yager Creek	Y	84,554	132	169
															111131	Weott	Y	95,234	149	195
															111132	Benbow	Y	264,408	413	565
															111133	Laytonville	Y	80,851	126	176
															111141	Sequoia	Y	120,122	188	240
															111142	Spy Rock	Y	213,922	334	418
															111150	North Fork Eel River	Y	180,319	282	380
															111161	Outlet Creek	Y	102,051	160	248
															111162	Tomki Creek	Y	127,908	200	253
															111163*	Lake Pillsbury	Y	223,107	349	653
															111171	Eden Valley	Y	164,031	256	362
															111172	Round Valley	Y	83,406	130	199
															111173	Black Butte River	Y	102,890	161	249
															111174	Wilderness	Y	131,377	205	253
1112	Cape Mendocino	Bear River Mattole River		319,484	499	654	340	261	340	332	Humboldt	311,733	487	98%						
											Mendocino	7,751	12	2%	111210	Oil Creek	Y	14,740	23	29
															111220	Capetown	Y	66,269	104	120
															111230	Mattole River	Y	238,476	373	505
1113	Mendocino Coast	Ten Mile-Noyo_big Albion-Navarro-Garcia		1,022,913	1599	2,103	1028	857	990	943	Mendocino	850,622	1330	83%						
											Sonoma	172,291	269	17%	111311	Usal Creek	Y	26,825	42	52
															111312	Wages Creek	Y	37,669	59	67
															111313	Ten Mile River	Y	82,479	129	163
															111320	Noyo River	Y	105,964	166	205
															111330	Big River	Y	128,899	202	265
															111340	Albion River	Y	43,762	68	92
															111350	Navarro River	Y	201,945	316	414
															111361	Greenwood Creek	Y	20,286	32	42
															111362	Elk Creek	Y	18,069	28	44
															111363	Alder Creek	Y	27,898	44	63
															111364	Brush Creek	Y	11,372	18	22
															111370	Garcia River	Y	95,445	149	208
															111381	North Fork Gualala River	Y	30,636	48	66
															111382	Rockpile Creek	Y	22,389	35	42
															111383	Buckeye Creek	Y	25,768	40	55
															111384	Wheatfield Fork	Y	71,443	112	162
															111385	Gualala	Y	62,248	97	128
															111390	Russian Gulch	Y	9,817	15	15

*111163 Is bisected by the ESU Boundary (Scott Dam). 46,517 acres (73 square miles) lie within the ESU, 106 stream miles lie within the ESU.

Table B2. Summary of Occupied Subbasins/Watersheds. PCE's and Management Activities Affecting PCE's for the Northern California Steelhead ESU

Map Code	Basin	Watershed	Calwater Unit	Spawning/Rearing PCEs (mi)**	Rearing/Migration PCEs (mi)**	Presence/Migration Only PCEs (mi)**	Management Activities***
	Redwood Creek	Orick	110710	67	67	65	FR, FC, GM, WI, GR
	Redwood Creek	Baeaver	110720	45	45	45	FR
	Redwood Creek	Lake Prairie	110730	28	28	28	FR, WI
	Trinidad	Big Lagoon	110810	32	32	30	FR, NW
	Trinidad	Little River	110820	20	20	20	FR, AG, GR, WI, NW, FC
	Mad River	Blue Lake	110910	35	35	33	FR, RB, AG, SC
	Mad River	North Fork Mad River	110920	16	16	16	FR, AG, GR, WI
	Mad River	Butler Valley	110930	77	77	74	FR, AG, GR, SC
	Mad River	Ruth	110940	9	9	9	FR, NH
	Eureka Plain	Eureka Plain	111000	118	118	118	UR, FC, RB, TR
	Eel River	Ferndale	111111	45	45	45	AG, FC, GM
	Eel River	Scotia	111112	41	41	41	GM, FR, ES
	Eel River	Larabee Creek	111113	43	44	44	AG, FR, WI
	Eel River	Hydesville	111121	29	29	27	FR, GM, ES, WI
	Eel River	Bridgeville	111122	78	78	71	FR, ES
	Eel River	Yager Creek	111123	38	38	38	FR, AG, GR, ES
	Eel River	Weott	111131	70	70	70	FR, ES, WI
	Eel River	Benbow	111132	215	215	214	FR, UR, ES, WI
	Eel River	Laytonville	111133	82	82	82	FR, UR, ES, NW
	Eel River	Sequoia	111141	61	61	57	FR, UR, NH
	Eel River	Spy Rock	111142	96	96	65	AG, FR, ES, NH
	Eel River	North Fork Eel River	111150	85	85	74	AG, GR, WI, ES, PO
	Eel River	Outlet Creek	111161	83	83	83	UR, FR, WI, NW
	Eel River	Tomki Creek	111162	86	86	84	FR, WI, NW
	Eel River	Lake Pillsbury	111163	25	25	25	ES, NH, NW
	Eel River	Eden Valley	111171	45	64	53	FR, GR, WI
	Eel River	Round Valley	111172	37	46	34	AG, FR, WI
	Eel River	Black Butte River	111173	30	30	30	FR, GR, WI
	Eel River	Wilderness	111174	38	38	35	FR, PO
	Cape Mendocino	Oil Creek	111210	12	12	12	GR, FR
	Cape Mendocino	Capetown	111220	67	67	67	AG, GR, FR, WI
	Cape Mendocino	Mattole River	111230	261	261	254	FR, AG, GR, WI
	Mendocino Coast	Usal Creek	111311	20	20	20	FR, RB
	Mendocino Coast	Wages Creek	111312	39	39	34	FR, RB, NW
	Mendocino Coast	Ten Mile Creek	111313	96	86	86	FR, GR, PO
	Mendocino Coast	Noyo River	111320	129	130	120	FR, UR, NW
	Mendocino Coast	Big River	111330	161	161	151	FR, PO, WL
	Mendocino Coast	Albion River	111340	58	58	55	FR, UR, NW
	Mendocino Coast	Navarro River	111350	179	181	176	FR, AG, WI
	Mendocino Coast	Greenwood Creek	111361	10	10	10	FR
	Mendocino Coast	Elk Creek	111362	7	7	7	FR
	Mendocino Coast	Alder Creek	111363	7	7	7	FR, GR
	Mendocino Coast	Brush Creek	111364	13	13	13	FR, AG
	Mendocino Coast	Garcia River	111370	76	76	73	FR, AG, WI
	Mendocino Coast	North Fork Gualala River	111381	29	29	22	FR, RB, NW
	Mendocino Coast	Rockpile Creek	111382	10	10	10	FR, RB
	Mendocino Coast	Buckeye Creek	111383	26	26	26	FR, AG

Map Code	Basin	Watershed	Calwater Unit	Spawning/Rearing PCEs (mi)**	Rearing/Migration PCEs (mi)**	Presence/Migration Only PCEs (mi)**	Management Activities***
	Mendocino Coast	Wheatfield Fork	111384	71	71	71	FR, AG
	Mendocino Coast	Gualala	111385	67	67	61	GM, GR, RB
	Mendocino Coast	Russian Gulch	111390	4	4	4	GR

*Total Stream Miles calculated from blueline streams represented on 1:100,000 USGS Topographic Maps

**Overlap of stream miles may occur betweeen the three habitat types.

***Management Activities Codes:

AG - Agriculture
CM - Channel Modification
ES - Exotic / Invasive Species
FC - Flood Control Channel
FR - Forestry
GM - Sand and Gravel Mining
GR - Grazing
HD - Hydroelectric Dam
NH - Non-hydro Dam
NW - Non-agriculture Withdrawls / Impoundments
PO - Poaching
RB - Road Building / Maintenance
SP Septic System Failure / Containation
TR - River, Estuary, Ocean Traffic
UR - Urbanization
WI - Agriculture Withdrawls / Impoundments
WL - Wetland Loss / Removal

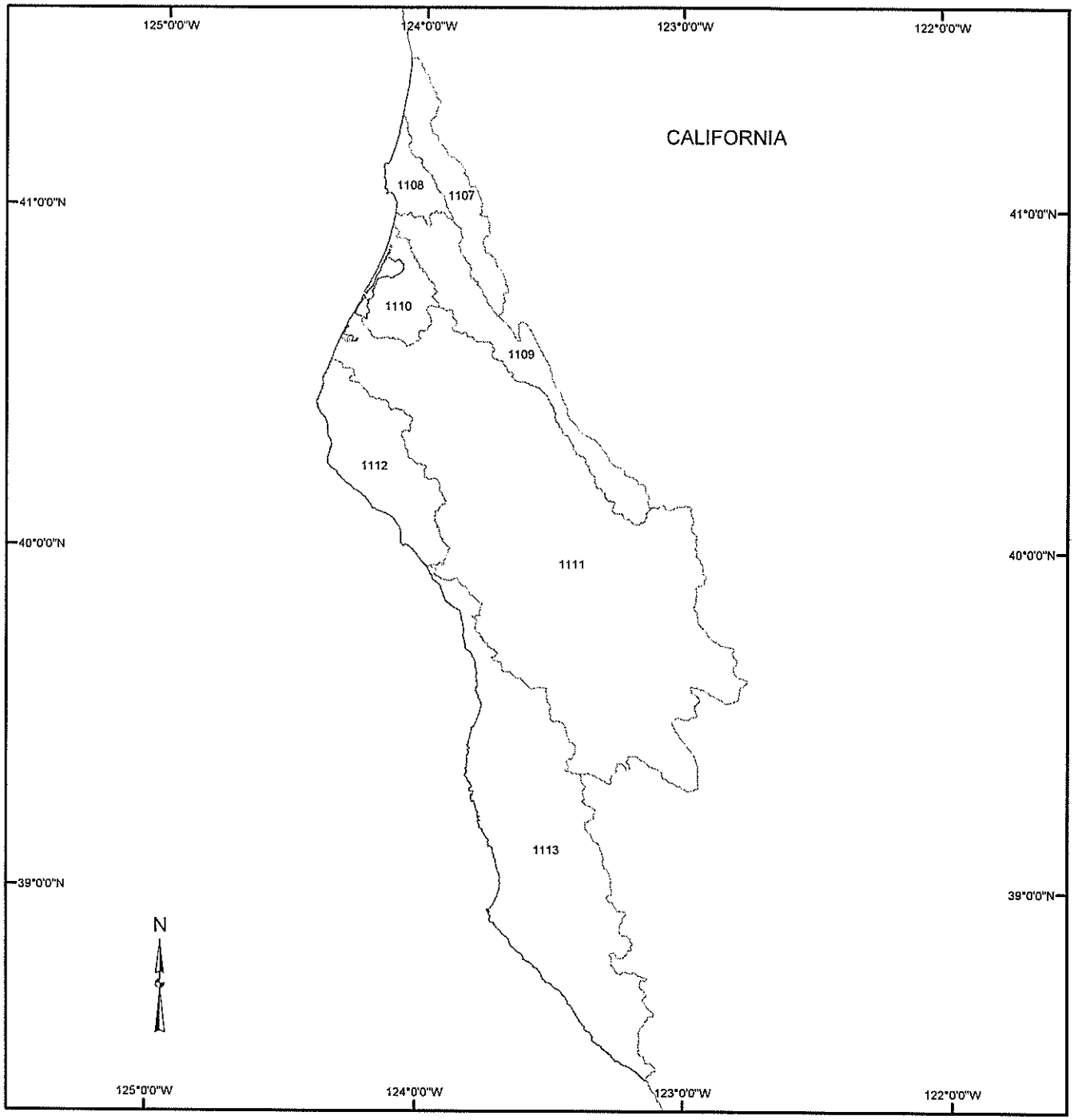
Table B3. Summary of Scores and Overall Rankings of Conservation Values for Critical Habitat for HSA watersheds occupied by the Northern California Steelhead ESU

Map Code	Basin	Watershed	Calwater Unit	Total Score (0-18)	Comments / Other Considerations	Conservation Value
	Redwood Creek	Orick	110710	13		High
	Redwood Creek	Baeaver	110720	13		High
	Redwood Creek	Lake Prairie	110730	12		Medium
	Trinidad	Big Lagoon	110810	10		Low
	Trinidad	Little River	110820	13		High
	Mad River	Blue Lake	110910	13		High
	Mad River	North Fork Mad River	110920	14		High
	Mad River	Butler Valley	110930	12		High
	Mad River	Ruth	110940	10		Low
	Eureka Plain	Eureka Plain	111000	14		High
	Eel River	Ferndale	111111	11		Medium
	Eel River	Scotia	111112	12		Medium
	Eel River	Larabee Creek	111113	14		High
	Eel River	Hydesville	111121	13		High
	Eel River	Bridgeville	111122	12		Medium
	Eel River	Yager Creek	111123	11		Medium
	Eel River	Weott	111131	13		High
	Eel River	Benbow	111132	14		High
	Eel River	Laytonville	111133	14		High
	Eel River	Sequoia	111141	12		Medium
	Eel River	Spy Rock	111142	11		Medium
	Eel River	North Fork Eel River	111150	11		Medium
	Eel River	Outlet Creek	111161	13		High
	Eel River	Tomki Creek	111162	13		High
	Eel River	Lake Pillsbury	111163	12		Medium
	Eel River	Eden Valley	111171	12		High
	Eel River	Round Valley	111172	11		Medium
	Eel River	Black Butte River	111173	12		High
	Eel River	Wilderness	111174	14		High
	Cape Mendocino	Oil Creek	111210	10		Low
	Cape Mendocino	Capetown	111220	10		Low
	Cape Mendocino	Mattole River	111230	14		High
	Mendocino Coast	Usal Creek	111311	11		Medium
	Mendocino Coast	Wages Creek	111312	11		Medium
	Mendocino Coast	Ten Mile Creek	111313	13		High
	Mendocino Coast	Noyo River	111320	13		High
	Mendocino Coast	Big River	111330	13		High
	Mendocino Coast	Albion River	111340	12		Medium
	Mendocino Coast	Navarro River	111350	14		High

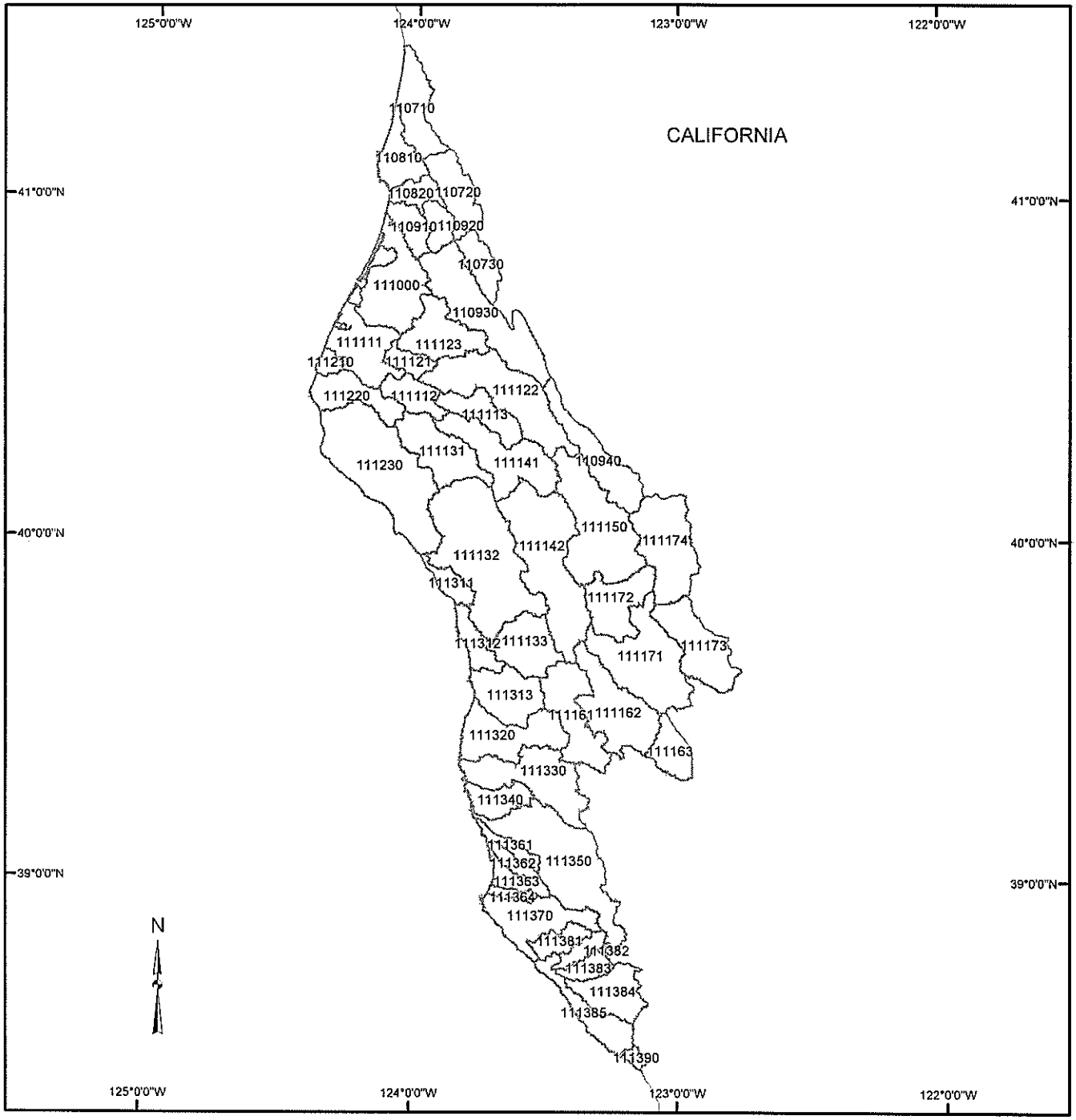
	Mendocino Coast	Greenwood Creek	111361	10		Low
	Mendocino Coast	Elk Creek	111362	10		Medium
	Mendocino Coast	Alder Creek	111363	9		Low
	Mendocino Coast	Brush Creek	111364	10		Low
	Mendocino Coast	Garcia River	111370	13		High
	Mendocino Coast	North Fork Gualala River	111381	13		High
	Mendocino Coast	Rockpile Creek	111382	10		Low
	Mendocino Coast	Buckeye Creek	111383	12		High
	Mendocino Coast	Wheatfield Fork	111384	13		High
	Mendocino Coast	Gualala	111385	13		High
	Mendocino Coast	Russian Gulch	111390	7		Low
	Outside ESU	Lake Pillsbury	111163			High

Figures B1 and B2: CALWATER Hydrologic Units and Hydrologic Subareas within the Range of the NC Steelhead ESU.

Map of the Northern California Steelhead ESU

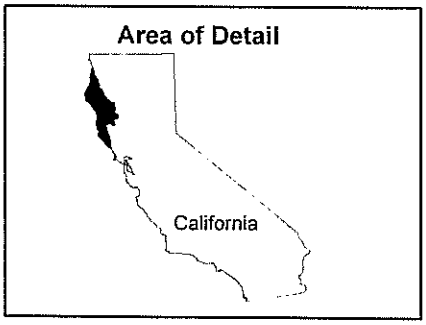


Map of the Northern California Steelhead ESU



Subbasin Boundaries

State Boundary



Maps B1 through B7: Northern California Steelhead ESU - Occupied Habitat Areas (Units) Considered for Critical Habitat Designation

B1 - Unit 1107 (Redwood Creek)

B2 - Unit 1108 (Trinidad)

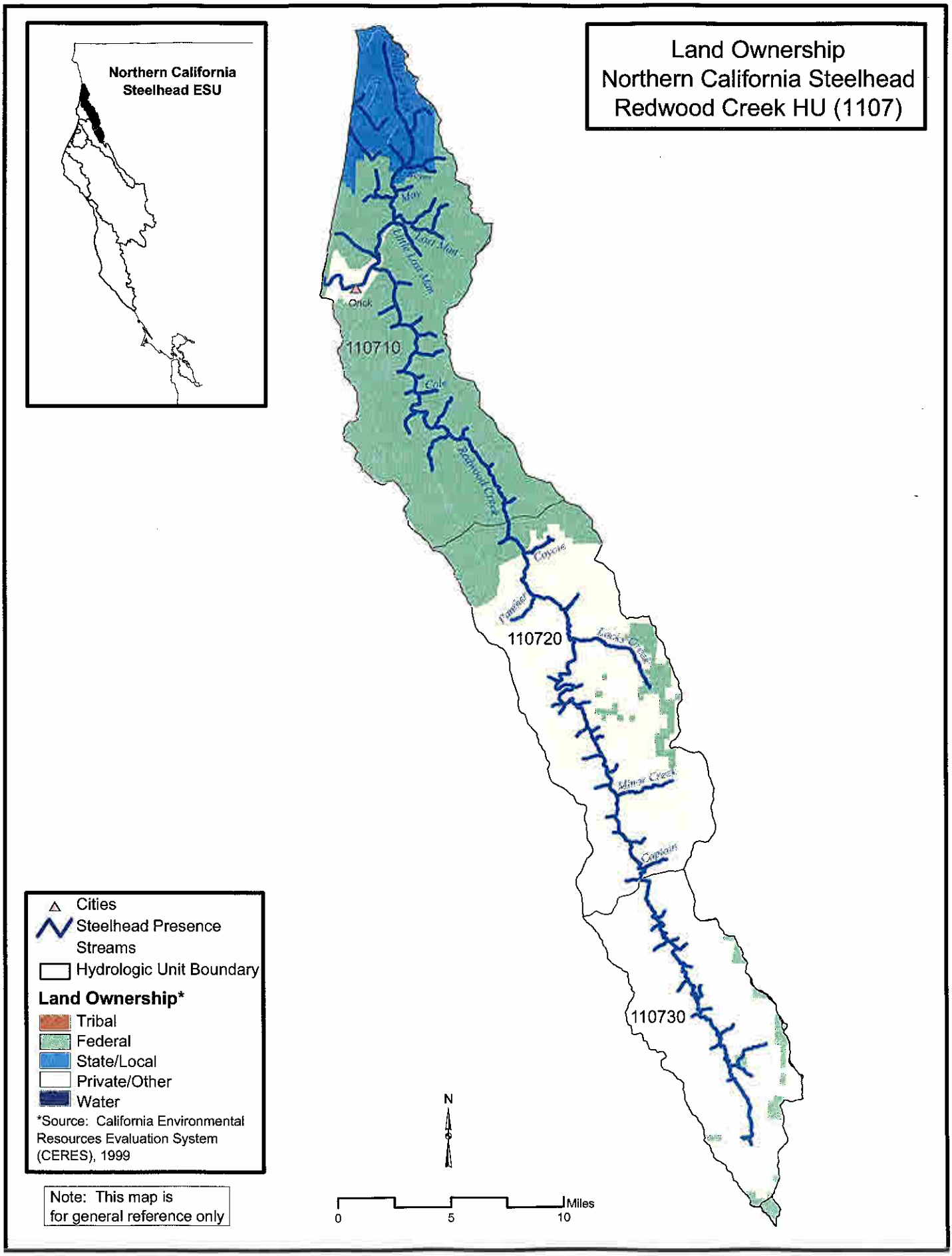
B3 - Unit 1109 (Mad River)

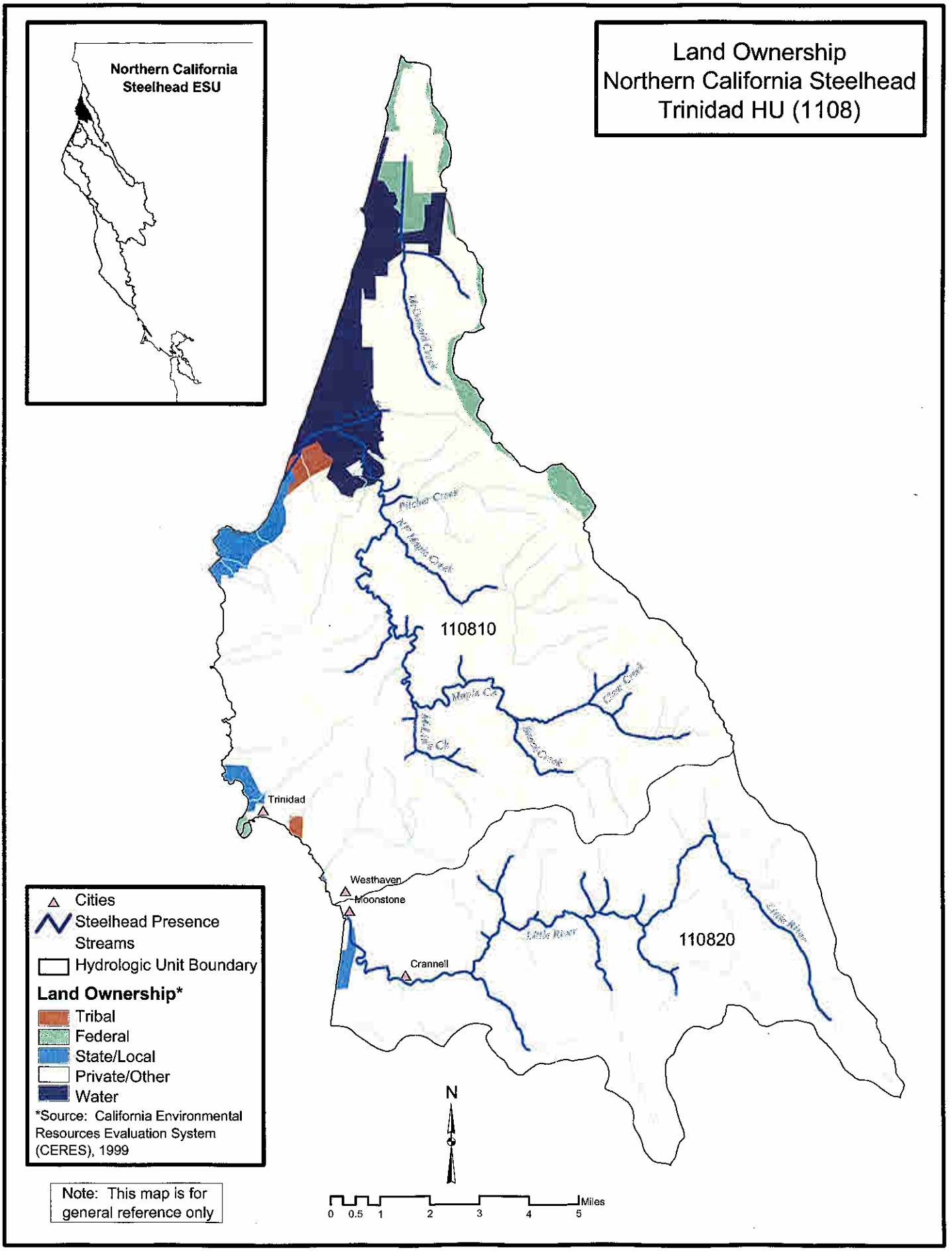
B4 - Unit 1110 (Eureka Plain)

B5 - Unit 1111 (Eel River)

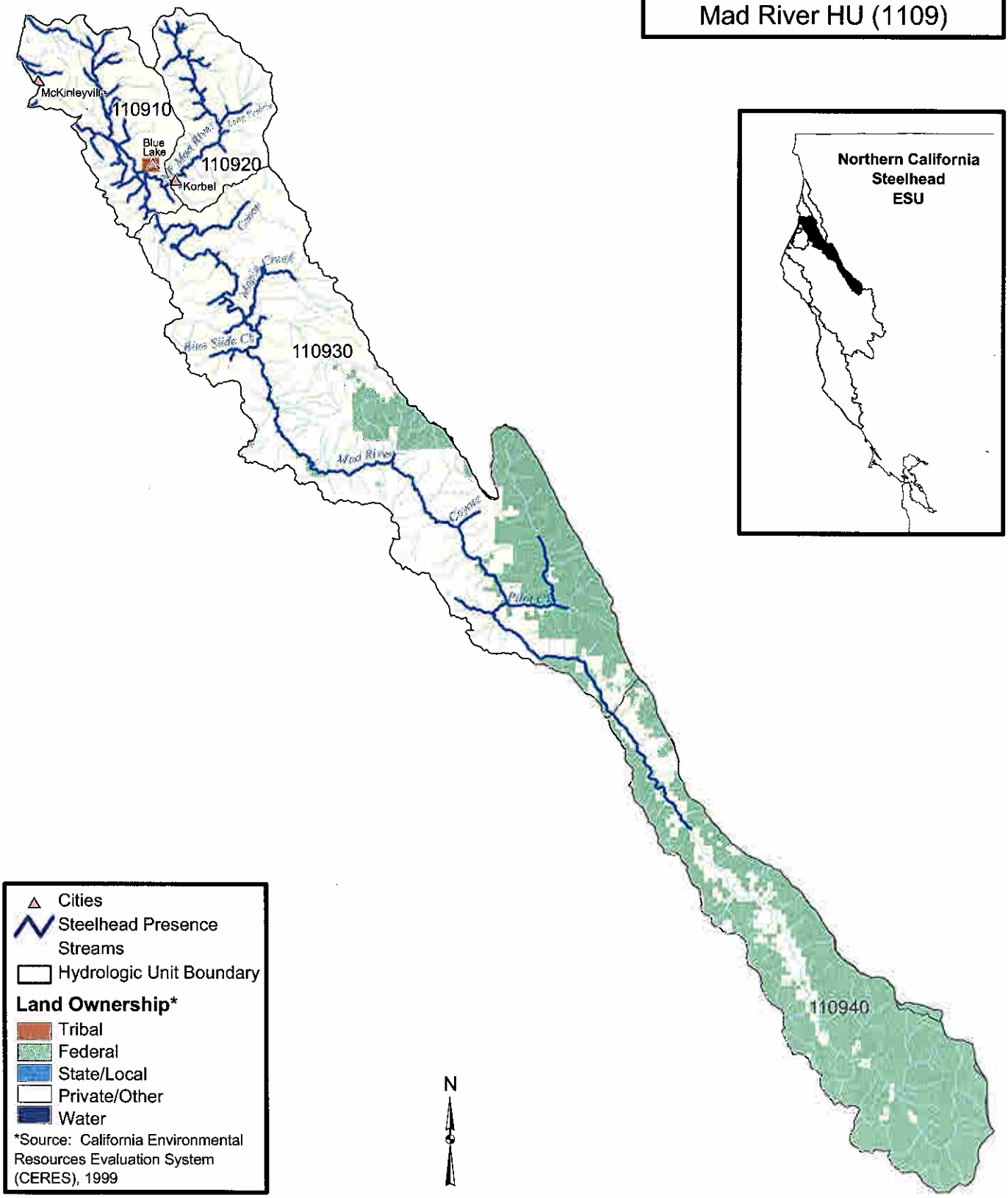
B6 - Unit 1112 (Cape Mendocino)

B7 - Unit 1113 (Mendocino Coast)


Northern California Steelhead ESU
Land Ownership
Northern California Steelhead
Redwood Creek HU (1107)
Orick
110710
Redwood Creek
Coyote
110720
Lacks Creek
Miner Creek
Captain
110730
Cities
Steelhead Presence Streams
Hydrologic Unit Boundary
Land Ownership*
Tribal
Federal
State/Local
Private/Other
Water
*Source: California Environmental Resources Evaluation System (CERES), 1999
Note: This map is for general reference only
N
0
5
10
Miles


Land Ownership
Northern California Steelhead
Trinidad HU (1108)
Northern California Steelhead ESU
110810
110820
Trinidad
Westhaven
Moonstone
Crannell
Cities
Steelhead Presence Streams
Hydrologic Unit Boundary
Land Ownership*
Tribal
Federal
State/Local
Private/Other
Water
*Source: California Environmental Resources Evaluation System (CERES), 1999
Note: This map is for general reference only
N
0 0.5 1 2 3 4 5 Miles

Land Ownership
Northern California Steelhead
Mad River HU (1109)



- Cities
- Steelhead Presence Streams
- Hydrologic Unit Boundary

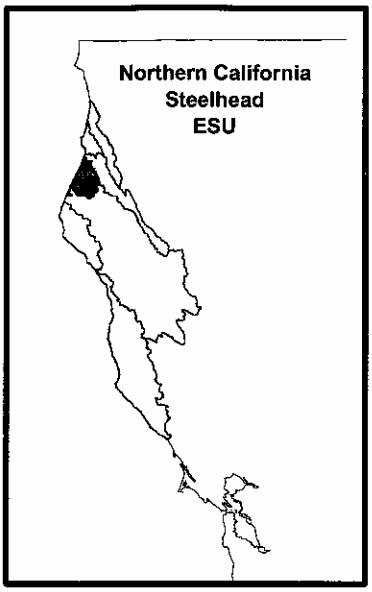
Land Ownership*

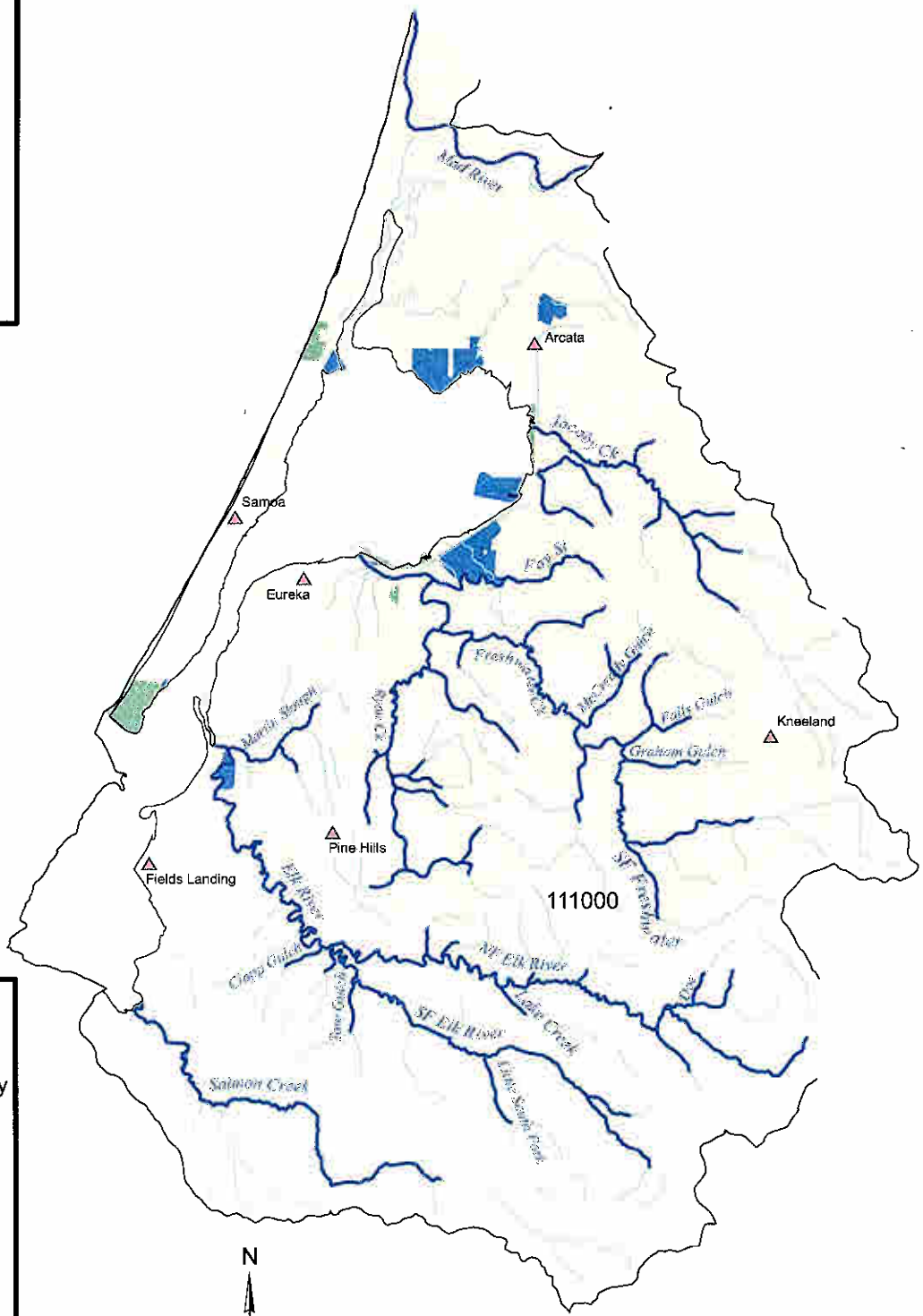
- Tribal
- Federal
- State/Local
- Private/Other
- Water

*Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is for general reference only

Land Ownership
Northern California Steelhead
Eureka Plain HU (1110)





- Cities
- Steelhead Presence Streams
- Hydrologic Unit Boundary

Land Ownership*

- Tribal
- Federal
- State/Local
- Private/Other
- Water

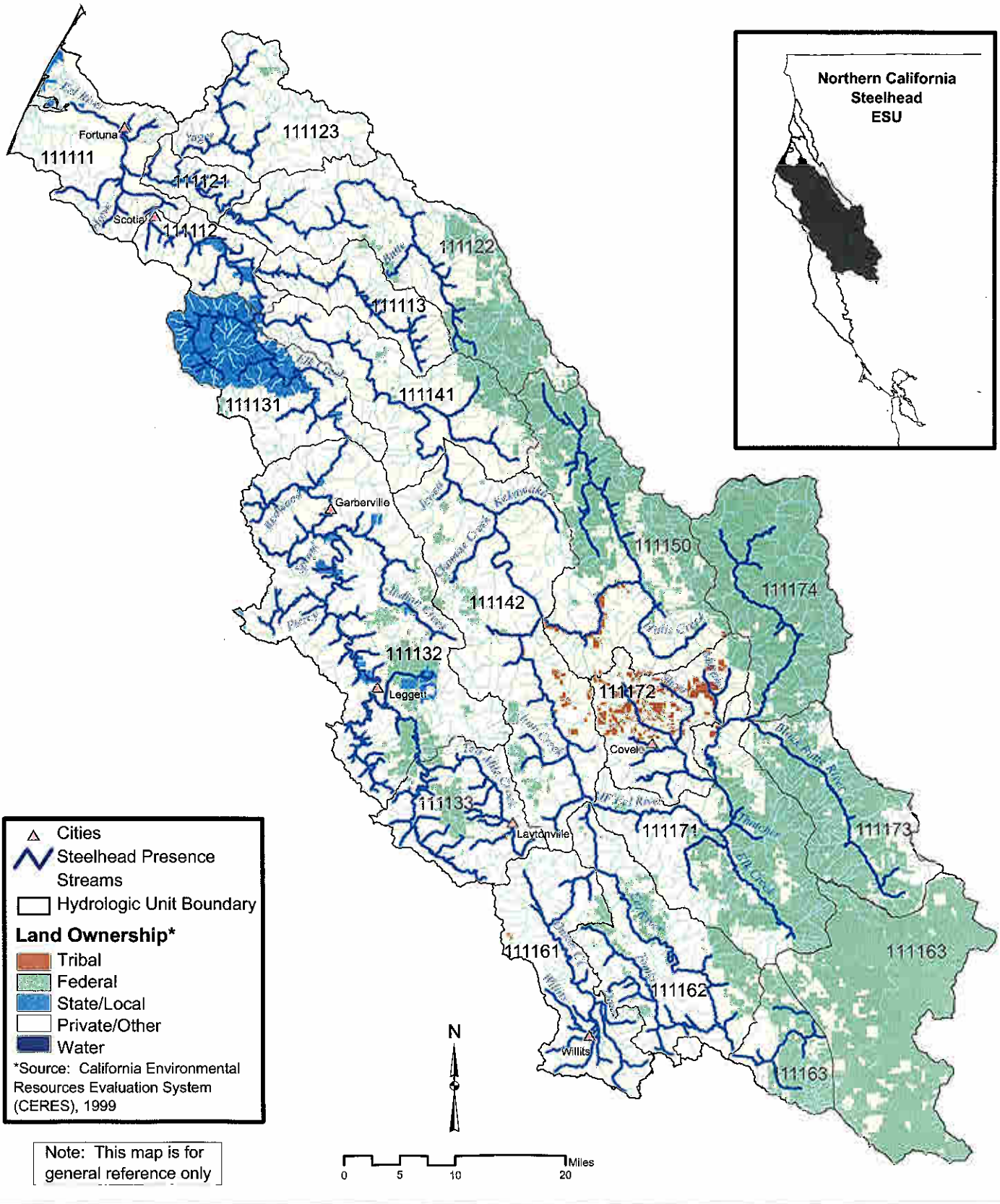
*Source: California Environmental Resources Evaluation System (CERES), 1999

N

0 0.5 1 2 3 4 5 Miles

Note: This map is for general reference only

Land Ownership
Northern California Steelhead
Eel River HU (1111)



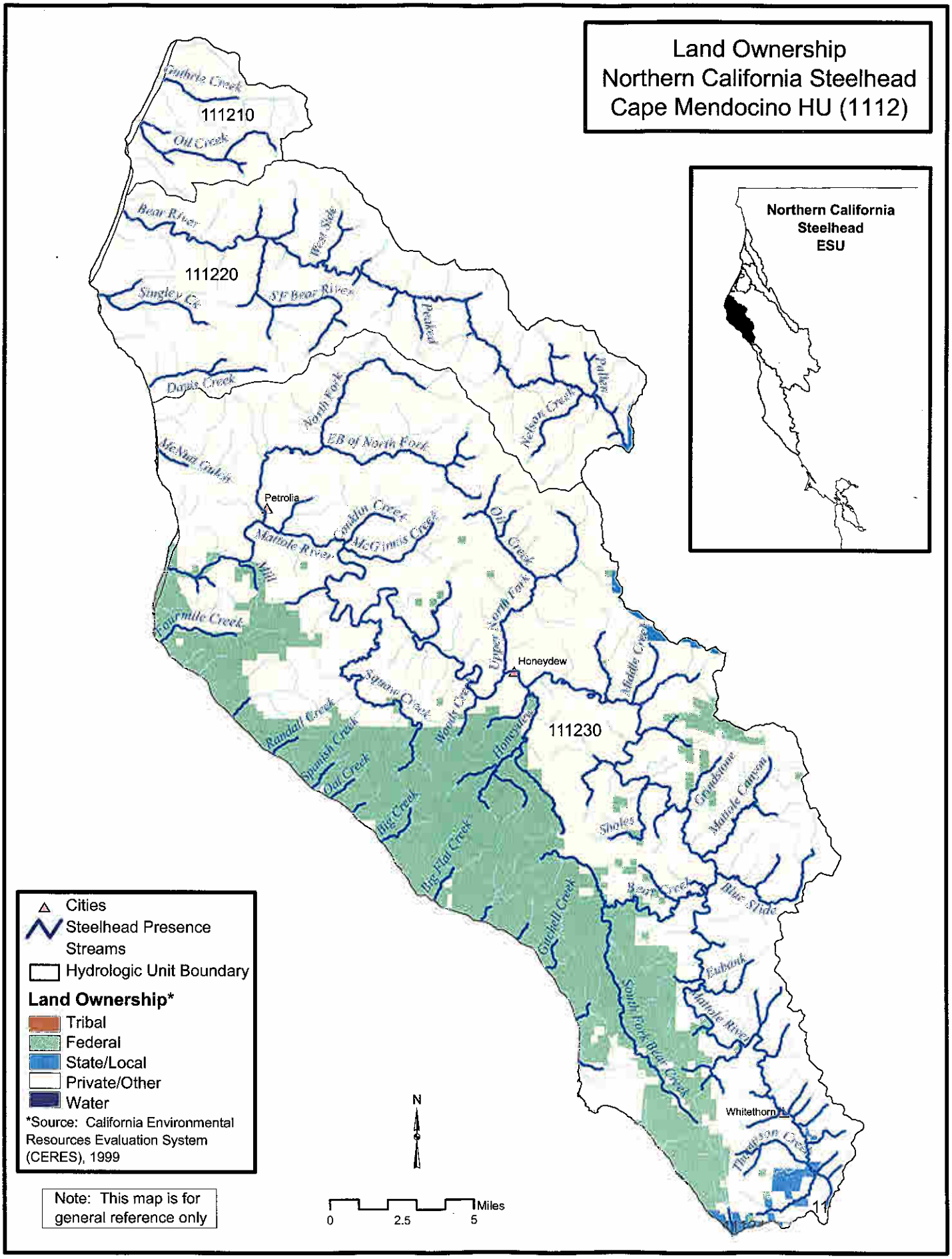
- Cities
- Steelhead Presence Streams
- Hydrologic Unit Boundary

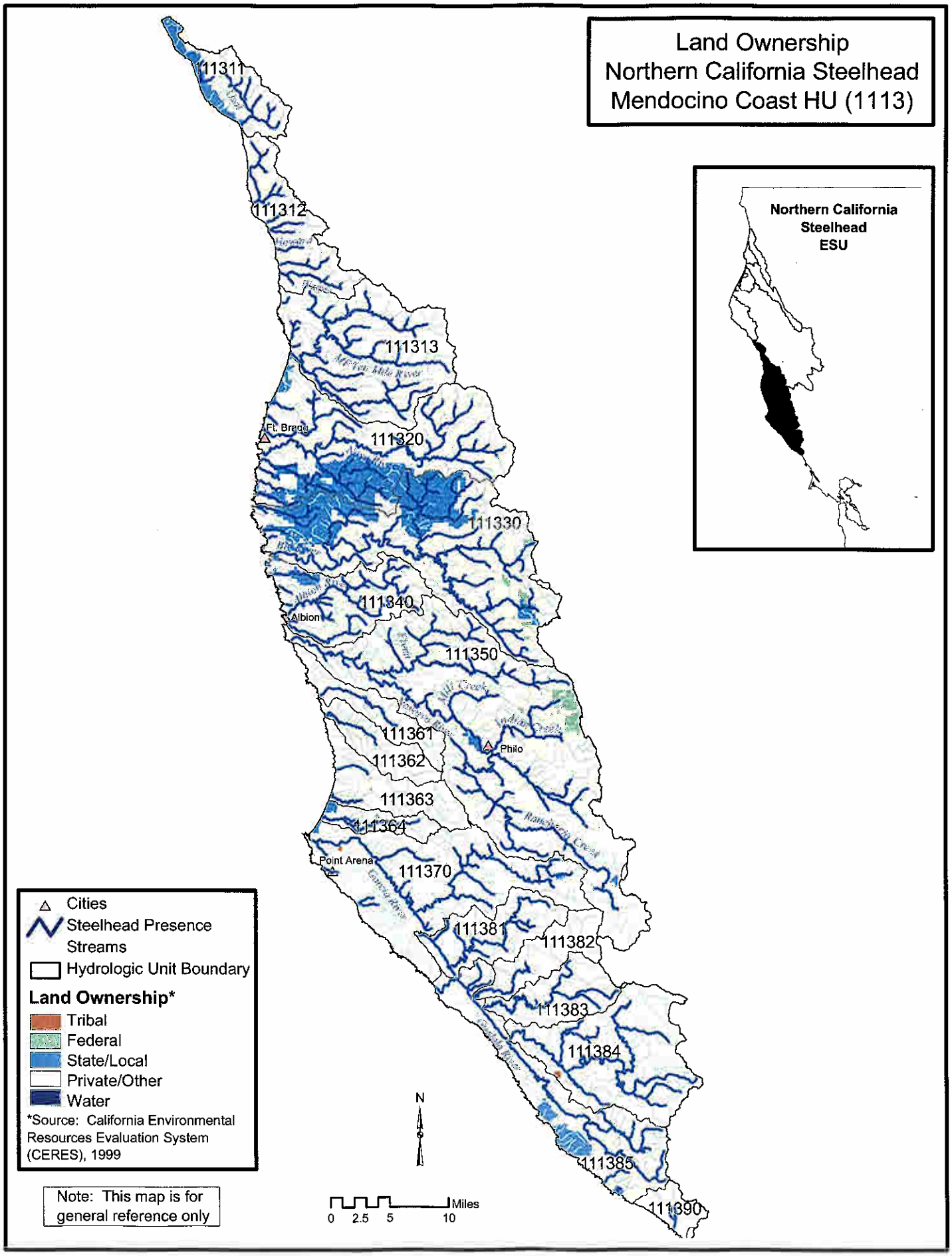
Land Ownership*

- Tribal
- Federal
- State/Local
- Private/Other
- Water

*Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is for general reference only

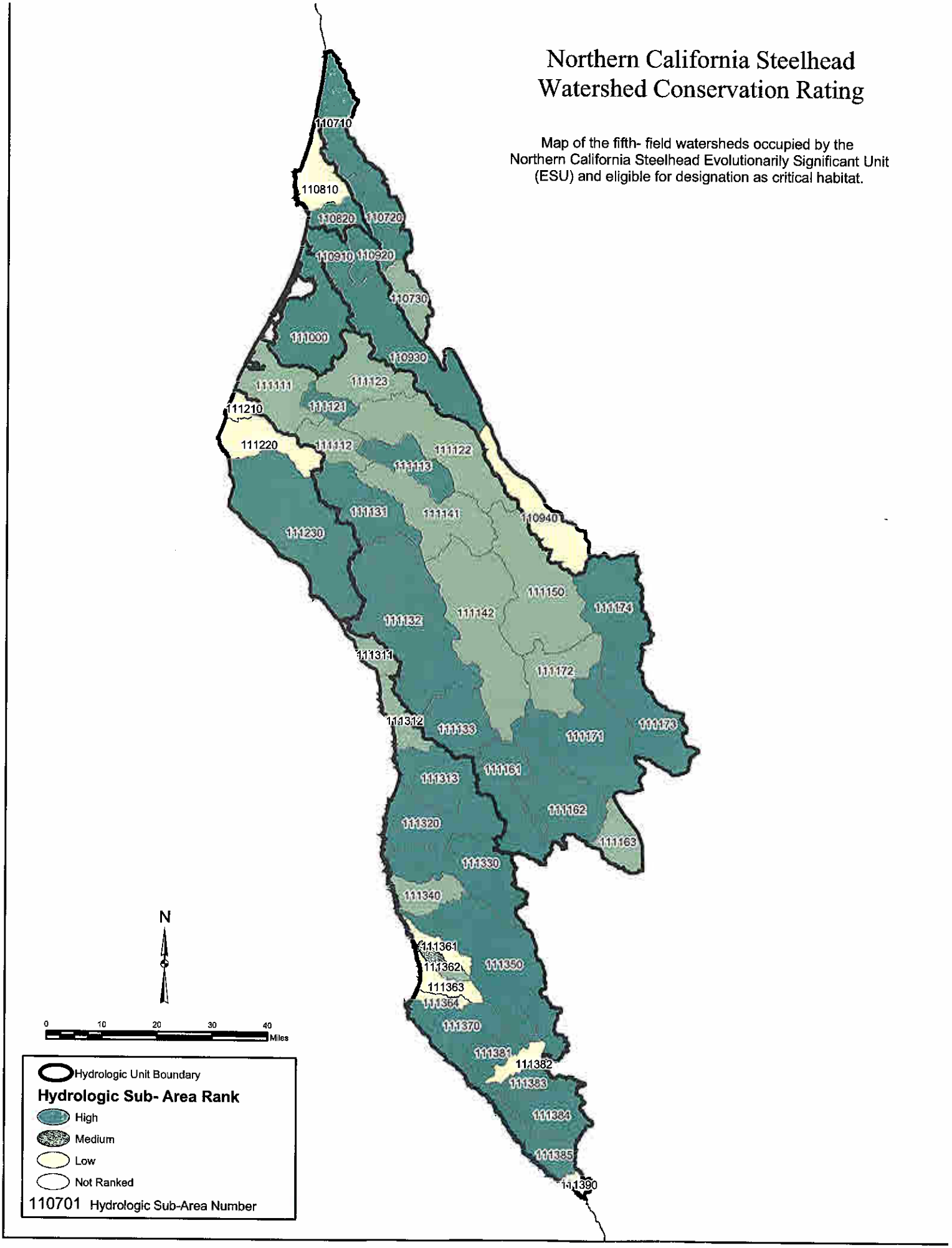

Land Ownership
Northern California Steelhead
Cape Mendocino HU (1112)
Northern California Steelhead ESU
111210
111220
111230
Petrolia
Honeydew
Whitethorn
Cities
Steelhead Presence Streams
Hydrologic Unit Boundary
Land Ownership*
Tribal
Federal
State/Local
Private/Other
Water
*Source: California Environmental Resources Evaluation System (CERES), 1999
Note: This map is for general reference only
N
0
2.5
5
Miles


Land Ownership
Northern California Steelhead
Mendocino Coast HU (1113)
Northern California Steelhead ESU
111311
111312
111313
111320
111330
111340
111350
111361
111362
111363
111364
111370
111381
111382
111383
111384
111385
111390
Ft. Bragg
Albion
Philo
Point Arena
Cities
Steelhead Presence Streams
Hydrologic Unit Boundary
Land Ownership*
Tribal
Federal
State/Local
Private/Other
Water
*Source: California Environmental Resources Evaluation System (CERES), 1999
Note: This map is for general reference only
N
0 2.5 5 10 Miles

Map B8. Final CHART Ratings of Conservation Value for CALWATER HSA Watersheds occupied by the Northern California Steelhead ESU

Northern California Steelhead Watershed Conservation Rating

Map of the fifth- field watersheds occupied by the Northern California Steelhead Evolutionarily Significant Unit (ESU) and eligible for designation as critical habitat.



Appendix C
Final CHART Assessment for the California Central Coast Steelhead ESU

ESU Description

The CCC Steelhead ESU was listed as a threatened species in 1997 (62 FR 433937; August 18, 1997). The ESU includes all naturally spawned populations of steelhead in coastal river basins from the Russian River southward to, and including Aptos Creek, as well as naturally spawned populations of steelhead in streams that drain into San Francisco and San Pablo Bay eastward to but excluding the Sacramento-San Joaquin Delta. Major coastal watersheds occupied by naturally spawning fish in this ESU include the Russian River, Lagunitas Creek, and San Lorenzo River. Important watersheds occupied by naturally spawning fish within the San Francisco Bay/San Pablo Bay area include Coyote Creek, Guadelupe Creek, Petaluma River, and the Napa River. Based on an updated status review (NMFS 2003a) and an assessment of hatchery populations located within the range of the ESU (NMFS 2003b), NMFS proposed that the ESU remain listed as a threatened species (69 FR 33102; June 14, 2004). In addition, NMFS proposed that resident O. mykiss co-occurring with anadromous populations below impassable barriers (both natural and man made), two artificially propagated populations (Don Clausen Fish Hatchery in the Russian River basin and the Kingfisher Flat Hatchery/Scott Creek hatchery in Scott Creek south of San Francisco) and three resident O. mykiss sub-populations above Dam 1 in Upper Alameda Creek also be included in this ESU. NMFS recently determined that a 6-month extension in making a final listing determination for this and all other west coast steelhead/O. mykiss ESUs was warranted (70 FR 37219; June 28, 2005). A Technical Recovery Team has developed a preliminary model of the historic and extant population structure of this ESU. Additional technical recovery planning work is underway that will identify viability criteria for independent populations within the ESU and for the ESU as a whole.

CHART Area Assessments

The preliminary CHART assessment for this ESU (NMFS 2004b) was prepared to support our December 10, 2004, critical habitat proposal (69 FR 71880). In the preliminary CHART assessment, the team considered the watershed unit occupied by resident O. mykiss in upper Alameda Creek to be occupied for the purposes of critical habitat analysis because these populations were proposed for listing and a final listing

determination was expected before the final critical habitat designation was scheduled to be finalized. However, because a final determination regarding the listing status of these resident populations has been delayed until December 2005, the watershed unit occupied by these populations was treated as unoccupied in this final CHART assessment. The final CHART assessment also considered new information received during the public comment period regarding fish distribution and habitat use. Based on these comments and new information, relatively minor changes in fish distribution were made in two HSA watersheds (220320 and 220550). These changes in fish distribution added approximately 9 miles of additional occupied stream habitat, but did not result in any changes in the occupancy of conservation value of Hydrologic Subareas (HSA) within the freshwater and estuarine range of this ESU.

The final CHART assessment for the CCC Steelhead ESU addressed into10 CALWATER Hydrologic Units (HUs) or subbasins containing 46 occupied HSAs (Figures C1 and C2). The HSAs were chosen as freshwater critical habitat units because they presented a convenient and systematic way to organize the CHART's watershed assessments for this ESU. Five of the HSAs included in this assessment encompass the San Francisco-San Pablo-Suisun Bay complex which constitutes migratory and rearing habitat for several Bay area tributary stream populations (Figure C3). Information presented below for individual HUs within the range of the ESU (area, counties, total stream miles, occupied stream miles, and habitat use) were generated from GIS data sets compiled by the NMFS Southwest Region and can be found in Table C1.

Unit 1. Russian River Subbasin (HU 1114)

The Russian River HU is located in the northern portion of the ESU an includes the Russian River drainage. The HU encompasses approximately 1,483 square miles and occurs primarily in Mendocino and Sonoma Counties. The HU contains 11 HSAs, 10 of which are occupied, and 1,831 stream miles (at 1:100,000 hydrography). The unoccupied HSA does not contain fish because it located above Coyote Dam which is an impassable fish barrier used to facilitate water diversions from the Eel River and delivery downstream for agricultural and municipal purposes. Fish distribution and habitat use data compiled by NMFS biologists identify approximately 713 miles of occupied riverine habitat in the 10 occupied HSAs (Table C1). The CHART concluded that these occupied HSAs contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) and identified several management activities that may affect the PCEs. Table C2 summarizes

the total miles of occupied riverine habitat for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map C1 depicts the specific areas in this HU and the nested HSAs that are occupied by the ESU and were considered for critical habitat designation. The CHART did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 2. Bodega Bay Subbasin (HU 1115)

The Bodega Bay HU is located in the north central portion of the ESU and includes several small streams including Bodega Harbor. The HU encompasses approximately 147 mi^2 and occurs in Sonoma and Marin Counties. This HU contains 4 HSAs, 2 of which are occupied, and 157 stream miles (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 25 miles of occupied riverine habitat in the occupied HSAs (Table C1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) and identified management activities that may affect the PCEs. Table C2 summarizes the total miles of occupied riverine habitat identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map C2 depicts the specific areas in this HU (and nested HSAs) that are occupied by the ESU and were considered for critical habitat designation. The CHART did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 3. Marin Coastal Subbasin (HU 2201)

The Marin Coastal HU is located in the central coastal portion of the ESU and includes several small watersheds including Lagunitas Creek. The HU encompasses approximately 327 mi^2 and occurs primarily in Marin County. This HU contains 5 HSAs, 4 of which are occupied, and a total of 347 miles of streams (at 1:100,000 hydrography). The unoccupied HSA lacks satisfactory habitat and is of high gradient. Fish distribution and habitat use data compiled by NMFS biologists identify approximately 75 miles of occupied riverine habitat in the 4 occupied HSAs (Table C1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) and identified management activities that may affect the PCEs. Table C2 summarizes the total miles of occupied riverine and estuarine habitat identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map C3

depicts the specific areas in this HU (and its nested HSAs) that are occupied by the ESU and were considered for critical habitat designation. The CHART did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 4. San Mateo Subbasin (HU 2202)

The San Mateo HU is located on the coast immediately south of the Golden Gate and includes several small creeks including San Gregorio and Pescadero Creeks. The HU encompasses approximately 257 mi^2 and occurs primarily in San Mateo County with small portions in San Francisco, Santa Cruz, and Santa Clara Counties. This HU contains 6 HSAs, 5 of which are occupied, and a total of 319 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 144 miles of occupied riverine habitat in the occupied HSAs (Table C1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table C2 summarizes the total miles of occupied riverine habitat for the HSAs that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map C4 depicts the specific areas in this HU (and its nested HSAs) that are occupied by the ESU and were considered for critical habitat designation. The CHART did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 5. Bay Bridges Subbasin (HU 2203)

The Bay Bridges HU is located in the central portion of the ESU and includes portions of northern San Francisco Bay, San Pablo Bay, and some associated watersheds. The HU encompasses approximately 191 mi^2 and occurs in portions of several counties including: Alameda, Contra Costa, Marin, and San Francisco. This HU contains 4 HSAs, 3 of which are occupied, and 85 miles of streams (at 1:100,000 hydrography). The San Francisco Bayside HSA is unoccupied due to intense urbanization and lack of stream habitat. Fish distribution and habitat use data compiled by NMFS biologists identify approximately 26 miles of occupied riverine habitat in the 3 occupied HSAs (NMFS 2004a). One of the occupied HSAs (220312; Bay Waters) includes that portion of San Francisco Bay bounded by the Bay Bridge, the Golden Gate Bridge, and the Richmond Bridge, and it encompasses an area of approximately 83 mi^2 (Figure C3). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect

the PCEs. Table C2 summarizes the total miles of occupied riverine and estuarine habitat identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map C5 depicts the specific areas in this HU that are occupied by the ESU and under consideration for the critical habitat designation. The CHART did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 6. South Bay Subbasin (HU 2204)

The South Bay HU is located in the southern portion of the ESU and includes South San Francisco and associated tributaries such as Alamada Creek. This HU encompasses approximately 1,220 mi^2 and occurs in portions of several Counties including: Alameda, Contra Costa, San Francisco, San Joaquin, San Mateo, Santa Clara, and Stanislaus. This HU contains 4 HSAs, three of which are occupied, and 1,279 miles of streams (at 1:100,000 hydrography). The HSA watershed that is considered unoccupied for the purposes of this assessment is Upper Alameda Creek (HSA 220430). This watershed is not currently accessible to steelhead, but it is occupied by resident O. mykiss populations which NMFS has proposed to include in this ESU (69 FR 33102; June 14, 2004). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 47 miles of occupied riverine habitat in the occupied HSAs (Table C1). One of the occupied HSAs (220410; Bay Channel) includes that portion of San Francisco Bay south of the Bay Bridge to the Dumbarton Bridge, and it encompasses an area of approximately 173 mi^2 (Figure C3). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table C2 summarizes the total miles of occupied riverine and/or estuarine habitat identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map C6 depicts the specific areas in this HU (and nested HSAs) that are occupied by the ESU and were considered for critical habitat designation. The CHART did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 7. Santa Clara Subbasin (HU 2205)

The Santa Clara HU is located in the southern portion of the ESU and includes part of South San Francisco Bay and associated tributaries including Coyote Creek and the Guadalupe River. This HU encompasses approximately 840 mi^2 and occurs primarily in Santa Clara County and smaller portions of Alameda, San Mateo, Santa Cruz, and

Stanislaus Counties. The HU contains 5 occupied HSAs and 975 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 126 miles of occupied riverine habitat in the occupied HSAs (Table C1). One of the occupied HSAs (220510; Dumbarton South) includes that portion of San Francisco Bay south of the Dumbarton Bridge which encompasses an area of approximately 15 mi^2 (Figure C3). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table C2 summarizes the total miles of occupied riverine and estuarine habitat identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map C7 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The CHART did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 8. San Pablo Subbasin (HU 2206)

The San Pablo HU is located in the central portion of the ESU and includes part of San Pablo Bay as well as several associated tributaries including the Petaluma River, Sonoma Creek, and the Napa River. This HU encompasses approximately 1,018 mi^2 and occurs in several Counties including: Alameda, Contra Costa, Marin, Napa, Sonoma, and Solana. The HU contains 6 HSAs, all of which are occupied, and 974 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 378 miles of occupied riverine habitat in the 6 HSAs (Table C1). One of the occupied HSAs (220610; San Pablo Bay) includes San Pablo Bay from the Richmond Bridge to the Carquinez Bridge, an area that encompasses approximately 115 mi^2 (Figure C3). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table C2 summarizes the total miles of occupied riverine and estuarine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map C8 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The CHART did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 9. Suisun Bay Subbasin (HU 2207)

The Suisun Bay HU is located in the easternmost portion of the ESU and includes Suisun Bay and associated tributaries including Mount Diablo Creek and Suisun Creek. This HU encompasses approximately 653 mi^2 and occurs primarily in Solano and Contra Costa Counties. The HU contains 8 HSAs, 5 of which are occupied, and 794 miles of streams (at 1:100,000 hydrography). The remaining three HSAs are unoccupied due to unsuitable habitat and/or barriers and urbanization. Fish distribution and habitat use data compiled by NMFS biologists identify approximately 69 miles of occupied riverine habitat in the 5 occupied HSAs (Table C1). One of the occupied HSAs (220710; Suisun Bay) includes Suisun Bay which encompasses an area of approximately 56 mi^2 (Figure C3). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table C2 summarizes the total miles of occupied riverine and estuarine habitat identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map C9 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The CHART did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 10. Big Basin Subbasin (HU 3304)

The Big Basin HU is located in the southernmost coastal portion of the ESU south of The Golden Gate and includes several small coastal streams such as Gazos Creek, Waddell Creek, Scott Creek, the San Lorenzo River, Soquel Creek and Aptos Creek.. This HU encompasses approximately 367 mi^2 and occurs primarily in Santa Cruz and Santa Clara Counties. The HU contains 4 HSAs, all of which are occupied, and 509 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 220 miles of occupied riverine/estuarine habitat in the 4 HSAs (Table C1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table C2 summarizes the total miles of occupied riverine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map C10 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The CHART did not identify any unoccupied areas in this subbasin that

may be essential for the conservation of the ESU.

Final 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 HSAs were of high or medium conservation value to the ESU. Of the 46 occupied HSAs that were evaluated, 19 were rated as having high conservation value, 13 were rated as having medium conservation value, and 14 were rated as having low conservation value. Table C3 summaries the CHARTs PCE/watershed scores and final conservation value ratings (i.e. low, medium or high) for each occupied HSA. Map C11 depicts the overall spatial distribution of conservation scores for occupied HSAs within the ESU.

Marine Areas

NMFS determined that marine areas did not warrant consideration as critical habitat for this ESU.

References and Sources of Information

NMFS 2003a. Updated Status of Federally Listed ESUs of West Coast Salmon and Steelhead. West Coast Salmon Biological Review Team; Northwest Fisheries Science Center and Southwest Fisheries Science Center. July 2003.

NMFS 2003b. Hatchery Broodstock Summaries and Assessments for Chum, Coho, and Chinook Salmon and Steelhead Stocks within ESUs listed under the ESA. Salmon and Steelhead Hatchery Assessment Group/NOAA Fisheries; Northwest Fisheries Science Center and Southwest Fisheries Science Center.

NMFS 2004b. Draft Findings of NMFS' Critical habitat development and review teams (CHARTs) for 7 ESUs of Salmon and O. mykiss ESUs in California. Main report and 7 appendices. Prepared by NMFS Southwest Region.

Federal Register Notices

62 FR 433937 - Central California Coast Steelhead listing determination

69 FR 33102 - Proposed Listing Determinations for 27 West Coast Salmon and Steelhead ESUs

70 FR 37219 - 6-Month Extension of the Final Listing Determinations for 10 ESUs of West Coast O. mykiss.

Table C1. Central California Coast Steelhead ESU: Occupancy, habitat use, and geographic area information by Hydrologic Unit and Hydrologic Subarea

HU NUMBER	HU NAME	Major Stream / Watershed in HU	HU Occupied (Y or N)	Acres in HU	Square Miles in HU	Stream Miles (1:100k) in HU	Occupied Stream Miles	Occupied Stream Miles (Spawning)	Occupied Stream Miles (Rearing)	Occupied Stream Miles (Migration)	County HU Falls within	Acres of County in HU	Square Miles of County in HU	Percent of HU by County	HSA NUMBER	HSA NAME	HSA Occupied (Y or N)	Acres in HSA	Square Miles in HSA	Stream Miles (1:100k) in the HSA
1114	Russian River	Russian River	Y	949211	1483	1831	712	480	654	668	Lake	2538	4	0%						
											Mendocino	290098	453	33%	111411	Guerneville	Y	102216	160	185
											Sonoma	588906	919	67%	111412	Austin Creek	Y	39834	62	79
											Napa	408	1	0%	111421	Laguna	Y	56598	88	96
															111422	Santa Rosa	Y	49472	77	79
															111423	Mark West	Y	55203	86	94
															111424	Warm Springs	Y	139422	218	278
															111425	Geyserville	Y	132898	208	217
															111426	Sulphur Creek	Y	52612	82	86
															111431	Ukiah	Y	200076	313	437
															111432*	Coyote Valley	N	66957	105	159
															111433	Forsythe Creek	Y	53923	84	121
1115	Bodega	Estero San Antonio-Estero Americano-Salmon Creek-Bodega Bay	Y	93502	147	157	25	19	18	24	Marin	22720	36	24%						
											Sonoma	70928	111	76%	111510	Salmon Creek	Y	28338	44	50
															111520	Bodega Harbor	N	6111	10	6
															111530	Estero Americano	Y	24798	39	42
															111540	Estero San Antonio	N	34255	54	59
2201	Marin Coastal	Walker Creek-Tomales Bay Lagunitas Creek	Y	208824	327	347	75	57	68	70	Marin	205999	322	99%						
											Sonoma	2653	4	1%	220112	Walker Creek	Y	63334	99	100
											San Francisco	33	0	0%	220113	Lagunitas Creek	Y	69642	109	139
															220114	Inverness	N	6821	11	5
															220120	Point Reyes	Y	34392	54	35
															220130	Bolinas	Y	34635	54	67
2202	San Mateo	Tunitas Creek-San Gregorio Creek-Pescadero Creek	Y	164310	257	319	144	112	129	125	San Francisco	7892	12	5%						
											San Mateo	153004	239	93%	220210	San Francisco Coastal	N	14301	22	4
											Santa Clara	134	0	0%	220221	San Mateo Coastal	Y	19095	30	35
											Santa Cruz	3239	5	2%	220222	Half Moon Bay	Y	18485	29	38
															220223	Tunitas Creek	Y	21427	33	34
															220230	San Gregorio Creek	Y	33300	52	77
															220240	Pescadero Creek	Y	57702	90	131
2203	Bay Bridges	Central SF Bay	Y	122400	191	85	26	19	17	23	Alameda	23448	37	19%						
											Contra Costa	16378	26	13%	220312	Bay Waters	Y	52992	83	20
											Marin	57570	90	46%	220320	San Rafael	Y	39667	62	57
											San Francisco	26297	41	21%	220330	Berkeley	Y	22605	35	8
															220340	San Francisco Bayside	N	7136	11	0
2204	South Bay	Alameda Creek South-central SF Bay	Y	780202	1220	1279	51	27	34	40	Alameda	399176	624	52%						
											Contra Costa	50989	80	7%	220410	Bay Channel	Y	110512	173	26
											San Francisco	30769	48	4%	220420	Eastbay Cities	Y	157291	246	245
											San Joaquin	111	0	0%	220430	Alameda Creek	N	404560	632	904
											San Mateo	152553	238	20%	220440	San Mateo Bayside	Y	107839	169	104
											Santa Clara	141111	220	18%						
											Stanislaus	53	0	0%						
2205	Santa Clara	Coyote Creek-GuadalupeRiver	Y	536966	840	975	131	87	121	130	Alameda	54404	85	10%						
											San Mateo	27180	42	5%	220510	Dumbarton South	Y	9432	15	9
											Santa Clara	458706	717	85%	220520	Freemont Bayside	Y	47897	75	63
											Santa Cruz	256	0	0%	220530	Coyote Creek	Y	236058	369	477
											Stanislaus	4	0	0%	220540	Guadalupe River	Y	96410	151	169
															220550	Palo Alto	Y	147169	230	257
2206	San Pablo	Petaluma River-Sonoma Creek-Napa River	Y	651485	1018	974	378	227	250	346	Alameda	230	0	0%						
											Contra Costa	86186	135	13%	220610	San Pablo Bay	Y	73352	115	26
											Marin	91855	144	14%	220620	Novato	Y	45829	72	56
											Napa	243910	381	37%	220630	Petaluma River	Y	94454	148	161
											Solano	39701	62	6%	220640	Sonoma Creek	Y	106510	166	198
											Sonoma	190488	298	29%	220650	Napa River	Y	266537	416	434
															220660	Pinole	Y	64802	101	99
2207	Suisun	Suisun Bay	Y	417643	653	794	69	26	28	69	Alameda	56	0	0%						
											Contra Costa	171934	269	42%	220710	Suisun Bay	Y	36024	56	18
											Napa	30345	47	7%	220721	Benicia	Y	56907	89	78
											Sacramento	1027	2	0%	220722	Suisun Creek	Y	32578	51	68
											Solano	206989	323	50%	220723	Suisun Slough	N	102785	161	221
															220724	Grizzly Island	N	28310	44	105
															220731	Pittsburg	Y	78308	123	146

															220732	Walnut Creek	N	52634	82	95
															220733	Martinez	Y	30097	47	51
3304	Big Basin	San Lorenzo River	Y	234962	367	509	220	162	197	194	San Mateo	20187	32	9%						
											Santa Clara	372	1	0%	330411	Davenport	Y	67624	106	157
											Santa Cruz	214132	335	91%	330412	San Lorenzo	Y	93389	146	200
															330413	Aptos-Soquel	Y	49328	77	101
															330420	Ano Nuevo	Y	24621	38	51

*111432 is outside the ESU boundary (coyote Dam) although it is inside the HU Boundary

Table C2. Summary of Occupied Subbasins/Watersheds. PCE's and Management Activities Affecting PCE's for the Central California Coast Steelhead ESU

Map Code	Basin	Watershed	Calwater Unit	Spawning/Rearing PCEs (mi)**	Rearing/Migration PCEs (mi)**	Presence/Migration Only PCEs (mi)**	Management Activities***
	Russian River	Guerneville	111411	115	115	115	UR, AG, FC, NH
	Russian River	Austin Creek	111412	50	50	49	UR, GR, NW
	Russian River	Laguna De Santa Rosa	111421	11	29	29	FC, UR, AG
	Russian River	Santa Rosa Creek	111422	29	29	29	UR, FC, CM, RB
	Russian River	Mark West Springs	111423	36	38	38	UR, AG, WI
	Russian River	Warm Springs	111424	66	66	59	AG, UR, NH
	Russian River	Geyserville	111425	120	125	123	AG, GM, WI
	Russian River	Sulphur Creek	111426	44	44	44	GR, RB, WI
	Russian River	Ukiah	111431	140	142	140	UR, AG, NH
	Russian River	Forsythe Creek	111433	43	43	43	GR, RB, WI
	Bodega Bay	Salmon Creek	111510	15	20	20	GR, UR, WI
	Bodega Bay	Bodega Harbor	111520				
	Bodega Bay	Estero Americano	111530	4	4	4	AG, GR, WI
	Bodega Bay	Estero De San Antonio	111540				AG, GR, CM, WI, WG
	Marin Coastal	Walker Creek	220112	17	17	17	GR, UR, WI
	Marin Coastal	Lagunitas Creek	220113	36	36	36	UR, NH, NW, WI
	Marin Coastal	Inverness	220114				
	Marin Coastal	Point Reyes	220120	4	6	5	GR
	Marin Coastal	Bolinas	220130	12	12	12	UR, FR, FC
	San Mateo	San Francisco Coastal	220210				
	San Mateo	San Mateo Coastal	220221	8	8	8	NH, UR, WI
	San Mateo	Half Moon Bay	220222	19	22	22	WI, AG, NH
	San Mateo	Tunitas Creek	220223	13	13	12	WI, NW
	San Mateo	San Gregorio Creek	220230	40	40	36	RB, NW
	San Mateo	Pescadero Creek	220240	55	55	47	RB, WI, NW, CM
	Bay Bridges	Bay Waters	220312				TR, WL, UR, RB
	Bay Bridges	San Rafael	220320	17	21	21	UR, CM, FC
	Bay Bridges	Berkeley	220330	2	2	2	UR, CM, FC
	Bay Bridges	San Francisco Bayside	220340				
	South Bay	Bay Channel	220410				UR, TR, RB
	South Bay	Eastbay Cities	220420	34	39	39	UR, FC, NH
	South Bay	Upper Alameda Creek	220430				
	South Bay	San Mateo Bayside	220440	0	1	1	UR, NH, CM
	Santa Clara	Dumbarton South	220510				RB, UR, WL
	Santa Clara	Freemont Bayside	220520	0	4	4	UR, FC, NH

Map Code	Basin	Watershed	Calwater Unit	Spawning/Rearing PCEs (mi)**	Rearing/Migration PCEs (mi)**	Presence/Migration Only PCEs (mi)**	Management Activities***
	Santa Clara	Coyote Creek	220530	37	44	44	UR, NH
	Santa Clara	Guadalupe River-San Jose	220540	37	37	37	UR, FC, NH
	Santa Clara	Palo Alto	220550	45	46	46	UR, NH, NW
	San Pablo	San Pablo Bay	220610				RB, UR, WL
	San Pablo	Novato Creek	220620	11	17	17	UR, CM
	San Pablo	Petaulma River	220630	15	39	39	TR, UR, FC, CM, AG
	San Pablo	Sonoma Creek	220640	83	87	87	NH, RB, NW, CM, AG
	San Pablo	Napa River	220650	145	177	177	NH, WI, UR, CM, AG
	San Pablo	Pinole	220660	5	26	26	UR, CM, NH
	Suisun	Suisun Bay	220710				RB, TR, UR, WL
	Suisun	Benicia	220721	11	18	29	NH, WI, RB
	Suisun	Suisun Creek	220722	14	15	15	NH, NW, UR
	Suisun	Suisun Slough	220723				
	Suisun	Grizzly Island	220724				
	Suisun	Pittsburg	220731	0	15	15	UR, RB
	Suisun	Walnut Creek	220732				
	Suisun	Martinez	220733	2	9	9	FC, UR, NH
	Big Basin	Davenport	330411	51	51	41	RB, WI, FR
	Big Basin	San Lorenzo	330412	93	103	97	NW, RB, FR
	Big Basin	Aptos-Soquel	330413	42	41	41	NW, RB, FR
	Big Basin	Ano Nuevo	330420	14	14	14	WI, NH

*Total Stream Miles calculated from blueline streams represented on 1:100,000 USGS Topographic Maps

**Overlap of stream miles may occur betweeen the three habitat types.

***Management Activities Codes:

AG - Agriculture
CM - Channel Modification
ES - Exotic / Invasive Species
FC - Flood Control Channel
FR - Forestry
GM - Sand and Gravel Mining
GR - Grazing
HD - Hydroelectric Dam
NH - Non-hydro Dam
NW - Non-agriculture Withdrawls / Impoundments
PO - Poaching
RB - Road Building / Maintenance
SP Septic System Failure / Containation
TR - River, Estuary, Ocean Traffic
UR - Urbanization
WI - Agriculture Withdrawls / Impoundments
WL - Wetland Loss / Removal

Table C3. Summary of Scores and Overall Rankings of Conservation Values for Critical Habitat for HSA watersheds occupied by the Central California Coast Steelhead ESU

Map Code	Basin	Watershed	Calwater Unit	Total Score (0-18)	Comments / Other Considerations	Conservation Value
	Russian River	Guerneville	111411	15		High
	Russian River	Austin Creek	111412	14		High
	Russian River	Laguna De Santa Rosa	111421	8		Low
	Russian River	Santa Rosa Creek	111422	12		Medium
	Russian River	Mark West Springs	111423	12		High
	Russian River	Warm Springs	111424	13		High
	Russian River	Geyserville	111425	14		High
	Russian River	Sulphur Creek	111426	14		High
	Russian River	Ukiah	111431	12		Medium
	Russian River	Forsythe Creek	111433	13		High
	Bodega Bay	Salmon Creek	111510	10		Medium
	Bodega Bay	Bodega Harbor	111520	0		NA
	Bodega Bay	Estero Americano	111530	9		Low
	Bodega Bay	Estero De San Antonio	111540	0		NA
	Marin Coastal	Walker Creek	220112	10		Medium
	Marin Coastal	Lagunitas Creek	220113	14		High
	Marin Coastal	Inverness	220114	0		NA
	Marin Coastal	Point Reyes	220120	5		Low
	Marin Coastal	Bolinas	220130	6		Low
	San Mateo	San Francisco Coastal	220210	0		NA
	San Mateo	San Mateo Coastal	220221	8		Low
	San Mateo	Half Moon Bay	220222	11		Medium
	San Mateo	Tunitas Creek	220223	10		Medium
	San Mateo	San Gregorio Creek	220230	14		High
	San Mateo	Pescadero Creek	220240	14		High
	Bay Bridges	Bay Waters	220312	0		High
	Bay Bridges	San Rafael	220320	11		Medium
	Bay Bridges	Berkeley	220330	5		Low
	Bay Bridges	San Francisco Bayside	220340	0		NA
	South Bay	Bay Channel	220410	0		High
	South Bay	Eastbay Cities	220420	10		Medium
	South Bay	Upper Alameda Creek	220430	0		NA
	South Bay	San Mateo Bayside	220440	1		Low
	Santa Clara	Dumbarton South	220510	0		High
	Santa Clara	Freemont Bayside	220520	0		Low
	Santa Clara	Coyote Creek	220530	12		Medium
	Santa Clara	Guadalupe River-San Jose	220540	7		Low
	Santa Clara	Palo Alto	220550	10		Medium
	San Pablo	San Pablo Bay	220610	0		High
	San Pablo	Novato Creek	220620	8		Low
	San Pablo	Petaulma River	220630	11		Medium
	San Pablo	Sonoma Creek	220640	14		High

	San Pablo	Napa River	220650	13		High
	San Pablo	Pinole	220660	6		Low
	Suisun	Suisun Bay	220710	0		Low
	Suisun	Benicia	220721	2		Low
	Suisun	Suisun Creek	220722	10		Medium
	Suisun	Suisun Slough	220723	0		NA
	Suisun	Grizzly Island	220724	0		NA
	Suisun	Pittsburg	220731	9		Low
	Suisun	Walnut Creek	220732	0		NA
	Suisun	Martinez	220733	5		Low
	Big Basin	Davenport	330411	14		High
	Big Basin	San Lorenzo	330412	14		High
	Big Basin	Aptos-Soquel	330413	13		High
	Big Basin	Ano Nuevo	330420	10		Medium

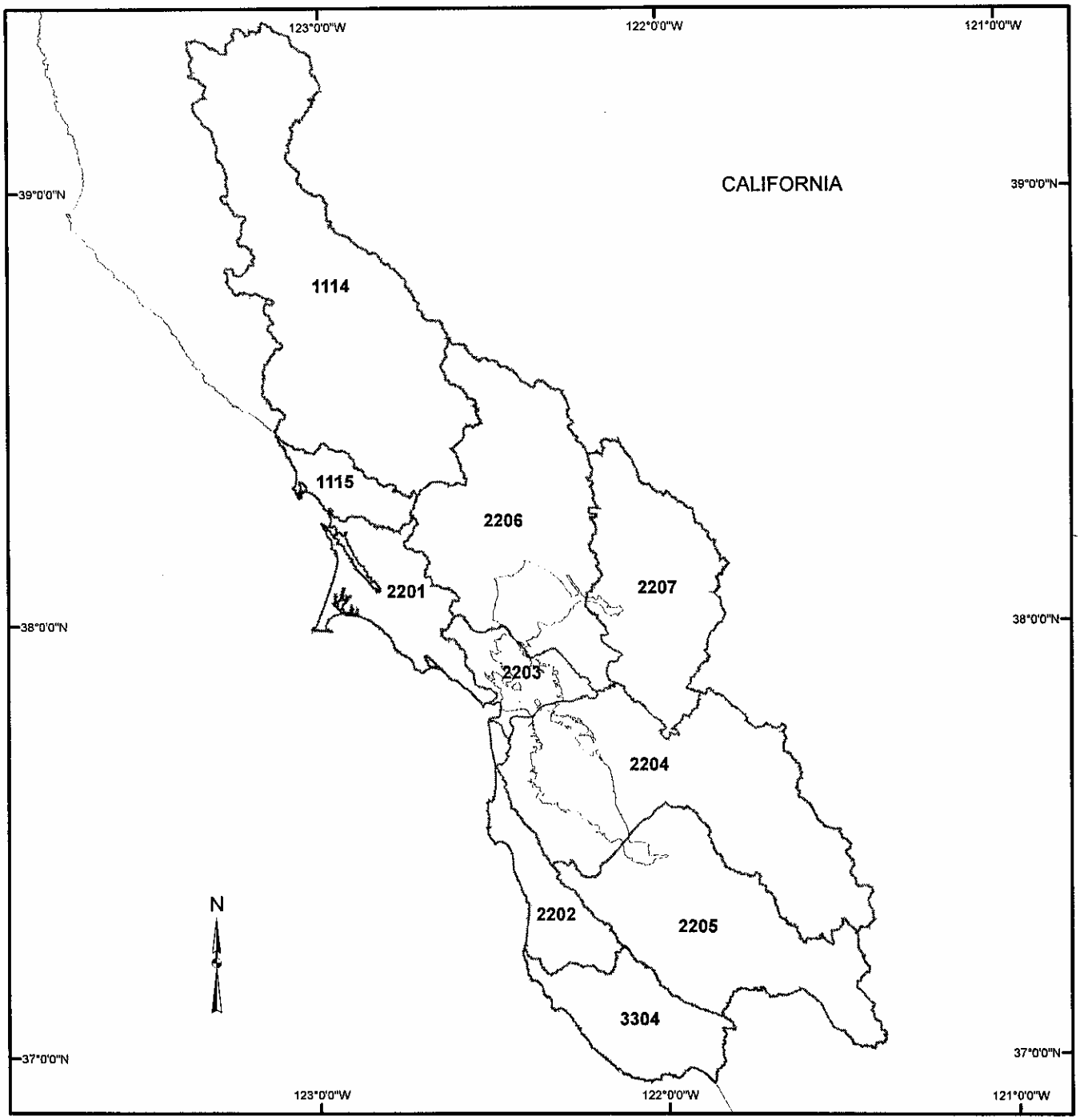
Figures C1 through C3: CALWATER Hydrologic Units, and Hydrologic subareas within the Range of the Central California Coast *Steelhead* ESU

C1 - CALWATER Hydrologic Units

C2 - CALWATER Hydrologic Subareas

C3 - San Francisco/San Pablo Bay HSAs

Map of the Central California Coast Steelhead ESU

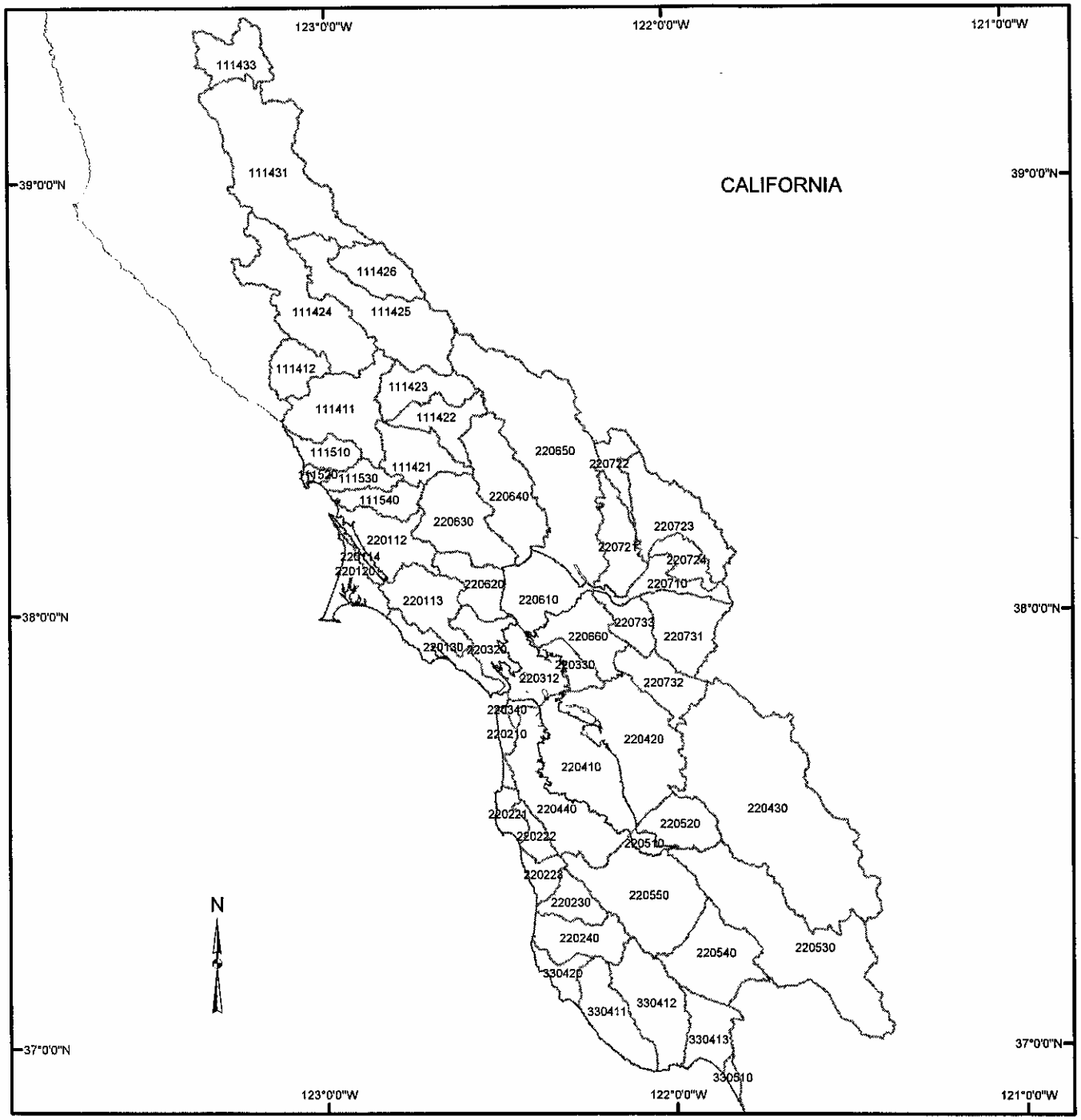


Hydrologic Unit Boundaries

State Boundary

Area of Detail

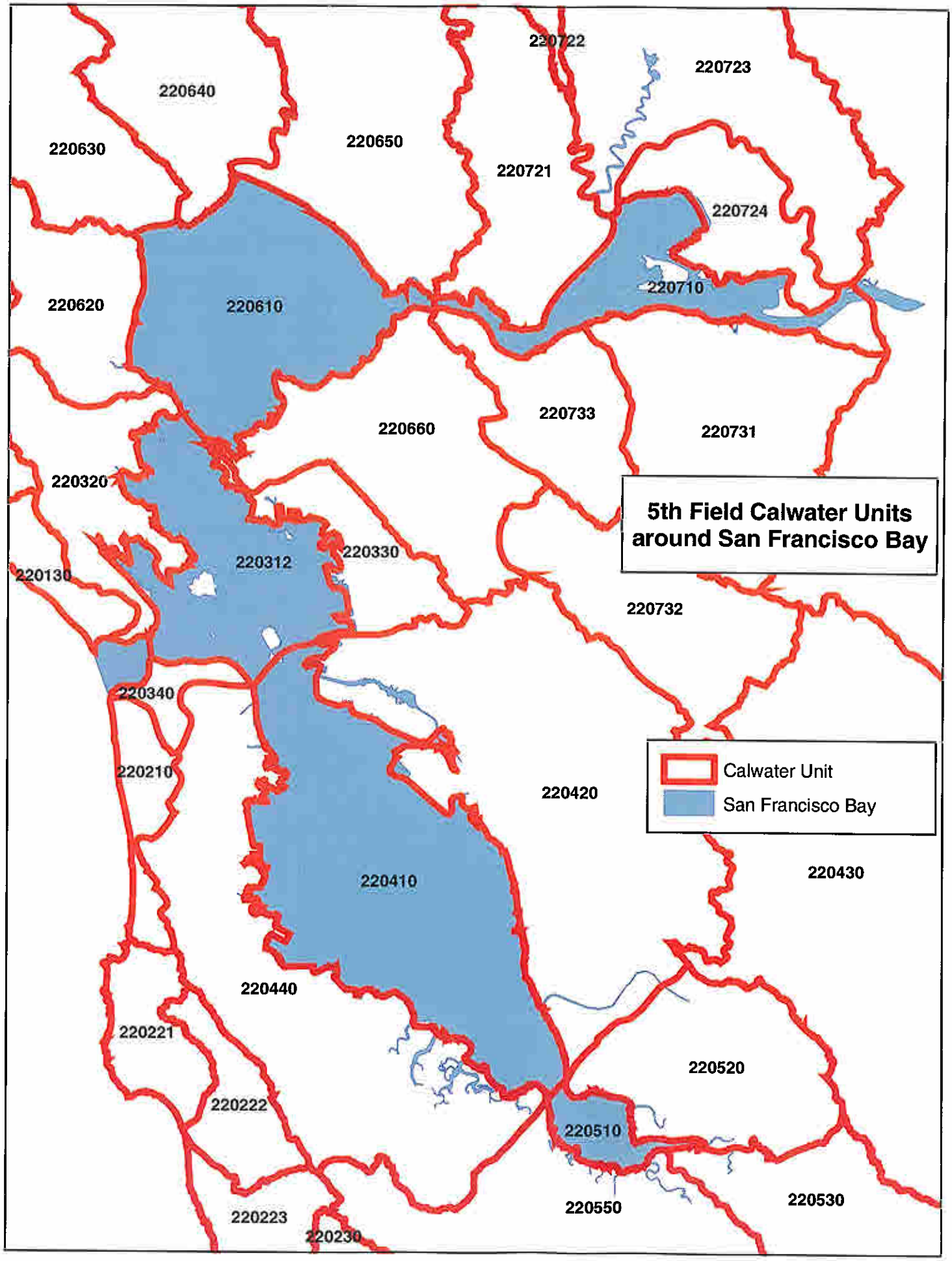
Map of the Central California Coast Steelhead ESU



Subbasin Boundaries

State Boundary

Area of Detail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220620
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220733
220660
220731
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220312
220330
220130
220732
220340
220210
220420
220410
220430
220440
220221
220520
220222
220510
220223
220550
220530
220230
5th Field Calwater Units around San Francisco Bay
Calwater Unit
San Francisco Bay

Maps C1 through C10: Central California Coast *Steelhead* ESU - Habitat Areas (Units) Considered for Critical Habitat Designation

C1 - Unit 1114 (Russian River HU)

C2 - Unit 1115 (Bodega HU)

C3 - Unit 2201 (Marin Coastal HU)

C4 - Unit 2202 (San Mateo HU)

C5 - Unit 2203 (Bay Bridges HU)

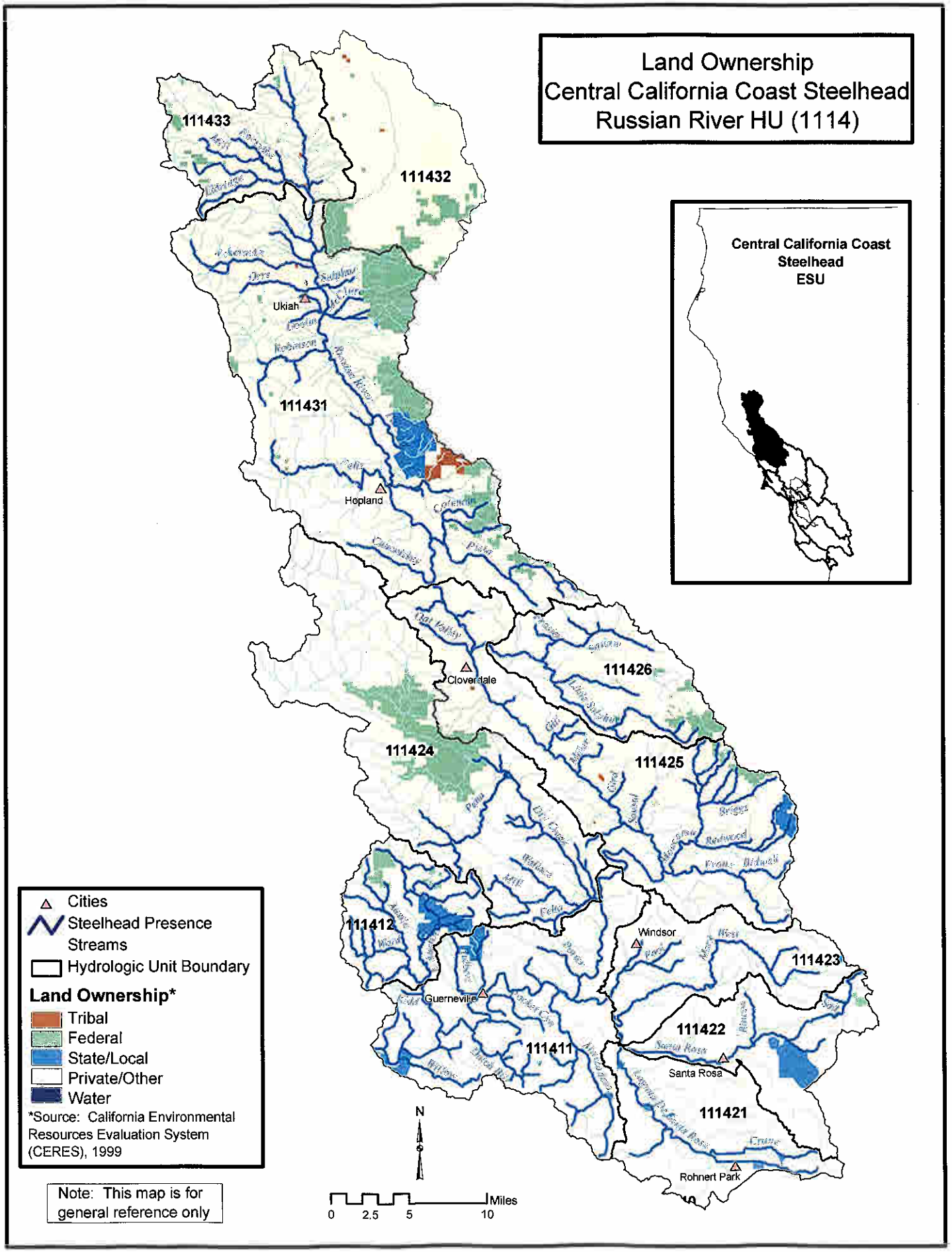
C6 - Unit 2204 (South Bay HU)

C7 - Unit 2205 (Santa Clara HU)

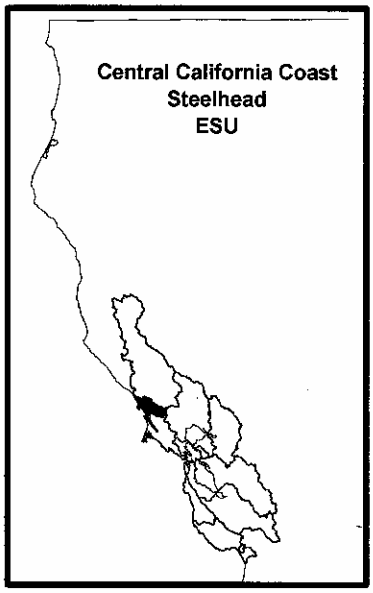
C8 - Unit 2206 (San Pablo HU)

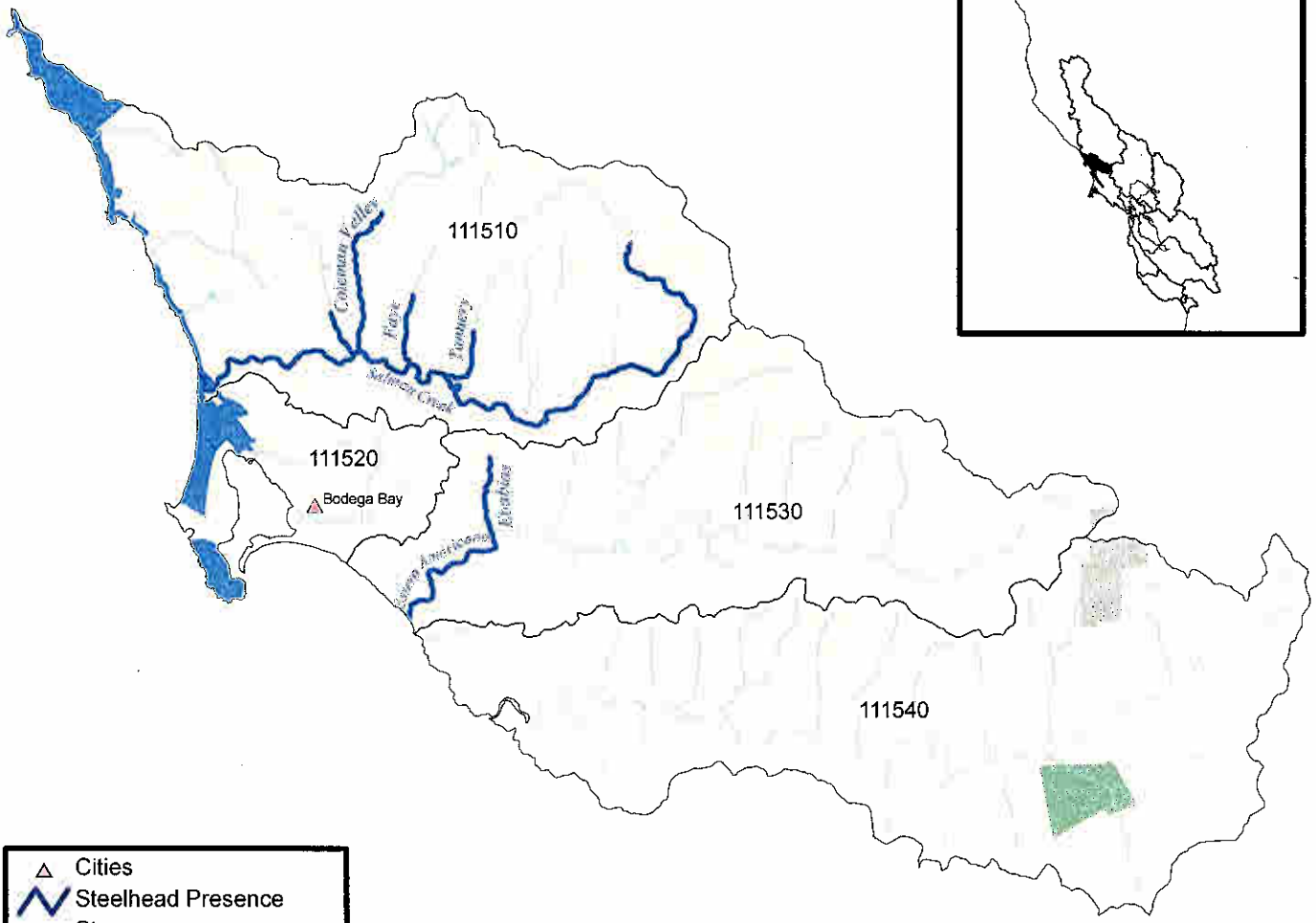
C9 - Unit 2207 (Suisun HU)

C10 - Unit 3304 (Big Basin HU)


Land Ownership
Central California Coast Steelhead
Russian River HU (1114)
Central California Coast Steelhead ESU
111433
111432
111431
111426
111425
111424
111423
111422
111421
111412
111411
Ukiah
Hopland
Cloverdale
Windsor
Guerneville
Santa Rosa
Rohnert Park
Cities
Steelhead Presence Streams
Hydrologic Unit Boundary
Land Ownership*
Tribal
Federal
State/Local
Private/Other
Water
*Source: California Environmental Resources Evaluation System (CERES), 1999
Note: This map is for general reference only
N
0 2.5 5 10 Miles

Land Ownership
Central California Coast Steelhead
Bodega HU (1115)





- Cities
- Steelhead Presence Streams
- Hydrologic Unit Boundary

Land Ownership*

- Tribal
- Federal
- State/Local
- Private/Other
- Water

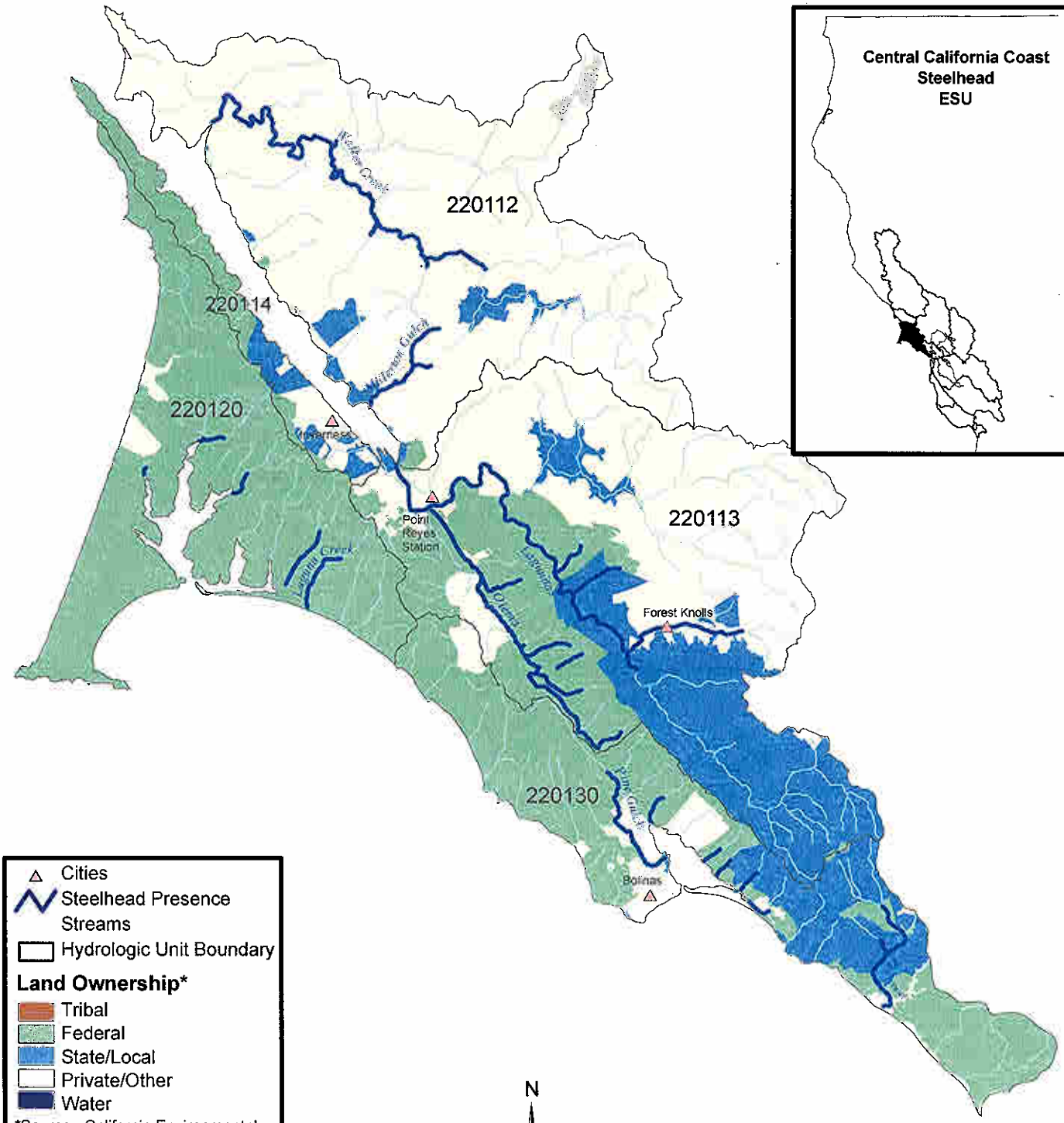
*Source: California Environmental Resources Evaluation System (CERES), 1999

N

Note: This map is for general reference only

0 2.5 Miles

Land Ownership
Central California Coast Steelhead
Marin Coastal HU (2201)



- Cities
- Steelhead Presence Streams
- Hydrologic Unit Boundary

Land Ownership*

- Tribal
- Federal
- State/Local
- Private/Other
- Water

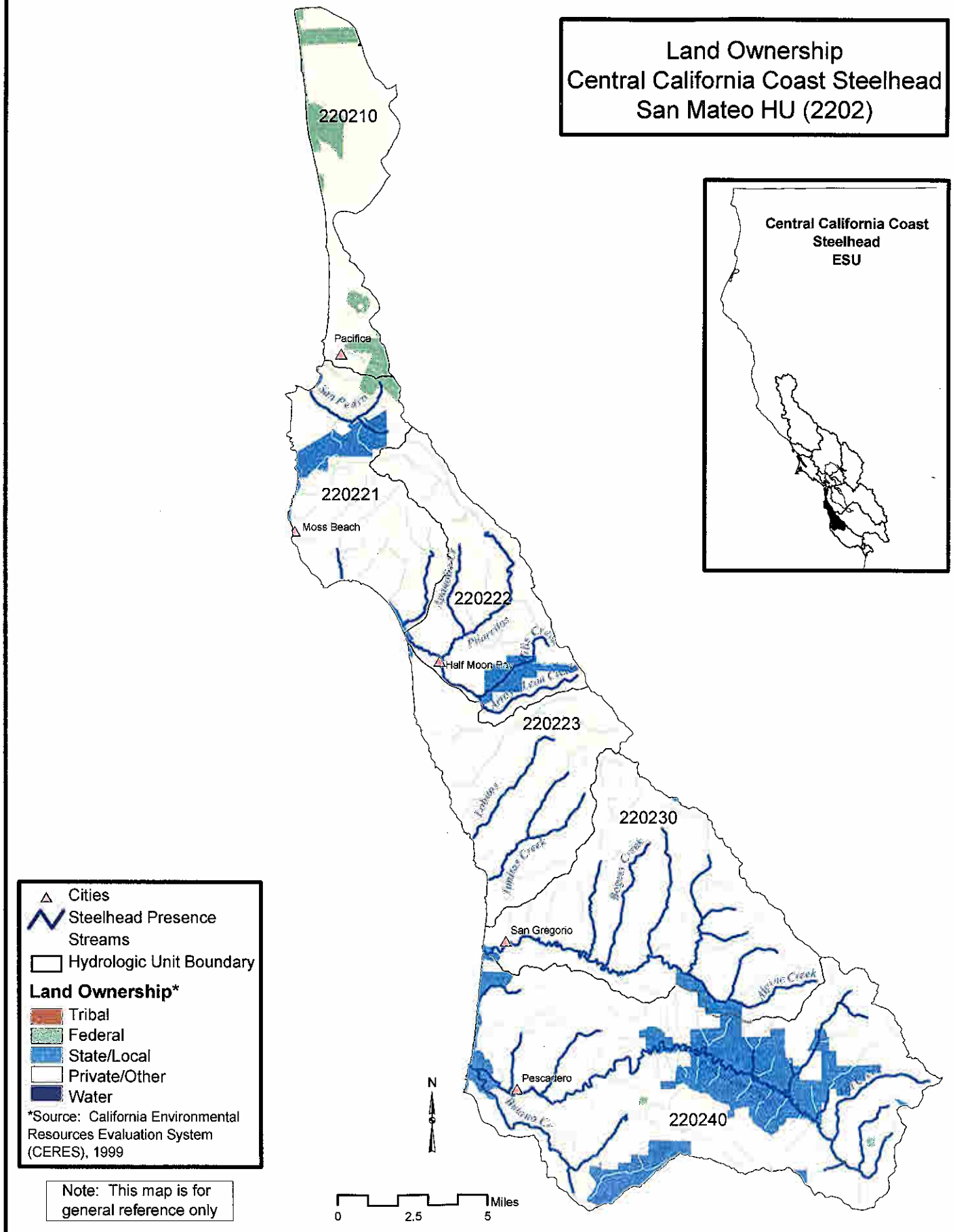
*Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is for general reference only

N

0 1 2 4 6 8 10 Miles

Land Ownership
Central California Coast Steelhead
San Mateo HU (2202)



- Cities
- Steelhead Presence Streams
- Hydrologic Unit Boundary

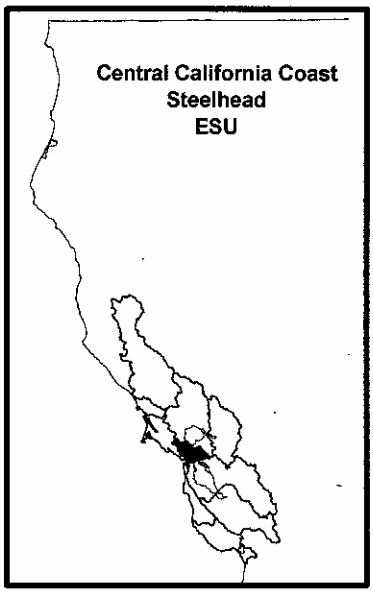
Land Ownership*

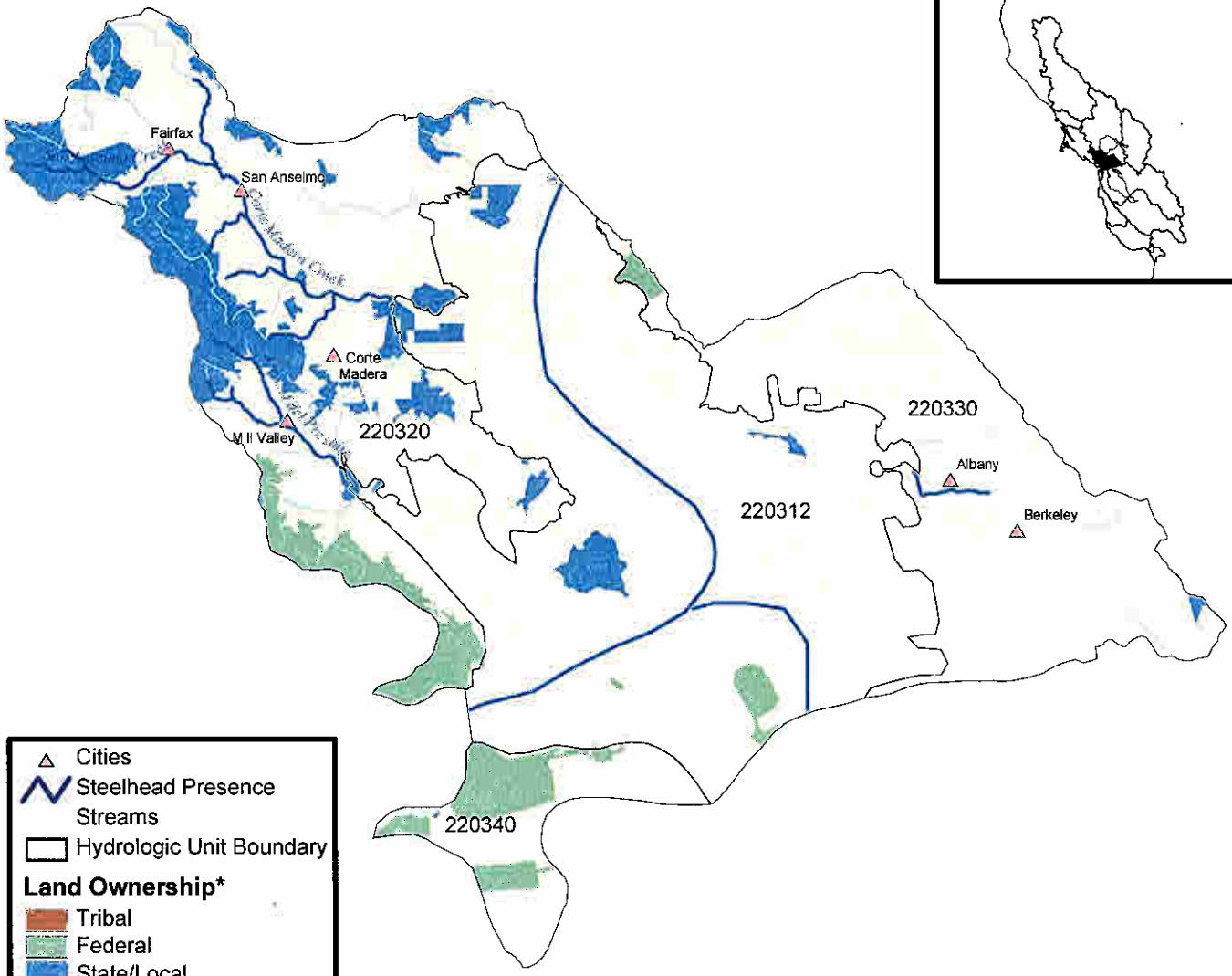
- Tribal
- Federal
- State/Local
- Private/Other
- Water

*Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is for general reference only

Land Ownership
Central California Coast Steelhead
Bay Bridges HU (2203)





- Cities
- Steelhead Presence Streams
- Hydrologic Unit Boundary

Land Ownership*

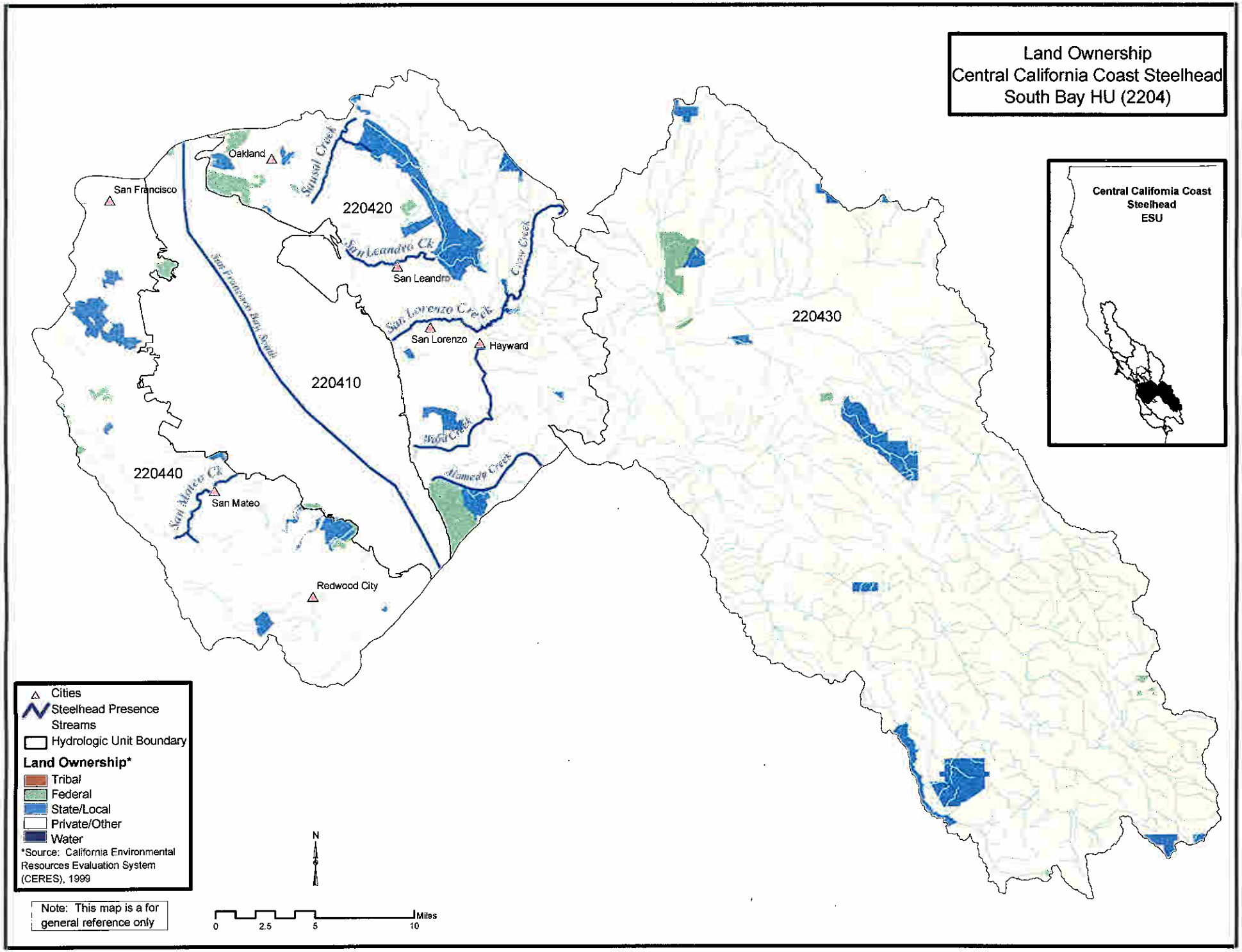
- Tribal
- Federal
- State/Local
- Private/Other
- Water

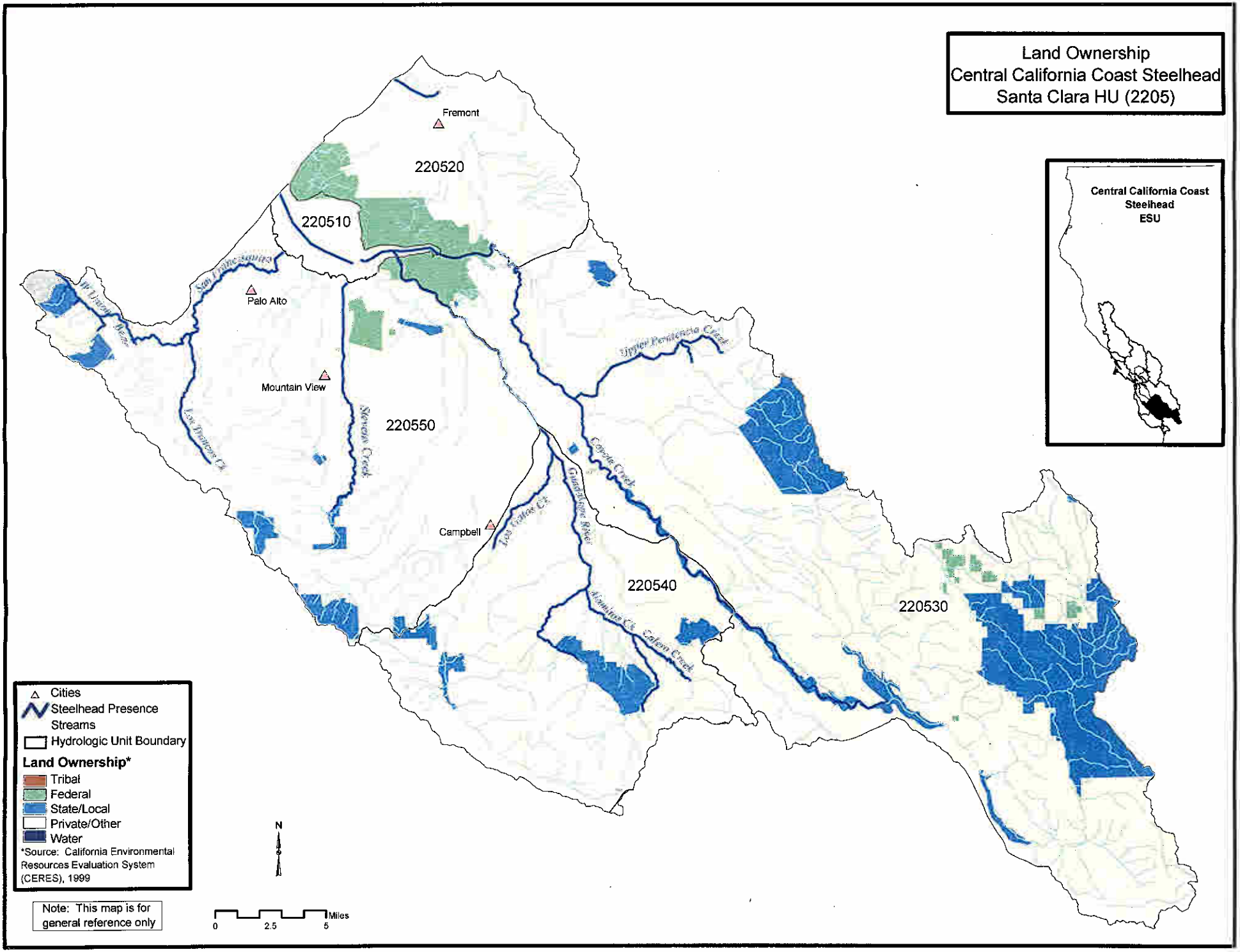
*Source: California Environmental Resources Evaluation System (CERES), 1999

N

Note: This map is for general reference only

0 2.5 5 Miles


Land Ownership
Central California Coast Steelhead
South Bay HU (2204)
Central California Coast Steelhead ESU
220420
220410
220430
220440
Oakland
San Francisco
San Leandro
San Lorenzo
Hayward
San Mateo
Redwood City
Sausal Creek
San Leandro Ck
San Lorenzo Creek
Crow Creek
San Francisquito Bay South
Ward Creek
Alameda Creek
San Mateo Ck
Cities
Steelhead Presence Streams
Hydrologic Unit Boundary
Land Ownership*
Tribal
Federal
State/Local
Private/Other
Water
*Source: California Environmental Resources Evaluation System (CERES), 1999
N
Note: This map is a for general reference only
0
2.5
5
10
Miles


Land Ownership
Central California Coast Steelhead
Santa Clara HU (2205)
Central California Coast Steelhead ESU
Fremont
220520
220510
Palo Alto
Mountain View
220550
Campbell
220540
220530
Cities
Steelhead Presence
Streams
Hydrologic Unit Boundary
Land Ownership*
Tribal
Federal
State/Local
Private/Other
Water
*Source: California Environmental Resources Evaluation System (CERES), 1999
Note: This map is for general reference only
N
0
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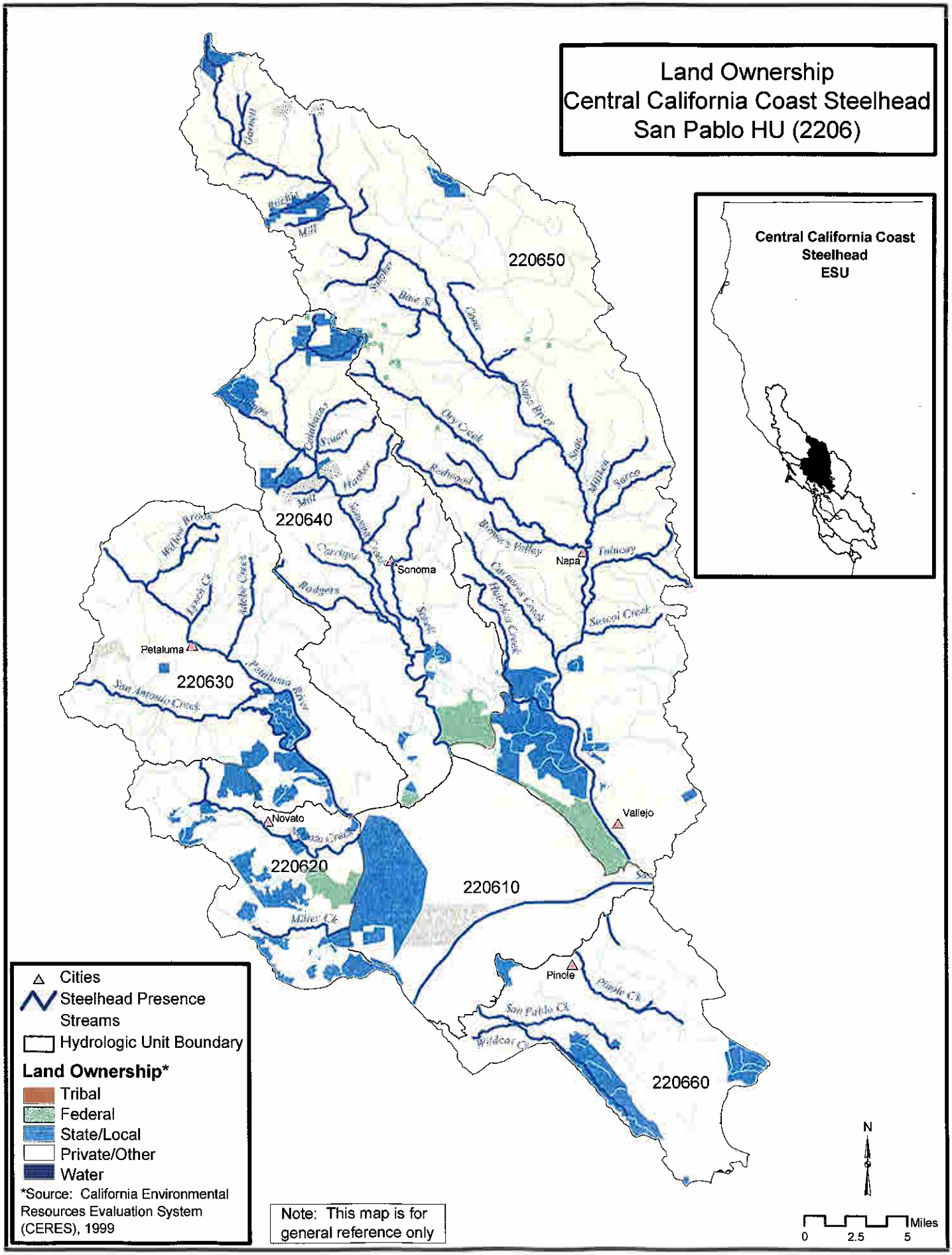
Miles


Land Ownership
Central California Coast Steelhead
San Pablo HU (2206)
Central California Coast
Steelhead
ESU
220650
220640
220630
220620
220610
220660
Sonoma
Napa
Petaluma
Novato
Vallejo
Pinole
Cities
Steelhead Presence
Streams
Hydrologic Unit Boundary
Land Ownership*
Tribal
Federal
State/Local
Private/Other
Water
*Source: California Environmental Resources Evaluation System (CERES), 1999
Note: This map is for general reference only
N
Miles
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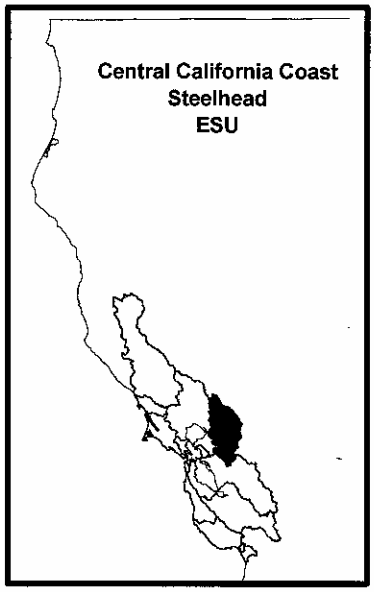
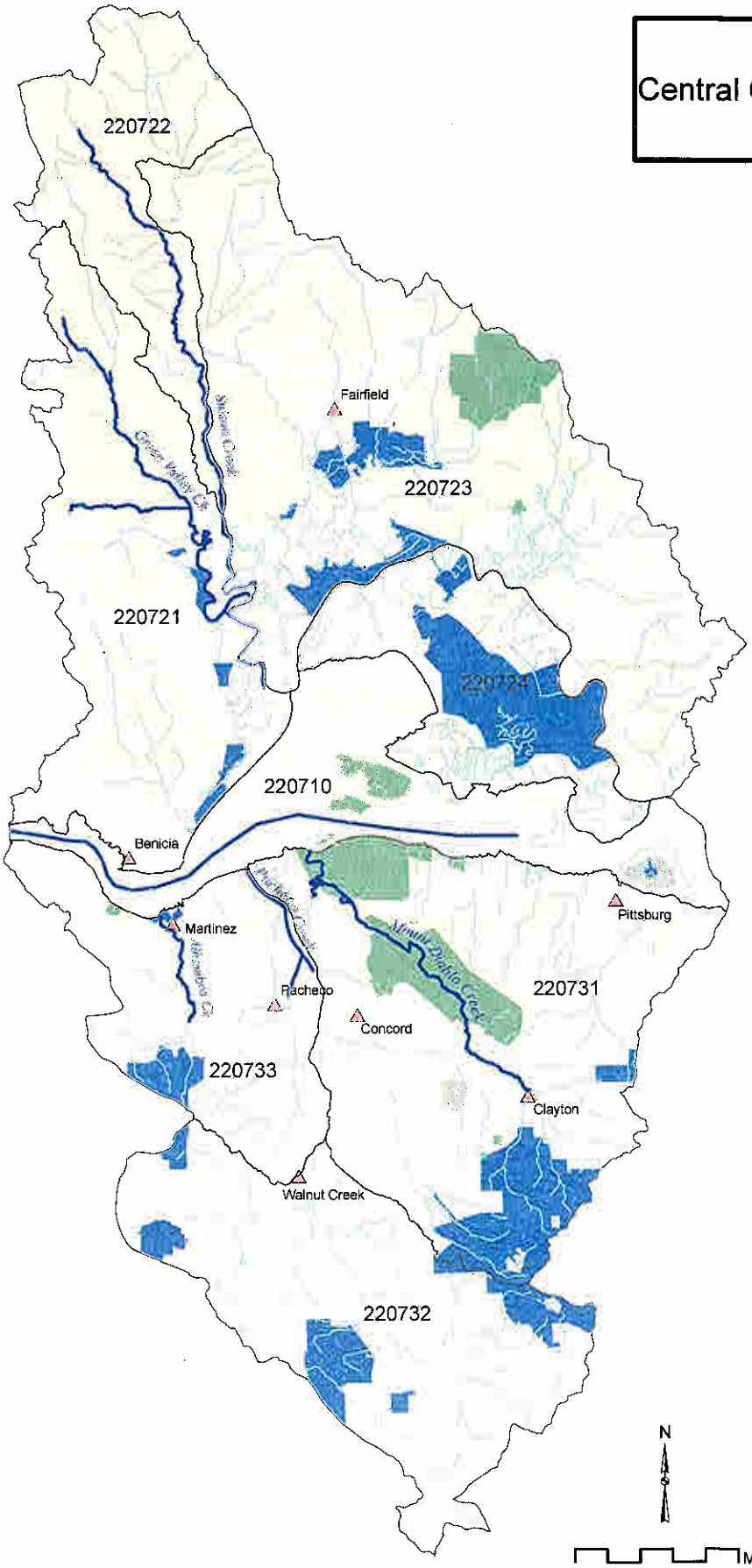
2.5
5

Land Ownership
Central California Coast Steelhead
Suisun HU (2207)





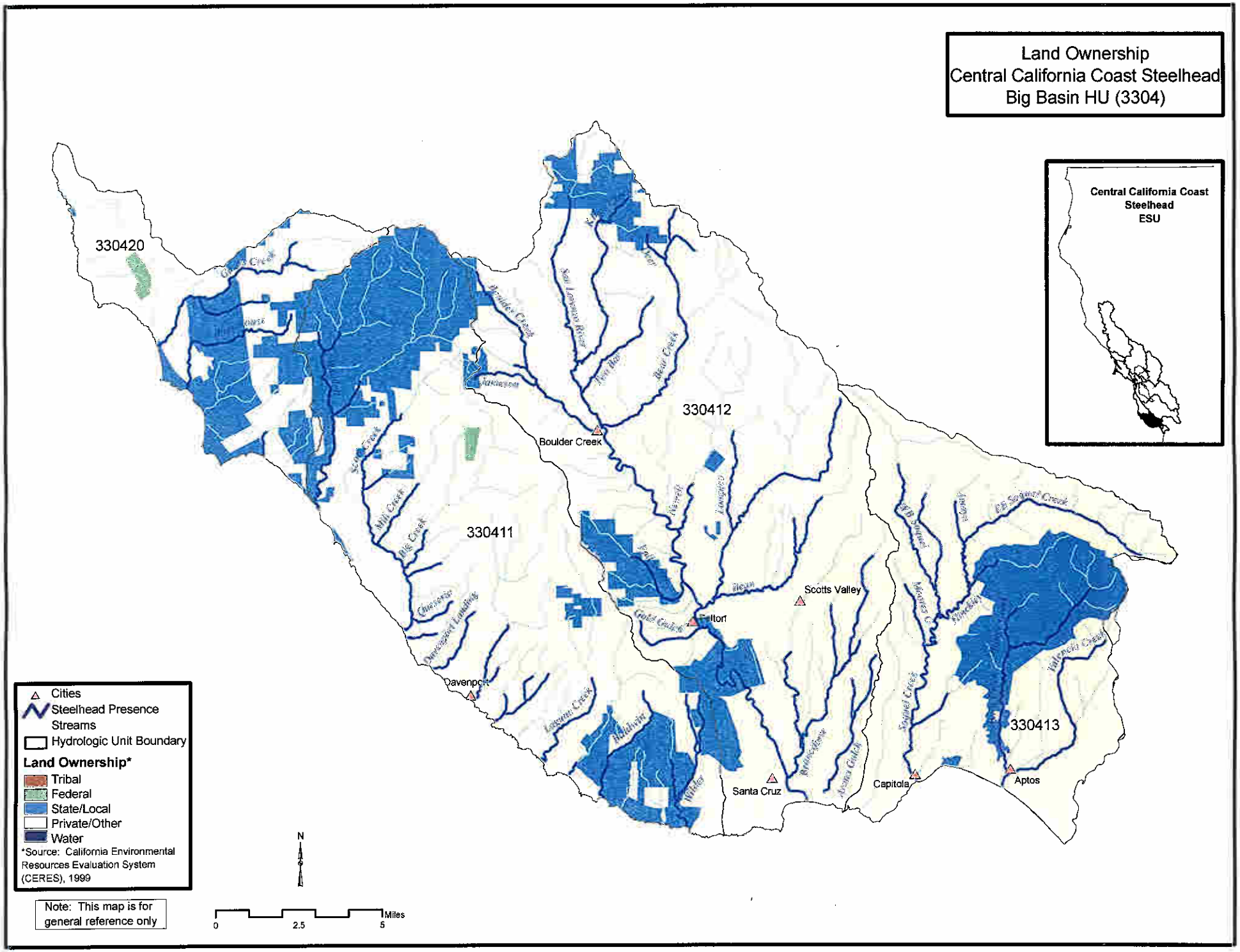
- Cities
- Steelhead Presence Streams
- Hydrologic Unit Boundary

Land Ownership*

- Tribal
- Federal
- State/Local
- Private/Other
- Water

*Source: California Environmental Resources Evaluation System (CERES), 1999

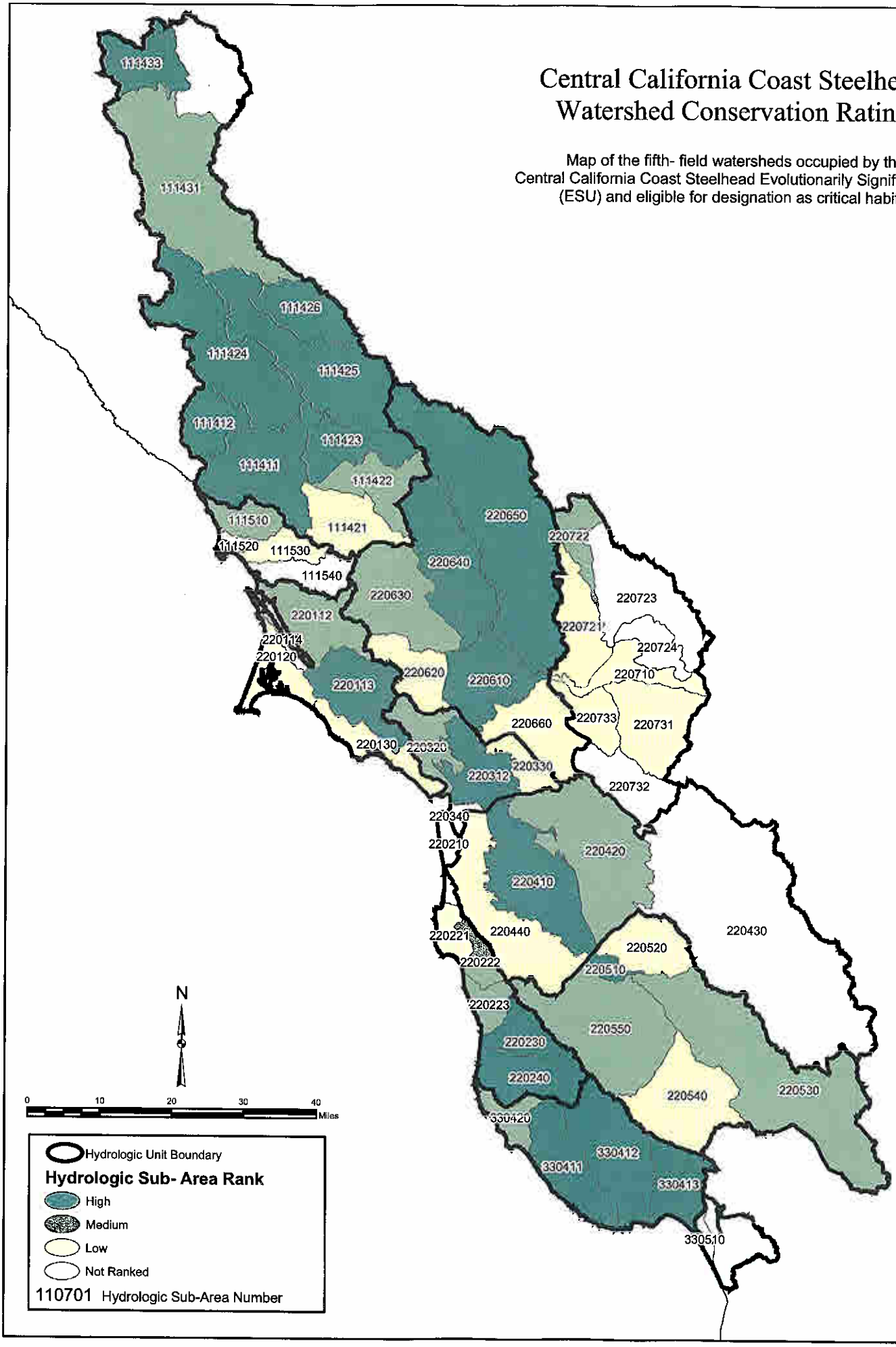
Note: This map is for general reference only


Land Ownership
Central California Coast Steelhead
Big Basin HU (3304)
Central California Coast Steelhead ESU
330420
330412
330411
330413
Boulder Creek
Scotts Valley
Felton
Davenport
Santa Cruz
Capitola
Aptos
Cities
Steelhead Presence Streams
Hydrologic Unit Boundary
Land Ownership*
Tribal
Federal
State/Local
Private/Other
Water
*Source: California Environmental Resources Evaluation System (CERES), 1999
Note: This map is for general reference only
N
0
2.5
5
Miles

Map C11. Preliminary CHART Ratings of Conservation Value for CALWATER HSA Watersheds occupied by the Central California Coast *Steelhead* ESU

Central California Coast Steelhead Watershed Conservation Rating

Map of the fifth- field watersheds occupied by the Central California Coast Steelhead Evolutionarily Significant Unit (ESU) and eligible for designation as critical habitat.



Appendix D
Final CHART Assessment for the South-Central California Coast (SCCC) Steelhead ESU

ESU Description

The SCCC Steelhead ESU was listed as a threatened species in 1997 (62 FR 43937). The ESU includes all naturally spawned populations of steelhead in coastal river basins from the Pajaro River southward to, but not including, the Santa Maria River. The major watersheds occupied by naturally spawning fish in this ESU include the Pajaro River, Salinas River, Carmel River, and numerous smaller rivers and stream along the Big Sur coast and southward. Most of the rivers in this ESU drain the Santa Lucia Range, the southernmost unit of the California Coast Ranges and only winter steelhead are found in this ESU. The climate is drier and warmer than in the north which is reflected in vegetational changes from coniferous forest to chapparral and coastal scrub. The mouths of many rivers and streams in this ESU are seasonally closed by sand berms that form during periods of low flow in the summer. Based on an updated status review (NMFS 2003a), NMFS proposed that the ESU remain listed as a threatened species and that resident O. mykiss co-occurring with anadromous populations below impassible barriers (both natural and man-made) be included in the ESU (69 FR 33102; June 14, 2004). NMFS recently determined that a 6-month extension in making a final listing determination for this and all other west coast steelhead/O. mykiss ESUs was warranted (70 FR 37219; June 28, 2005). A Technical Recovery Team has been formed and is in the process of identifying the historical and extant independent population structure of this ESU and associated population viability criteria.

CHART Area Assessments

The preliminary CHART assessment for this ESU (NMFS 2004b) was prepared to support our December 10, 2004, critical habitat proposal (69 FR 71880). No new information regarding fish distribution, habitat use, or watershed conservation ratings for this ESU was received during the public comment period. The CHART reaffirmed its preliminary findings for this ESU and determined that no changes were required.

The final CHART assessment for this ESU considered 8 CALWATER Hydrologic Units (HUs) containing 30 occupied CALWATER HSAs (Figures D1 and D2). One of the 30 occupied HSA watersheds was Morro Bay which serves as rearing and migration habitat

for some populations in this ESU. The HSAs were chosen as freshwater critical habitat units because they present a convenient and systematic way to organize the CHART's watershed assessments for this ESU. Information presented below for individual HUs within the range of the ESU (size, counties, total stream miles, occupied stream miles, and habitat use) were generated from GIS data sets compiled by the NMFS Southwest Region and can be found in Table D1.

Unit 1. Pajaro River Subbasin (HU 3305)

The Pajaro River HU is located in the northern part of the ESU and includes the Pajaro River and its tributaries. The HU encompasses approximately 1,311 mi^2 and occurs within portions of Fresno, Merced, Monterey, San Benito, Santa Clara, Santa Cruz, and Stanislaus Counties, but the vast majority of the unit occurs in San Benito and Santa Clara Counties. The HU contains 5 HSAs (although a portion of one HSA is located outside the boundary of the ESU), all of which are occupied, and approximately 1,861 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 296 miles of occupied riverine habitat in the 5 occupied HSAs (Table D1). The CHART concluded that these occupied HSAs contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) and identified several management activities that may affect the PCEs. Table D2 summarizes the total miles of occupied riverine habitat for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map D1 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The CHART also concluded that inaccessible habitat above Uvas Dam in Uvas Creek (a tributary to the Pajaro River) may be essential to the conservation of the ESU because: (1) it supports steelhead native to the Pajaro River watershed and contains habitat suitable for spawning and rearing, and (2) efforts are underway to implement a long-standing agreement between the South Santa Clara Valley Water Conservation District and the State of California to provide fish passage above this dam.

Unit 2. Bolsa Neuva Subbasin (HU 3306)

The Bolsa Neuva HU is a small watershed unit located in the northern part of the ESU which includes Elkhorn Slough. The HU encompasses approximately 51mi^2 and occurs Monterey and San Benito Counties. The HU contains 1 HSA which is not considered occupied and approximately 63 miles of streams (at 1:100,000 hydrography). Fish

distribution and habitat use data compiled by NMFS biologists indicate that the HU is not occupied (Table D1). Map D2 depicts the this HU. The CHART did not identify any unoccupied habitat in this subbasin that may be essential for the conservation of the ESU.

Unit 3. Carmel River Subbasin (HU 3307)

The Carmel River HU is located in the northwestern portion of the ESU and includes the Carmel River watershed. The HU encompasses approximately 256 mi^2 and occurs entirely within Monterey County. The HU contains only one HSA which is occupied and approximately 404 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 146 miles of occupied riverine habitat in the single occupied HSA (Table D1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) and identified management activities that may affect the PCEs. Table D2 summarizes the total miles of occupied riverine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map D3 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The CHART did not identify any unoccupied habitat in this subbasin that may be essential for the conservation of the ESU.

Unit 4. Santa Lucia Subbasin (HU 3309)

The Santa Lucia HU is located along the Big Sur coastal area and includes the Big Sur River and Little Sur River watersheds. The HU encompasses approximately 302 mi^2 and occurs entirely within Monterey County. This HU contains only a single HSA which is occupied and approximately and 442 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 81 miles of occupied riverine/estuarine habitat in this single occupied HSA (Table D1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) and identified management activities that may affect the PCEs. Table D2 summarizes the total miles of occupied riverine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in the occupied HSA. Map D4 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The team did not identify any unoccupied habitat in this subbasin that may be essential for the conservation of the ESU.

Unit 5. Salinas Subbasin (HU 3309)

The Salinas HU is located in the north-central portion of the ESU and includes the Salinas River watershed which is the largest in the ESU. This is the largest HU in the ESU and encompasses approximately 3,527 mi^2 primarily in Monterey and San Luis Obispo Counties. The HU contains 12 HSAs, 7 of which are occupied, and approximtely 4,727 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 375 miles of occupied riverine/estuarine habitat in the 7 occupied HSAs (Table D1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) and identified management activities that may affect the PCEs. Table D2 summarizes the total miles of occupied riverine habitat identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in the occupied HSA. Map D5 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The CHART did not identify any unoccupied habitat in this subbasin that may be essential for the conservation of the ESU.

Unit 6. Estero Bay Subbasin HU (3310)

The Estero Bay HU is located along the southern coast of the ESU and includes a large number of small coastal streams including Arroyo De La Cruz, San Simeon Creek, Santa Rosa Creek, Morro Creek, San Luis Obispo Creek, and Arroyo Grande Creek. The HU encompasses approximately 751 mi^2 and occurs primarily in San Luis Obispo County. The HU contains 17 HSAs, 15 of which are occupied, and approximately and 940 miles of streams (at 1:100,000 hydrography). One of these occupied watersheds is Morro Bay into which the Morro Creek and Chorro Creek watersheds drain. Morro Bay encompasses an area of approximately 3mi^2 and is an important rearing and migration habitat for populations occupying watersheds draining into the Bay. Fish distribution and habitat use data compiled by NMFS biologists identify approximately 353 miles of occupied riverine habitat in the 15 occupied HSAs (Table D1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) and identified management activities that may affect the PCEs. Table D2 summarizes the total miles of occupied riverine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in the occupied HSA. Map D6 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The CHART did not identify any unoccupied habitat in

this subbasin that may be essential for the conservation of the ESU.

Units 7 (Santa Maria Subbasin - HU 3312) and 8 (Estrella Subbasin - HU 3317)
Portions of the Santa Maria and Estrella HUs are within the geographic range of this ESU, but do not contain occupied habitat. The Santa Maria HU includes a single HSA (Guadalupe; 331210) which is divided by the ESU boundary. All occupied habitat within this HSA occurs within the range of the Southern California steelhead ESU. The Estrella HU contains a single HSA (Estrella River; 331700) which is unoccupied.

Final CHART Conservation Value Rating

Freshwater Areas
After reviewing the best available scientific data regarding critical habitat for this ESU, the CHART concluded that most of the occupied HSAs were of high or medium conservation value to the ESU. Of the 30 occupied HSAs that were evaluated, 13 were rated as having high conservation value, 11 were rated as having medium conservation value, and 6 were rated as having low conservation value. Table D3 summaries the CHARTs PCE/watershed scores and final conservation value ratings (i.e. low, medium or high). Figure D7 shows the overall spatial distribution of conservation ratings for occupied HSAs within the range of the ESU.

Marine Areas
NMFS determined that marine areas did not warrant consideration as critical habitat for this ESU.

References and Sources of Information

NMFS 2003a. Updated Status of Federally Listed ESUs of West Coast Salmon and Steelhead. West Coast Salmon Biological Review Team; Northwest Fisheries Science Center and Southwest Fisheries Science Center. July 2003.

NMFS 2004b. Draft Findings of NMFS's Critical Habitat Development and Review Teams (CHARTs) for 7 Salmon and O. mykiss ESUs in California. Main Report and 7 Appendices. Prepared by NMFS' Southwest Region.

Federal Register Notices

62 FR 43937 - South-Central California Coast Steelhead Listing Determination (1997)

69 FR 33102 - Proposed Listing Determinations for 27 West Coast Salmon and Steelhead ESUs (June 2004)

70 FR 37219 - 6-Month Extension of the Final Listing Determinations for Ten ESUs of West Coast O. mykiss.

Table D1. South-central California Coast Steelhead ESU: Occupancy, miles of occupied habitat use, and geographic area information by Hydrologic Unit and Hydrologic Subarea

HU NUMBER	HU NAME	Major Stream / Watershed in HU	HU Occupied (Y or N)	Acres in HU	Square Miles in HU	Stream Miles (1:100k) in HU	Occupied Stream Miles	Occupied Stream Miles (Spawning)	Occupied Stream Miles (Rearing)	Occupied Stream Miles (Migration)	County HU Falls within	Acres of County in HU	Square Miles of County in HU	Percent of HU by County	HSA NUMBER	HSA NAME	HSA Occupied (Y or N)	Acres in HSA	Square Miles in HSA	Stream Miles (1:100k) in the HSA
3305	Pajaro River	Pajaro River	Y	838,758	1,311	1,861	296	143	97	258	Fresno	365	1	0%						
											Merced	91	0	0%	330510*	Watsonville	Y	79,519	124	140
											Monterey	11,311	18	1%	330520	Santa Cruz Mountains	Y	101,327	158	197
											San Benito	524,169	819	62%	330530	South Santa Clara Valley	Y	129,843	203	234
											Santa Clara	235,336	368	28%	330540	Pacheco-Santa Ana Creek	Y	155,310	243	376
											Santa Cruz*	67,454	105	8%	330550	San Benito River	Y	372,759	582	915
											Stanislaus	32	0	0%						
3306	Bolsa Neuva	Elkhorn Slough	N	32,634	51	63	0	0	0	0	San Benito	5,926	9	18%						
											Monterey	26,708	42	82%	330600	Bolsa Neuva	N	32,634	51	63
3307	Carmel River	Carmel River	Y	163,572	256	404	146	88	93	87	Monterey	163,572	256	100%						
															330700	Carmel River	Y	163,572	256	404
3308	Santa Lucia	Big Sur-Little Sur	Y	193,558	302	442	81	67	75	70	Monterey	193,558	302	100%						
															330800	Santa Lucia	Y	193,558	302	442
3309	Salinas	Salinas River	Y	2,257,107	3,527	4,727	375	122	147	327	Fresno	433	1	0%						
											Monterey	1,570,280	2,453	70%	330911	Neponset	Y	73,127	114	149
											San Benito	149,820	234	7%	330912	Moro Cojo	N	10,673	17	17
											San Luis Obispo	536,574	838	24%	330920	Chualar	Y	68,155	106	134
															330930	Soledad	Y	93,914	147	119
															330940	Upper Salinas Valley	Y	88,662	139	105
															330950	Monterey Peninsula	N	78,184	122	103
															330960	Arroyo Seco	Y	284,532	445	591
															330970	Gabilan Range	Y	544,467	851	1,303
															330981	Paso Robles	Y	957,132	1,496	2,042
															330982	Nacimiento Reservoir	N	5,626	9	35
															330983	San Antonio Reservoir	N	5,431	8	26
															330990	Pozo	N	47,205	74	102
3310	Estero Bay	Chorro-Morro Santa Rosa-Arroyo De La Cruz	Y	480,639	751	940	353	127	320	234	Monterey	12,980	20	3%						
											San Luis Obispo	467,659	727	97%	331011	San Carpoforo	Y	29,315	46	64
															331012	Arroyo De La Cruz	Y	27,773	43	65
															331013	San Simeon	Y	51,384	80	129
															331014	Santa Rosa	Y	33,192	52	82
															331015	Villa	Y	13,849	22	29
															331016	Cayucos	Y	11,624	18	24
															331017	Old	Y	15,346	24	29
															331018	Toro	Y	9,941	16	18
															331021	Morro	Y	18,141	28	35
															331022	Chorro	Y	29,911	47	61
															331023	Los Osos	Y	17,939	28	31
															331024	San Luis Obispo Creek	Y	55,553	87	98
															331025	Point San Luis	Y	27,595	43	51
															331026	Pismo	Y	25,354	40	49
															331027	Morro Bay	N	2,100	3	Bay
															331031	Oceano	Y	97,871	153	175
															331032	Nipomo Mesa	N	13,749	21	0
3312	Santa Maria	Santa Maria River	N	93,637	146	88	0	0	0	0	Santa Barbara	69,873	109	75%						
											San Luis Obispo	23,764	37	25%	331210**	Guadalupe	N	93,637	146	88
3317	Estrella	Estrella River-Cholame-San Juan Creek	N	610,690	954	1,227	0	0	0	0	Fresno	187	0	0%						
											Kern	19	0	0%	331700	Estrella River	N	610,690	954	1,227
											Kings	144	0	0%						

			Monterey	141,143	221	23%	
			San Luis Obispo	469,197	733	77%	

*330510 is divided by the ESU Boundary. Forty-two acres fall outside the ESU but within the Hydrologic Unit.

**331210 is divided by ESU Boundary. 69,863 acres fall outside the ESU but within the Hydrologic Unit.
77 Miles of stream fall outside the ESU Boundary but within the Hydrologic Unit
All occupied habitat within this HSA is located within the Southern CA ESU

Table D2. Summary of Occupied Subbasins/Watersheds. PCE's and Management Activities Affecting PCE's for the South-central California Coast Steelhead ESU

Map Code	Basin	Watershed	Calwater Unit	Spawning/Rearing PCEs (mi)**	Rearing/Migration PCEs (mi)**	Presence/Migration Only PCEs (mi)**	Management Activities***
	Pajaro River	Watsonville	330510	42	58	56	FC, WI, NW
	Pajaro River	Santa Cruz Mountains	330520	25	29	29	WI, NW
	Pajaro River	South Santa Clara Valley	330530	42	85	85	FC, RB
	Pajaro River	Pachecho-Santa Ana Creek	330540	20	22	18	NH
	Pajaro River	San Benito River	330550	15	69	69	GM, WI
	Bolsa Nueuva	Bolsa Neuva	330600				
	Carmel River	Carmel River	330700	93	93	86	NH, FC, NW, NW
	Santa Lucia	Santa Lucia	330800	75	76	70	RB
	Salinas	Neponset	330911	7	53	53	AG, FC, WL
	Salinas	Moro Cojo	330912				
	Salinas	Chualar	330920	1	8	6	
	Salinas	Soledad	330930	7	48	48	RB, WI
	Salinas	Upper Salinas Valley	330940	0	38	38	AG, WI
	Salinas	Monterey Peninsula	330950				
	Salinas	Arroyo Seco	330960	62	62	61	RB
	Salinas	Gabilan Range	330970	8	8	0	
	Salinas	Paso Robles	330981	63	121	121	H, NH, WI
	Salinas	Nacimiento Reservoir	330982				
	Salinas	San Antonio Reservoir	330983				
	Salinas	Pozo	330990				
	Estero Bay	San Carpoforo	331011	15	15	15	GM, CM,
	Estero Bay	Arroyo de la Cruz	331012	28	28	28	GR, WI
	Estero Bay	San Simeon	331013	58	57	52	WI, RB
	Estero Bay	Santa Rosa	331014	18	27	16	GR, RB
	Estero Bay	Villa	331015	27	27	27	GR, AG

Estero Bay	Cayucos	331016	15	15	15	GR, AG
Estero Bay	Old	331017	1	1	0	NH
Estero Bay	Toro	331018	12	12	0	AG, GR
Estero Bay	Morro	331021	25	25	25	GR, AG, WI,
Estero Bay	Chorro	331022	30	31	20	NH, RB
Estero Bay	Los Osos	331023	9	7	0	GR, AG
Estero Bay	San Luis Obispo Creek	331024	39	39	6	UR, CM, GR
Estero Bay	Point San Luis	331025	22	21	14	
Estero Bay	Pismo	331026	12	14	8	NH, GR, WI
Estero Bay	Morro Bay	331027				
Estero Bay	Oceano	331031	15	24	8	NH, AG
Estero Bay	Nipomo Mesa	331032				
Santa Maria	Guadelupe	331210				
Estrella	Estrella River	331700				

*Total Stream Miles calculated from blueline streams represented on 1:100,000 USGS Topographic Maps

**Overlap of stream miles may occur betweeen the three habitat types.

***Management Activities Codes:

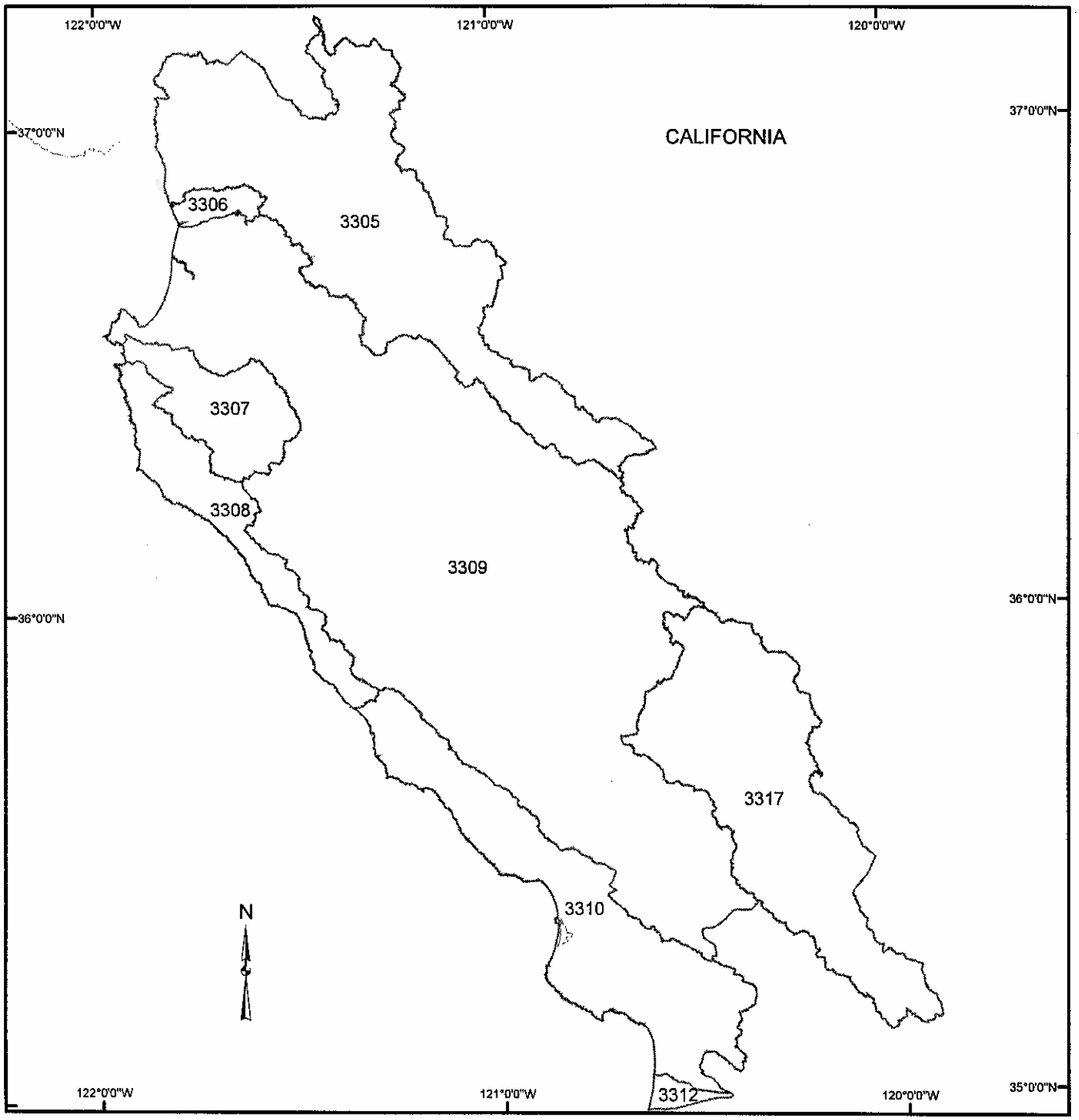
AG - Agriculture
CM - Channel Modification
ES - Exotic / Invasive Species
FC - Flood Control Channel
FR - Forestry
GM - Sand and Gravel Mining
GR - Grazing
HD - Hydroelectric Dam
NH - Non-hydro Dam
NW - Non-agriculture Withdrawls / Impoundments
PO - Poaching
RB - Road Building / Maintenance
SP Septic System Failure / Containation
TR - River, Estuary, Ocean Traffic
UR - Urbanization
WI - Agriculture Withdrawls / Impoundments
WL - Wetland Loss / Removal

Table D3. Summary of Scores and Overall Rankings of Conservation Values for Critical Habitat for HSA watersheds occupied by the South-central California Coast Steelhead ESU

Map Code	Basin	Watershed	Calwater Unit	Total Score (0-18)	Comments / Other Considerations	Conservation Value
	Pajaro	Watsonville	330510	11		High
	Pajaro	Santa Cruz Mountains	330520	11		High
	Pajaro	South Santa Clara Valley	330530	10		Medium
	Pajaro	Pachecho-Santa Ana Creek	330540	10		Medium
	Pajaro	San Benito River	330550	10		Medium
	Bolsa Neuva	Bolsa Neuva	330600			NA
	Carmel River	Carmel River	330700	11		High
	Santa Lucia	Santa Lucia	330800	11		High
	Salinas	Neponset	330911	7		Low
	Salinas	Moro Cojo	330912			NA
	Salinas	Chualar	330920	5		Low
	Salinas	Soledad	330930	7		Low
	Salinas	Upper Salinas Valley	330940	7		Low
	Salinas	Monterey Peninsula	330950			NA
	Salinas	Arroyo Seco	330960	13		High
	Salinas	Gabilan Range	330970	9		Medium
	Salinas	Paso Robles	330981	14		High
	Salinas	Nacimiento Reservoir	330982			NA
	Salinas	San Antonio Reservoir	330983			NA
	Salinas	Pozo	330990			NA
	Estero Bay	San Carpoforo	331011	8		Medium
	Estero Bay	Arroyo de la Cruz	331012	10		Medium
	Estero Bay	San Simeon	331013	11		High
	Estero Bay	Santa Rosa	331014	12		High
	Estero Bay	Villa	331015	7		Low
	Estero Bay	Cayucos	331016	7		Low
	Estero Bay	Old	331017	10		Medium
	Estero Bay	Toro	331018	10		High
	Estero Bay	Morro	331021	11		High
	Estero Bay	Chorro	331022	12		High
	Estero Bay	Los Osos	331023	9		Medium
	Estero Bay	San Luis Obispo Creek	331024	11		High
	Estero Bay	Point San Luis	331025	9		Medium
	Estero Bay	Pismo	331026	9		Medium
	Estero Bay	Morro Bay	331027			NA
	Estero Bay	Oceano	331031	8		Medium
	Estero Bay	Nipomo Mesa	331032			NA
	Santa Maria	Guadelupe	331210			NA
	Estrella	Estrella River	331700			NA

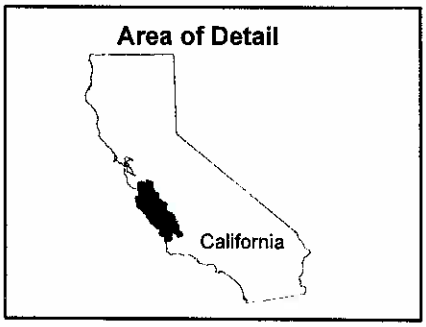
Figures D1 and D1 - CALWATER Hydrologic Units and Hydrologic Subareas within the Range of the South-Central California Coast Steelhead ESU

Map of the South-central California Coast Steelhead ESU

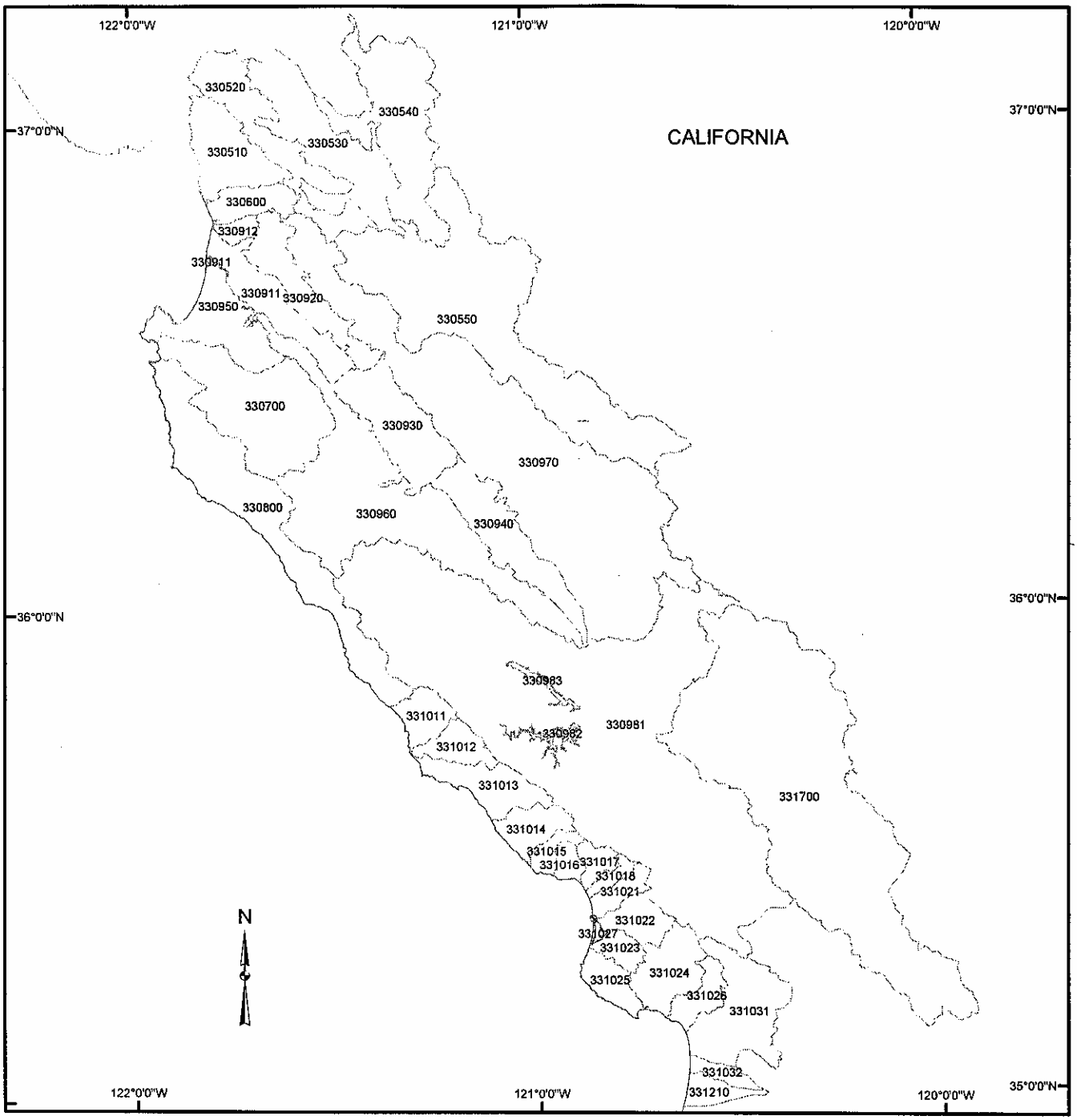


Hydrologic Unit Boundaries

State Boundary



Map of the South-central California Coast Steelhead ESU



Subbasin Boundaries

State Boundary

Area of Detail

Maps D1 through D6: South-Central California Coast Steelhead ESU - Habitat Areas Considered for Critical Habitat Designation

D1 - Unit 3305 (Pajaro River HU)

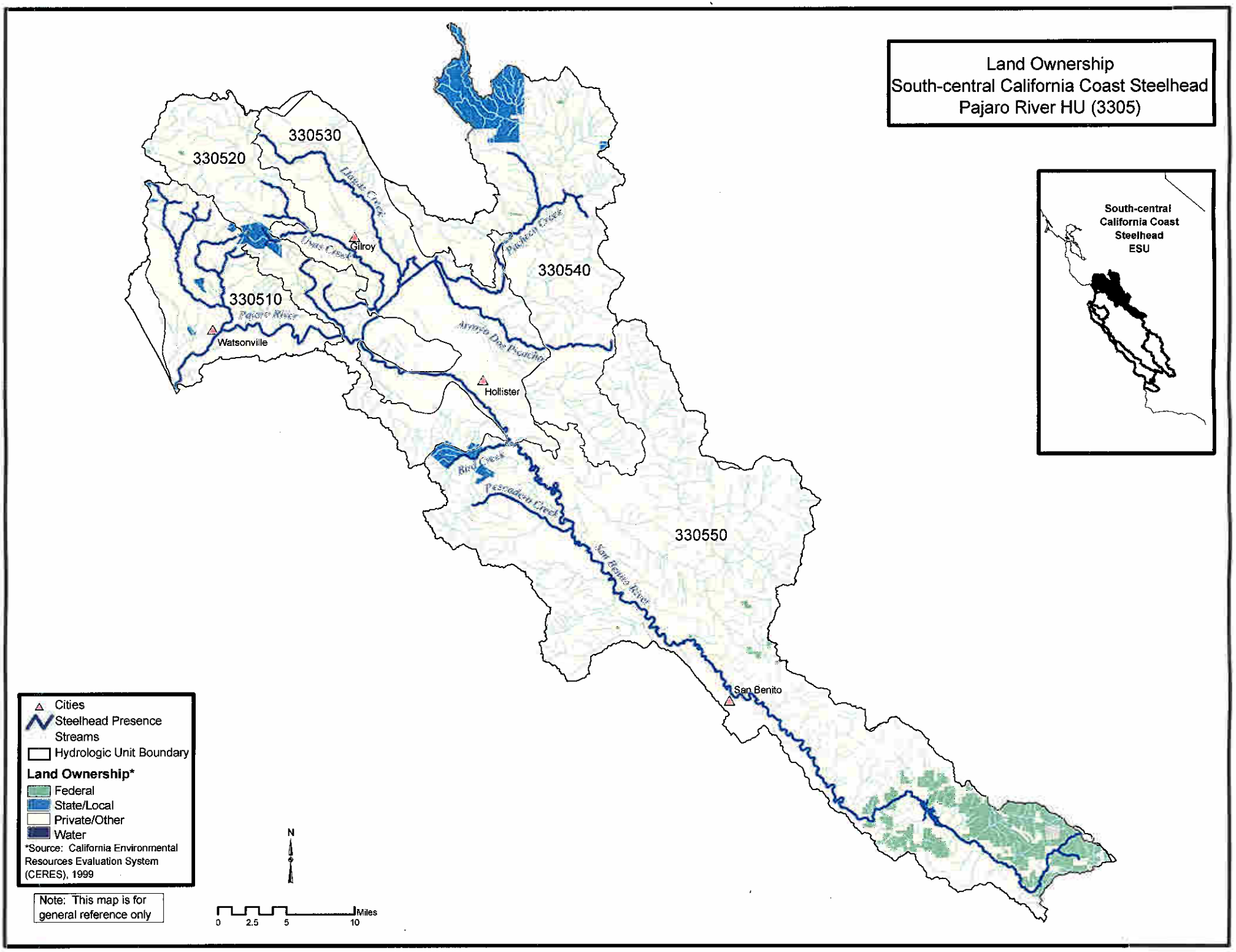
D2 - Unit 3306 (Bolsa Neuva HU)

D3 - Unit 3307 (Carmel River HU)

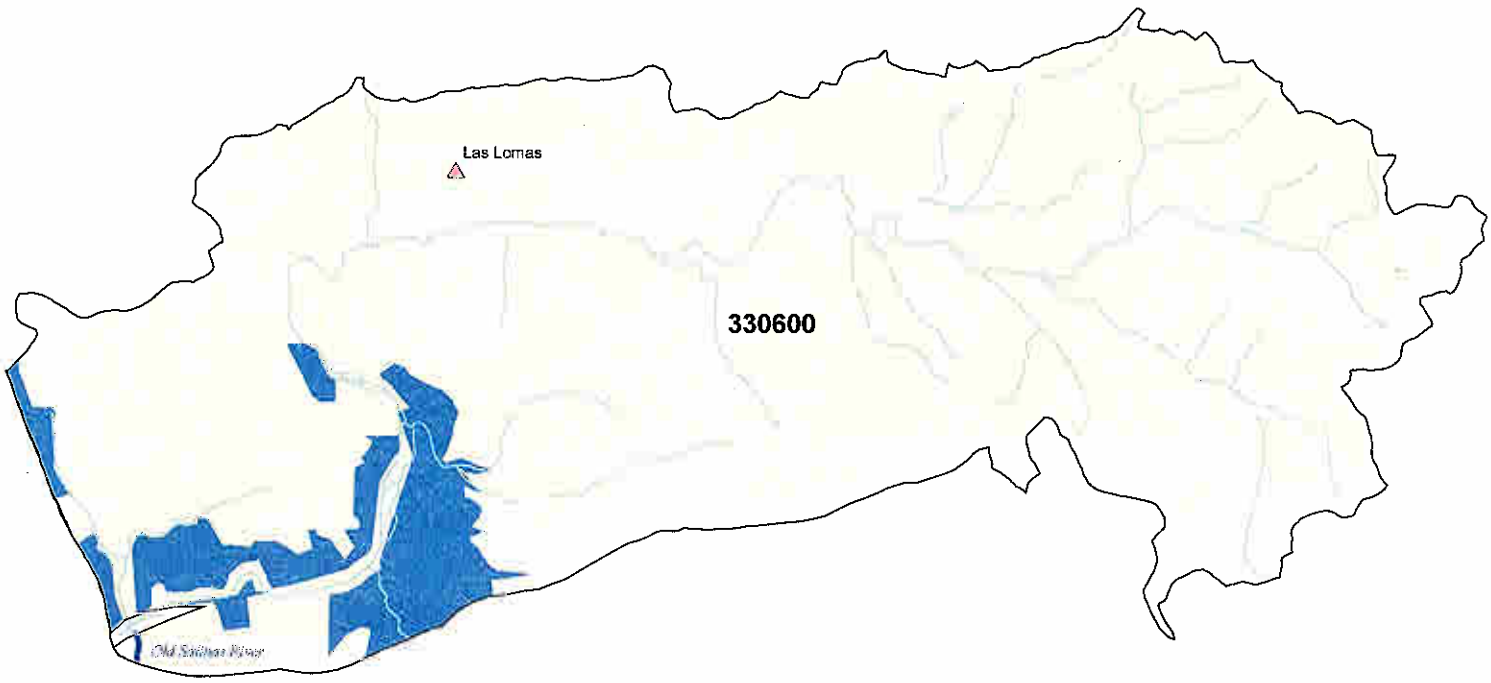
D4 - Unit 3308 (Santa Lucia HU)

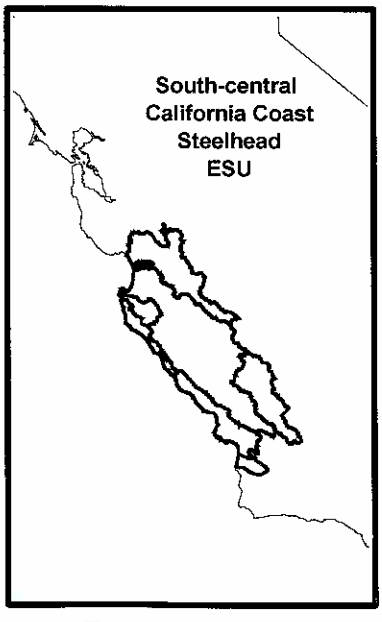
D5 - Unit 3309 (Salinas HU)

D6 - Unit 3310 (Estero Bay HU)


Land Ownership
South-central California Coast Steelhead
Pajaro River HU (3305)
330530
330520
330510
330540
330550
Llagas Creek
Uvas Creek
Pajaro River
Arroyo Dos Picachos
Pajaro River
Gilroy
Watsonville
Hollister
San Benito
South-central California Coast Steelhead ESU
Cities
Steelhead Presence
Streams
Hydrologic Unit Boundary
Land Ownership*
Federal
State/Local
Private/Other
Water
*Source: California Environmental Resources Evaluation System (CERES), 1999
Note: This map is for general reference only
N
0
2.5
5
10
Miles

Land Ownership
South-central California Coast Steelhead
Bolsa Neuva HU (3306)





Cities
Steelhead Presence
Streams
Hydrologic Unit Boundary

Land Ownership*

Federal
State/Local
Private/Other
Water

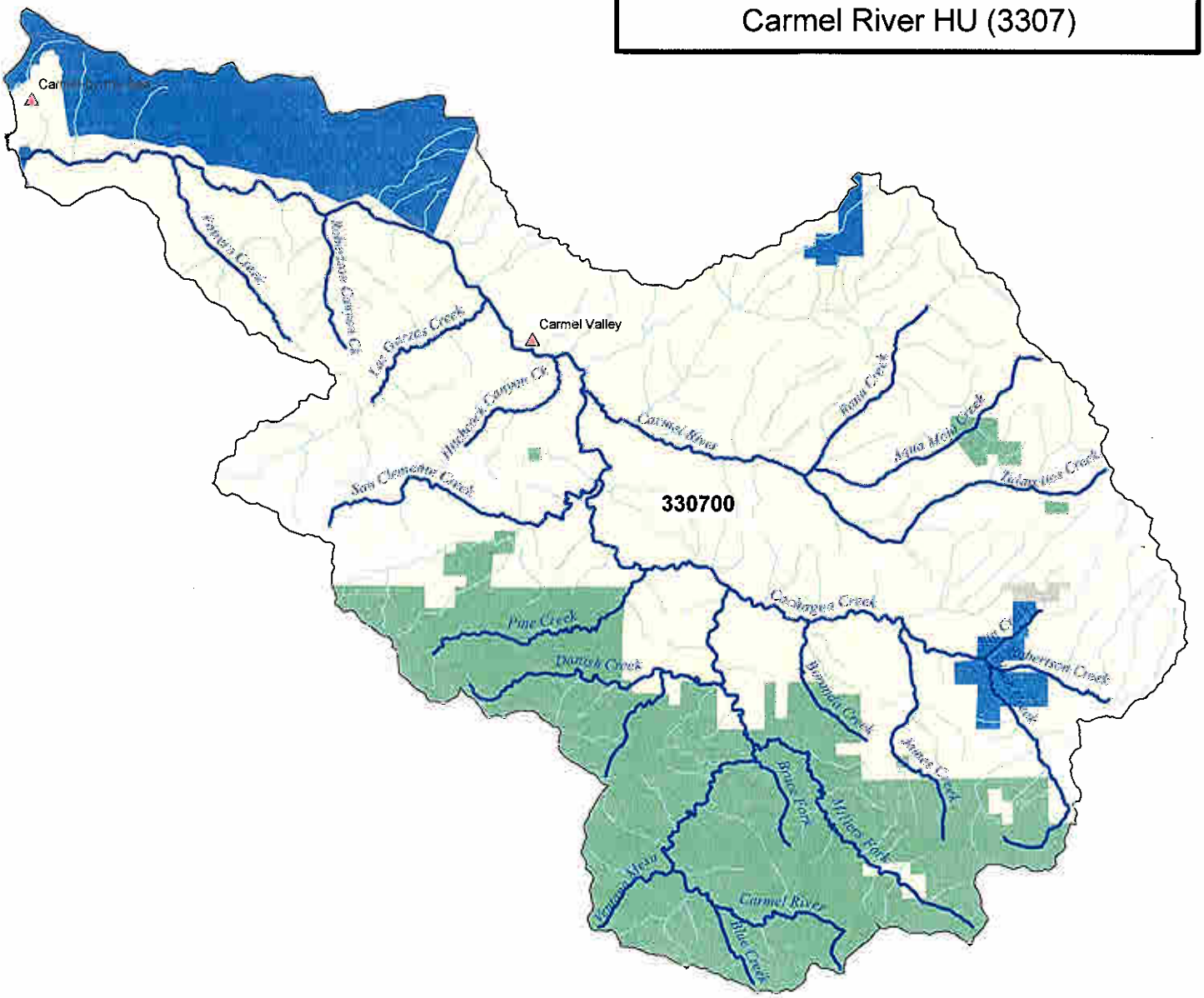
*Source: California Environmental Resources Evaluation System (CERES), 1999

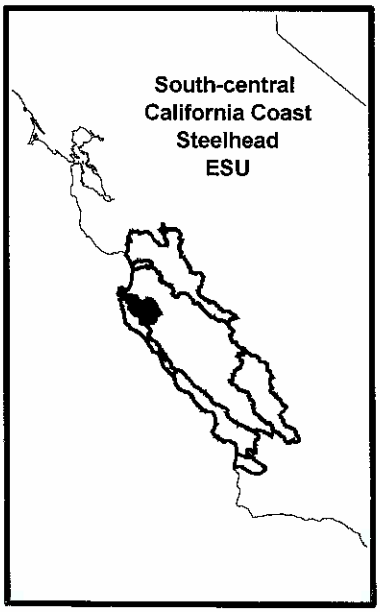
Note: This map is for general reference only

N

0 1 Miles

Land Ownership
South-central California Coast Steelhead
Carmel River HU (3307)





- Cities
- Steelhead Presence
- Streams
- Hydrologic Unit Boundary

Land Ownership*

- Federal
- State/Local
- Private/Other
- Water

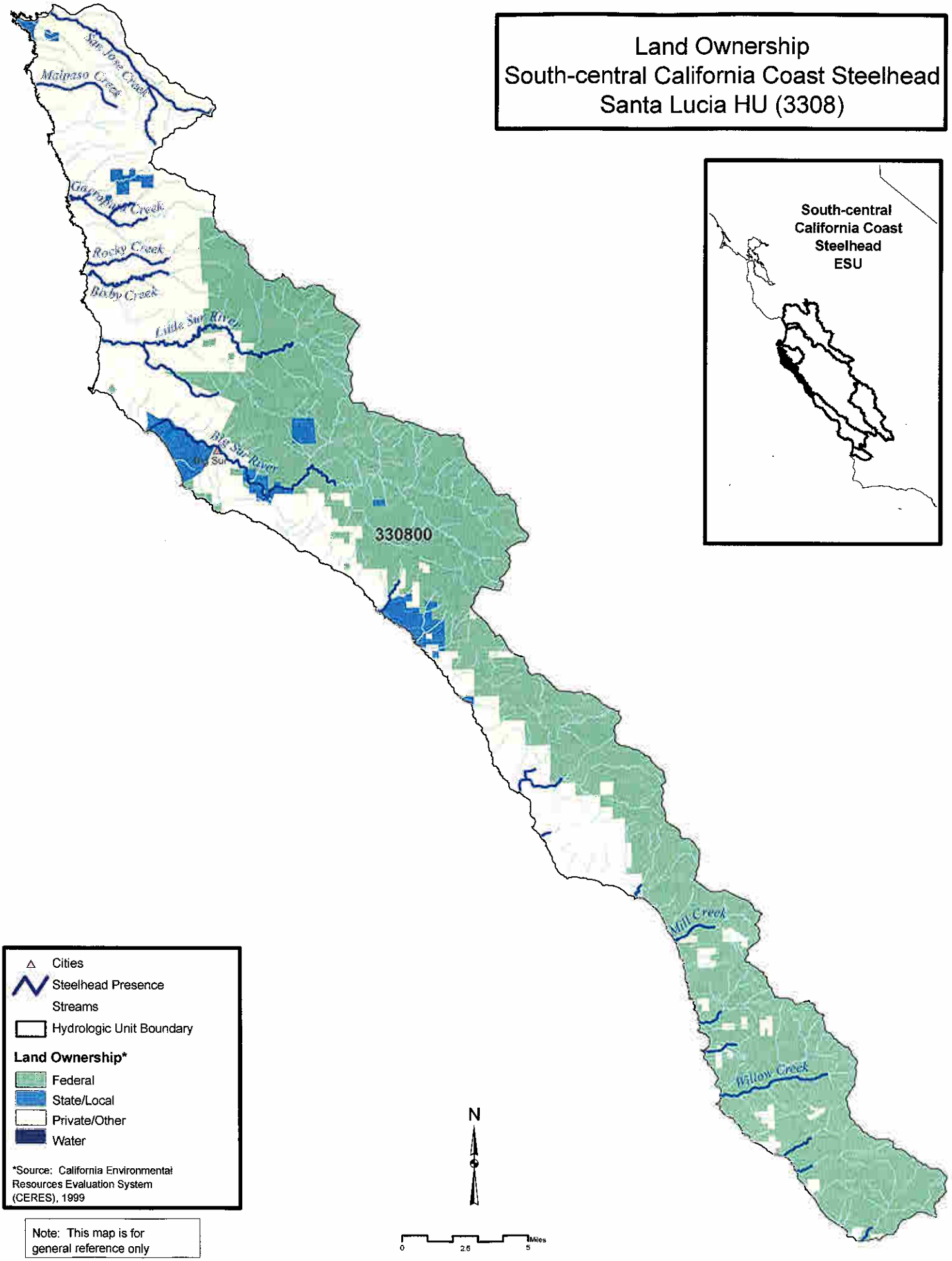
*Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is for general reference only

N

0 2.5 5 Miles

Land Ownership
South-central California Coast Steelhead
Santa Lucia HU (3308)



- Cities
- Steelhead Presence
- Streams
- Hydrologic Unit Boundary

Land Ownership*

- Federal
- State/Local
- Private/Other
- Water

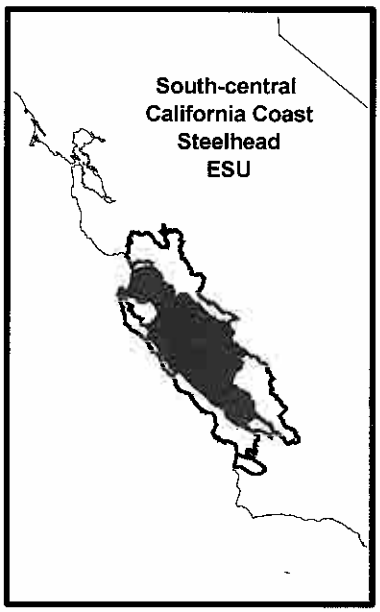
*Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is for general reference only

N

0 2.5 5 Miles

Land Ownership
South-central California Coast Steelhead
Salinas River HU (3309)



330912
Gabilan Creek
Salinas
330950
330911
330920
Salinas River
330930
330970
Arroyo Seco River
Nacimiento River
330940
King City
330960
330981
330983
San Antonio
Nacimiento R.
330982
San Marcos
Estrella
El Paso de Robles
Atascadero

- Cities
- Steelhead Presence
- Streams
- Hydrologic Unit Boundary

Land Ownership*

- Federal
- State/Local
- Private/Other
- Water

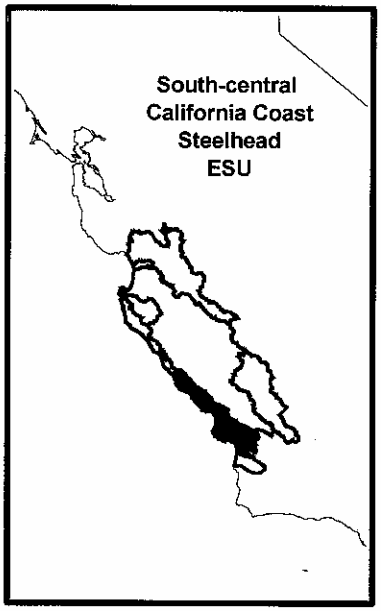
*Source: California Environmental Resources Evaluation System (CERES), 1999

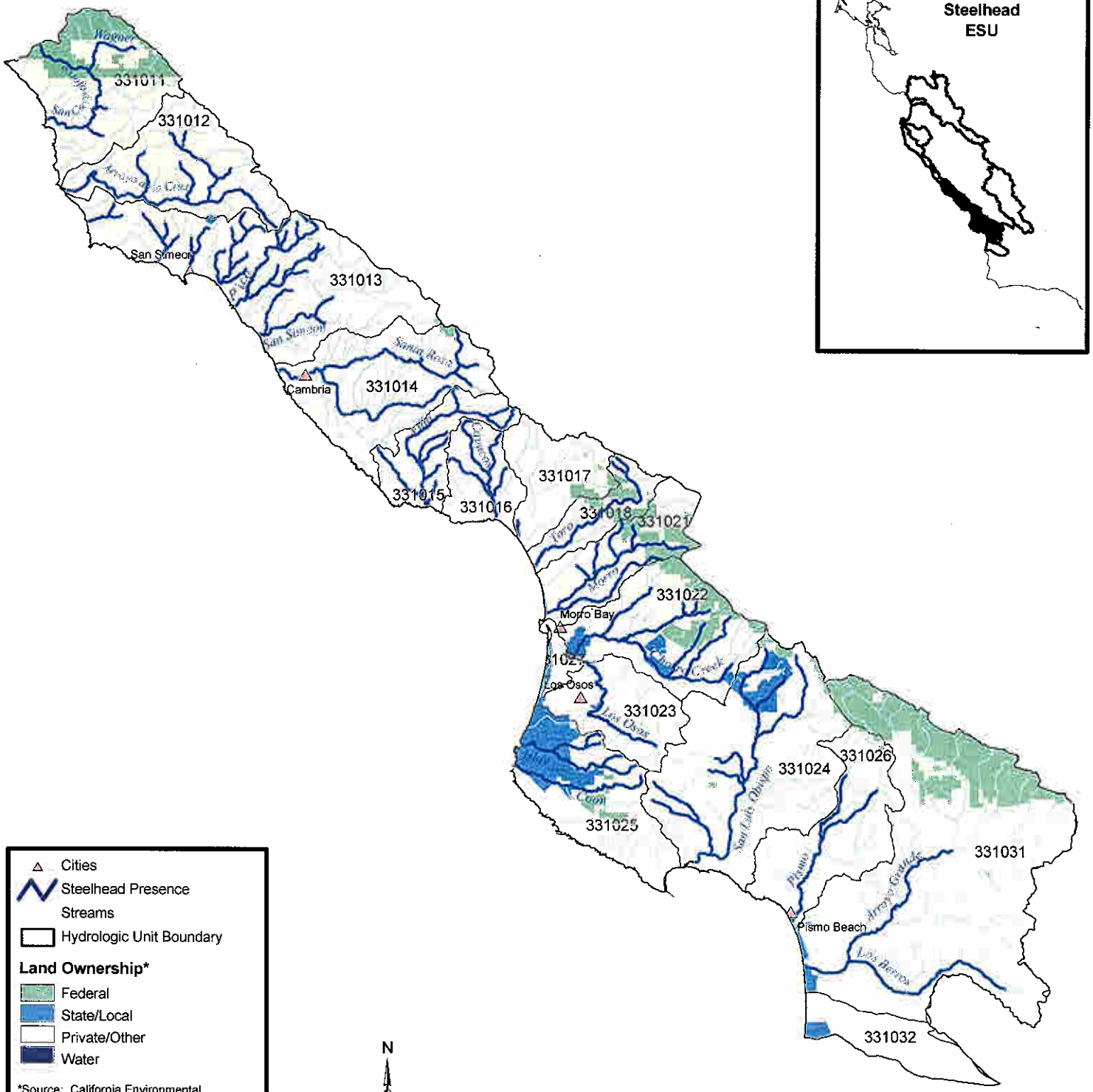
N

0 2.5 5 10 15 Miles

Note: This map is for general reference only

Land Ownership
South-central California Coast Steelhead
Estero Bay HU (3310)





- Cities
- Steelhead Presence
- Streams
- Hydrologic Unit Boundary

Land Ownership*

- Federal
- State/Local
- Private/Other
- Water

*Source: California Environmental Resources Evaluation System (CERES), 1999

N

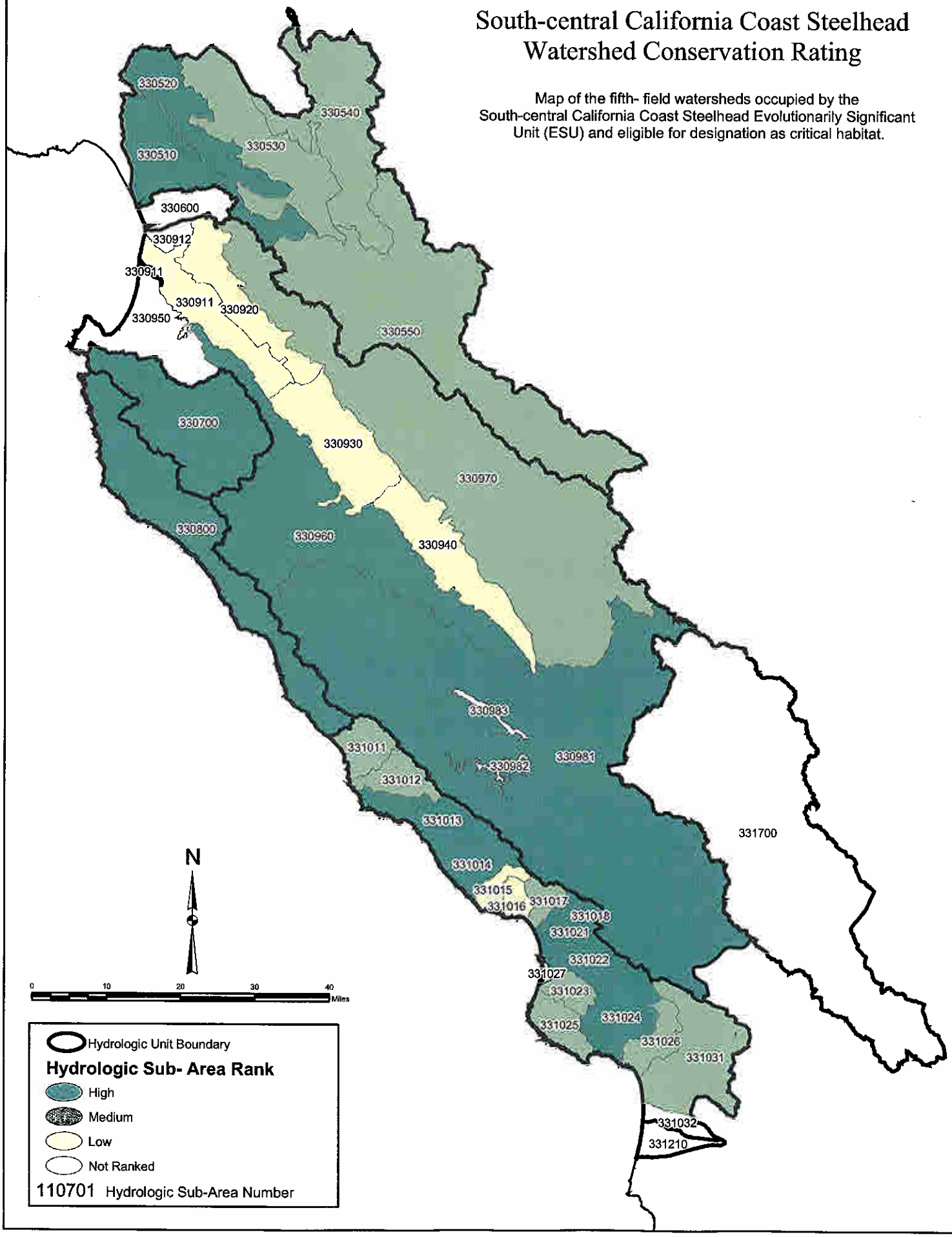
0 2.5 5 10 Miles

Note: This map is for general reference only

Map D7. Final CHART Ratings of Conservation Value for CALWATER HSA Watersheds occupied by the South-Central California Coast Steelhead ESU

South-central California Coast Steelhead Watershed Conservation Rating

Map of the fifth- field watersheds occupied by the South-central California Coast Steelhead Evolutionarily Significant Unit (ESU) and eligible for designation as critical habitat.



Appendix E
Final CHART Assessment for the Southern California (SC) Steelhead ESU

ESU Description

The SC Steelhead ESU was listed as an endangered species in 1997 (62 FR 433937; August 18, 1997) and then re-evaluated and its range extended in 2002 (67 FR 21586; May 1, 2002. The SC Steelhead ESU includes all naturally spawned populations in coastal river basins from the Santa Maria River in San Luis Obispo County southward to the U.S. - Mexican Border (67 FR 21586). Major coastal watersheds occupied by naturally spawning fish in this ESU include the Santa Maria River, Santa Ynez River, Ventura River, and the Santa Clara River. Several smaller streams in Santa Barbara, Ventura and northern Los Angeles County also support steelhead, as do two watersheds (San Juan Creek and San Mateo Creek) in southern Orange County and northern San Diego County. These southernmost populations are disjunct in distribution and are separated from the northernmost populations by approximately 80 miles. Following an updated status review (NMFS 2003a), NMFS proposed that the ESU remain listed as an endangered species (69 FR 33102; June 14, 2004), but also proposed that resident O. mykiss co-occurring with anadromous populations below impassable barriers (both natural and man made) be included in the ESU. NMFS recently determined that a 6-month extension in making a final listing determination for this and all other west coast steelhead/O. mykiss ESUs was warranted (70 Fr 37219). A Technical Recovery Team has been formed for the South-Central coast of California and is in the process of identifying the historical and extant independent population structure of this ESU, as well as the associated viability criteria for these populations.

CHART Area Assessments

The preliminary CHART assessment for this ESU (NMFS 2004b) was prepared to support our December 10, 2004, critical habitat proposal (69 FR 71880). This final CHART assessment considered new information received during the public comment period regarding fish distribution, habitat use, and watershed conservation ratings. Based on this new information, as well as information from the California Department of Fish and Game, changes were made to the distribution of occupied habitat in several watersheds. These changes resulted in an overall reduction of occupied fish habitat for the ESU, and in several instances resulted in HSA watersheds being changed from

occupied habitat to unoccupied habitat. Specifically, these changes resulted in the following: 1) a reduction of 24 occupied stream miles from HSA 331440 (Alamo Pintado and Santa Aguedo Creeks), 2) a reduction of approximately 0.8 miles of habitat in HSA 331534 (Santa Monica estuary), 3) a reduction of approximately 20 miles of occupied habitat in HSA 440232 (San Antonio Creek and tributaries), 4) a reduction of approximately 5 miles of occupied habitat in HSA 440331 (Pole Creek), 5) the change of 5 HSAs from occupied to unoccupied in the San Juan Creek/Trabuco Creek watershed (HSAs 490121, 490122, 490125, 490126, and 490128), 6) a reduction of approximately 12 miles of occupied habitat in HSA 490123 (Trabuco Creek), and 7) a reduction of approximately 5 miles of occupied habitat in HSA 490140 (Devil Creek in upper San Mateo Creek watershed).

The final CHART assessment for the SC Steelhead ESU addressed 8 Hydrologic Units (HUs) or subbasins containing 32 occupied HSAs (Figures E1 and E2). The HSAs were chosen as freshwater critical habitat units because they provided a convenient and systematic way to organize the CHART's watershed assessments for this ESU. Information presented below for individual HUs or subbasins (size, counties, total stream miles, occupied stream miles, and habitat use) were generated from GIS data sets compiled by the NMFS Southwest Region and can be found in Table E1.

Unit 1. Santa Maria River Subbasin (HU 3312)

The Santa Maria River HU is located in the northwestern portion of the ESU and includes the Santa Maria River watershed, including the Sisquoc and Cuyama tributaries upstream. The HU encompasses an area of approximately 704 mi^2 and occurs in Santa Barbara and San Luis Obispo Counties. The HU contains 3 HSAs, all of which are occupied, and approximately 1,079 stream miles within the portion of the HU that lies within the ESU (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 220 miles of occupied riverine habitat in the 3 occupied HSAs (Table E1). The CHART concluded that these occupied HSAs contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) and identified several management activities that may affect the PCEs. Table E2 summarizes the total miles of occupied riverine habitat for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map E1 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The CHART did not identify any unoccupied areas in this subbasin that

may be essential for the conservation of the ESU.

Unit 2. Santa Ynez Subbasin (HU 3314)

The Santa Ynez HU is located in the northwestern portion of the ESU and includes the Santa Ynez River watershed. The HU encompasses an area of approximately 485 mi^2 and occurs entirely in Santa Barbara County. The HU contains 6 HSAs, 5 of which are occupied, and approximately 720 stream miles within the portion of the HU that lies within the ESU (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 114 miles of occupied riverine habitat in the 5 occupied HSAs (Table E1). The CHART concluded that these occupied HSAs contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) and identified several management activities that may affect the PCEs. Table E2 summarizes the total miles of occupied riverine habitat for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map E2 depicts the specific areas in this HU that are occupied by the ESU and were considered for the critical habitat designation.

The CHART also concluded that inaccessible reaches of the Santa Ynez River and its tributaries above Bradbury Dam may be essential to the conservation of this ESU. The team reached this conclusion because historical records indicate that the upper portion of the Santa Ynez watershed above Bradbury Dam provided the principal spawning and rearing habitat for a historically large anadromous steelhead population prior to construction of the dam. Because of the large size of the Santa Ynez river system, it is likely to have historically supported one or more independent populations which contributed to the resiliency of the ESU and served as a buffer against extinction. The currently occupied habitat areas within the range of this ESU are relatively small in number and size, and in many cases are isolated from other occupied habitats, thus the re-establishment of larger populations such as the one that historically occurred in the Santa Ynez River may be necessary to reduce the extinction risk for this ESU.

Unit 3. South Coast Subbasin (HU 3315)

The South Coast HU is located in the northwestern portion of the ESU and includes several small streams including Arroyo Hondo, Mission Creek, and Carpinteria Creek. That portion of the HU within the ESU encompasses an area of approximately 375 mi^2 and occurs primarily in Santa Barbara County. The HU contains 5 HSAs, all of which

are occupied, and approximately 620 stream miles within the portion of the HU that lies within the ESU (at 1:100,000 hydrography), although most of the stream miles are in one HSA. Fish distribution and habitat use data compiled by NMFS biologists identify approximately 149 miles of occupied riverine habitat in the 5 occupied HSAs (Table E1). The CHART concluded that these occupied HSAs contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) and identified several management activities that may affect the PCEs. Table E2 summarizes the total miles of occupied riverine habitat for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map E3 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The CHART did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 4. Ventura River Subbasin (HU 4402)

The Ventura River HU is located in the northwestern portion of the ESU and includes the Ventura River and its associated tributaries. That portion of the HU within the ESU encompasses an area of approximately 162 mi^2 and occurs entirely in Ventura County. The HU contains 4 HSAs, all of which are occupied, and approximately 296 stream miles within the portion of the HU that lies within the ESU (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 48 miles of occupied riverine habitat in the 4 occupied HSAs (Table E1). The CHART concluded that these occupied HSAs contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) and identified several management activities that may affect the PCEs. Table E2 summarizes the total miles of occupied riverine habitat for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map E4 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation.

The CHART also concluded that inaccessible reaches of Matilija Creek and its tributaries above Matilija Dam and inaccessible reaches of Coyote and Santa Ana Creeks above Casitas Dam may be essential to the conservation of this ESU. The team reached this conclusion because historical records indicate that the inaccessible habitat reaches above Matilija and Casitas Dams provided the principal spawning and rearing habitat for a historically large anadromous steelhead population within the Ventura River watershed prior to construction of the dams. Because of the relatively large size of the Ventura

River watershed, it is likely to have historically supported one or more independent populations prior to dam construction which contributed to the resiliency of the ESU and served as a buffer against extinction. The currently occupied habitat areas within the range of this ESU are relatively small in number and size, and in many cases are isolated from other occupied habitats, thus the re-establishment of larger populations such as the ones that historically occurred in the Ventura River watershed may be necessary to reduce the extinction risk of this ESU.

Unit 5. Santa Clara - Calleguas Subbasin (HU 4403)

The Santa Clara - Calleguas HU is located in the northwestern portion of the ESU and includes the Santa Clara River and its tributaries including Sespe Creek. That portion of the HU within the ESU encompasses a large area of approximately 1,236 mi^2 and occurs primarily in Ventura and Los Angeles Counties. The HU contains 14 HSAs, only 6 of which are occupied, and approximately 1,839 stream miles within the portion of the HU that lies within the ESU (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 177 miles of occupied riverine habitat in the occupied HSAs (Table E1). The CHART concluded that these occupied HSAs contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) and identified several management activities that may affect the PCEs. Table E2 summarizes the total miles of occupied riverine habitat for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map E5 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation

The CHART also concluded that inaccessible reaches of Piru Creek and its tributaries above Santa Felicia Dam may be essential to the conservation of this ESU. The team reached this conclusion because historical records indicate that the inaccessible habitat reaches above Santa Felicia Dam provided the principal spawning and rearing habitat for a historically large anadromous steelhead population within the Santa Clara River watershed prior to construction of the dam. Because of the large size of the Santa Clara River watershed, it is likely to have historically supported one or more independent populations prior to dam construction which contributed to the resiliency of the ESU and served as a buffer against its extinction. The currently occupied habitat areas within the range of this ESU are relatively small in number and size, and in many cases are isolated from other occupied habitats, thus the re-establishment of larger populations such as the one that historically occurred in the Santa Clara River watershed may be necessary to

reduce the extinction probability of this ESU.

Unit 6. Santa Monica Bay Subbasin (HU 4404)

The Santa Monica Bay HU is located in the northwestern portion of the ESU and includes Topanga Creek, Malibu Creek, and Arroyo Sequit. That portion of the HU within the ESU encompasses a large area of approximately 328 mi^2 and occurs primarily in Los Angeles County. The HU contains 29 HSAs, only 3 of which are occupied, and approximately 222 stream miles within the portion of the HU that lies within the ESU (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify only approximately 11 miles of occupied riverine and/or estuarine habitat in the occupied HSAs (Table E1). The CHART concluded that these occupied HSAs contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) and identified several management activities that may affect the PCEs. Table E2 summarizes the total miles of occupied riverine/estuarine habitat for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map E6 depicts the specific areas in this HU that are occupied by the ESU and were considered for the critical habitat designation.

The CHART also concluded that inaccessible reaches of Malibu Creek above Rindge Dam may be essential to the conservation of this ESU. The team reached this conclusion because historical records indicate that the inaccessible habitat reaches above Rindge Dam provided the principal spawning and rearing habitat for an important anadromous steelhead population within the Malibu River watershed prior to construction of the dam. Because of the size of this watershed, it is likely to have historically supported an independent population prior to dam construction which contributed to the resiliency of the ESU and served as a buffer against its extinction. The currently occupied habitat areas within the range of this ESU are relatively small in number and size, and in many cases are isolated from other occupied habitats, thus the re-establishment of larger populations such as the one that historically occurred in Malibu Creek may be necessary to reduce the extinction risk of this ESU.

Unit 7. Calleguas Subbasin (HU 4408)

The Calleguas HU is located in the northwestern portion of the ESU and includes Calleguas Creek and estuary. That portion of the HU within the ESU encompasses a large area of approximately 344 mi^2 and occurs primarily in Ventura County. The HU

contains 12 HSAs, only 2 of which are occupied, and approximately 463 stream miles within the portion of the HU that lies within the ESU (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify only approximately 1 mile of occupied estuarine habitat in one of occupied HSAs (Table E1). Mugu Lagoon, which constitutes the other occupied HSA, is also utilized by the ESU. The CHART concluded that the occupied HSAs contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) and identified several management activities that may affect the PCEs. Table E2 summarizes the total miles of occupied estuarine habitat for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map E7 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation.

Unit 8. San Juan Subbasin (HU 4901)

The San Juan HU is located in the southern portion of the ESU and includes the San Juan Creek and San Mateo Creek watersheds which have recently been recolonized by Steelhead.. That portion of the HU within the ESU encompasses an area of approximately 496 mi^2 and occurs primarily in portions of Orange, Riverside, and Orange Counties. The HU contains 18 HSAs, only 3 of which are occupied, and approximately 743 stream miles within the portion of the HU that lies within the ESU (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify only approximately 21 miles of occupied riverine and/or estuarine habitat in the occupied HSAs (Table E1). The CHART concluded that the occupied HSAs contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) and identified several management activities that may affect the PCEs. Table E2 summarizes the total miles of occupied estuarine habitat for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map E8 depicts the specific areas in this HU that are occupied by the ESU and under consideration for the critical habitat designation.

Within the range of the SC Steelhead ESU, which extends from the Santa Maria River southward to the U.S.- Mexico border, there are a large number of HSA watersheds and their associated subbasins (or HUs) that are not occupied. These unoccupied subbasins include the San Gabriel River, Los Angeles River, Santa Ana River, Santa Margarita River, San Luis Rey River, San Dieguito River, San Diego River, Sweetwater River,

Otay River and Tijuana River. Because these areas are unoccupied and were not considered essential for conservation of the ESU by the team, they were not considered further in the designation process.

Final CHART Conservation Value Rating

Freshwater Areas

After reviewing the best available scientific data regarding critical habitat for this ESU, the CHART concluded that most of the occupied HSAs were of high or medium conservation value to the ESU. Of the 32 occupied HSAs that were evaluated, 21 were rated as having high conservation value, 6 were rated as having medium conservation value, and 5 were rated as having low conservation value. Table E3 summaries the CHARTs PCE/watershed scores and preliminary conservation value ratings (i.e. low, medium or high). Figure E9 shows the overall spatial distribution of conservation ratings by HSA watershed for the ESU.

Marine Areas

NMFS determined that marine areas did not warrant consideration as critical habitat for this ESU.

References and Sources of Information

NMFS 2003a. Updated Status of Federally Listed ESUs of West Coast Salmon and Steelhead. West Coast Salmon Biological Review Team; Northwest Fisheries Science Center and Southwest Fisheries Science Center. July 2003.

NMFS 2004b. Draft Findings of NMFS' Critical Habitat Development and Review Teams (CHARTs) for 7 Salmon and O. mykiss ESUs in California. Main Report and 7 Appendices. Prepared by NMFS Southwest Region.

Federal Register Notices

62 FR 43937 - Southern California Steelhead Listing Determination (1997)

67 FR 21586 - SC Steelhead Range Extension (2002)

69 FR 33102 - Proposed Listing Determinations for 27 West Coast Salmon and Steelhead ESUs (June 2004)

70 FR 37219 - 6-Month Extension of the Final Listing Determinations for 10 ESUs of west coast O. mykiss

Table E1. Southern California Steelhead ESU: Occupancy, miles of occupied habitat, and geographic area information by Hydrologic Unit and Hydrologic Subarea.

HU Number	HU Name	Major Stream / Watershed in HU	HU Occupied (Y or N)	Acres in HU (within ESU)	Square Miles in HU (within ESU)	Acres in HU (Total)	Percent of HU within ESU	Stream Miles (1:100k) in HU (within ESU)	Occupied Stream Miles	Occupied Stream Miles (Spawning)	Occupied Stream Miles (Rearing)	Occupied Stream Miles (Migration)	County HU Falls within	Acres of County in HU (within ESU)	Square Miles of County in HU (within ESU)	Percent of HU by County (within ESU)	HSA Number	HSA Name	HSA Occupied (Y or N)	Acres in HSA	Square Miles in HSA	Stream Miles (1:100k) in HSA
3312	Santa Maria River	Santa Maria Sisquoc River Cuyama River	Y	450,705	704	1,188,416	38%	1,079	220	171	178	220	San Luis Obispo Santa Barbara	42,046 408,654	66 639	9% 91%	**331210	Guadalupe	Y	152,234	238	220
																	331220	Sisquoc	Y	303,496	474	839
																	**331230	Cuyama Valley	Y	732,686	1,145	1,884
3313	San Antonio	San Antonio Creek	N	135,630	212	135,630	100%	242					Santa Barbara	135,520	212	100%	331300	SAME AS HUNAME	N	135,630	212	242
3314	Santa Ynez	Santa Ynez River	Y	310,545	485	576,064	54%	720	114	60	61	114	Santa Barbara	310,529	485	100%	331410	Lompoc	Y	71,470	112	115
																	331420	Santa Rita	Y	80,881	126	197
																	331430	Buellton	Y	53,579	84	99
																	**331440	Los Olivos	Y	102,891	160	303
																	**331451	Santa Cruz Creek	Y	264,128	413	808
																	331452	Lake Cachuma	N	3,235	5	20
3315	South Coast	Santa Barbara South Coast Streams	Y	240,101	375	240,101	100%	620	149	138	144	149	Ventura	7,096	11	3%	331510	Arguello	Y	139,409	218	369
													Santa Barbara	232,871	364	97%	331531	Goleta	Y	33,302	52	98
																	331532	Santa Barbara	Y	22,347	35	43
																	331533	Montecito	Y	12,420	19	32
																	331534	Carpinteria	Y	32,622	51	77
4401	Pitas Point	Los Sauces Creek	N	14,051	22	14,051	100%	29					Ventura	14,050	22	100%	440100	SAME AS HUNAME	N	14,051	22	29
4402	Ventura River	Ventura River	Y	103,441	162	144,672	72%	296	48	27	33	48	Ventura	103,441	162	100%	440210	Lower Ventura River	Y	24,576	38	58
																	**440220	Upper Ventura River	Y	90,324	141	265
																	440231	Upper Ojai	Y	8,149	13	19
																	440232	Ojai Valley	Y	21,622	34	67
4403	Santa Clara-Calleguas	Santa Clara River Sespe Creek	Y	790,865	1,236	1,037,178	76%	1,839	177	139	162	164	Santa Barbara Ventura Los Angeles	1,168 365,336 424,307	2 571 663	0% 46% 54%	440310	Oxnard Plain	Y	19,860	31	14
																	440321	Sulfer Springs	Y	66,041	103	170
																	440322	Sisar	Y	7,434	12	23
																	440331	Fillmore	Y	49,159	77	86
																	440332	Topa Topa	Y	160,438	251	493
																	440341	Santa Felicia	Y	78,076	122	160
																	440342	Upper Piru	N	169,192	264	469
																	440343	Hungry Valley	N	39,647	62	86
																	440344	Stauffer	N	37,475	59	88
																	440351	Eastern	N	291,841	456	615
																	440352	Bouquet	N	8,700	14	16
																	440353	Mint Canyon	N	10,838	17	28
																	440354	Sierra Pelona	N	9,678	15	16
																	440355	Acton	N	88,796	139	218
4404	Santa Monica Bay	Malibu Creek	Y	210,077	328	267,163	79%	222	11	5	9	3	Ventura Los Angeles	2,930 206,993	5 323	1% 99%	440411	Topanga Canyon	Y	12,575	20	30
																	440412	Tuna Canyon	N	1,016	2	3
																	440413	Pena Canyon	N	611	1	2
																	440414	Piedra Gorda Canyon	N	646	1	2
																	440415	Las Flores Canyon	N	2,899	5	6
																	440416	Carbon Canyon	N	2,328	4	5
																	440421	Monte Nido	Y	13,431	21	30
																	440422	La Virgenes Canyon	N	15,552	24	33
																	440423	Lindero Canyon	N	11,454	18	30
																	440424	Triunfo Canyon	N	10,063	16	23
																	440425	Russell Valley	N	9,280	15	25
																	440426	Sherwood	N	10,737	17	20
																	440431	Corral Canyon	N	4,300	7	8
																	440432	Solstice Canyon	N	2,842	4	8
																	440433	Latigo Canyon	N	814	1	3
																	440434	Escondido Canyon	N	2,300	4	6
																	440435	Ramera Canyon	N	3,339	5	8
																	440436	Zuma Canyon	N	6,356	10	13
																	440437	Trancas Canyon	N	6,550	10	13
																	440441	Encinal Canyon	N	1,799	3	4
																	440442	Los Alisos Canyon	N	2,405	4	6
																	440443	Nicholas Canyon	N	1,242	2	2
																	440444	Arroyo Senuit	Y	7,552	12	17
																	440450	Upper Santa Monica Bay	N	27,486	43	36
																	440461	Culver City	N	25,063	39	9
																	440462	Hollywood	N	22,830	36	
																	440463	Wilshire	N	35,765	56	2
																	440464	Marina Del Ray Harbor	N	409	1	
																	440470	Lower Santa Monica Bay	N	25,520	40	7
4405	San Gabriel River	San Gabriel River	N	229,862	359	378,771	61%	284					Orange San Bernardino Los Angeles	57 41 229,742	0 0 359	0% 0% 100%	440512	Alamitos Bay	N	619	1	
																	440515	Central (Split)	N	80,234	125	64
																	440520	Upper San Gabriel	N	101,714	159	137
																	440542	Lower Canyon	N	3,681	6	8
																	440543	Upper Canyon	N	145,228	227	379
																	440544	Foothill	N	13,201	21	35
																	440551	San Jose	N	6,639	10	8
																	440552	Pomona	N	6,367	10	7

4407	Buenaventura	Arundell Barranca	N	13,226	21	13,226	100%	23					Ventura	13,226	21	100%	440700	SAME AS HUNAME	N	13,226	21	23
4408	Calleguas	Calleguas Creek	Y	220,177	344	220,177	100%	463	1	0	0	1	Los Angeles	2,682	4	1%	440811	East of Oxnard	Y	24,500	38	11
													Ventura	217,276	339	99%	440812	Pleasant Valley	N	36,931	58	34
																	†440813	Point Mugu Lagoon	Y	110	0	0
																	†440813	Point Mugu Lagoon	N	248	0	
																	440821	West Las Posas	N	12,914	20	28
																	440822	East Las Posas	N	51,580	81	176
																	440823	Arroyo Santa Rosa	N	7,793	12	12
																	440824	Conejo Valley	N	17,706	28	43
																	440825	Tierra Rejada Valley	N	4,580	7	5
																	440826	Gillibrand	N	11,358	18	33
																	440827	Simi Valley	N	41,143	64	90
																	440828	Thousand Oaks	N	11,334	18	29
4409	Ventura Coastal Streams	Big Sycamore Canyon	N	22,476	35	22,476	100%	50					Los Angeles	1	0	0%	440901	Little Sycamore Canyon	N	3,791	6	8
													Ventura	22,476	35	100%	440902	Deer Canyon	N	2,273	4	4
																	440903	Big Sycamore canyon	N	13,614	21	32
																	440904	La Jolla Valley	N	2,798	4	7
4410	Oxnard	NA	N	18,721	29	18,721	100%						Ventura	18,506	29	100%	441000	SAME AS HUNAME	N	18,721	29	
4411	Dominguez Channel	Dominguez Channel	N	81,763	128	81,763	100%	22					Los Angeles	81,763	128	100%	441101	Carson	N	48,193	75	18
																	441102	San Pedro	N	25,853	40	4
																	441103	Terminal Island	N	2,111	3	
																	441104	Los Angeles Harbor	N	5,605	9	0
4412	Los Angeles River	Los Angeles River	N	379,521	593	533,851	71%	387					Ventura	6,159	10	2%	441210	Los Angeles	N	104,224	163	51
													Los Angeles	373,355	583	98%	441221	Bull Canyon	N	184,402	288	209
																	441222	Sylmar	N	29,198	46	61
																	441223	Tujunga	N	97,865	153	250
																	441224	Verdugo	N	13,874	22	32
																	441225	Eagle Rock	N	3,582	6	
																	441231	Pasadena	N	73,439	115	95
																	441232	Monk Hill	N	20,358	32	49
																	441233	Santa Anita	N	8,909	11	16
4481	Santa Ana River	San Antonio Creek Channel	N	975	2	16,686	6%	2					Orange	3	0	0%	448115	Yorba Linda (Split)	N	975	2	2
		Chino Creek											San Bernardino	0	0	0%	448121	Chino (Split)	N	9,257	14	7
													Los Angeles	972	2	100%	448122	Harrison	N	516	1	3
																	448123	Claremont Heights (Split)	N	5,938	9	15
4801	Santa Ana River	Santa Ana River	N	308,702	482	1,245,648	25%	451					Riverside	6,600	10	2%	480111	East Coastal Plain	N	194,573	304	210
													Los Angeles	21	0	0%	480112	Santiago	N	54,165	85	143
													Orange	289,055	452	94%	480113	Santa Ana Narrows	N	32,112	50	71
													San Bernardino	12,939	20	4%	480114	Newport Bay	N	1,610	3	0
																	480115	Yorba Linda (Split)	N	26,242	41	37
																	480121	Chino (Split)	N	190,514	298	253
																	480123	Claremont Heights (Split)	N	11,393	18	31
																	480124	Cucamonga	N	10,715	17	26
																	480125	Temescal	N	35,737	56	45
																	480126	Arlington	N	44,217	69	79
																	480127	Riverside	N	50,189	78	50
																	480131	Coldwater	N	10,441	16	15
																	480132	Bedford	N	31,760	50	85
																	480133	Cajalco	N	25,197	39	43
																	480134	Lee Lake	N	22,542	35	43
																	480135	Terra Cotta	N	14,216	22	25
																	480141	Upper Lytle	N	29,654	46	62
																	480142	Lower Lytle	N	5,760	9	23
																	480143	Rialto	N	4,577	7	7
																	480144	Colton	N	17,765	28	8
																	480145	Reche	N	7,074	11	15
																	480151	Cajon	N	36,201	57	87
																	480152	Bunker Hill	N	124,790	195	279
																	480153	Redlands	N	6,469	10	3
																	480154	Mentone	N	1,423	2	
																	480155	Reservoir	N	7,552	12	7
																	480156	Crafton	N	2,697	4	6
																	480157	Santa Ana Canyon	N	20,702	32	52
																	480158	Mill Creek	N	30,371	47	69
																	480159	Sycamore	N	4,158	6	18
																	480161	Yucaipa	N	7,729	12	16
																	480162	Beaumont	N	29,338	46	70
																	480163	Cherry Valley	N	4,890	8	6
																	480165	Gateway	N	3,563	6	11
																	480166	Oak Glen	N	12,063	19	22
																	480167	South Mesa	N	7,626	12	20
																	480168	Noble Creek	N	10,126	16	29
																	480171	Bear Valley	N	34,332	54	79
																	480172	Seven Oaks	N	56,351	91	143
																	480173	Baldwin	N	22,788	36	36
4845	San Gabriel River	Carbon Creek	N	55,644	87	55,644	100%	72					Los Angeles	81	0	0%	†484515	Central (Split)	N	79	0	6
		Fullerton Creek											Orange	53,573	84	96%	†484515	Central (Split)	N	436	1	
													San Bernardino	1,990	3	4%	†484515	Central (Split)	N	106	0	

4901	San Juan	San Mateo Creek San Juan Creek	Y	317,273	496	317,273	100%	743	21	15	18	21	San Diego Riverside Orange	96,683 54,498 166,091	151 85 260	30% 17% 52%
4902	Santa Margarita	Santa Margarita River	N	248,443	388	475,463	52%	525					Riverside San Diego	177,431 71,001	277 111	71% 29%
4903	San Luis Rey	San Luis Rey River	N	220,396	344	358,676	61%	436					San Diego Riverside	220,093 303	344 0	100% 0%
4904	Carlsbad	Escondido Creek	N	112,105	175	135,756	83%	173					San Diego	112,078	175	100%

†484515	Central (Split)	N	137	0	
†484515	Central (Split)	N	433	1	
†484515	Central (Split)	N	752	1	
484561	Anaheim	N	40,937	64	46
†484562	La Habra (Split)	N	10,770	17	20
†484562	La Habra (Split)	N	1,994	3	
490111	San Joaquin Hills	N	4,345	7	12
490112	Laguna Beach	N	6,780	11	16
490113	Aliso	N	22,862	36	52
490114	Dana Point	N	6,252	10	12
490121	Oso	N	11,117	17	26
490122	Upper Trabuco	N	12,855	20	34
490123	Middle Trabuco	Y	10,047	16	31
490124	Gobernadora	N	11,210	18	24
490125	Upper San Juan	N	50,858	79	135
490126	Middle San Juan	N	4,302	7	11
490127	Lower San Juan	Y	8,044	13	13
490128	Ortega	N	4,921	8	6
490131	Prima Deshecha	N	5,441	9	3
490132	Segunda Deshecha	N	7,289	11	13
490140	San Mateo Canyon	Y	85,470	134	199
490151	San Onofre Valley	N	37,403	58	86
490152	Las Pulgas	N	19,214	30	46
490153	Stuart	N	8,863	14	25
490211	Lower Ysidora	N	9,043	14	13
490212	Chappo	N	7,814	12	7
490213	Upper Ysidora	N	11,107	17	25
490221	Deluz Creek	N	37,958	59	76
490222	Gavilan	N	28,956	45	80
490223	Vallecitos	N	6,059	9	9
490231	Wildomar	N	13,114	20	27
490232	Murrieta	N	32,147	50	72
490233	French	N	20,684	32	44
490234	Lower Domenigoni	N	3,151	5	3
490235	Domenigoni	N	6,559	10	3
490236	Diamond	N	7,082	11	4
490241	Bachelor Mountain	N	21,879	34	52
490242	Gertrudis	N	20,730	32	47
490243	Lower Tucalota	N	6,735	11	11
490244	Tucalota	N	9,662	15	13
490251	Pauba	N	17,232	27	37
490252	Wolf	N	12,206	19	26
490261	Lancaster Valley	N	14,447	23	26
490262	Lewis	N	9,950	16	12
490263	Reed Valley	N	15,486	24	29
490271	Lower Coahuila	N	13,257	21	22
490272	Upper Coahuila	N	11,235	18	25
490273	Anza	N	24,781	39	28
490274	Burnt	N	2,329	4	3
490281	Vail	N	21,426	33	54
490282	Devils Hole	N	5,981	9	13
490283	Redec	N	12,958	20	31
490284	Tule Creek	N	23,266	36	56
490291	Lower Culp	N	9,432	15	20
490292	Previlt Canyon	N	26,136	41	46
490293	Dodge	N	7,154	11	24
490294	Chihuahua	N	5,704	9	12
490311	Mission	N	30,213	47	55
490312	Bonsall	N	65,493	102	124
490313	Moosa	N	12,794	20	18
490314	Valley Center	N	4,330	7	6
490315	Woods	N	1,915	3	2
490316	Rincon	N	4,927	8	13
490321	Pala	N	35,307	55	67
490322	Pauma	N	54,733	86	120
490323	La Jolla Amago	N	16,928	26	40
490331	Warner	N	124,038	194	275
490332	Combs	N	7,996	12	18
490410	Loma Alta	N	6,283	10	14
490421	El Salto	N	7,464	12	7
490422	Vista	N	6,982	11	10
490431	Los Monos	N	13,686	21	22
490432	Buena	N	6,050	9	13
490440	Encinas	N	2,547	4	4
490451	Batiquitos	N	19,502	30	26
490452	Richland	N	12,864	20	15
490453	Twin Oaks	N	5,663	9	12
490461	San Elijo	N	20,371	32	39
490462	Escondido	N	29,219	46	37
490463	Lake Wohlford	N	5,124	8	10

4905	San Dieguito	San Dieguito River	N	187,010	292	221,563	84%	365	San Diego	187,008	292	100%	490511	Rancho Santa Fe	N	22,966	36	36
													490512	La Jolla	N	5,760	9	12
													490521	Del Dios	N	21,108	33	30
													490522	Green	N	5,627	9	8
													490523	Felicita	N	1,820	3	3
													490524	Bear	N	1,716	3	3
													490531	Highland	N	2,552	4	4
													490532	Las Lomas Muertas	N	23,955	37	46
													490533	Reed	N	1,907	3	5
													490534	Hidden	N	1,193	2	2
													490535	Guejito	N	12,659	20	33
													490536	Vineyard	N	1,796	3	3
													490541	Ramona	N	25,851	40	43
													490542	Lower Hatfield	N	2,835	4	7
													490543	Wash Hollow	N	2,315	4	5
													490544	Upper Hatfield	N	1,019	2	2
													490545	Ballena	N	2,494	4	7
													490546	East Santa Teresa	N	882	1	2
													490547	West Santa Teresa	N	1,143	2	2
													490551	Boden	N	10,531	16	26
													490552	Pamo	N	36,879	58	87
													490553	Sutherland	N	18,511	29	35
													490554	Witch Creek	N	16,042	25	30
4906	Penasquitos	Poway Creek	N	103,794	162	103,794	100%	187	San Diego	103,794	162	100%	490610	Miramar Reservoir	N	33,329	52	62
													490620	Poway	N	27,094	42	63
													490630	Scripps	N	8,446	13	
													490640	Miramar	N	25,180	39	51
													490650	Tecolote	N	6,257	10	10
													490660	Vacation Isle	N	126	0	
													490670	Fiesta Island	N	1,046	2	0
													490680	Mission Bay	N	2,317	4	0
4907	San Diego	San Diego River	N	223,702	350	278,987	80%	409	San Diego	223,690	350	100%	490711	Mission San Diego	N	37,058	58	45
													490712	Santee	N	40,148	63	67
													490713	El Cajon	N	15,485	24	16
													490714	Coches	N	10,050	16	23
													490715	El Monte	N	8,260	13	15
													490721	Fernbrook	N	14,078	22	36
													490722	Kimball	N	8,491	13	18
													490723	Gower	N	14,854	23	42
													490724	Barona	N	10,202	16	19
													490731	Conejos Creek	N	51,820	81	110
													490733	Alpine	N	3,905	6	11
													490741	Inaja	N	52,197	82	109
													490742	Spencer	N	4,758	7	13
													490743	Cuyamaca	N	7,660	12	11
4908	Pueblo San Diego	Chollas Creek	N	37,547	59	37,547	100%	37	San Diego	37,475	59	100%	490810	Point Loma	N	4,417	7	
													490821	Lindbergh	N	5,192	8	
													490822	Chollas	N	21,489	34	26
													490831	El Toyan	N	1,963	3	4
													490832	Paradise	N	4,487	7	6
4909	Sweetwater	Sweetwater River	N	30,552	48	146,787	21%	47	San Diego	30,472	48	100%	490911	Telegraph	N	5,346	8	10
													490912	La Nacion	N	25,205	39	37
													490921	Jamacha	N	40,520	63	91
													490922	Hillsdale	N	1,375	2	1
													490923	Dehesa	N	4,567	7	11
													490924	Galloway	N	1,517	2	3
													490925	Sequan	N	2,925	5	6
													490926	Alpine Heights	N	2,581	4	5
													490931	Loveland	N	24,666	39	49
													490932	Japatul	N	1,494	2	3
													490933	Viejas	N	8,382	13	13
													490934	Descanso	N	14,344	22	24
													490935	Garnet	N	13,861	22	26
4910	Otay	Otay River	N	35,129	55	98,384	36%	62	San Diego	35,044	55	100%	491010	Coronado	N	5,561	9	
													491020	Otay Valley	N	29,568	46	62
													491031	Savage	N	10,220	16	29
													491032	Proctor	N	8,129	13	25
													491033	Jamul	N	7,795	12	29
													491034	Lee	N	2,075	3	7
													491035	Lyon	N	2,076	3	4
													491036	Hollenbeck	N	31,728	50	96
													491037	Engineer Springs	N	1,233	2	3
4911	Tijuana	Tijuana River Cottonwood Creek	N	73,378	115	299,193	25%	124	San Diego	73,339	115	100%	491111	San Ysidro	N	10,183	16	13
													491112	Water Tanks	N	9,582	15	5
													491121	Marron	N	9,805	15	11
													491122	Bee Canyon	N	3,283	5	7
													491123	Barrett	N	27,307	43	64
													491124	Round Potrero	N	1,969	3	3
													491125	Long Potrero	N	11,250	18	22
													491130	Barrett Lake	N	59,133	92	124

*4912	San Diego Bay	San Diego Bay	N	10,931	17	10,931	100%	0	San Diego	246	0	2%

491141	Pine	N	18,805	29	44
491142	Mount Laguna	N	5,322	8	9
491150	Morena	N	14,917	23	26
491160	Cottonwood	N	28,561	45	50
491170	Cameron	N	30,068	47	48
491181	Tecate	N	5,395	8	
491182	Canyon City	N	32,045	50	17
491183	Clover Flat	N	17,404	27	22
491184	Hill	N	7,471	12	9
491185	Hipass	N	6,693	10	
491200	SAME AS HUNAME	N	10,931	17	0

*HU #4912 encompasses San Diego Bay, which is almost entirely outside the county boundary (except for small areas of overlap). Therefore, the percentage of the HU within the county is very low.
**The HSA's listed below were bisected by the ESU boundary. The following values pertain to the portion of the HSA within the ESU boundary.

HSA #	Square Miles in HSA (within ESU)	Acres in HSA (within ESU)	Stream Miles (1:100k) in HSA (within ESU)
331210	206	132,990	208
331230	22	14,220	32
331440	158	101,306	299
331451	5	3,209	10
440220	77	49,093	152

† These entries contain multiple polygons for the same HSA #. Only one total stream mileage was given for the entire HSA.

Table E2. Summary of Occupied Subbasins/Watersheds. PCE's and Management Activities Affecting PCE's for the Southern California Steelhead ESU

Map Code	Basin	Watershed	CalWater Unit (HSA)	Spawning/Rearing PCEs (mi)**	Rearing/Migration PCEs (mi)**	Presence/Migration Only PCEs (mi)**	Management Activities***
	Santa Maria	Santa Maria	331210	0	27	27	D, I
	Santa Maria	Sisquoc	331220	175	186	186	S, G, H
	Santa Maria	Cuyama	331230	3	7	7	D
	Santa Ynez	Mouth of Santa Ynez	331410	2	18	18	D
	Santa Ynez	Santa Ynez, Salsipuedes	331420	20	36	36	G, I, R
	Santa Ynez	Santa Ynez, Zaca	331430	13	33	33	G, U, B
	Santa Ynez	Santa Ynez to Bradbury	331440	26	26	26	G, B, D
	Santa Ynez	Hilton	331451				
	South Coast	Arroyo Hondo	331510	58	59	59	A, B
	South Coast	UCSB Slough	331531	35	38	38	B, U, A, W
	South Coast	Mission	331532	15	17	17	U, B, I
	South Coast	San Ysidro	331533	13	13	13	U, B, R
	South Coast	Carpinteria	331534	23	23	23	R, A, B
	Ventura River	Ventura	440210	6	18	18	D, O, U, A, X
	Ventura River	Ventura	440220	20	23	23	I, A, U, X, D
	Ventura River	Lions	440231	5	5	5	A, U, B, X
	Ventura River	Thatcher	440232	2	2	2	B, I, A
	Santa Clara-Calleguas	Mouth of Santa Clara	440310	0	8	8	I, A, U
	Santa Clara-Calleguas	Santa Clara, Santa Paula	440321	13	19	19	D, I, A, U, B
	Santa Clara-Calleguas	Sisar	440322	5	5	5	B
	Santa Clara-Calleguas	Sespe, Santa Clara	440331	16	16	16	I, D
	Santa Clara-Calleguas	Sespe	440332	111	113	101	X, F
	Santa Clara-Calleguas	Santa Clara, Hopper Canyon, Piru	440341	16	16	16	D
	Santa Monica Bay	Topanga	440411	4	4	1	R, U
	Santa Monica Bay	Malibu	440421	3	3	1	U, D
	Santa Monica Bay	Arroyo Sequit	440444	3	4	1	R, B, C
	Calleguas	Callegus	440811	0	1	1	A, C
	Calleguas	Calleguas Estuary	440813				A, U
	San Juan	Trabuco	490121				
	San Juan	Upper Trabuco	490122				
	San Juan	Middle Trabuco	490123	0	1	1	R, U
	San Juan	Middle San Juan	490124				
	San Juan	Upper San Juan	490125				
	San Juan	Mid-upper San Juan	490126				
	San Juan	Lower San Juan	490127	2	5	5	R, U, B
	San Juan	Middle San Juan	490128				
	San Juan	San Mateo	490140	15	16	16	X, I, A

*Total Stream Miles calculated from blueline streams represented on 1:100,000 USGS Topographic Maps

**Overlap of stream miles may occur between the three habitat types

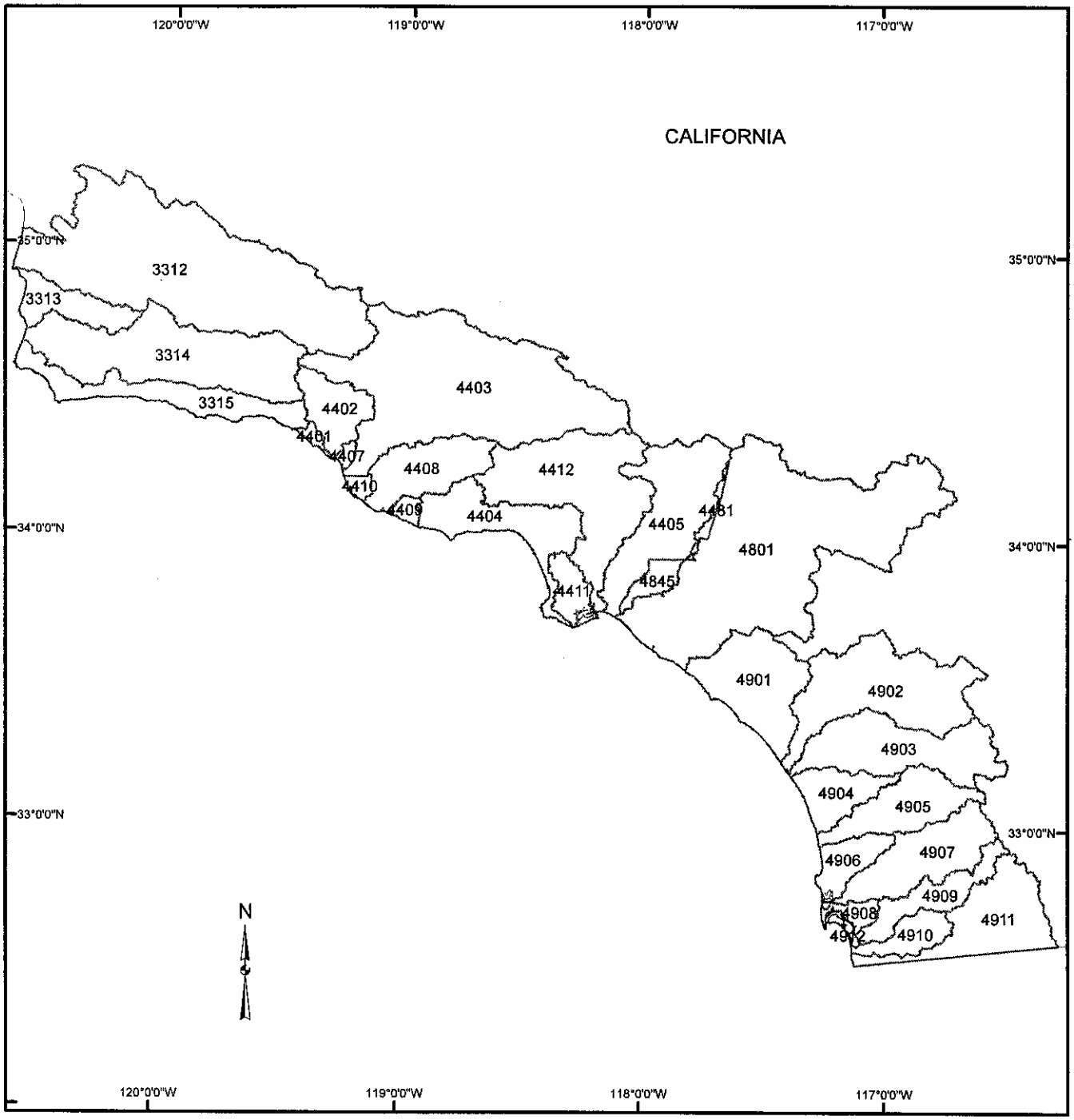
***Management Activities Codes:
A = Agriculture
B = Barriers / impediments
C = Channel modifications / flood control structures
D = Large water storage dams
F = Forest management and activities
G = Grazing
H = Species harvest and/or hatchery stocking
I = Irrigation / water diversions and withdrawals
M = Mineral mining
O = Oil and gas development
R = Roads
S = Sand and gravel mining
U = Urbanization / development
W = Wetland loss
X = Exotic/invasive species introduction

Table E3. Summary of Scores and Overall Rankings of Conservation Values for Critical Habitat for HSA watersheds occupied by the Southern California Steelhead ESU

Map Code	Basin	Watershed	Calwater Unit	Total Score (0-18)	Comments / Other Considerations	Conservation Value
	Santa Maria	Santa Maria	331210	6		Low
	Santa Maria	Sisquoc	331220	11		High
	Santa Maria	Cuyama	331230	7		Low
	Santa Ynez	Mouth of Santa Ynez	331410	11		High
	Santa Ynez	Santa Ynez, Salsipuedes	331420	11		High
	Santa Ynez	Santa Ynez, Zaca	331430	7		Low
	Santa Ynez	Santa Ynez to Bradburry	331440	10		Medium
	Santa Ynez	Hilton	331451	8		Medium
	South Coast	Arroyo Hondo	331510	11		High
	South Coast	UCSB Slough	331531	11		High
	South Coast	Mission	331532	12		High
	South Coast	San Ysidro	331533	11		High
	South Coast	Carpinteria	331534	11		High
	Ventura River	Ventura	440210	12		High
	Ventura River	Ventura	440220	12		High
	Ventura River	Lions	440231	9		Medium
	Ventura River	Thatcher	440232	9		Medium
	Santa Clara-Calleguas	Mouth of Santa Clara	440310	10		Medium
	Santa Clara-Calleguas	Santa Clara, Santa Paula	440321	11		High
	Santa Clara-Calleguas	Sisar	440322	12		High
	Santa Clara-Calleguas	Sespe, Santa Clara	440331	12		High
	Santa Clara-Calleguas	Sespe	440332	13		High
	Santa Clara-Calleguas	Santa Clara, Hopper Canyon, Piru	440341	11		High
	Santa Monica Bay	Topanga	440411	11		High
	Santa Monica Bay	Malibu	440421	13		High
	Santa Monica Bay	Arroyo Sequit	440444	12		High
	Calleguas	Callegus	440811	3		Low
	Calleguas	Callegus estuary	440813	4		Low
	San Juan	Middle Trabuco	490123	11		High
	San Juan	Lower San Juan	490127	11		High
	San Juan	San Mateo	490140	12		High

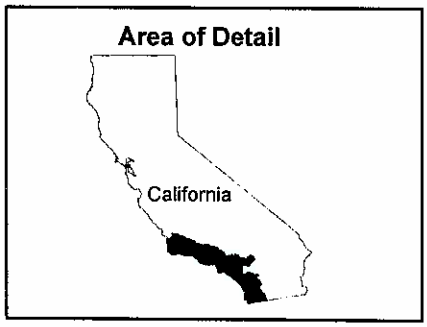
Figures E1 and E2: CALWATER Hydrologic Units and Hydrologic Subareas within the Range of the Southern California Steelhead ESU

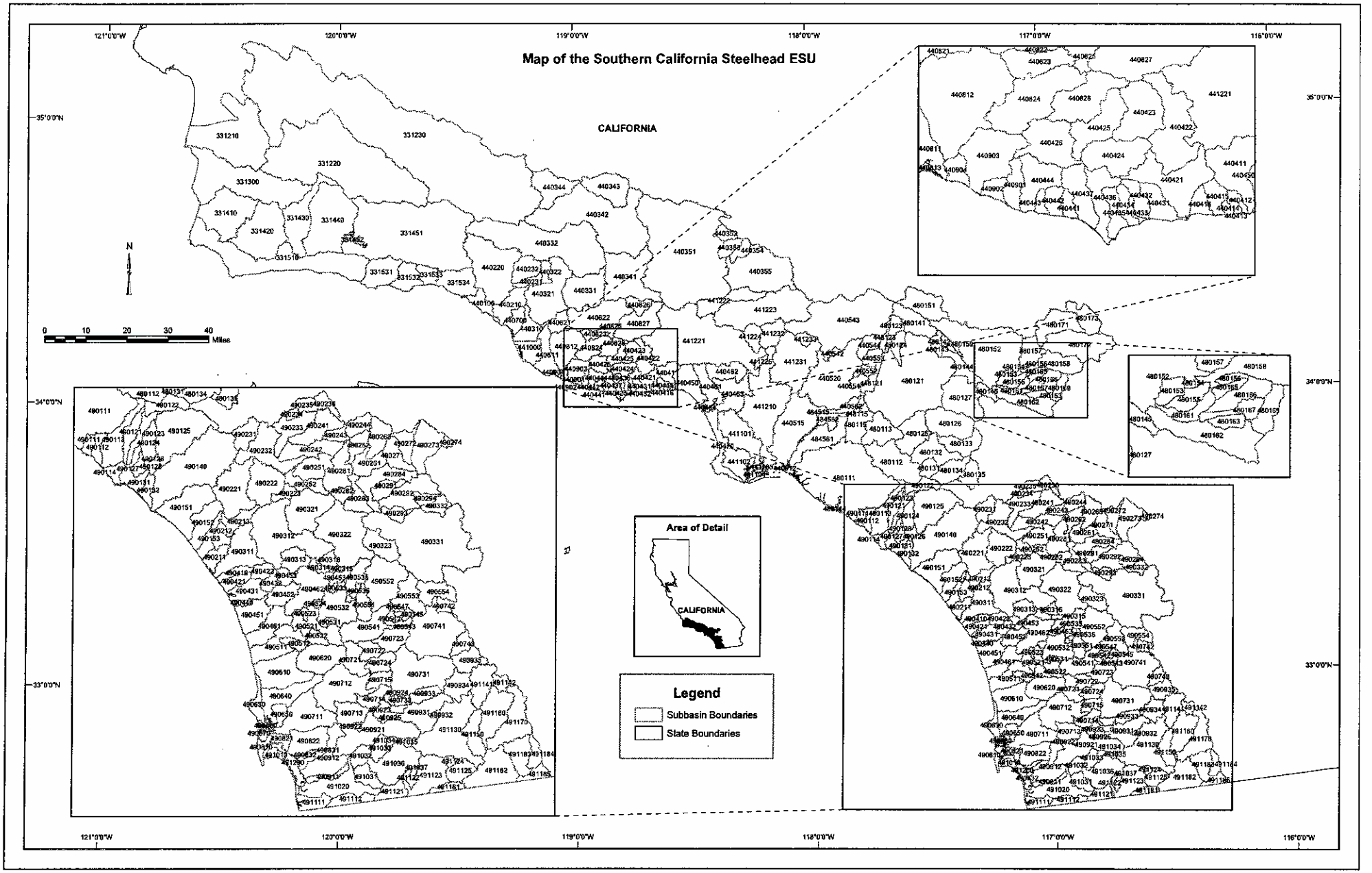
Map of the Southern California Steelhead ESU



Hydrologic Unit Boundaries

State Boundary




Map of the Southern California Steelhead ESU
CALIFORNIA
121°0'0"W
120°0'0"W
119°0'0"W
118°0'0"W
117°0'0"W
116°0'0"W
35°0'0"N
34°0'0"N
33°0'0"N
N
0 10 20 30 40
Miles
Area of Detail
CALIFORNIA
Legend
Subbasin Boundaries
State Boundaries

Maps E1 through E8: Southern California Steelhead ESU - Habitat Areas (Units) Considered for Critical Habitat Designation

E1 - Unit 3312 (Santa Maria River HU)

E2 - Unit 3314 (Santa Ynez HU)

E3 - Unit 3315 (South Coast HU)

E4 - Unit 4402 (Ventura River HU)

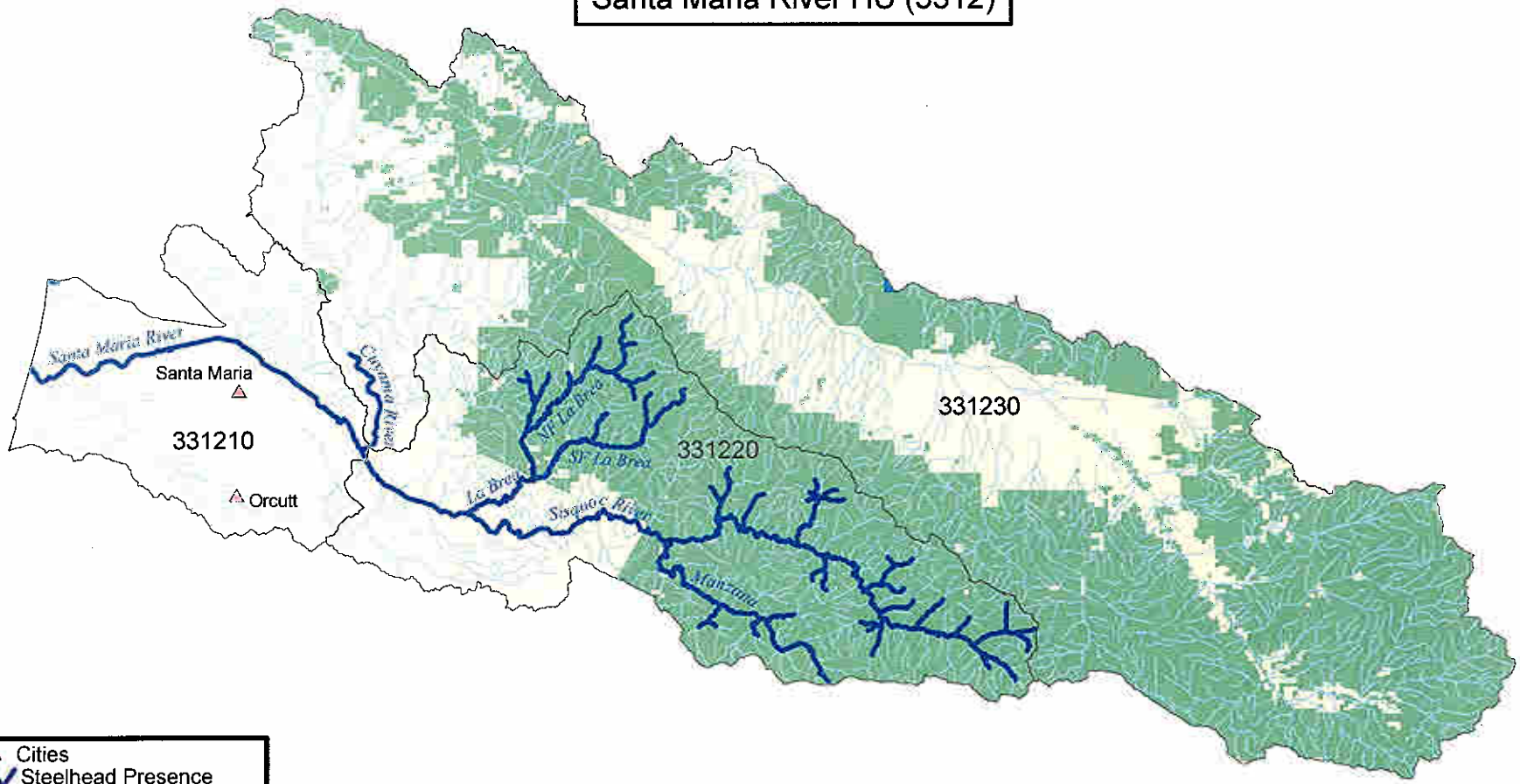
E5 - Unit 4403 (Santa Clara-Calleguas HU)

E6 - Unit 4404 (Santa Monica Bay HU)

E7 - Unit 4408 (Calleguas HU)

E8 - Unit 4901 (San Juan HU)

Land Ownership
Southern California Steelhead
Santa Maria River HU (3312)



△ Cities
Steelhead Presence Streams
Hydrologic Unit Boundary

Land Ownership*

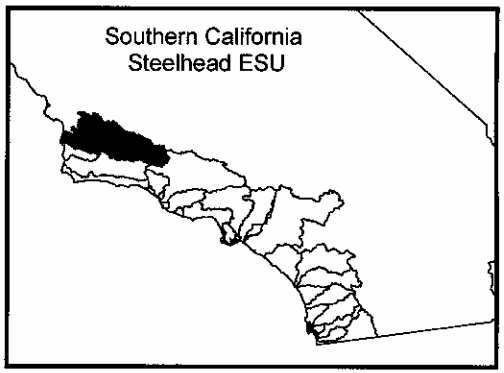
Tribal
Federal
State/Local
Private/Other
Water

*Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is for general reference only

N

0 3 6 9 12 Miles



Land Ownership
Southern California Steelhead
Santa Ynez HU (3314)

- Cities
- Steelhead Presence Streams
- Hydrologic Unit Boundary

Land Ownership*

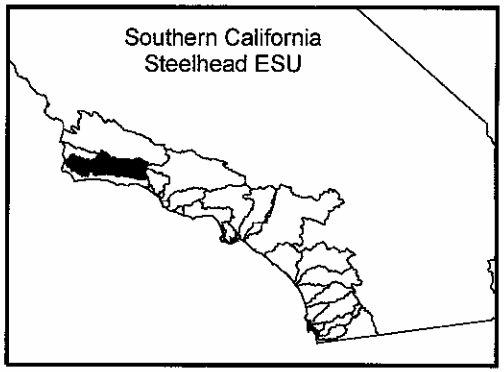
- Tribal
- Federal
- State/Local
- Private/Other
- Water

*Source: California Environmental Resources Evaluation System (CERES), 1999

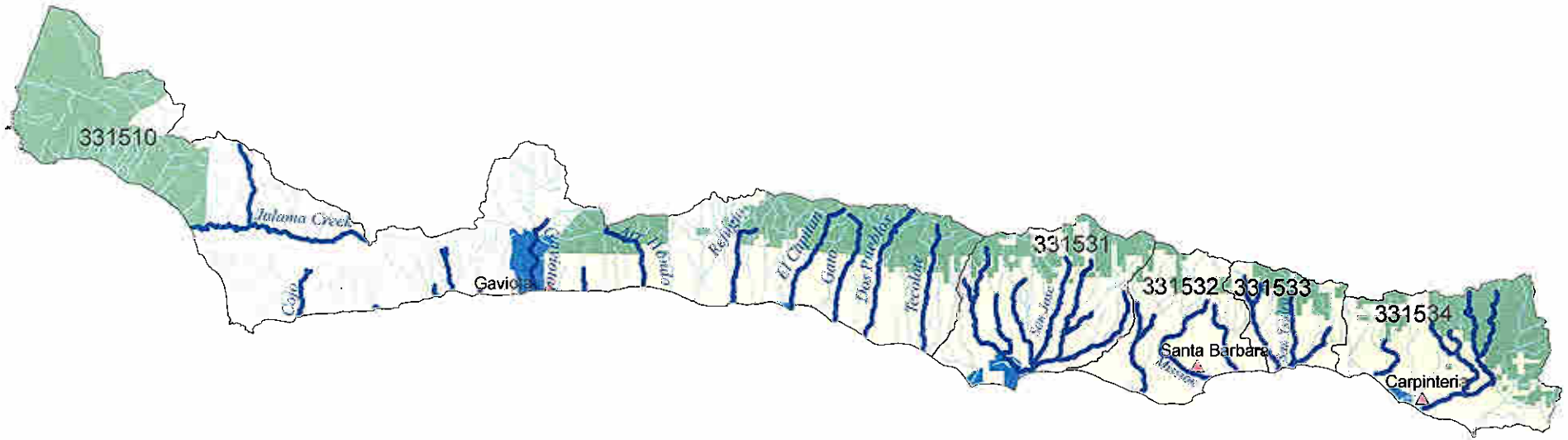
Note: This map is for general reference only

N

0 2.5 5 7.5 10 Miles



Land Ownership
Southern California Steelhead
South Coast HU (3315)



- Cities
- Steelhead Presence Streams
- Hydrologic Unit Boundary

Land Ownership*

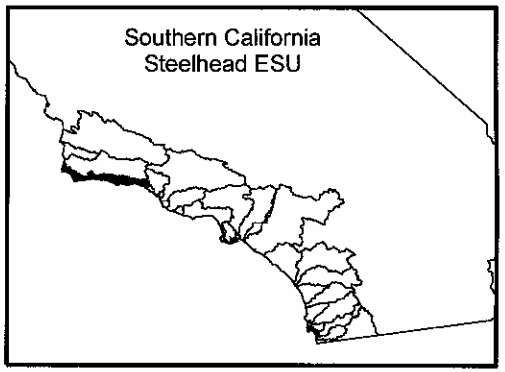
- Tribal
- Federal
- State/Local
- Private/Other
- Water

*Source: California Environmental Resources Evaluation System (CERES), 1999

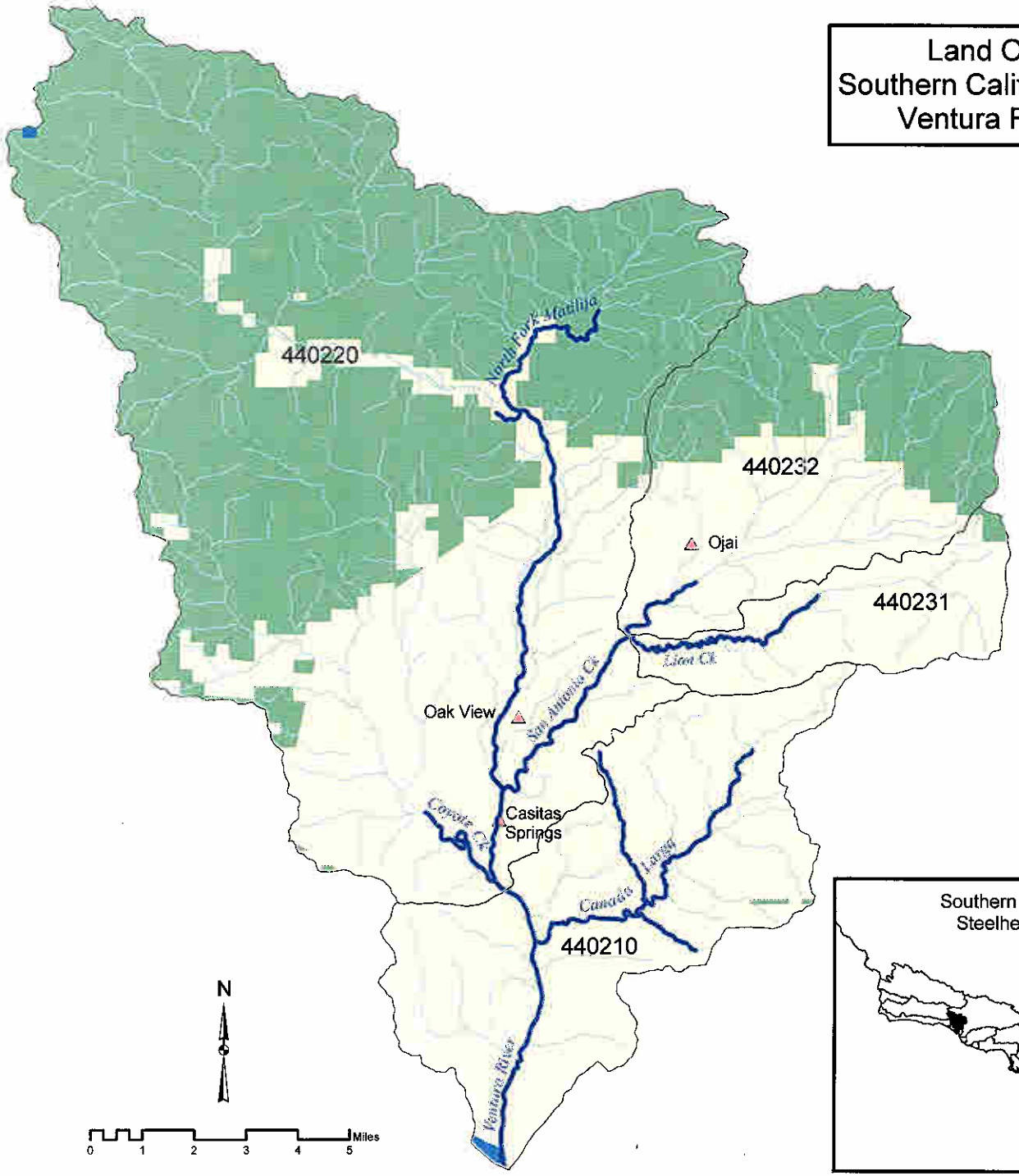
Note: This map is for general reference only

N

0 2.5 5 7.5 10 Miles



Land Ownership
Southern California Steelhead
Ventura River (4402)



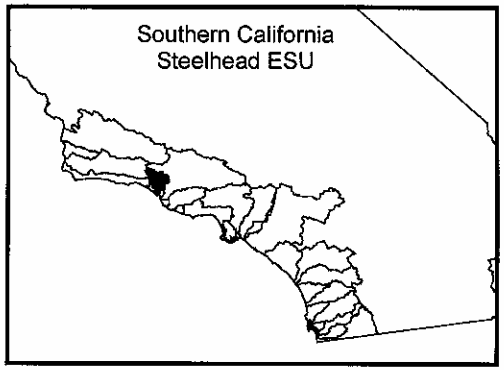
- Cities
- Steelhead Presence Streams
- Hydrologic Unit Boundary

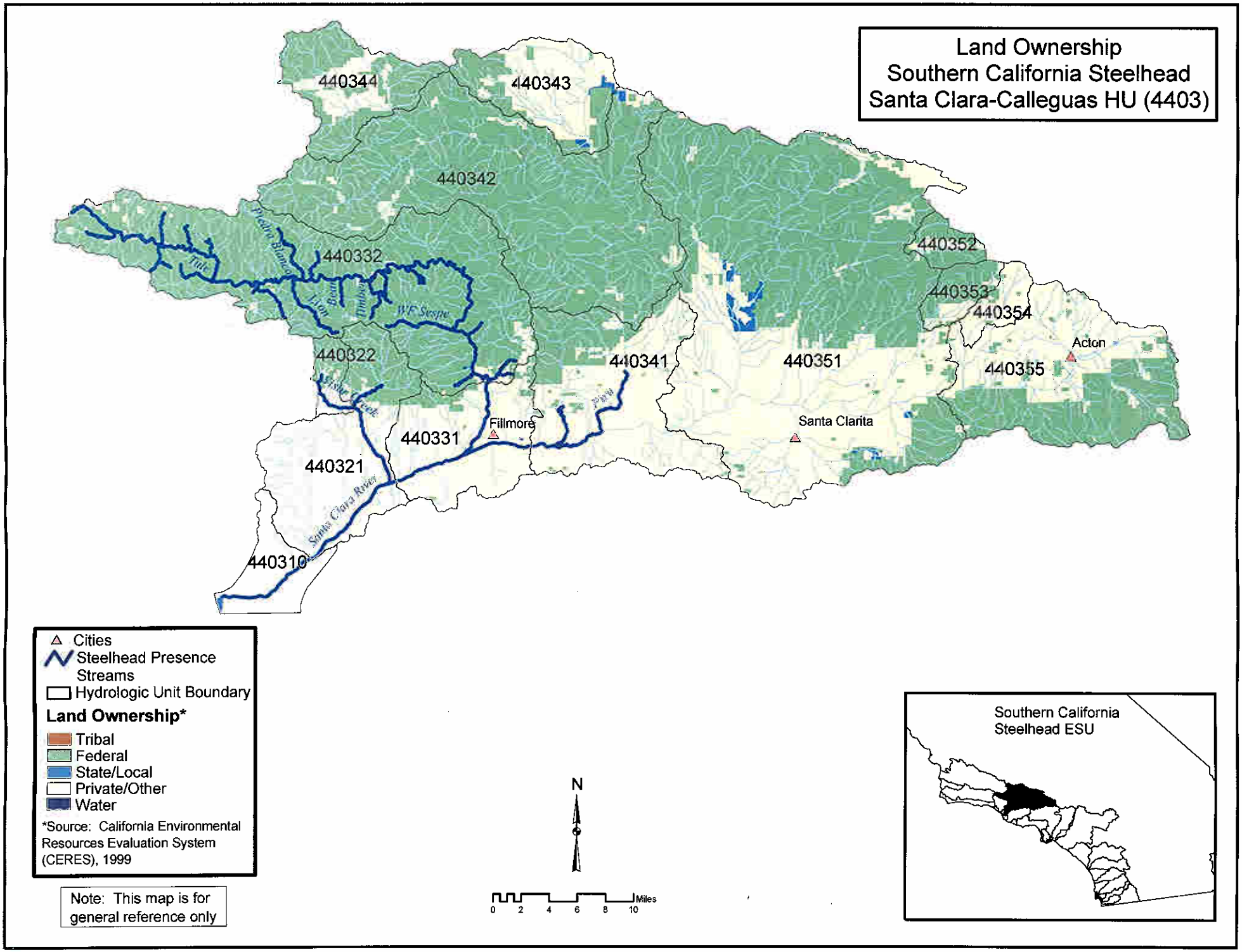
Land Ownership*

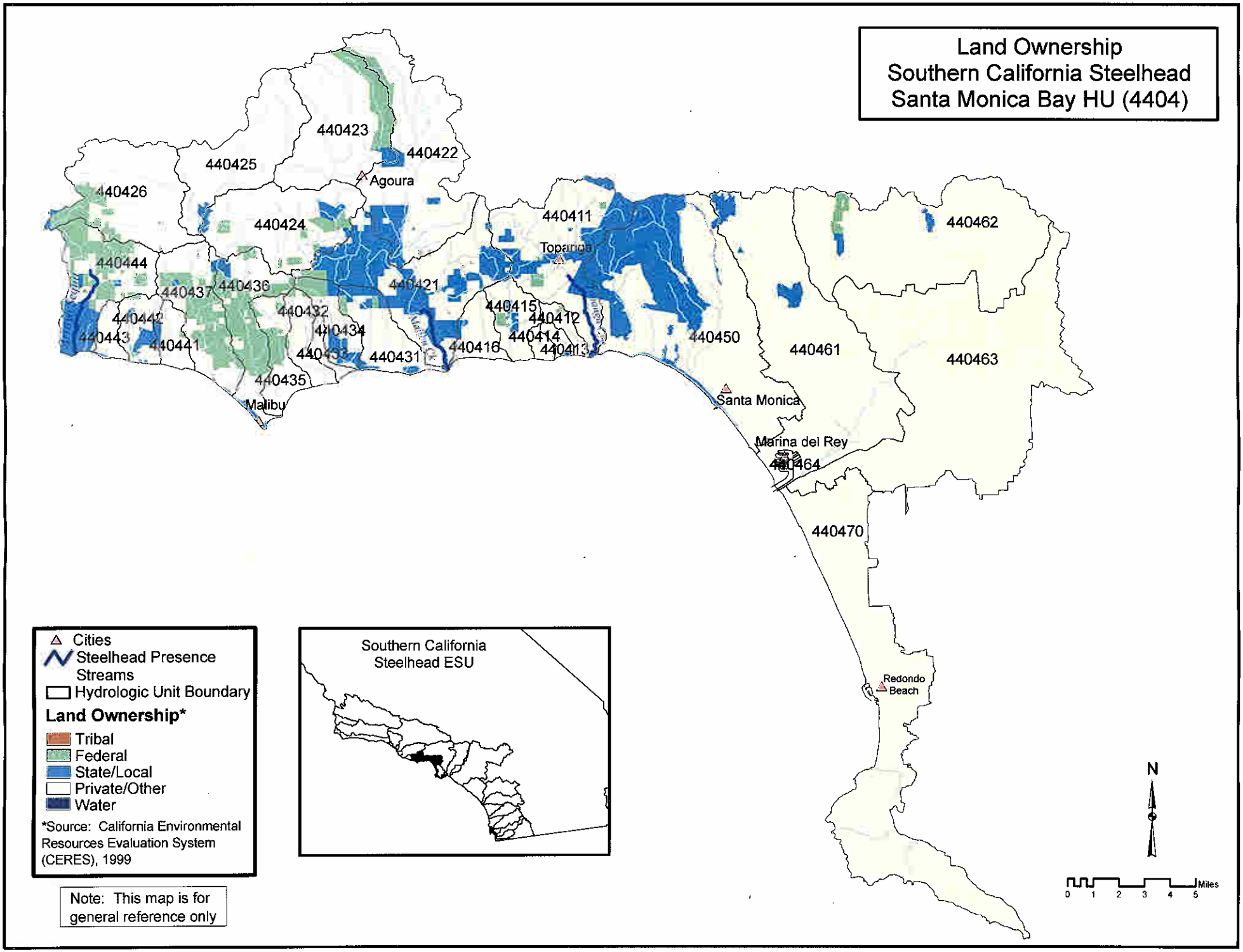
- Tribal
- Federal
- State/Local
- Private/Other
- Water

*Source: California Environmental Resources Evaluation System (CERES), 1999

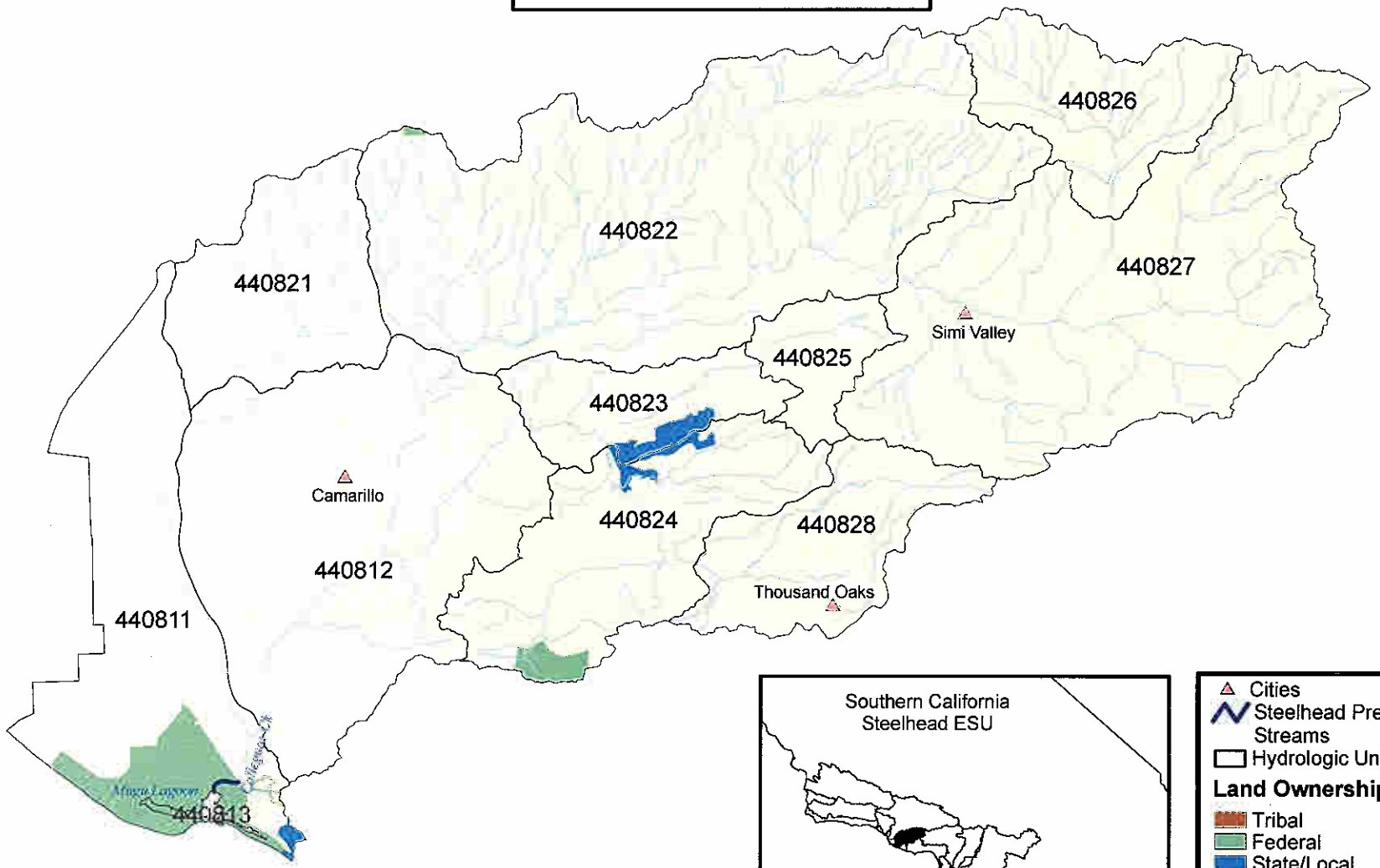
Note: This map is for general reference only

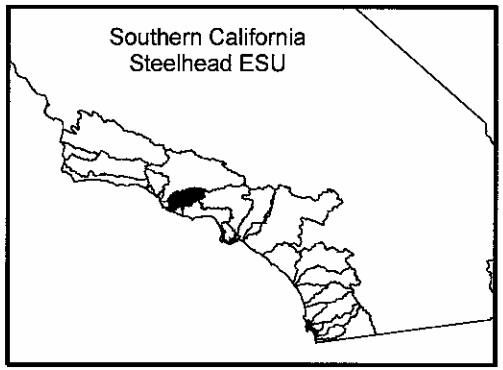



Land Ownership
Southern California Steelhead
Santa Clara-Calleguas HU (4403)
440344
440343
440342
440332
440322
440341
440351
440352
440353
440354
440355
440331
440321
440310
Piedra Blanca
Trib
Lion Head
Timber
W.F. Sespe
Sespe Creek
Piru
Santa Clara River
Fillmore
Santa Clarita
Acton
Cities
Steelhead Presence Streams
Hydrologic Unit Boundary
Land Ownership*
Tribal
Federal
State/Local
Private/Other
Water
*Source: California Environmental Resources Evaluation System (CERES), 1999
Note: This map is for general reference only
N
0 2 4 6 8 10 Miles
Southern California Steelhead ESU


Land Ownership
Southern California Steelhead
Santa Monica Bay HU (4404)
440423
440422
440425
Agoura
440426
440424
440411
Topanga
440462
440444
440437
440436
440421
440415
440412
440442
440432
440434
440414
440443
440441
440433
440431
440416
440413
440450
440461
440463
440435
Malibu
Santa Monica
Marina del Rey
440464
440470
Redondo Beach
Cities
Steelhead Presence Streams
Hydrologic Unit Boundary
Land Ownership*
Tribal
Federal
State/Local
Private/Other
Water
*Source: California Environmental Resources Evaluation System (CERES), 1999
Southern California Steelhead ESU
N
0 1 2 3 4 5 Miles
Note: This map is for general reference only

Land Ownership
Southern California Steelhead
Calleguas HU (4408)





- Cities
- Steelhead Presence Streams
- Hydrologic Unit Boundary

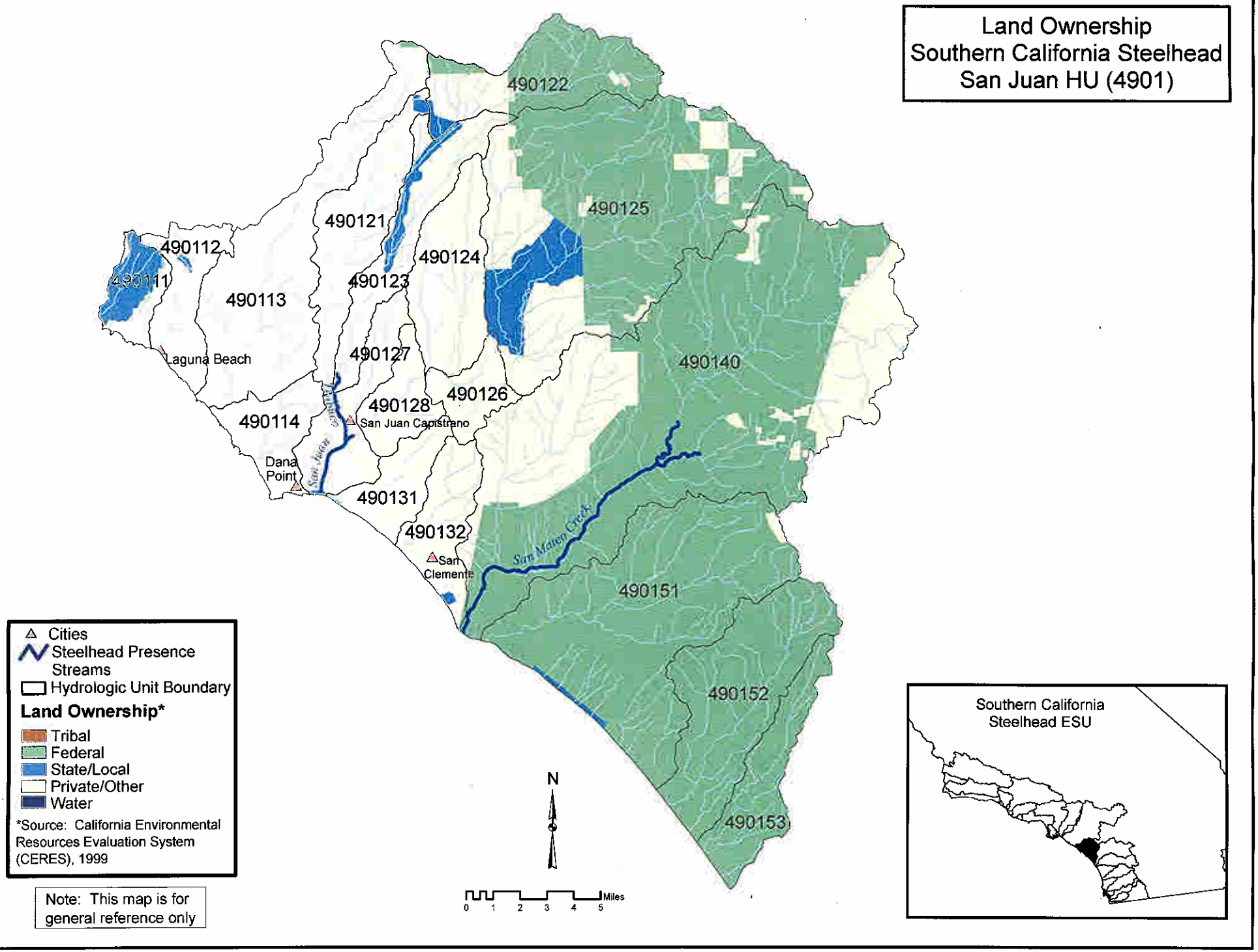
Land Ownership*

- Tribal
- Federal
- State/Local
- Private/Other
- Water

*Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is for general reference only

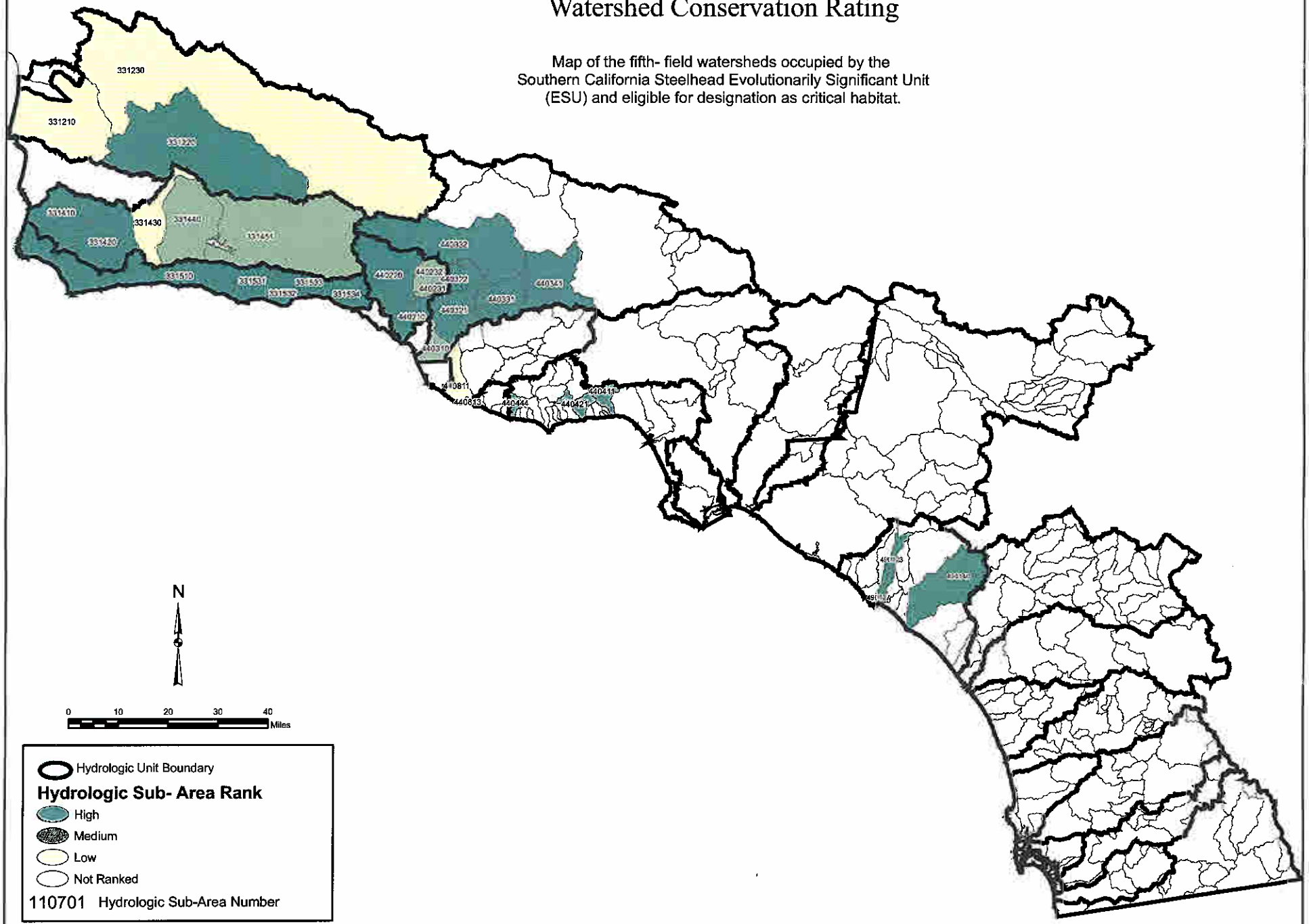
Land Ownership
Southern California Steelhead
San Juan HU (4901)



Map E9. Preliminary CHART Ratings of Conservation Value for CALWATER HSA Watersheds occupied by the Southern California Steelhead ESU

Southern California Steelhead
Watershed Conservation Rating

Map of the fifth- field watersheds occupied by the
Southern California Steelhead Evolutionarily Significant Unit
(ESU) and eligible for designation as critical habitat.



Appendix F
Final CHART Assessment for the
Central Valley (CV) Spring-run Chinook ESU

ESU Description

The CV spring-run chinook ESU was originally listed as a threatened species in 1999 (64 FR 50394). The ESU includes all naturally spawned populations of spring-run chinook salmon in the Sacramento River and its tributaries. In 2003, the agency conducted a review to update the ESU's status and also evaluated the ESU status of hatchery stocks within the ESU (NMFS 2003a and NMFS 2003b). Based on these reviews, NMFS NMFS proposed that the CV spring run chinook ESU remain listed as a threatened species (69 FR 33102; June 14, 2004) and that the one artificially propagated spring-run chinook stock in the historical geographic range of the ESU (Feather River Hatchery spring run chinook program) not be considered part of the ESU because of introgression with fall run chinook salmon. On June 28, 2005, NMFS finalized this proposed listing determination (70 FR 37160) and concluded that the Feather River Hatchery spring run chinook program should be included as part of this ESU.

A Technical Recovery Team has been established for the Central Valley recovery planning domain and it has identified historic and extant demographically independent populations of spring chinook (NMFS 2004; NOAA Technical Memorandum NOAA-TM-NMFS-SWFSC-370). The TRT divided the spring-run chinook ESU into four geographic groups. Members of each group inhabit similar environments based on a principle components analysis of environmental variables. The four geographic groups are the southern Cascades, northern Sierra, southern Sierra, and Coast Range. The TRT identified at least 18 historically demographically independent populations of spring run chinook distributed among these four geographic areas, plus an additional seven likely dependent populations that may have been strongly influenced by adjacent independent population. Three of the 18 independent populations are extant (Mill, Deer and Butte Creek populations) and all occur in the Southern Cascade geographic area. Several extant dependent populations have intermittent runs of spring chinook including Big Chico, Antelope, and Beegum Creeks. Recovery planning will likely emphasize the need for having viable populations distributed across the range of the identified geographic areas. Recovery planning efforts are currently focused on working with the CalFed and Central Valley Project Improvement Act programs to implement habitat restoration

projects and other recovery related efforts in the Central Valley. The CHART considered the TRT population structure information in rating each watershed and also solicited input from the TRT on the fish distribution and habitat use information that was compiled as well as the conservation assessment of occupied HSAs. As recovery planning proceeds, we anticipate having additional and better information which may lead to revisions in our recommended critical habitat designations.

CHART Area Assessments

The preliminary CHART assessment for this ESU (NMFS 2004b) was prepared to support our December 10, 2004, critical habitat proposal (69 FR 71880). This final CHART assessment considered new information received during the public comment period regarding fish distribution, habitat use, and the conservation value of occupied habitat areas or watersheds. Based on this new information, the CHART determined that: 1) HSA watershed 550731 should be considered unoccupied and that the occupied habitat of the ESU should therefore be reduced by approximately 10 miles, 2) HSA watershed 551510 should be considered occupied, approximately 5 miles of occupied should be added to the ESU, and that the watershed had a high conservation value to the ESU, and 3) the conservation value of HSA watershed 551921 should be changed from medium to high. Minor fish distribution changes were also made in another HSA watershed (550810), but there was no net change in occupied stream miles for the ESU.

The final CHART assessment for the CV spring run chinook ESU addressed 37 occupied CALWATER HSAs nested in 15 CALWATER Hydrologic Units (HUs) or subbasins (Figures F1 and F2). Four of these HSAs encompass the San Francisco-San Pablo-Suisun Bay complex which constitutes rearing and migration habitat for this ESU (Figure F3). This complex is treated as a separate unit in the following ESU description even though it is not a CALWATER HU. The HSAs were chosen as freshwater critical habitat units because they provide a convenient and systematic way to organize the CHARTs watershed assessments for this ESU. Information presented below for individual HUs (size, counties, total stream miles, occupied stream miles, and habitat use) were generated from GIS from data sets compiled by the NMFS Southwest Region and can be found in Table F1.

Unit 1. Tehama Subbasin (HU#5504)

The Tehama HU is located in the north central portion of the ESU and includes portions

of the mainstem Sacramento River, the lower portions of two westside tributaries (Thomes and Stony Creeks) and the lower portions of three eastside tributaries (Mill Creek, Deer Creek, and Pine Creek). The HU encompasses an areas approximately 1,119 square miles and occurs primarily in Tehama County, but also in portions of Butte and Glenn Counties. The HU contains 2 HSAs, both of which are occupied, and 1,879 stream miles (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 251 miles of occupied riverine and/or estuarine habitat in the 2 occupied HSAs (Table F1). The CHART concluded that these occupied HSAs contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) and identified several management activities that may affect the PCEs. Table F2 summarizes the total miles of occupied riverine and/or estuarine habitat for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F1 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 2. Whitmore Subbasin (HU#5507)

The Whitmore HU is located in the northeastern portion of the ESU and includes portions of upper Battle Creek (North and South Forks), upper Bear Creek, and the Cow Creek watershed. The HU encompasses an area approximately 913 mi^2 and occurs in Shasta and Tehama Counties. This HU contains 7 HSAs, 3 of which are occupied, and approximately 990 stream miles (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 47 miles of occupied riverine/estuarine habitat in the 3 occupied HSAs (Table F1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) and identified management activities that may affect the PCEs. Table F1 summarizes the total miles of occupied riverine and estuarine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F2 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The team did not identify any unoccupied habitat areas in this subbasin that may be essential to the conservation of the ESU.

Unit 3. Redding Subbasin (HU# 5508)

The Redding HU is located in the northernmost portion of the ESU and includes portions

of the upper Sacramento River mainstem, westside tributaries including Cottonwood Creek (portions of both the Middle and South Forks) and Clear Creek, and the lower portions of several eastside tributaries (Cow Creek, Bear Creek, and lower Battle Creek). The HU encompasses an area of approximately 705 mi^2 and occurs in Shasta and Tehama Counties. This HU contains 2 HSAs, both of which are occupied, and a total of 1,030 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 159 miles of occupied riverine habitat in the 2 occupied HSAs (Table F1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) and identified management activities that may affect the PCEs. Table F2 summarizes the total miles of occupied riverine and estuarine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F3 depicts the specific areas in this HU that are occupied by the ESU and were considered for the critical habitat designation. The team did not identify any unoccupied areas in this subbasin that may be essential to the conservation of the ESU.

Unit 4. Eastern Tehama Subbasin (HU# 5509)

The Eastern Tehama HU is located in the northeastern portion of the ESU and includes portions of several significant watersheds including Mill Creek, Deer Creek, Antelope Creek, and the upper portion of Big Chico Creek. The HU encompasses an area of approximately 896 mi^2 and occurs primarily in Tehama County with small portions in Butte, Shasta, and Plumas Counties. This HU contains 10 HSAs, only 4 of which are occupied, and a total of 1,049 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 117 miles of occupied riverine habitat in the 4 occupied HSA (Table F1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table F2 summarizes the total miles of occupied riverine and estuarine habitat for the HSA that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F4 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The team did not identify any unoccupied areas in this subbasin that may be essential to the conservation of the ESU.

Unit 5. Sacramento Delta Subbasin (HU# 5510)

The Sacramento Delta HU is located in the southern portion of the ESU and includes portions of the Sacramento River and Deep Water Ship Channel. The HU encompasses an area of approximately 446 mi^2 and occurs in portions of Yolo, Sacramento, and Solano Counties. This HU contains a single HSA which is occupied, and approximately 355 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 180 miles of occupied riverine habitat in this HSA (Table F1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table F2 summarizes the total miles of occupied riverine and estuarine habitat identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F5 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The team did not identify any unoccupied areas in this subbasin that may be essential to the conservation of the ESU.

Unit 6. Valley Putah-Cache Subbasin (HU# 5511)

The Valley Putah-Cache HU is located in the southern portion of the ESU and includes a portion of the Yolo Bypass. This HU encompasses an area of approximately 961 mi^2 and occurs primarily in Yolo and Solano Counties. This HU contains 3 HSAs, one of which is occupied, and 751 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 16 miles of occupied riverine habitat in this HSA (Table F1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table F2 summarizes the total miles of occupied riverine and estuarine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F6 depicts the specific areas in this HU that are occupied by the ESU and were considered for the critical habitat designation. The team did not identify any unoccupied areas in this subbasin that may be essential to the conservation of the ESU.

Unit 7. Marysville Subbasin (HU# 5515)

The Marysville HU is located in the central portion of the ESU and includes portions of the Feather River and Yuba River. This HU encompasses an area of approximately 417

mi^2 and occurs primarily in Butte and Yuba Counties with smaller portions located in Sutter and Placer Counties. The HU contains 3 HSAs, all of which are occupied, and 562 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 64 miles of occupied riverine habitat in the 3 HSAs (Table F1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table F2 summarizes the total miles of occupied riverine and estuarine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F7 depicts the specific areas in this HU that are occupied by the ESU and were considered for the critical habitat designation.

The CHART did not identify any unoccupied habitat areas in this subbasin that may be essential for the conservation of the ESU; however, the it did conclude that inaccessible stream reaches in the Upper Feather River above Oroville Dam in the adjacent subbasin (HU#5518) may be essential to the conservation of this ESU (NMFS 2004g). Specifically, the team identified the following stream reaches above Oroville Dam that may be essential for conservation of this ESU: from Oroville Dam upstream along the West Branch of the Feather River to the vicinity of Kimshew Falls; along the North Fork of the Feather River upstream of the location of Lake Almanor; along the East Branch of the NF Feather River including Indian Creek and Spanish Creek; the South Middle Fork of the Feather River, and the South Fork of the Feather River upstream to the first natural impassible barrier. Spring-run chinook (and steelhead) historically occurred in the Upper Feather River prior to Pacific Gas and Electric's hydroelectric development in the North Fork watershed and the construction of Oroville Dam. Construction of Oroville Dam extirpated the spring-run chinook (and steelhead) population in this upper watershed. The team concluded that spawning, rearing, an migratory habitat occurs above Oroville Dam in these inaccessible reaches, but it is in better condition for steelhead than spring-run chinook salmon. The feasibility of providing fish passage past Oroville Dam is currently being evaluated through the ongoing FERC relicensing process for this facility. The team concluded this inaccessible habitat may be essential for the conservation of this ESU because the genetic integrity of spring-run chinook in the Lower Feather River has been compromised by Feather River Hatchery practices (i.e. introgression of spring and fall runs in the hatchery), and providing access to the unoccupied habitat above the dam would allow for expansion of the population in this watershed.

Unit 8. Yuba River Subbasin (HU# 5517)

The Yuba River HU is located in the central and eastern portion of the ESU and includes part of the upper Yuba River watershed. This HU encompasses an area of approximately 1,436 mi^2 and occurs in several counties including: Butte, Nevada, Placer, Plumas, Sierra, and Yuba. The HU contains 16 HSAs, 4 of which are occupied, and 2,048 miles of streams (at 1:100,000 hydrography); however, most of the HSAs are outside the recognized boundary of the ESU. Fish distribution and habitat use data compiled by NMFS biologists identify only approximately 22 miles of occupied riverine habitat in the occupied HSAs (Table F1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table F2 summarizes the total miles of occupied riverine and estuarine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F8 depicts the specific areas in this HU that are occupied by the ESU and were considered for the critical habitat designation.

The CHART concluded that inaccessible stream reaches on the Upper Yuba River above Englebright Dam may be essential to the conservation of this ESU, including those upstream reaches on the North Yuba to New Bullards Bar Dam, on the Middle Yuba to Milton Dam, and on the South Yuba to Lake Spaulding (NMFS 2004g). All three forks of the Upper Yuba River historically supported populations of spring chinook (and steelhead). The team considered this area to be essential for conservation of the ESU because it provides one of the largest areas of suitable habitat in the Central Valley that can be accessed by providing passage at one relatively small dam. The Lower Yuba is also considered to have a good "seed" population of spring chinook (and steelhead) and both populations are considered relatively free of hatchery influence. A large, multi-million dollar study program is underway through the CALFED Ecological Restoration Program to evaluate the feasibility of restoring anadromous salmonid populations to the Upper Yuba River.

Unit 9. Valley-American Subbasin (HU# 5519)

The Valley-American HU is located in the south-central and eastern portion of the ESU and includes portions of the Lower American, the mainstem Sacramento River, and the lower Feather River. This HU encompasses an area of approximately 958 mi^2 and occurs primarily in Placer, Sacramento, Sutter, and Yuba Counties. The HU contains 4 HSAs,

only 2 of which are occupied, and approximately 1,188 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify only approximately 61 miles of occupied riverine habitat in the 2 HSAs (Table F1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table F2 summarizes the total miles of occupied riverine and estuarine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F9 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The CHART did not identify any unoccupied habitat in this subbasin that may be essential for the conservation of the ESU.

Unit 10. Colusa Basin Subbasin (HU# 5520)

The Colusa Basin HU is located in the central portion of the ESU and includes portions of the mainstem Sacramento River, lower Butte Creek, and the Butte Creek-Sutter Bypass. This HU encompasses an area of approximately 2,767 mi^2 and occurs in portions of Butte, Colusa, Glenn, Sutter, and Yolo Counties. The HU contains 5 HSAs, 3 of which are occupied, and 2,815 miles of streams (at 1:100,000 hydrography) although most of these stream miles are in unoccupied HSAs. Fish distribution and habitat use data compiled by NMFS biologists identify approximately 231 miles of occupied riverine habitat, including the Butte Creek-Sutter Bypass, in the 3 HSAs (Table F1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table F2 summarizes the total miles of occupied riverine and estuarine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F10 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The CHART did not identify any unoccupied habitat areas in this subbasin that may be essential for the conservation of the ESU.

Unit 11. Butte Creek Subbasin (HU# 5521)

The Butte Creek HU is located in the northeastern portion of the ESU and portions of upper Butte Creek. This HU encompasses an area of approximately 207 mi^2 and occurs primarily in Butte County. The HU contains 3 HSAs, only one of which is occupied, and 310 miles of streams (at 1:100,000 hydrography), most of which are in the occupied

HSA. Fish distribution and habitat use data compiled by NMFS biologists identify approximately 15 miles of occupied riverine habitat in the single occupied HSA (Table F1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table F2 summarizes the total miles of occupied riverine and estuarine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F11 depicts the specific areas in this HU that are occupied by the ESU and were considered for the critical habitat designation.

The CHART also concluded that inaccessible reaches of Upper Butte Creek above Centerville Dam upstream to Butte Meadow may be essential to the conservation of this ESU (NMFS 2004g). It is uncertain whether this area was historically used by the ESU, but spawning, rearing, and migration habitat is present in the inaccessible areas and is thought to be in good condition. The team believes this area may be essential for conservation because current spring run chinook (and steelhead) spawning in this watershed is all below an elevation of 1,000 ft and other spring-run chinook populations within the ESU typically spawn above 2,000 ft. High water temperatures in the lower portion of Butte Creek have led to significant spring-run chinook pre-spawning mortalities in recent years, and the team concluded that improved fish passage over the Centerville Diversion Dam would increase the range of this ESU and reduce the risk of adult losses in the lower stream reaches. The team expects that feasibility of passage at the Centerville Diversion Dam will be evaluated through the upcoming FERC relicensing process for the facility.

Unit 12. Ball Mountain Subbasin (HU# 5523)

The Ball Mountain HU is located in the northwestern portion of the ESU and includes a portion of upper Thomes Creek. This HU encompasses an area of approximately 334 mi^2 and occurs almost entirely in Tehama County. The HU contains 3 HSAs, only 1 of which is occupied, and 521 miles of streams (at 1:100,000 hydrography), most of which is in the Thomes Creek watershed. Fish distribution and habitat use data compiled by NMFS biologists identify approximately 15 miles of occupied riverine habitat in the one occupied HSA (Table F1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table F2 summarizes the

total miles of occupied riverine and estuarine habitat identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F12 depicts the specific areas in this HU that are occupied by the ESU and were considered for the critical habitat designation. The CHART did not identify any unoccupied areas in this subbasin that may be essential for the conservation of this ESU.

Unit 13. Shasta Bally Subbasin (HU# 5524)

The Shasta Bally HU is located in the northwestern portion of the ESU and includes portions of the South Fork Cottonwood Creek and Beegum Creek. This HU encompasses an area of approximately 905 mi^2 and occurs primarily in Shasta and Tehama Counties. The HU contains 9 HSAs, 4 of which are occupied, and approximately 1,003 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 50 miles of occupied riverine habitat in the 4 HSAs (Table F1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table F2 summarizes the total miles of occupied riverine and estuarine habitat identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F13 depicts the specific areas in this HU that are occupied by the ESU and were considered for the critical habitat designation. The CHART did not identify any unoccupied areas in this subbasin that may be essential for the conservation of this ESU.

Unit 14. North Diablo Range Subbasin (HU# 5543)

The North Diablo Range HU is located in the southernmost portion of the ESU and includes only a small portion of the south-central Delta. This HU encompasses an area of approximately 315 mi^2 and occurs primarily in Alameda, Contra Costa, and San Joaquin Counties. The HU contains only a single HSA which is partially occupied, and 336 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify only approximately 4 miles of occupied riverine/estuarine habitat in this HSA (Table F1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table F2 summarizes the total miles of occupied riverine and estuarine habitat identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as

well as management activities that may affect the PCEs in each HSA. Map F10 depicts the specific areas in this HU that are occupied by the ESU and were considered for the critical habitat designation. The CHART team did not identify any unoccupied habitat areas in this subbasin that may be essential for the conservation of the ESU.

Unit 15. San Joaquin Delta Subbasin (HU# 5544)

The San Joaquin Delta HU is located in the southernmost portion of the ESU aand includes portions of the central and south Delta. This HU encompasses an area of approximately 628 mi^2 and occurs primarily in Contra Costa and San Joaquin counties. The HU contains a single HSA which is occupied, and approximately 455 miles of streams and channels (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 142 miles of occupied riverine/estuarine habitat in this HSA (Table F1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table F2 summarizes the total miles of occupied riverine and estuarine reaches identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F15 depicts the specific areas in this HU that are occupied by the ESU and were considered for the critical habitat designation. The CHART did not identify any unoccupied habitat areas in this subbasin that may be essential for the conservation of the ESU.

Unit 16. Suisun Bay (HU# 2207), San Pablo Bay (HU#2206) and San Francisco Bay (HU#s 2203 and 2204)

Portions of four HUs (2207, 2206, 2203, 2204) comprise the Suisun Bay-San Pablo-San Francisco Bay complex that is utilized by this ESU. These 4 HUs contain both estuarine habitat in the Bay complex as well as freshwater tributaries to the Bay complex, but only the 4 HSAs (HSAs: 220710, 220610, 220410, and 220312) that comprise the estuarine Bay complex are occupied by this ESU (Table F1). These 4 HSAs encompass approximately 427 mi^2 of estuarine habitat that serves as a rearing and migratory habitat and a corridor providing connectivity between freshwater spawning, rearing, and migratory habitats for this ESU in the Sacramento-San Joaquin basin and the ocean. The CHART concluded that these four HSAs were occupied and contained PCEs for migratory habitat that support this ESU, and identified management activities that may affect the PCEs (Table F2). Map F16 depicts the specific HSAs in this complex which are occupied and were considered for the critical habitat designation. The CHART did

not identify any unoccupied areas in the San Francisco Bay-San Pablo-Suisun Bay complex that may be essential for the conservation of this ESU.

Unoccupied Habitat Outside the ESU Range that May be Essential to ESU Conservation

The CHART identified several unoccupied habitat areas in the Central Valley that are outside the current range of the CV spring-run chinook ESU, but that may be essential for its conservation (NMFS 2004g). These unoccupied areas are described below:

(1) Lower and Upper Mokelumne River. The CHART concluded that currently unoccupied portions of the Lower Mokelumne River from its confluence with the San Joaquin River upstream to Comanche Dam may be essential for the conservation of this ESU. In addition, the team concluded that inaccessible reaches of the Upper Mokelumne River above Comanche Dam up to Bald Rock Falls (which is 7 miles above Electra Dam) may be essential to the conservation of this ESU. The Mokelumne River historically supported large runs of spring run chinook salmon which have been extirpated. The lower portion of the Mokelumne River would be essential as a migratory corridor for spring chinook access to the upper watershed above Comanche Dam. Suitable habitat exists above Comanche Dam, but it has been altered by Comanche and Pardee reservoirs. The Central Valley TRT identifies this as a historically independent population and indicates that multiple independent populations of this ESU distributed throughout the Central Valley may be required to recover this ESU.

(2) Lower and Middle Stanislaus River. The CHART concluded that currently unoccupied reaches of the Lower Stanislaus River from its confluence with the San Joaquin River up to Goodwin Dam may be essential for the conservation of this ESU. The team also concluded that inaccessible habitat reaches in the Middle Stanislaus River from Goodwin Dam to New Melones Dam may be essential to the conservation of this ESU. The Stanislaus River historically supported a large population of spring-run chinook salmon which was extirpated with the construction of Goodwin Dam. The lower portion of the Stanislaus River would be essential as a migratory corridor for spring chinook access to the upper watershed above Goodwin Dam. Depending upon dam operations and resulting instream water temperatures, rearing and spawning habitat might be available in this lower reach. Suitable habitat exists above Goodwin Dam and fish passage at the Dam is thought to be feasible. The Central Valley TRT identifies this as a historically independent population and indicates that multiple independent populations

of this ESU distributed throughout the Central Valley may be required to recover this ESU.

(3) Lower and Middle Tuolumne River. The CHART concluded that currently unoccupied reaches of the Lower Tuolumne River from its confluence with the San Joaquin River up to LaGrange Dam may be essential for the conservation of this ESU. The team also concluded that inaccessible habitat reaches in the Middle Tuolumne River between LaGrange and New Don Pedro Dams may be essential to the conservation of this ESU. The Tuolumne River historically supported a large population of spring-run chinook salmon which was extirpated with the construction of LaGrange Dam. The lower portion of the Stanislaus River would be essential as a migratory corridor for spring chinook access to the upper watershed above LaGrange Dam. Depending upon dam operations and resulting instream water temperatures, rearing and spawning habitat might be available in this lower reach. Suitable habitat is thought to exist above LaGrange Dam for this ESU although feasibility of providing passage above the dam is uncertain. The Central Valley TRT identifies this as a historically independent population that is now extirpated and indicates that multiple independent populations of this ESU distributed throughout the Central Valley may be required to recover this ESU.

(4) Lower and Middle Merced River. The CHART concluded that currently unoccupied reaches of the Lower Merced River from its confluence with the San Joaquin River up to Crocker-Huffman Dam may be essential for the conservation of this ESU. The team also concluded that inaccessible habitat reaches in the Middle Merced River between Crocker-Huffman and Exchequer Dams may be essential to the conservation of this ESU. The Merced River historically supported a large population of spring-run chinook salmon which was extirpated with the construction of Crocker-Huffman Dam. The lower portion of the Merced River would be essential as a migratory corridor for spring-chinook access to the upper watershed above Crocker-Huffman Dam. Depending upon dam operations and resulting instream water temperatures, rearing and spawning habitat might be available in this lower reach. Suitable habitat is thought to exist above Crocker-Huffman Dam for this ESU although passage at the Dam is thought to be feasible because of its low height. The Central Valley TRT identifies this as a historically independent population that is now extirpated and indicates that multiple independent populations of this ESU distributed throughout the Central Valley may be required to recover this ESU.

Final 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 HSAs were of high or medium conservation value to the ESU. Of the 37 occupied HSAs that were evaluated, 27 were rated as having high conservation value, 3 were rated as having medium conservation value, and 7 were rated as having low conservation value. Table F3 summaries the CHARTs PCE/watershed scores and preliminary conservation value ratings (i.e. low, medium or high) for each occupied HSA. Map F17 shows the overall spatial distribution of conservation ratings (i.e. low, medium and high) for occupied HSAs within the freshwater/estuarine range of the ESU.

Marine Areas

NMFS determined that marine areas did not warrant consideration as critical habitat for this ESU.

References and Sources of Information

NMFS 2003a. Updated Status of Federally Listed ESUs of West Coast Salmon and Steelhead. West Coast Salmon Biological Review Team; Northwest Fisheries Science Center and Southwest Fisheries Science Center. July 2003.

NMFS 2003b. Hatchery Broodstock Summaries and Assessments for Chum, Coho, and Chinook Salmon and Steelhead Stocks within ESUs listed under the ESA. Salmon and Steelhead Hatchery Assessment Group/NOAA Fisheries; Northwest Fisheries Science Center and Southwest Fisheries Science Center.

NMFS 2004. Population Structure of threatened and endangered chinook salmon ESU in California's Central Valley. NOAA-TM-NMFS-SWFSC-370.

NMFS 2004b. Draft Findings of NMFS' Critical Habitat Development and Review Teams (CHARTs) for 7 ESUs of Salmon and O. mykiss ESUs in California. Main Report and 7 appendices. Prepared by NMFS, Southwest Region.

Federal Register Notices

64 FR 50394 - CV spring run chinook Listing Determination

69 FR 33102 - Proposed Listing Determinations for 27 West Coast Salmon and Steelhead ESUs

69 FR 71880 - Proposed Critical Habitat Designations for 7 ESUs of Salmon and Steelhead in California

70 FR 37160 - Final Listing Determinations for 16 ESUs of West Coast Salmon and Final 4(d) Protective Regulations for Threatened Salmonid ESUs

Table F1. Spring-run Chinook Salmon ESU: Occupancy, miles of occupied habitat, and geographic information by Hydrologic Unit and Hydrologic Subarea

HSA falls within and outside of ESU
HSA falls entirely outside of ESU

Note: Occupied Miles totals can be misleading for units 5510, 5511, 5515, 5519, 5520 as mainstem Sacramento River, Feather River, Butte Creek-Sutter Bypass straddle the unit boundaries

HU NUMBER	HU NAME	Major Stream / Watershed in HU	HU Occupied (Y or N)	Acres in HU	Square Miles in HU	Stream Miles (1:100k**) in HU	Occupied Stream Miles	Occupied Stream Miles (Spawning)	Occupied Stream Miles (Natal and Non-natal Rearing)	Occupied Stream Miles (Migration)	County HU Falls within	Acres of County in HU	Square Miles of County in HU	Percent of HU by County	HSA NUMBER	HSA NAME	HSA Occupied (Y or N)	Acres in HSA	Square Miles in HSA	Stream Miles (1:100k) in the HSA
2207	Suisun	Suisun Bay	Y	410,350	641	746	Bay Corridor	Bay Corridor	Bay Corridor	Bay Corridor	Alameda	56	269	42%						
											Contra Costa	171,934	47	7%	220710	Suisun Bay	Y	36,024	56	Bay
											Napa	30,344	2	0%	220721	Benicia	N	56,912	89	80
											Sacramento	1,027	323	50%	220722	Suisun Creek	N	28,367	44	58
											Solano	206,989			220723	Suisun Slough	N	97,025	152	239
															220724	Grizzly Island	N	28,310	44	111
															220731	Pittsburg	N	76,020	119	139
															220732	Walnut Creek	N	54,278	85	100
															220733	Martinez	N	33,418	52	58
5504	Tehama	Valley sections of Oat-Elder Stony-Reed-Pine-Red Bank	Y	716,144	1119	1879	251	38	251	147	Tehama	579,211	905	81%						
											Butte	84,931	133	12%	550410	Lower Stony Creek	Y	29,069	45	91
											Glenn	52,002	81	7%	550420	Red Bluff	Y	687,076	1,073	1788
5507	Whitmore	Upper NF Battle-NF Bear-South Cow-Clover-Oak Run	Y	584,320	913	990	47	40	47	40	Shasta	454,547	710	78%						
											Tehama	129,773	203	22%	550711	Inks Creek	Y	18,831	29	28
															550712	Battle Creek	Y	230,971	361	341
															550721	Ash Creek	N	11,417	18	19
															550722	Inwood	Y	80,479	126	138
															550731	South Cow Creek	N	50,429	79	85
															550732	Old Cow Creek	N	84,122	131	153
															550733	Little Cow Creek	N	108,071	169	227
5508	Redding	Valley sections of Cottonwood-Cow-Ash	Y	451,223	705	1030	159	75	159	139	Shasta	265,068	414	59%						
											Tehama	186,155	291	41%	550810	Enterprise Flat	Y	233,670	365	550
															550820	Lower Cottonwood	Y	217,553	340	481
5509	Eastern Tehama	Upper Deer-Mill-Antelope-Big Chico	Y	573,829	896	1049	117	96	117	117	Shasta	3,319	5	1%						
											Tehama	512,944	801	89%	550914	Big Chico Creek	Y	46,159	72	85
											Plumas	109	0	0%	550915	Mud Creek	N	19,323	30	59
											Butte	57,458	90	10%	550916	Pine Creek	N	69,300	108	171
															550920	Deer Creek	Y	133,316	208	206
															550941	Big Dry Creek	N	28,888	45	51
															550942	Upper Mill Creek	Y	83,637	131	128
															550962	Dye Creek	N	26,006	41	55
															550963	Antelope Creek	Y	92,466	144	158
															550964	Paynes Creek	N	55,702	87	105
															550965	Salt Creek	N	19,032	30	32
5510	Sacramento Delta	Sacramento River-Yolo Bypass	Y	285,422	446	355	180		153	180	Yolo	92,191	144	32%						
											Sacramento	112,178	175	39%	551000	Sacramento Delta	Y	285,422	446	355
											Solano	81,053	127	28%						
5511	Valley Putah-Cache	Putah	Y	615,528	961	751	16		16	16	Colusa	76	0	0%						
											Yolo	361,302	564	59%	551110	Elmira	N	246,988	386	313
											Napa	115	0	0%	551120	Lower Putah Creek	Y	249,336	389	229
											Solano	254,036	397	41%	551130	Lower Cache Creek	N	119,203	186	209
5515	Marysville	Feather-Yuba-Bear	Y	266,718	417	562	64	34	63	58	Butte	104,775	164	39%						
											Yuba	117,208	183	44%	551510	Lower Bear River	Y	76,927	120	185
											Sutter	23,006	36	9%	551530	Lower Yuba River	Y	28,145	44	41
											Placer	21,729	34	8%	551540	Lower Feather River	Y	161,646	252	336
5517	Yuba River	Yuba-Dry	Y	919,595	1436	2048	22	22	22	22	Butte	47,088	74	5%						
											Nevada	338,354	529	37%	551712	Browns Valley	Y	32,753	51	82
											Placer	12,558	20	1%	551713	Mildred Lake	Y	46,056	72	94
											Plumas	12,005	19	1%	551714	Englebright	Y	35,512	55	86
											Sierra	309,482	483	34%	551720	Nevada City	Y	54,499	85	122
											Yuba	200,108	313	22%	551731	Shady Creek	N	30,179	47	71
															551732	North Bloomfield	N	69,907	109	165
															551733	Canyon Creek	N	32,997	52	53
															551734	Lake Spaulding	N	96,106	150	178
															551741	North San Juan	N	54,176	85	129
															551742	Camptonville	N	57,012	89	113
															551743	Millde Yuba	N	23,805	37	41
															551751	Bullards Bar	N	49,017	77	118

																551752	North Yuba	N	39,349	61	95
																551753	Goodyears Bar	N	131,999	206	311
																551754	Sierra City	N	90,498	141	172
																551760	South Honcut Creek	N	75,736	118	219
5519	Valley-American	American- Lower Coon- Auburn	Y	613,101	958	1188	61		61	52	El Dorado	1,569	2	0%							
											Placer	174,403	272	28%	551911	Franklin	N	62,182	97	99
											Sacramento	290,552	454	47%	551912		N	65,397	102	84
											Sutter	69,045	108	11%	551921	Lower American	Y	195,188	305	418
											Yolo	1,397	2	0%	551922	Pleasant Grove	Y	290,333	454	588
											Yuba	76,136	119	12%						
5520*	Colusa Basin	Sutter Bypass- Colusa Drain-	Y	1,771,171	2767	2815	231		231	229	Butte	301,676	471	17%						
											Colusa	562,580	879	32%	552010	Sycamore-Sutter	Y	246,952	386	155
											Glenn	434,829	679	25%	552021	Colusa Trough	Y	891,690	1,393	1648
															552022	Orland	N	36,543	57	12
											Sutter	297,222	464	17%	552030	Sutter Bypass	Y	183,595	287	168
											Yolo	174,865	273	10%	552040	Butte Basin	Y	412,391	644	833
5521	Butte Creek	Butte- Little Chico	Y	132,405	207	310	15	15	15	15	Tehama	5,767	9	4%						
											Plumas	688	1	1%	552110	Upper Dry Creek	N	15,877	25	50
											Butte	125,949	197	95%	552120	Upper Butte Creek	N	17,761	28	49
															552130	Upper Little Chico	Y	98,767	154	211
5523	Ball Mountain	Upper Thomes-Elder	Y	213,899	334	521	15	15	15	15	Trinity	94	0	0%						
											Tehama	213,712	334	100%	552310	Thomes Creek	Y	123,466	193	301
											Mendocino	92	0	0%	552321	Elder Creek	N	60,503	95	149
															552322	Red Bank Creek	N	29,930	47	71
5524	Shasta Bally	SF-MF-NF- Cottonwood- Clear Creek	Y	579,290	905	1003	50	28	50	50	Trinity	825	1	0%						
											Shasta	360,702	563	62%	552433	South Fork	Y	110,519	173	192
											Tehama	217,763	340	38%	552434	Wells Creek	N	61,780	96	120
															552435	Ono	N	72,938	114	116
															552436	Platina	Y	140,502	219	264
															552440	Spring Creek	Y	34,898	55	67
															552461	Whiskeytown Lake	N	6,880	11	9
															552462	Kanaka Peak	Y	18,113	28	37
															552463	Middle Clear	N	47,350	74	77
															552464	French Gulch	N	86,311	135	122
5543	North Diablo Range	Upper Mountain House Corral Hollow	Y	201,825	315	336	4		4	4	Alameda	43,692	68	22%						
											Contra Costa	96,766	151	48%	554300	North Diablo Range	Y	201,825	315	336
											Sacramento	1,460	2	1%						
											San Joaquin	59,908	94	30%						
5544	San Joaquin Delta	Lower San Joaquin	Y	402,211	628	455	142		142	142	Alameda	3,428	5	1%						
											Contra Costa	92,390	144	23%	554400	San Joaquin Delta	Y	402,211	628	455
											Sacramento	11,399	18	3%						
											San Joaquin	294,902	461	73%						
											Stanislaus	93	0	0%						

**Total Stream Miles calculated from blueline streams represented on 1:100,000 USGS Topographic Maps

Table F2. Summary of Occupied Subbasins/Watersheds. PCE's and Management Activities Affecting PCE's for the Central Valley Spring-run Chinook ESU

Map Code	Basin	Watershed	Calwater Unit	Spawning/Rearing PCEs (mi)	Rearing/Migration PCEs (mi)	Presence/Migration Only PCEs (mi)	Management Activities*
	San Francisco Bay	Bay Waters	220312				AW, PP, IS, DK, BS, ID
	San Francisco Bay	Bay Channel	220410				AW, PP, IS, DK, BS, ID
	San Francisco Bay	San Pablo Bay	220610				AW, PP, IS, DK, BS, ID
	Suisun Bay	Suisun Bay	220710				AW, PP, IS, DK, BS, WE, ID
	Suisun Bay	Benicia	220721				
	Suisun Bay	Suisun Creek	220722				
	Suisun Bay	Suisun Slough	220723				
	Suisun Bay	Grizzly Island	220724				
	Suisun Bay	Pittsburg	220731				
	Suisun Bay	Walnut Creek	220732				
	Suisun Bay	Martinez	220733				
	Tehama	Lower Stony Creek	550410	23	23	23	AW, FP, DO
	Tehama	Red Bluff	550420	228	228	228	AW, PP, DK, BS, UD, RM
	Whitmore	Inks Creek	550711	2	2	2	RM
	Whitmore	Battle Creek	550712	40	40	40	AW, FP, WD
	Whitmore	Ash Creek	550721				
	Whitmore	Inwood	550722	6	6	6	AW, MW, UD
	Whitmore	South Cow Creek	550731				
	Whitmore	Old Cow Creek	550732				
	Whitmore	Little Cow Creek	550733				
	Redding	Enterprise Flat	550810	98	98	98	WS, DO, FP, PP, GM, RM
	Redding	Lower Cottonwood	550820	61	61	61	AW, FP, RM
	Eastern Tehama	Big Chico Creek	550914	9	9	9	FP, FM, RM, RD
	Eastern Tehama	Mud Creek	550915				
	Eastern Tehama	Pine Creek	550916				
	Eastern Tehama	Deer Creek	550920	35	35	35	FM, RM
	Eastern Tehama	Big Dry Creek	550941				
	Eastern Tehama	Upper Mill Creek	550942	47	47	47	FM, RM

	Eastern Tehama	Dye Creek	550962				
	Eastern Tehama	Antelope Creek	550963	25	25	25	FM, FP, AW, RM
	Eastern Tehama	Paynes Creek	550964				
	Eastern Tehama	Salt Creek	550965				
	Sacramento Delta	Sacramento Delta	551000	153	180	180	AW, PP, IS, DK, BS
	Valley Putah-Cache	Elmira	551110				
	Valley Putah-Cache	Lower Putah Creek	551120	16	16	16	
	Marysville	Lower Bear River	551510	5	5	0	AW, BS, UD
	Marysville	Lower Yuba River	551530	19	19	19	AW, MW, PP, DK, BS, FP
	Marysville	Lower Feather River	551540	40	40	40	WD, WS, PP, HM, DO
	Yuba River	Browns Valley	551712	17	17	17	AW, MW
	Yuba River	Mildred Lake	551713	0.4	0.4	0.4	AW, MW
	Yuba River	Englebright	551714	1	1	1	AW, FP, DO,
	Yuba River	Nevada City	551720	4	4	4	AW
	Yuba River	South Honcut Creek	551760				
	Valley-American	Franklin	551911				
	Valley-American		551912				
	Valley-American	Lower American	551921	10	10	10	AW, MW, WS, UD, HM, DO, PP
	Valley-American	Pleasant Grove	551922	47	47	47	AW, FP, PP, DK, BS
	Colusa Basin	Sycamore-Sutter	552010	83	83	83	AW, HR, PP, DK, BS
	Colusa Basin	Colusa Trough	552021				
	Colusa Basin	Orland	552022				
	Colusa Basin	Sutter Bypass	552030	70	70	70	AW, IS, DK, BS, FP, WH
	Colusa Basin	Butte Basin	552040	76	76	76	AW, FP, PP, DK, BS
	Butte Creek	Upper Dry Creek	552110				
	Butte Creek	Upper Butte Creek	552120				
	Butte Creek	Upper Little Chico	552130	15	15	15	WD
	Bull Mountain	Thomes Creek	552310	15	15	15	RM
	Bull Mountain	Elder Creek	552321				
	Bull Mountain	Red Bank Creek	552322				
	Shasta Bally	South Fork	552433	22	22	22	FM, RM, RD
	Shasta Bally	Wells Creek	552434				

	Shasta Bally	Ono	552435				
	Shasta Bally	Platina	552436	19	19	19	FM, RM, RD
	Shasta Bally	Spring Creek	552440	2	2	2	WD, WS, FP, PP, HM, DO
	Shasta Bally	Whiskeytown Lake	552461				
	Shasta Bally	Kanaka Peak	552462	7	7	7	HR, GM, WD, WS, DO
	Shasta Bally	Middle Clear	552463				
	Shasta Bally	French Gulch	552464				
	North Diablo Range	North Diablo Range	554300	4	4	4	AW, MW, IS, PP
	San Joaquin Delta	San Joaquin Delta	554400	142	142	142	AW, MW, PP, IS, EF

*Management Activities Codes:

AP, Adult passage
AW - Agricultural water withdrawls
BS - Streamband stabilization for flood control
DK - Diking
DO - Dam operations
EF - Entrainment and flow alterations
FM - Forest management
FP - Fish passage
GM - Gravel mining
HM - Hatchery management
HR - Habitat restoration
ID - Industrial development
IS - Invasive/non-native species
MW - Municipal water withdrawls
PP - Point and non-point water pollution
RD - Roads
RM- Rangeland management
SF - Seasonal flooding for flood control
UD - Urban development
WD - Water diversion for hydroelectric
WE - Wetland/Estuary management
WH - Wildlife habitat management
WS - Water storage for flood control

Table F3. Summary of Preliminary Scores and Overall Rankings of Conservation Values for Critical Habitat for HSA watersheds occupied by the Central Valley Spring-run Chinook ESU

Map Code	Basin	Watershed	Calwater Unit	Total Score (0-18)	Comments / Other Considerations	Conservation Value
	San Francisco Bay	Bay Waters	220312	10		High
	San Francisco Bay	Bay Channel	220410	5		Low
	San Francisco Bay	San Pablo Bay	220610	10		High
	Suisun Bay	Suisun Bay	220710	10		High
	Suisun Bay	Benicia	220721	0		Not Occupied
	Suisun Bay	Suisun Creek	220722	0		Not Occupied
	Suisun Bay	Suisun Slough	220723	0		Not Occupied
	Suisun Bay	Grizzly Island	220724	0		Not Occupied
	Suisun Bay	Pittsburg	220731	0		Not Occupied
	Suisun Bay	Walnut Creek	220732	0		Not Occupied
	Suisun Bay	Martinez	220733	0		Not Occupied
	Tehama	Lower Stony Creek	550410	7		Medium
	Tehama	Red Bluff	550420	15		High
	Whitmore	Inks Creek	550711	5		Low
	Whitmore	Battle Creek	550712	16		High
	Whitmore	Ash Creek	550721	0		Not Occupied
	Whitmore	Inwood	550722	5		Low
	Whitmore	South Cow Creek	550731	0		Not Occupied
	Whitmore	Old Cow Creek	550732	0		Not Occupied
	Whitmore	Little Cow Creek	550733	0		Not Occupied
	Redding	Enterprise Flat	550810	13		High
	Redding	Lower Cottonwood	550820	8	Initially considered moderate, changed to High based on recommendations byt the CVTRT to assign high conservation values to any streams in CV that are utilized for spawning or early rearing.	High

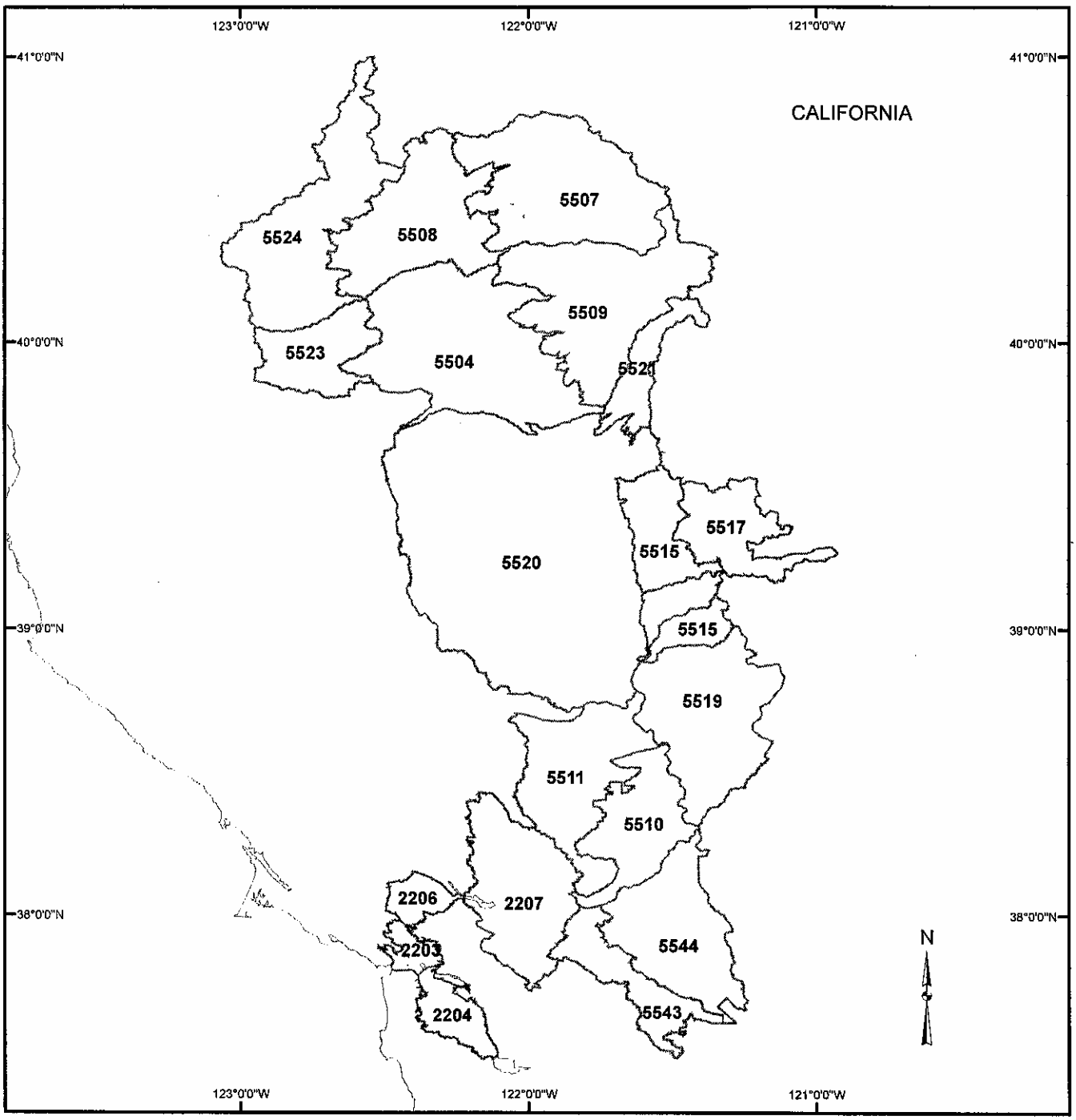
	Eastern Tehama	Big Chico Creek	550914	12		High
	Eastern Tehama	Mud Creek	550915	0		Not Occupied
	Eastern Tehama	Pine Creek	550916	0		Not Occupied
	Eastern Tehama	Deer Creek	550920	17		High
	Eastern Tehama	Big Dry Creek	550941	0		Not Occupied
	Eastern Tehama	Upper Mill Creek	550942	17		High
	Eastern Tehama	Dye Creek	550962	0		Not Occupied
	Eastern Tehama	Antelope Creek	550963	11	Initially considered moderate, changed to High based on recommendations byt the CVTRT to assign high conservation values to any streams in CV that are utilized for spawning or early rearing.	High
	Eastern Tehama	Paynes Creek	550964	0		Not Occupied
	Eastern Tehama	Salt Creek	550965	0		Not Occupied
	Sacramento Delta	Sacramento Delta	551000	14		High
	Valley Putah-Cache	Elmira	551110	0		Not Occupied
	Valley Putah-Cache	Lower Putah Creek	551120	11		High
	Marysville	Lower Bear River	551510	10		High
	Marysville	Lower Yuba River	551530	13		High
	Marysville	Lower Feather River	551540	11	Initially considered moderate, changed to High based on recommendations byt the CVTRT to assign high conservation values to any streams in CV that are utilized for spawning or early rearing.	High
	Yuba River	Browns Valley	551712	14		High
	Yuba River	Mildred Lake	551713	5		Low
	Yuba River	Englebright	551714	12		High
	Yuba River	Nevada City	551720	7		Medium
	Yuba River	South Honcut Creek	551760	0		Not Occupied
	Valley-American	Franklin	551911	0		Not Occupied
			551912	0		Not Occupied
	Valley-American	Lower American	551921	11		High

	Valley-American	Pleasant Grove	551922	10	Initially considered moderate, changed to High based on recommendations byt the CVTRT to assign high conservation values to any streams in CV that are utilized for spawning or early rearing.	High
	Colusa Basin	Sycamore-Sutter	552010	12		High
	Colusa Basin	Colusa Trough	552021	5		High
	Colusa Basin	Orland	552022	0		Not Occupied
	Colusa Basin	Sutter Bypass	552030	15		High
	Colusa Basin	Butte Basin	552040	16		High
	Butte Creek	Upper Dry Creek	552110	0		Not Occupied
	Butte Creek	Upper Butte Creek	552120	0		Not Occupied
	Butte Creek	Upper Little Chico	552130	15		High
	Bull Mountain	Thomes Creek	552310	5		Low
	Bull Mountain	Elder Creek	552321	0		Not Occupied
	Bull Mountain	Red Bank Creek	552322	0		Not Occupied
	Shasta Bally	South Fork	552433	3		Low
	Shasta Bally	Wells Creek	552434	0		Not Occupied
	Shasta Bally	Ono	552435	0		Not Occupied
	Shasta Bally	Platina	552436	11	Initially considered moderate, changed to High based on recommendations byt the CVTRT to assign high conservation values to any streams in CV that are utilized for spawning or early rearing.	High
	Shasta Bally	Spring Creek	552440	12		High
	Shasta Bally	Whiskeytown Lake	552461	0		Not Occupied
	Shasta Bally	Kanaka Peak	552462	12		High
	Shasta Bally	Middle Clear	552463	0		Not Occupied
	Shasta Bally	French Gulch	552464	0		Not Occupied
	North Diablo Range	North Diablo Range	554300	8		Medium
	San Joaquin Delta	San Joaquin Delta	554400	5		Low

Figures F1 and F2: CALWATER Hydrologic Units and Hydrologic Subareas within the range of the Central Valley spring-run chinook ESU

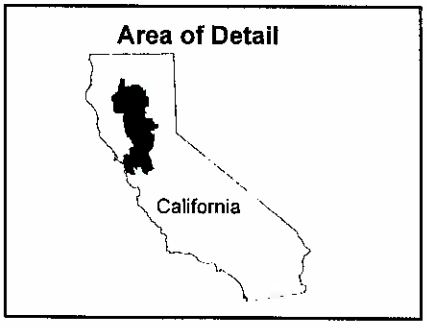
Figure F3: CALWATER Hydrologic Units comprising the San Francisco-San Pablo-Suisun Bay Complex

Map of the California Central Valley Spring- run O. tshawytscha ESU

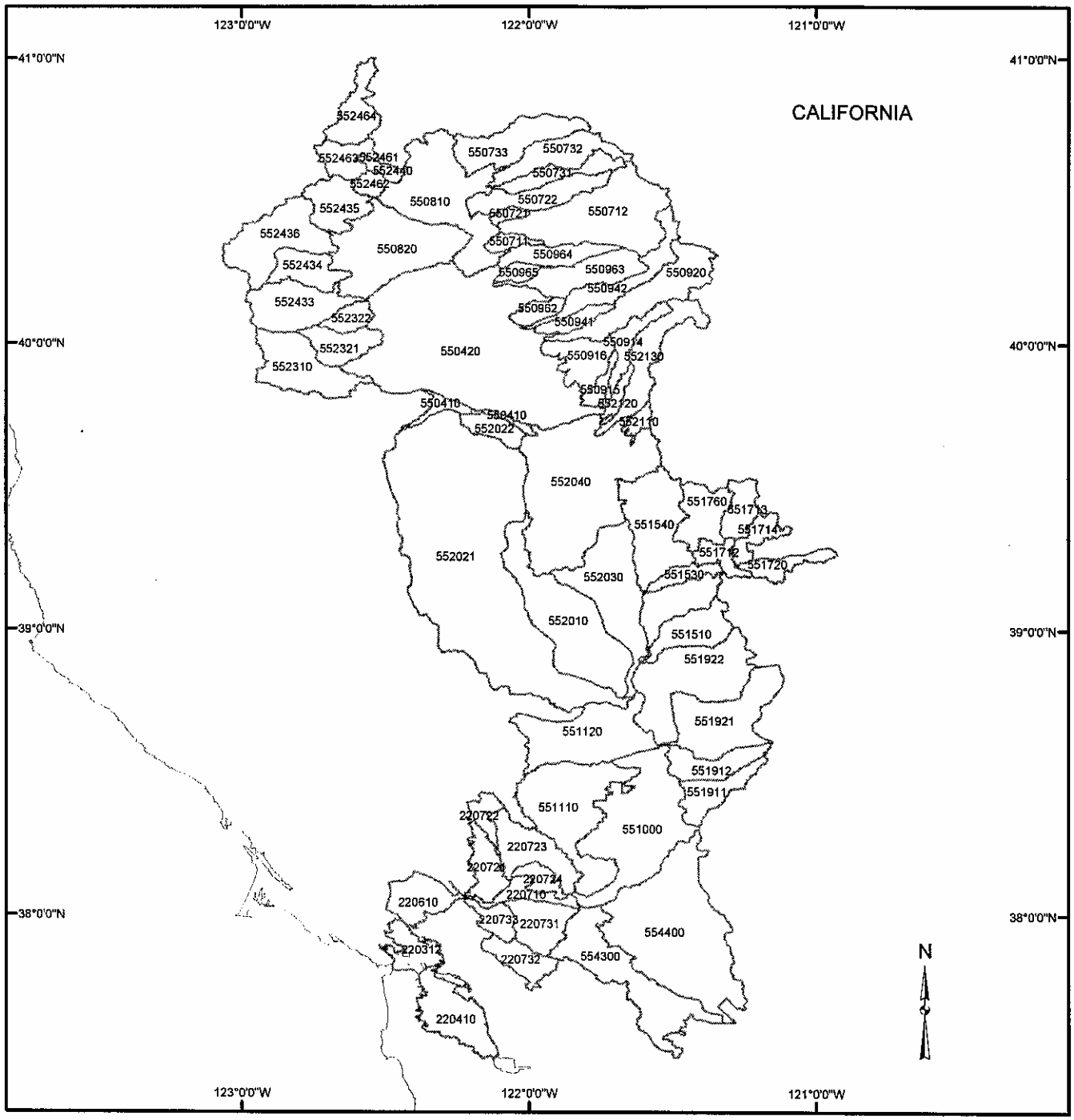


Hydrologic Unit Boundaries

State Boundary



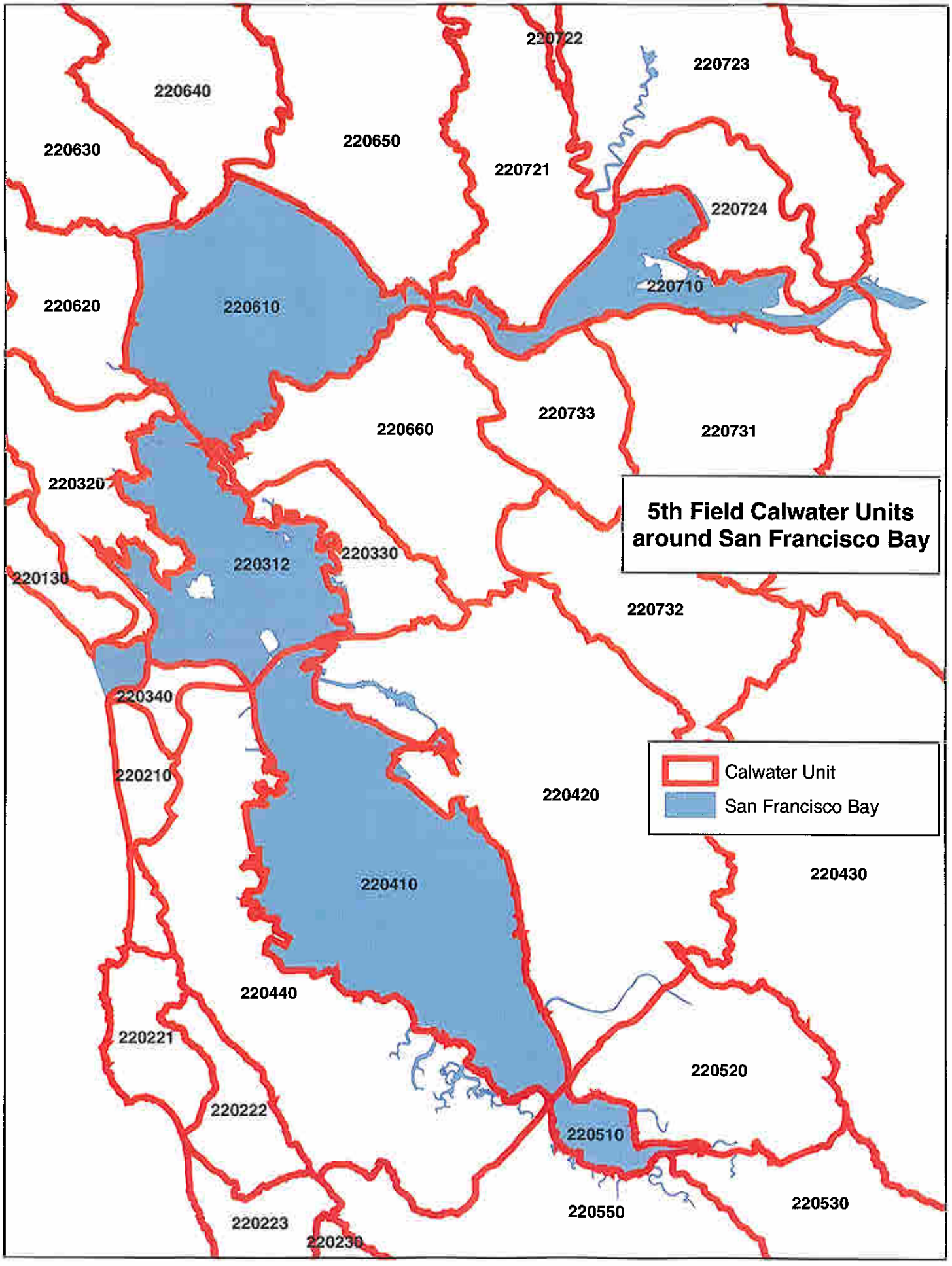
Map of the California Central Valley Spring- run O. tshawytscha ESU



Subbasin Boundaries

State Boundary

Area of Detail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220733
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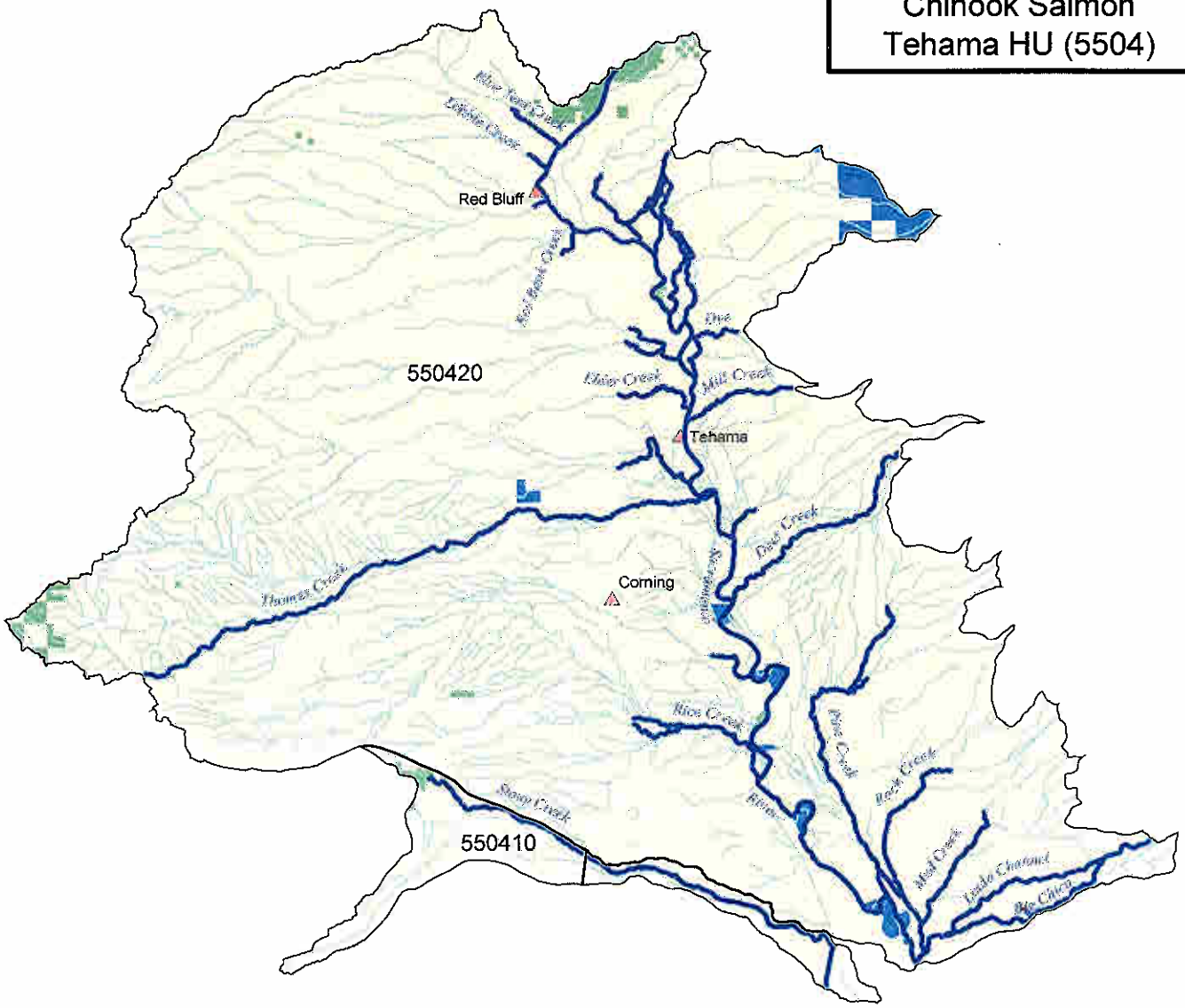
220330
220130
220732
220340
220210
220420
220410
220430
220440
220221
220520
220222
220510
220550
220530
220223
220230
5th Field Calwater Units around San Francisco Bay
Calwater Unit
San Francisco Bay

Maps F1 through F16: Central Valley spring run chinook ESU - Habitat Areas (Units) Considered for Critical Habitat Designation

F1 - Unit 5504 (Tehama HU)
F2 - Unit 5507 (Whitmore HU)
F3 - Unit 5508 (Redding HU)
F4 - Unit 5509 (Eastern Tehama HU)
F5 - Unit 5510 (Sacramento Delta HU)
F6 - Unit 5511 (Valley Putah-Cache HU)
F7 - Unit 5515 (Marysville HU)
F8 - Unit 5517 (Yuba River HU)
F9 - Unit 5519 (Valley-American HU)
F10 - Unit 5520 (Colusa Basin HU)
F11 - Unit 5521 (Butte Creek HU)
F12 - Unit 5523 (Ball Mountain HU)
F13 - Unit 5524 (Shasta Bally HU)
F14 - Unit 5543 (North Diablo Range HU)
F15 - Unit 5544 (San Joaquin HU)
F16 - San Francisco-San Pablo-Suisun Bay Unit

Land Ownership
Central Valley Spring-run Chinook Salmon
Tehama HU (5504)



- Cities
- Chinook Presence Streams
- Hydrologic Unit Boundary

Land Ownership*

- Tribal
- Federal
- State/Local
- Private/Other
- Water

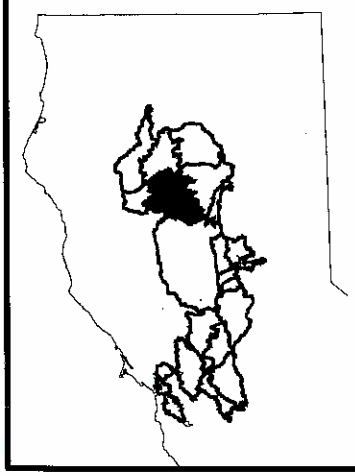
*Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is a for general reference only

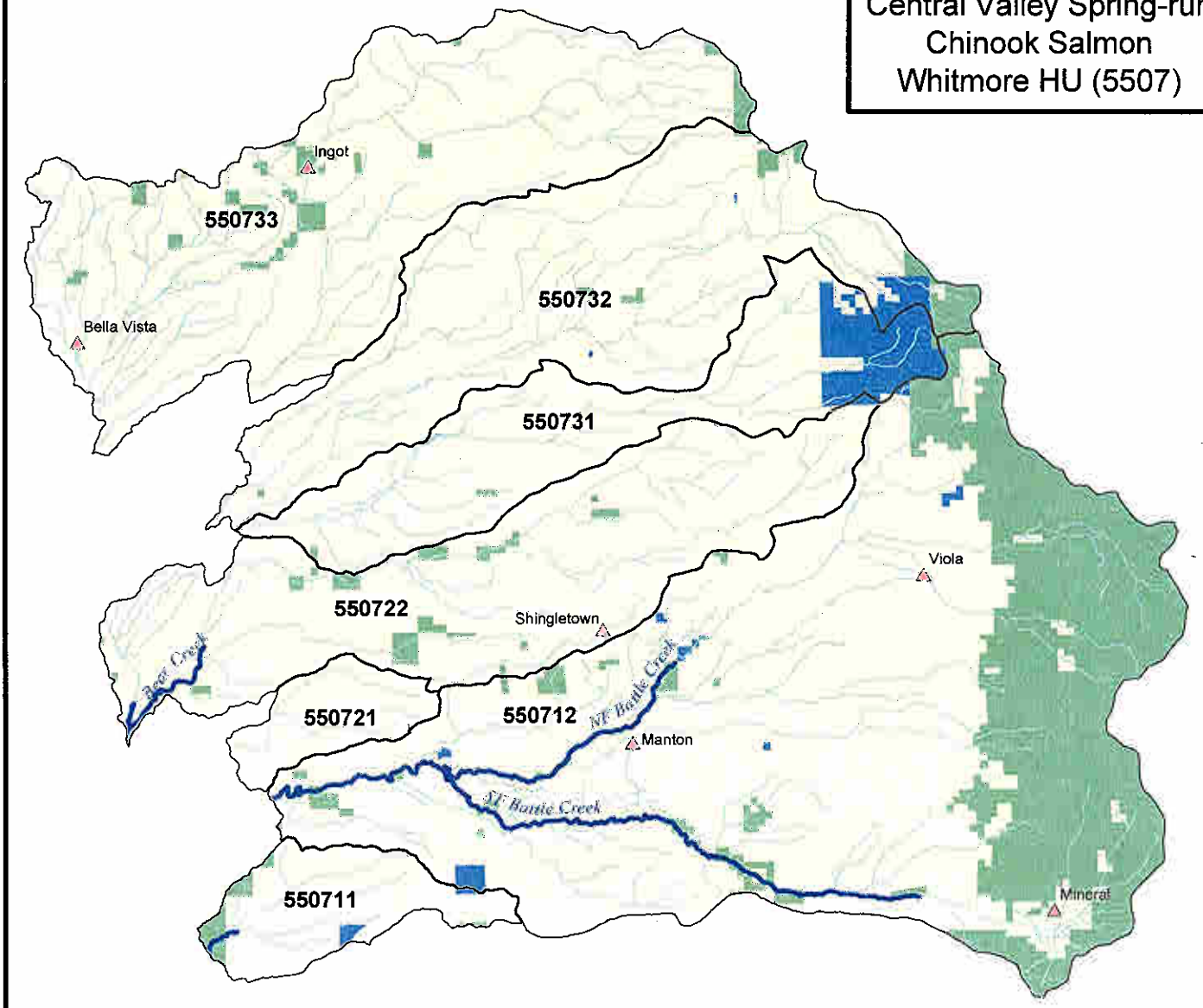
N

0 2.5 5 Miles

Central Valley Spring-run Chinook Salmon ESU



Land Ownership
Central Valley Spring-run Chinook Salmon
Whitmore HU (5507)



Cities
Chinook Presence Streams
Hydrologic Unit Boundary

Land Ownership*

Tribal
Federal
State/Local
Private/Other
Water

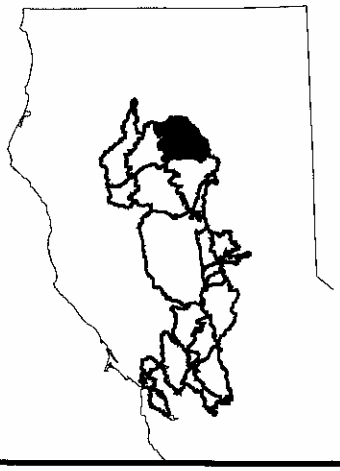
*Source: California Environmental Resources Evaluation System (CERES), 1999

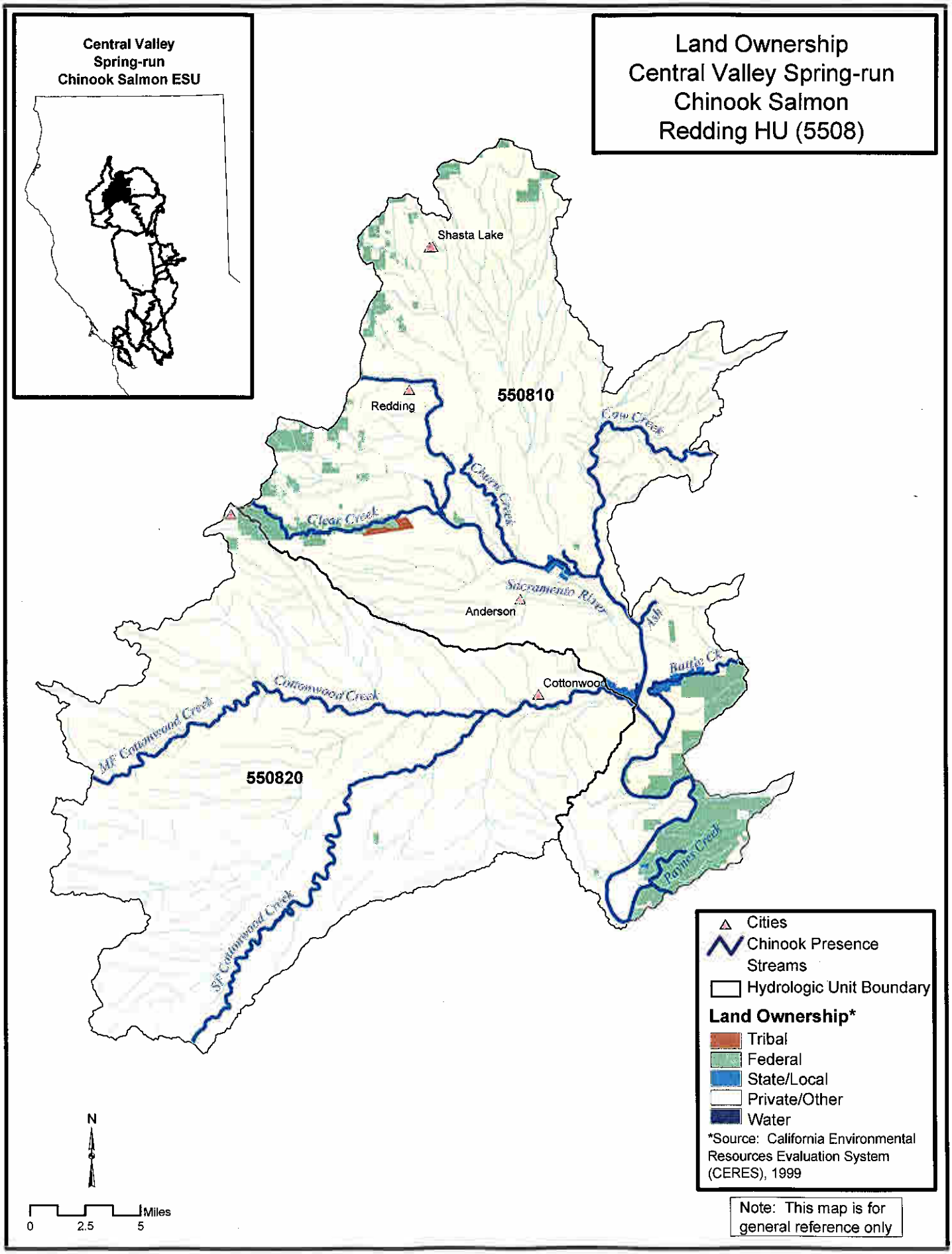
Note: This map is for general reference only

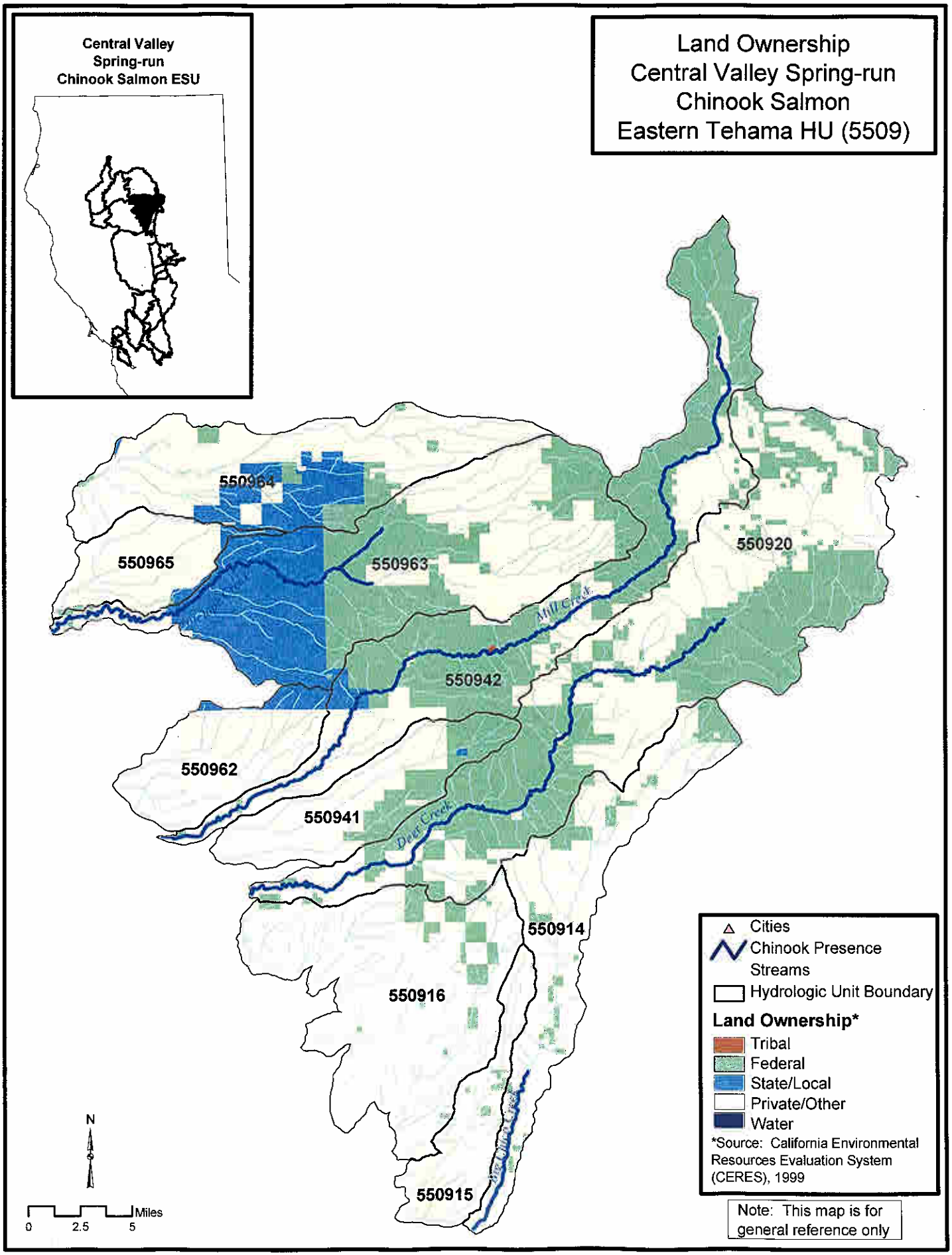
N

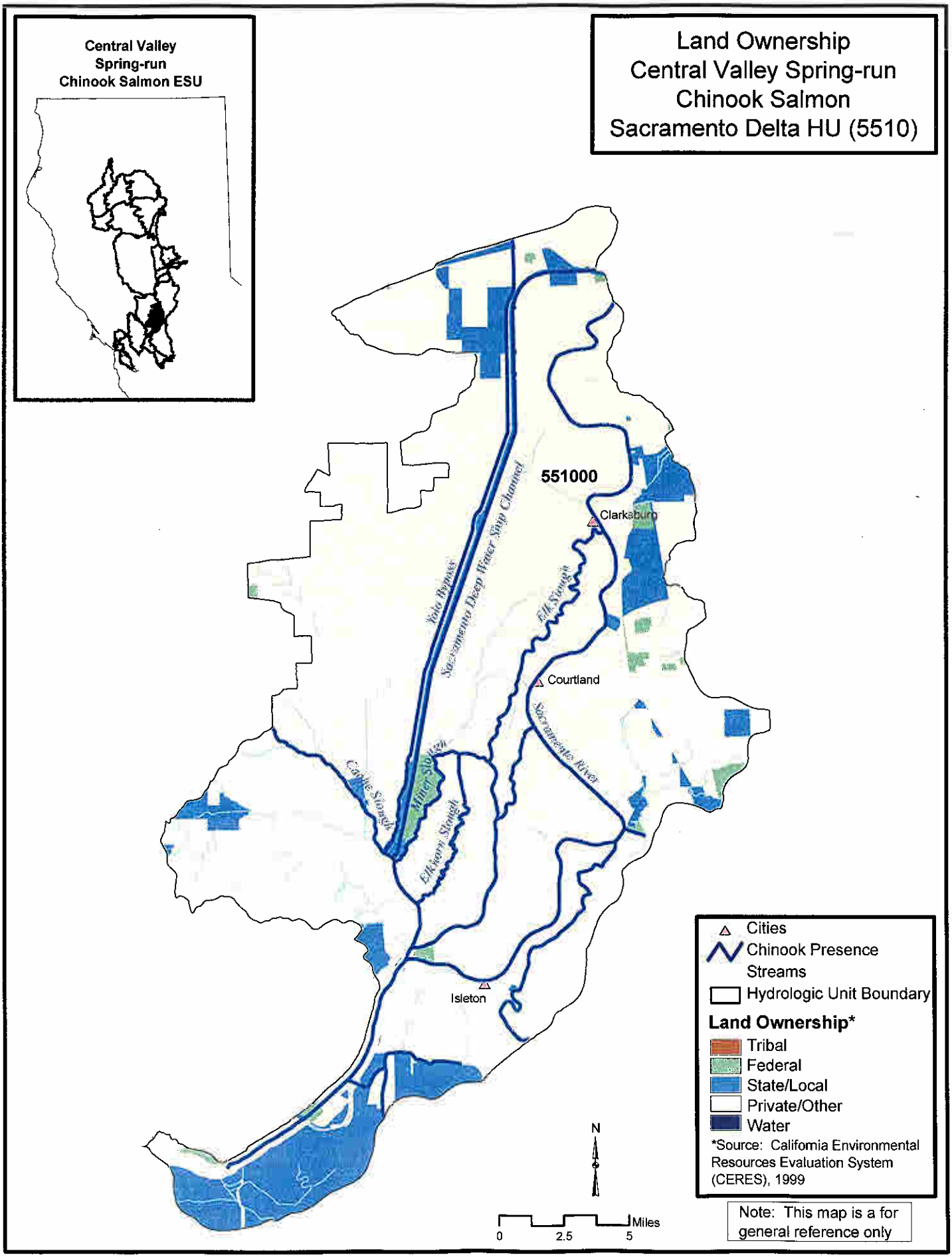
0 2.5 5 Miles

Central Valley Spring-run Chinook Salmon ESU

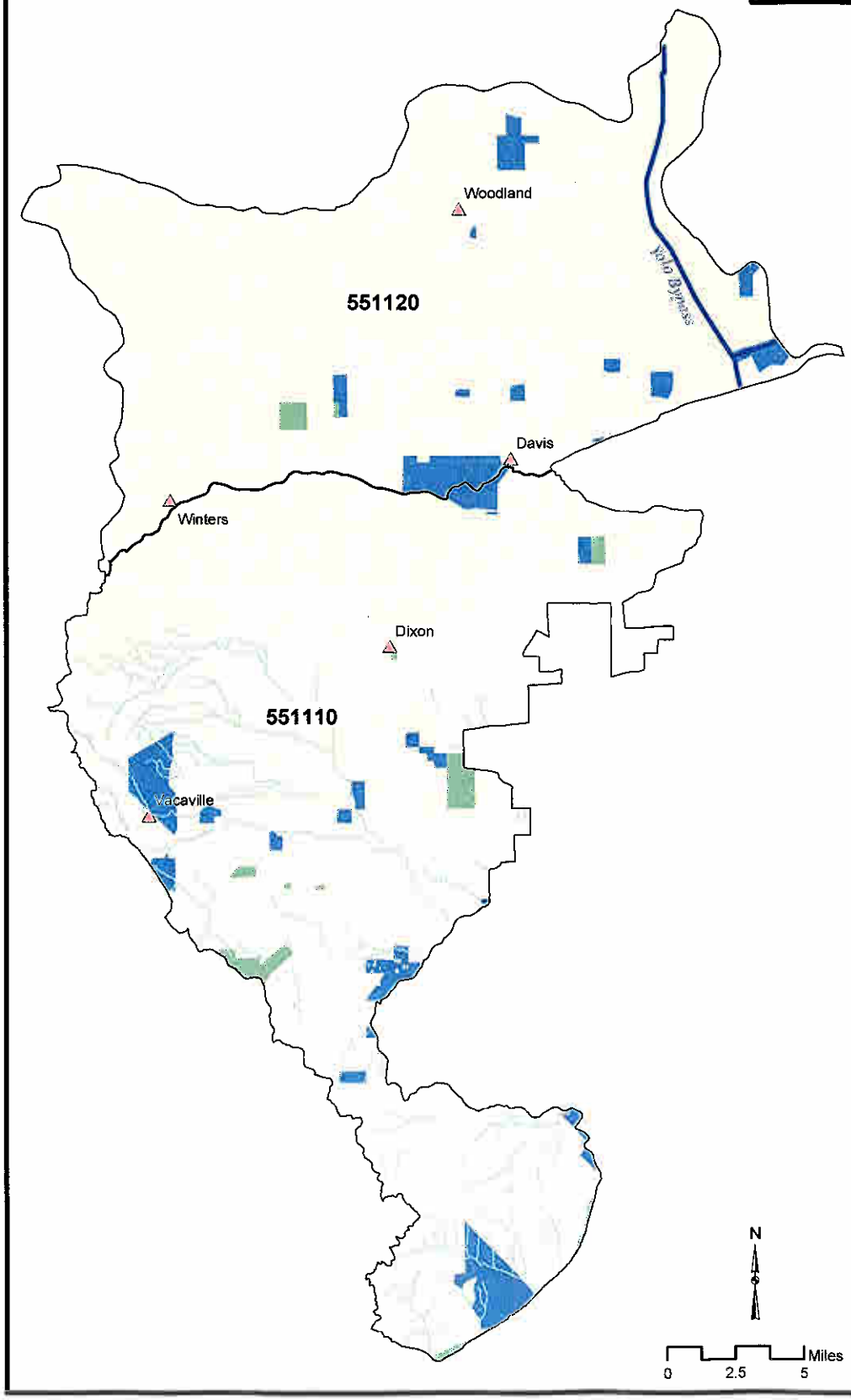


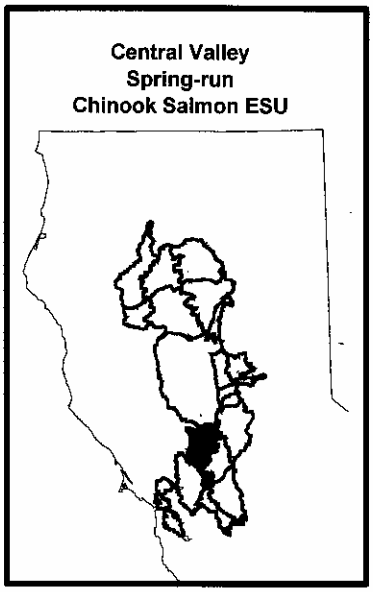

Central Valley
Spring-run
Chinook Salmon ESU
Land Ownership
Central Valley Spring-run
Chinook Salmon
Redding HU (5508)
Shasta Lake
Redding
550810
Cow Creek
Clear Creek
Churn Creek
Sacramento River
Anderson
Ash
Battle Ck
Cottonwood
Cottonwood Creek
MF Cottonwood Creek
550820
Paynes Creek
SF Cottonwood Creek
Cities
Chinook Presence Streams
Hydrologic Unit Boundary
Land Ownership*
Tribal
Federal
State/Local
Private/Other
Water
*Source: California Environmental Resources Evaluation System (CERES), 1999
N
0
2.5
5
Miles
Note: This map is for general reference only


Central Valley
Spring-run
Chinook Salmon ESU
Land Ownership
Central Valley Spring-run
Chinook Salmon
Eastern Tehama HU (5509)
550964
550965
550963
550920
550942
550962
550941
550914
550916
550915
Mill Creek
Deer Creek
Dry Creek
Cities
Chinook Presence
Streams
Hydrologic Unit Boundary
Land Ownership*
Tribal
Federal
State/Local
Private/Other
Water
*Source: California Environmental Resources Evaluation System (CERES), 1999
N
Miles
0
2.5
5
Note: This map is for general reference only


Central Valley
Spring-run
Chinook Salmon ESU
Land Ownership
Central Valley Spring-run
Chinook Salmon
Sacramento Delta HU (5510)
551000
Clarksburg
Courtland
Isleton
Yolo Bypass
Sacramento Deep Water Ship Channel
Elk Slough
Miner Slough
Cache Slough
Elkhorn Slough
Sacramento River
Cities
Chinook Presence Streams
Hydrologic Unit Boundary
Land Ownership*
Tribal
Federal
State/Local
Private/Other
Water
*Source: California Environmental Resources Evaluation System (CERES), 1999
N
0
2.5
5
Miles
Note: This map is a for general reference only

Land Ownership
Central Valley Spring-run Chinook Salmon
Valley Putah-Cache HU (5511)





- Cities
- Chinook Presence Streams
- Hydrologic Unit Boundary

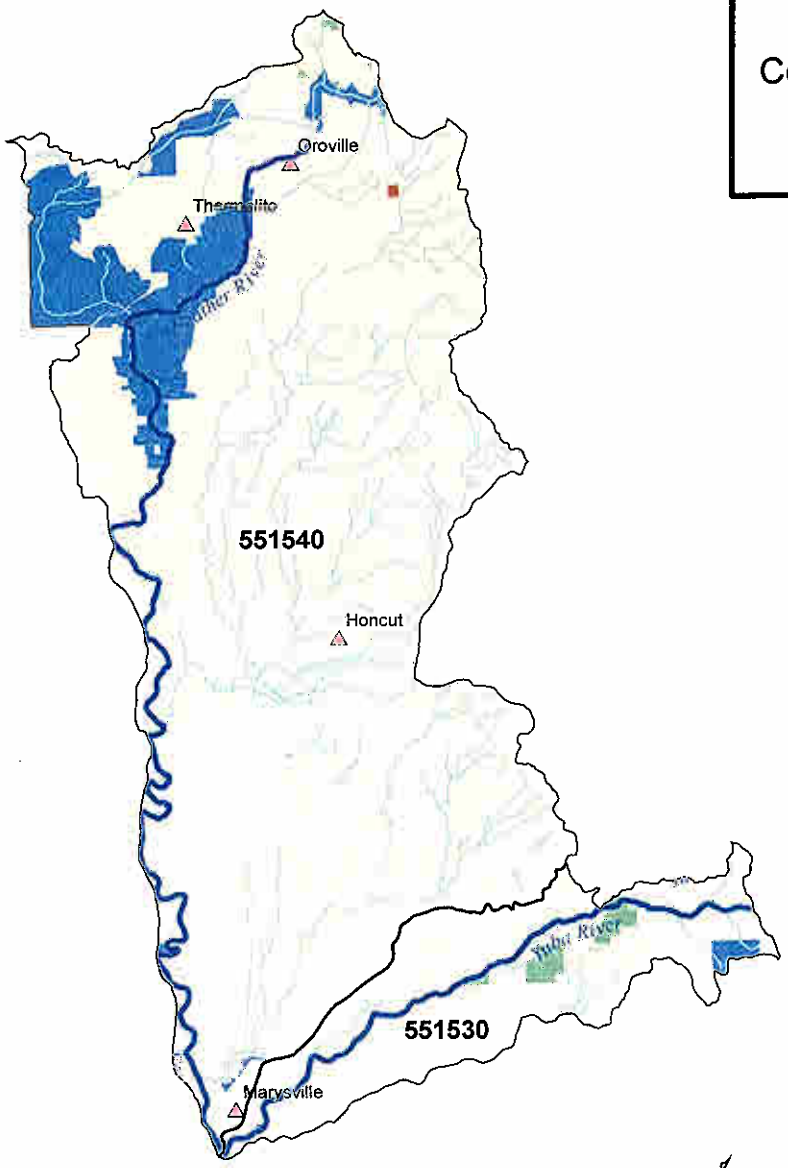
Land Ownership*

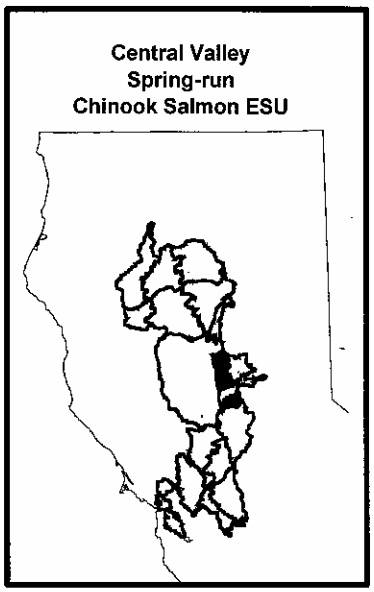
- Tribal
- Federal
- State/Local
- Private/Other
- Water

*Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is a for general reference only

Land Ownership
Central Valley Spring-run Chinook Salmon
Marysville HU (5515)





- Cities
- Chinook Presence Streams
- Hydrologic Unit Boundary

Land Ownership*

- Tribal
- Federal
- State/Local
- Private/Other
- Water

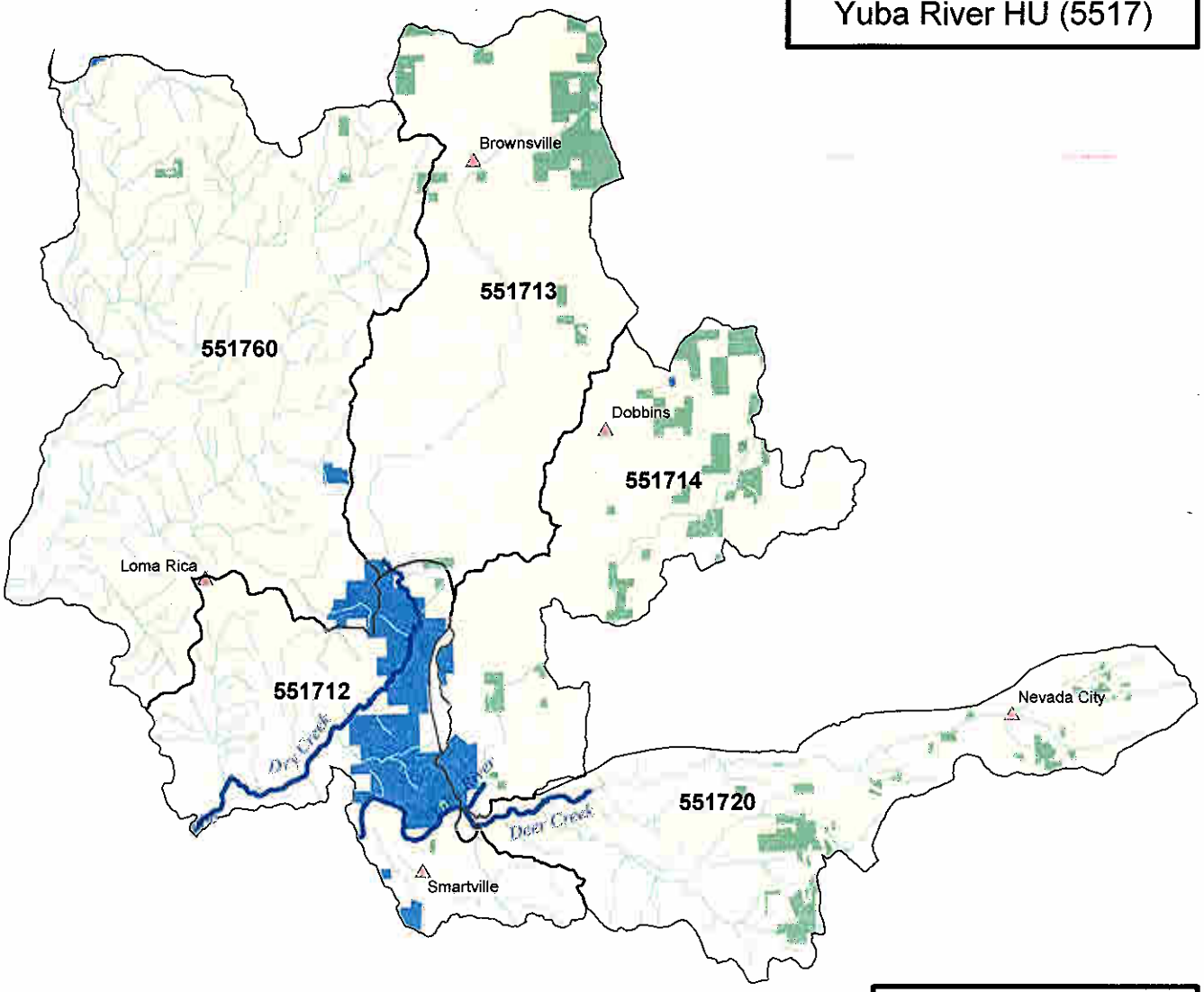
*Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is a for general reference only

N

0 2.5 5 Miles

Land Ownership
Central Valley Spring-run Chinook Salmon
Yuba River HU (5517)



Cities
Chinook Presence Streams
Hydrologic Unit Boundary

Land Ownership*
Tribal
Federal
State/Local
Private/Other
Water

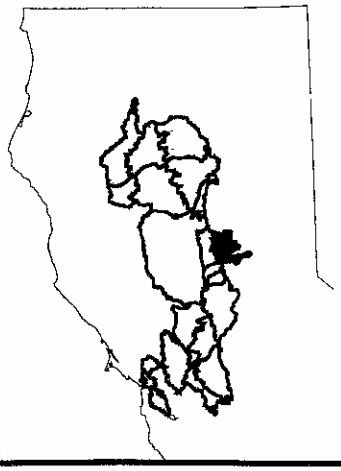
*Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is a for general reference only

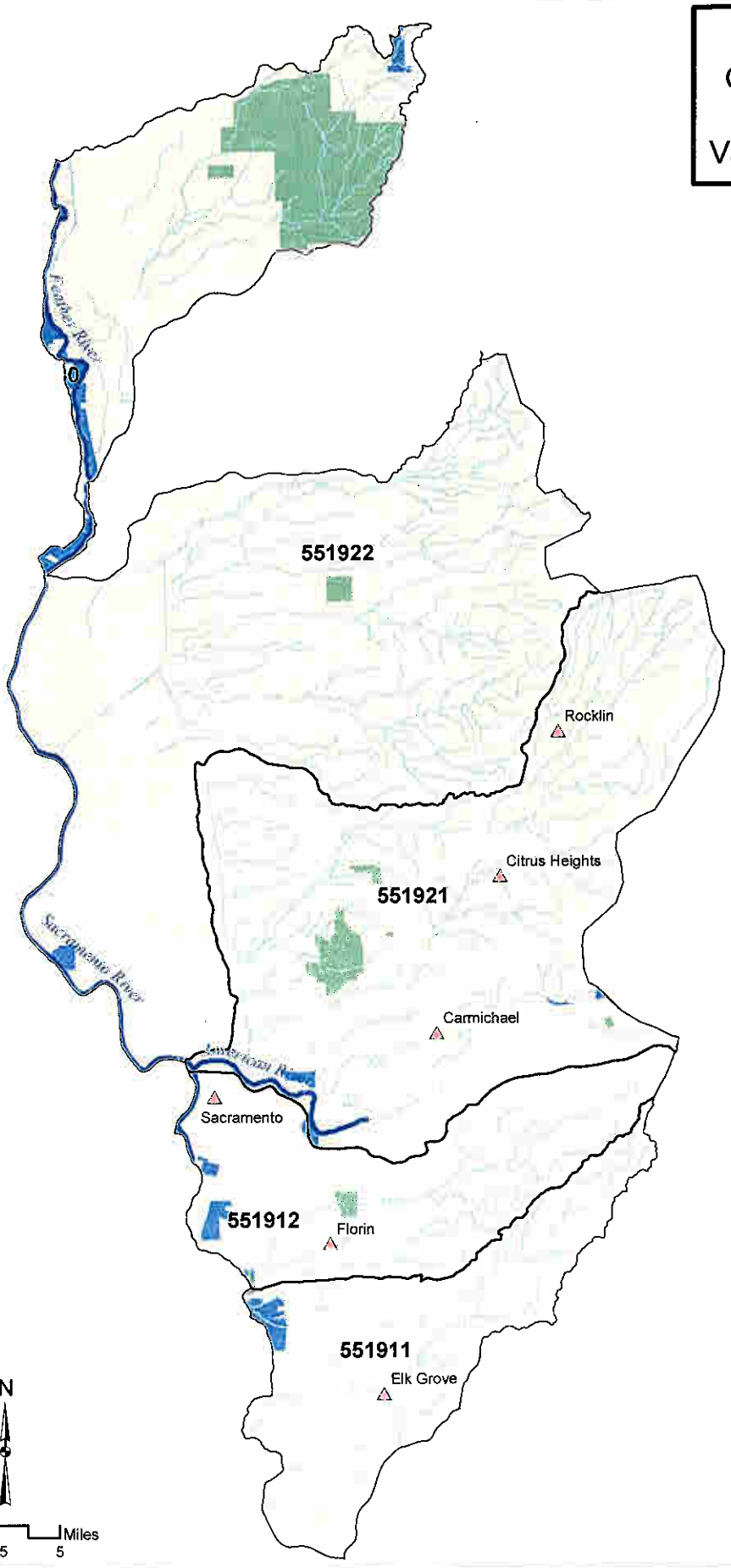
N

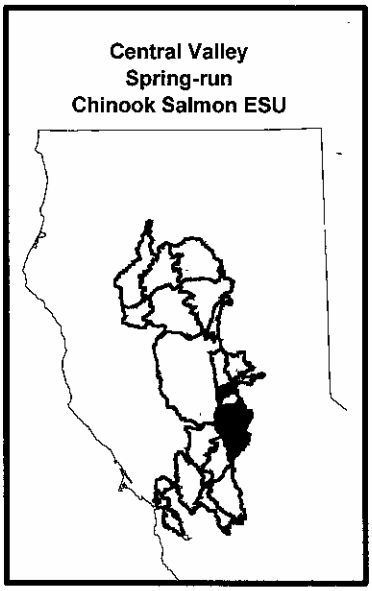
0 2.5 5 Miles

Central Valley Spring-run Chinook Salmon ESU



Land Ownership
Central Valley Spring-run Chinook Salmon
Valley-American HU (5519)





Cities
Chinook Presence Streams
Hydrologic Unit Boundary

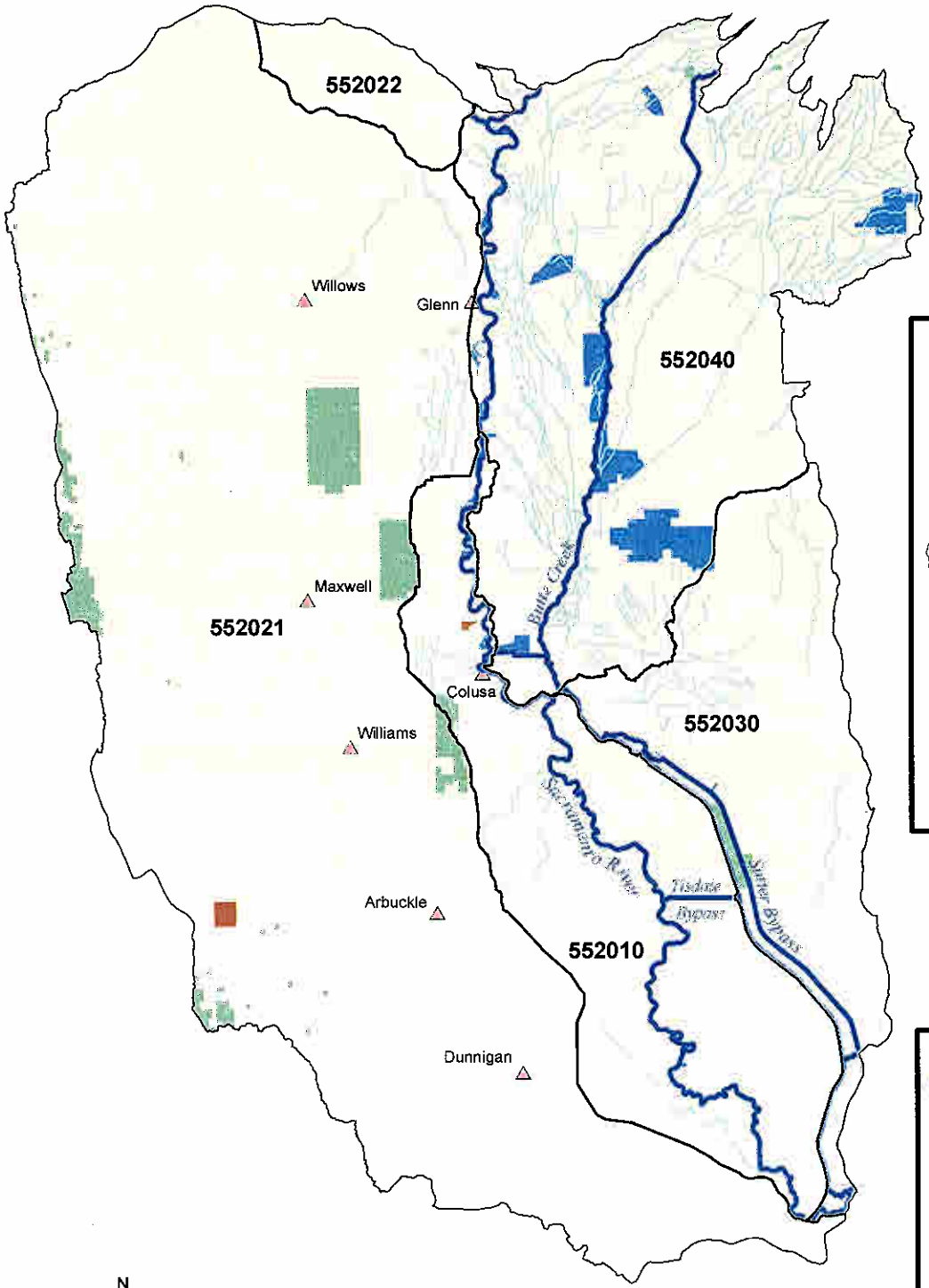
Land Ownership*

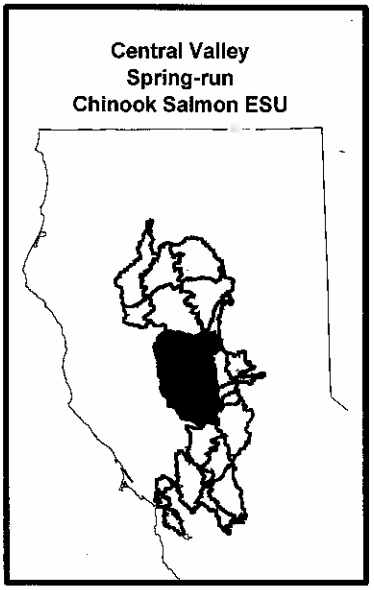
Tribal
Federal
State/Local
Private/Other
Water

*Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is a for general reference only

Land Ownership
Central Valley Spring-run Chinook Salmon
Colusa Basin HU (5520)





- Cities
- Chinook Presence Streams
- Hydrologic Unit Boundary

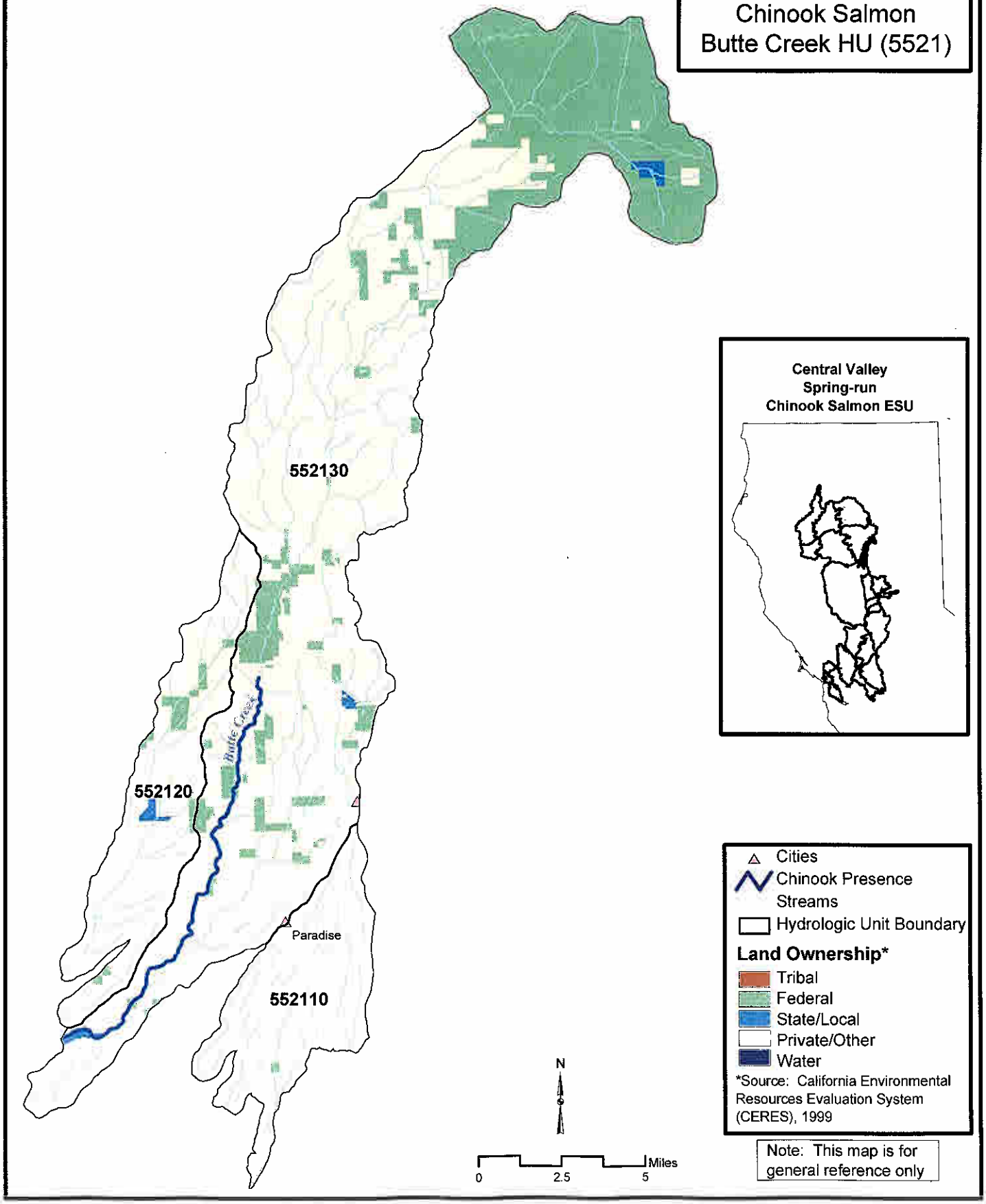
Land Ownership*

- Tribal
- Federal
- State/Local
- Private/Other
- Water

*Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is a for general reference only

Land Ownership
Central Valley Spring-run Chinook Salmon
Butte Creek HU (5521)



Central Valley Spring-run Chinook Salmon ESU

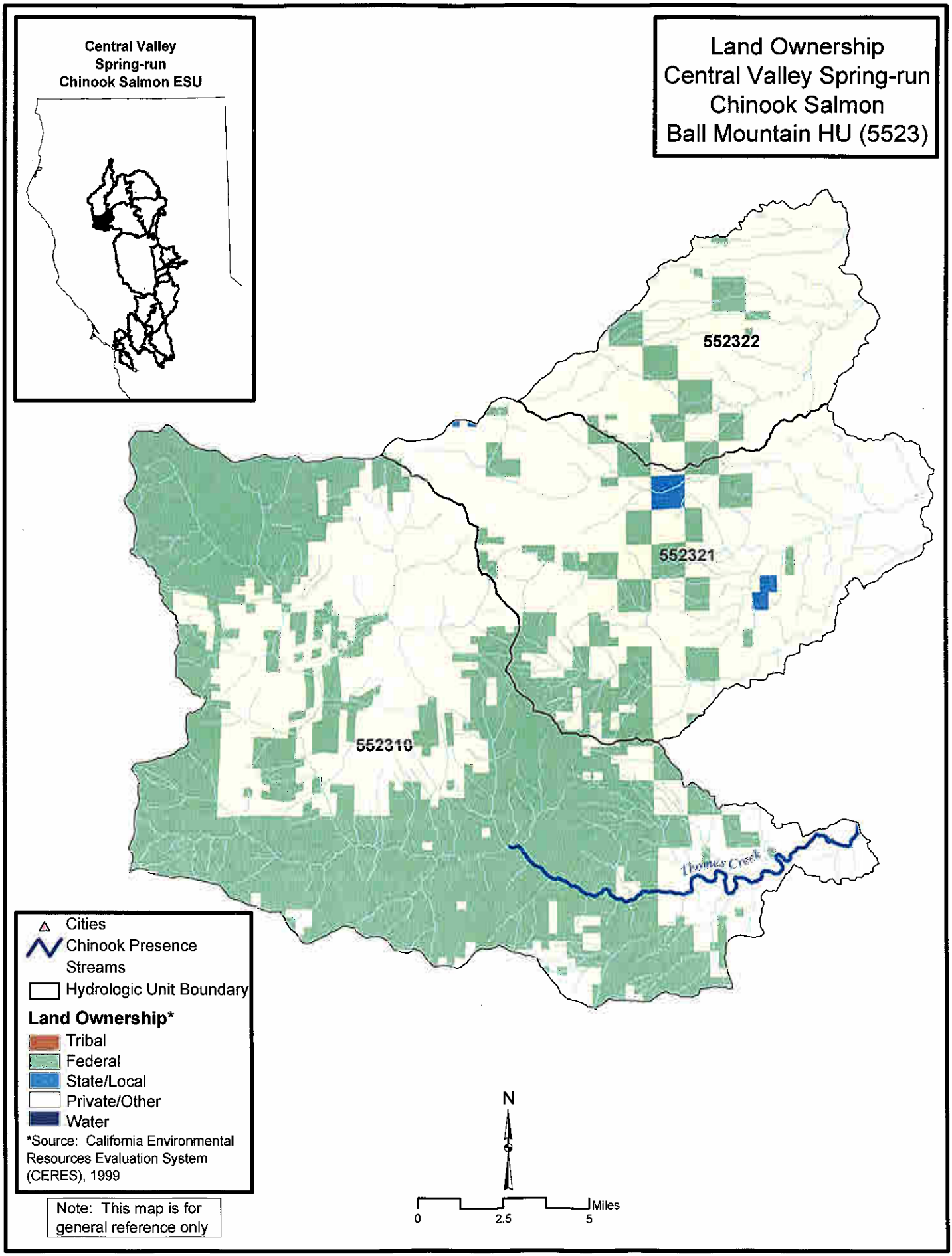
- Cities
- Chinook Presence Streams
- Hydrologic Unit Boundary

Land Ownership*

- Tribal
- Federal
- State/Local
- Private/Other
- Water

*Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is for general reference only


Central Valley
Spring-run
Chinook Salmon ESU
Land Ownership
Central Valley Spring-run
Chinook Salmon
Ball Mountain HU (5523)
552322
552321
552310
Holmes Creek
Cities
Chinook Presence
Streams
Hydrologic Unit Boundary
Land Ownership*
Tribal
Federal
State/Local
Private/Other
Water
*Source: California Environmental Resources Evaluation System (CERES), 1999
Note: This map is for general reference only
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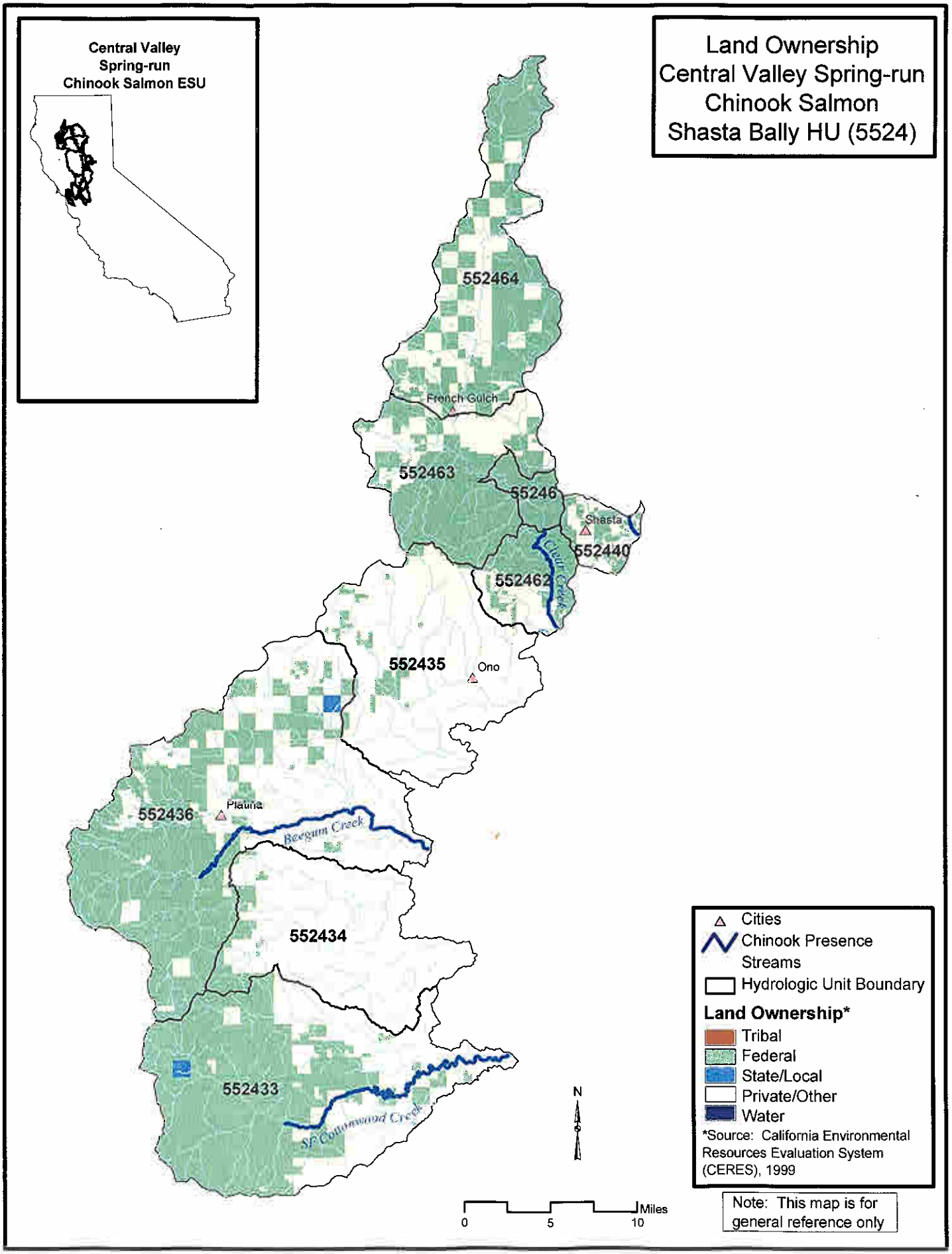
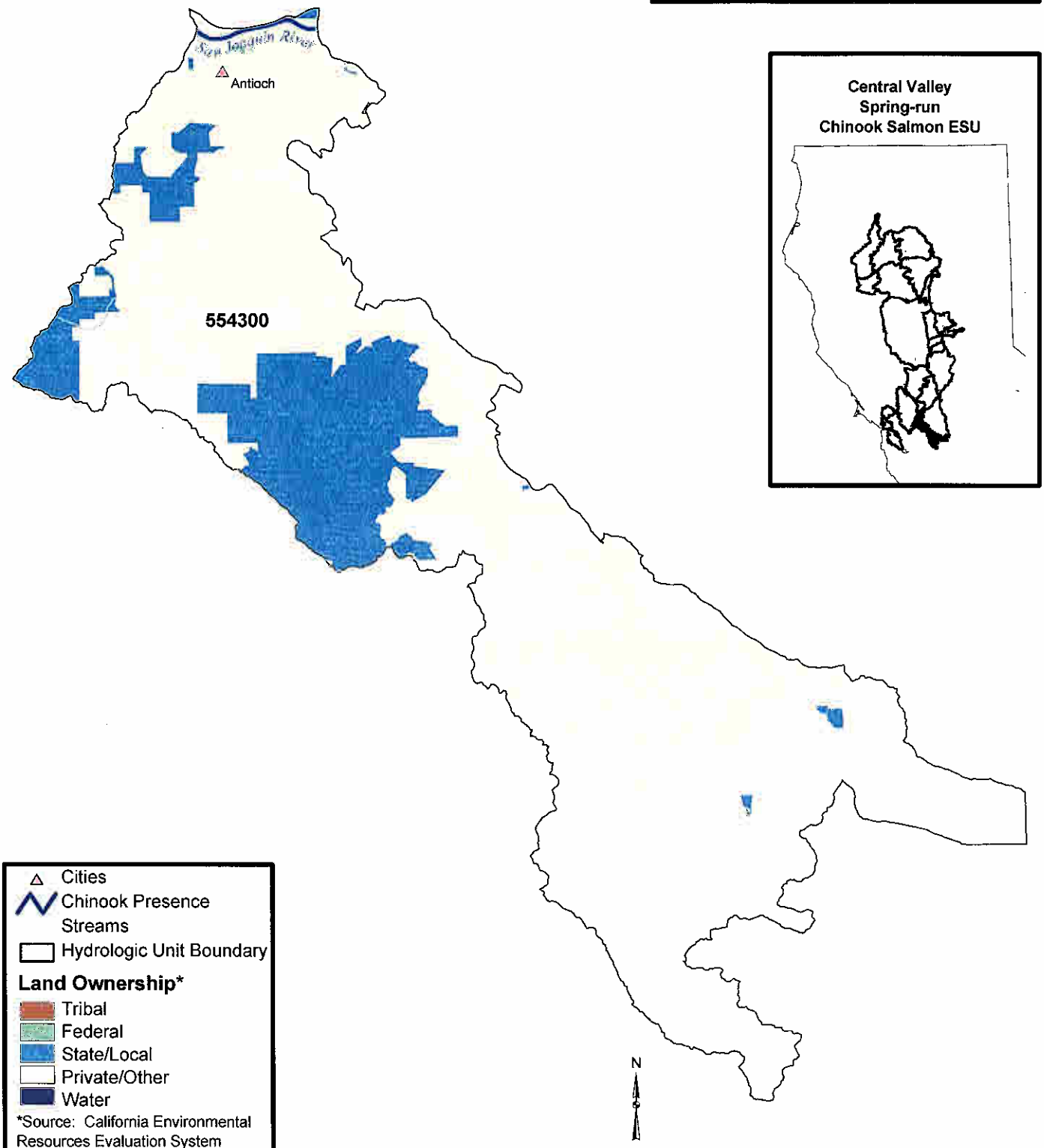
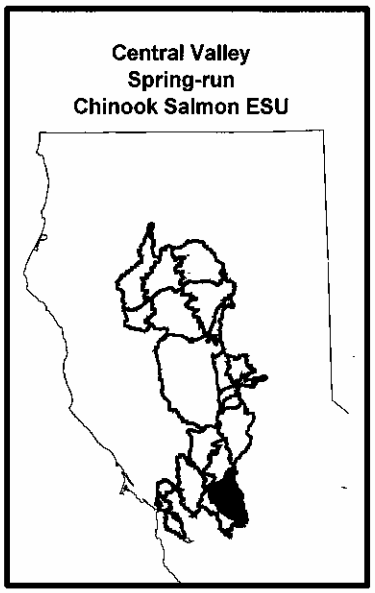
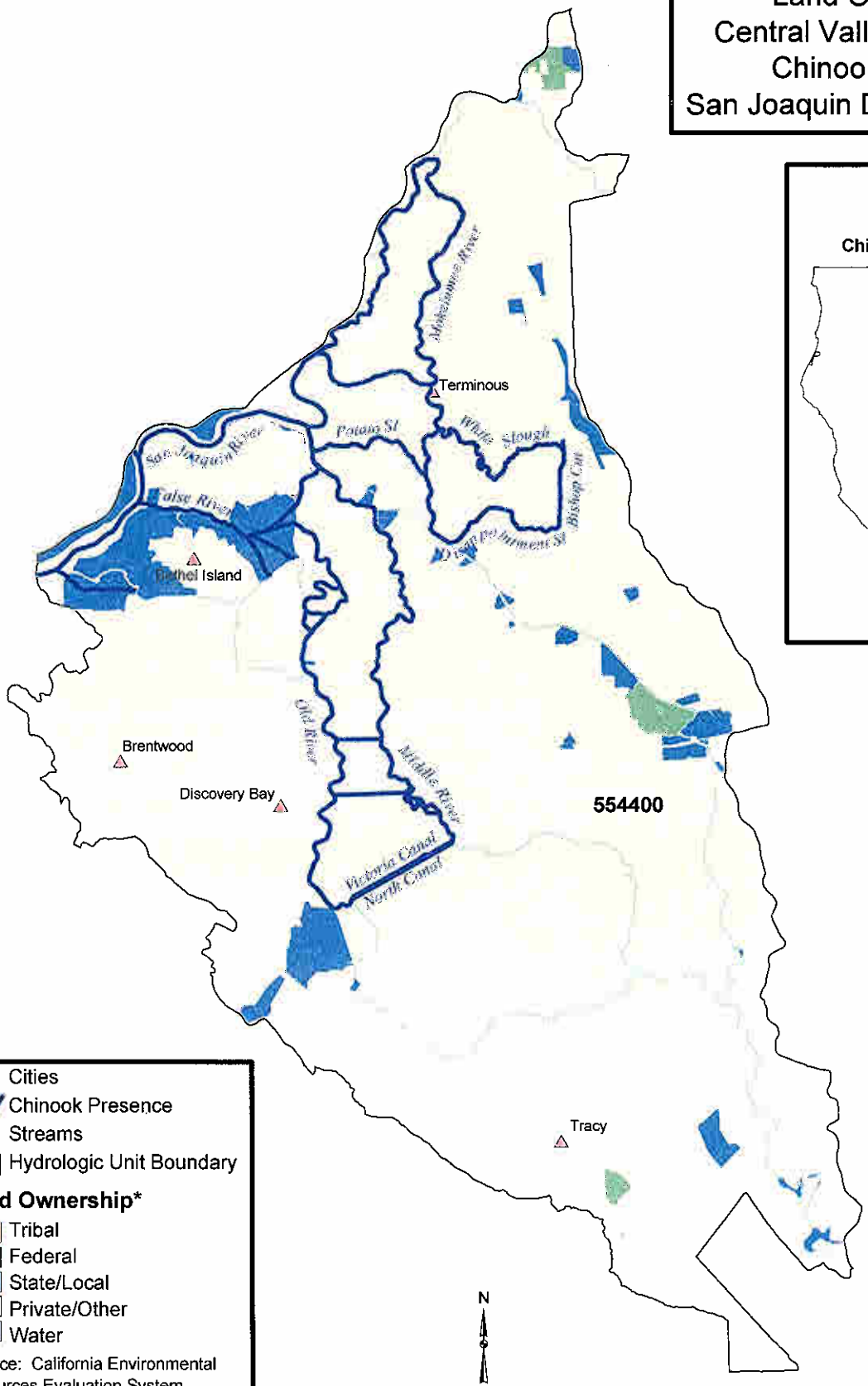

Central Valley
Spring-run
Chinook Salmon ESU
Land Ownership
Central Valley Spring-run
Chinook Salmon
Shasta Bally HU (5524)
552464
French Gulch
552463
55246
Shasta
552440
552462
Clear Creek
552435
Ono
552436
Platina
Beegum Creek
552434
552433
SF Cottonwood Creek
N
0
5
10
Miles
Cities
Chinook Presence Streams
Hydrologic Unit Boundary
Land Ownership*
Tribal
Federal
State/Local
Private/Other
Water
*Source: California Environmental Resources Evaluation System (CERES), 1999
Note: This map is for general reference only

Land Ownership
Central Valley Spring-run Chinook Salmon
North Diablo Range HU (5543)



Land Ownership
Central Valley Spring-run Chinook Salmon
San Joaquin Delta HU (5544)





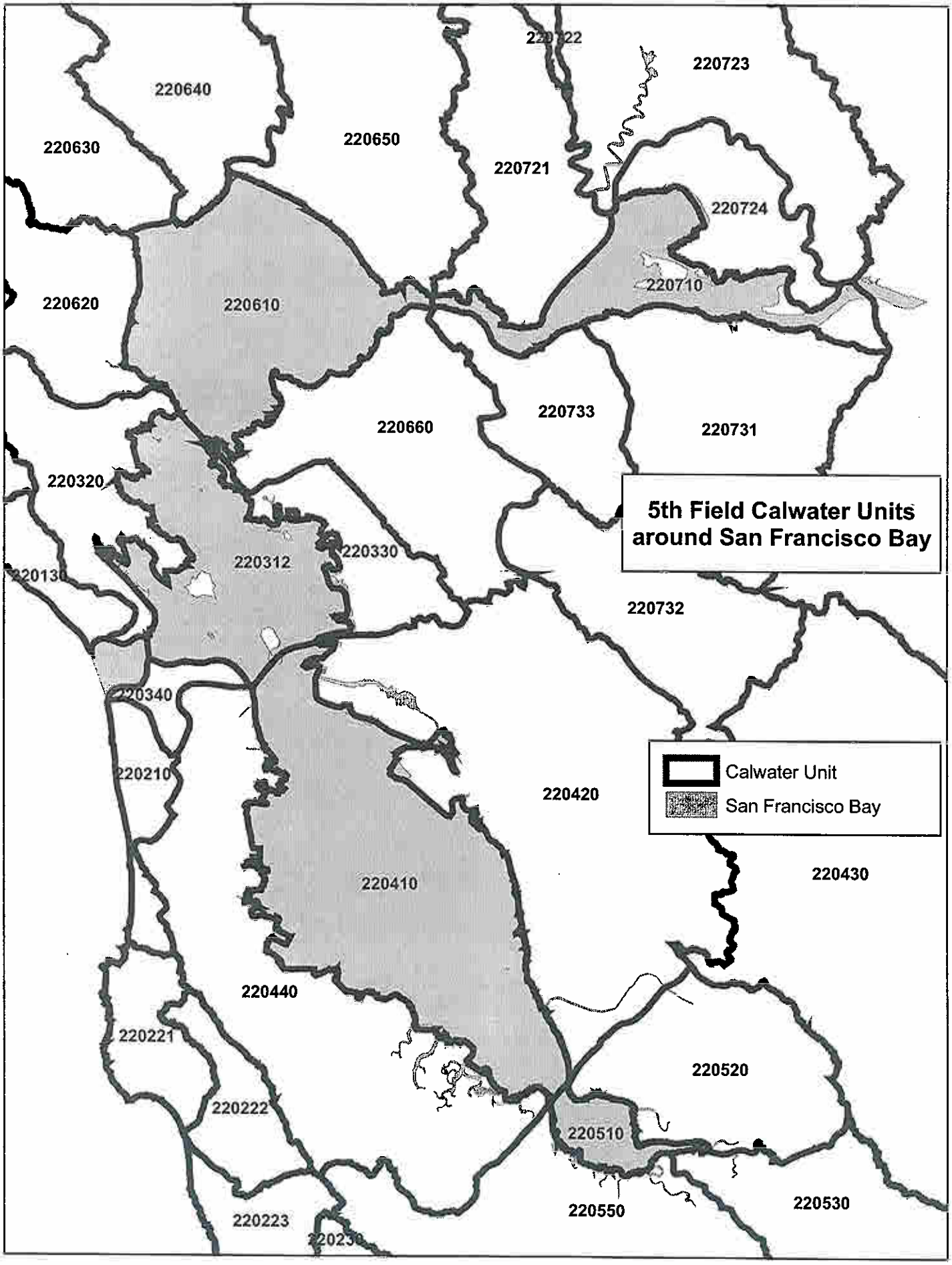
- Cities
- Chinook Presence Streams
- Hydrologic Unit Boundary

Land Ownership*

- Tribal
- Federal
- State/Local
- Private/Other
- Water

*Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is for general reference only


220640
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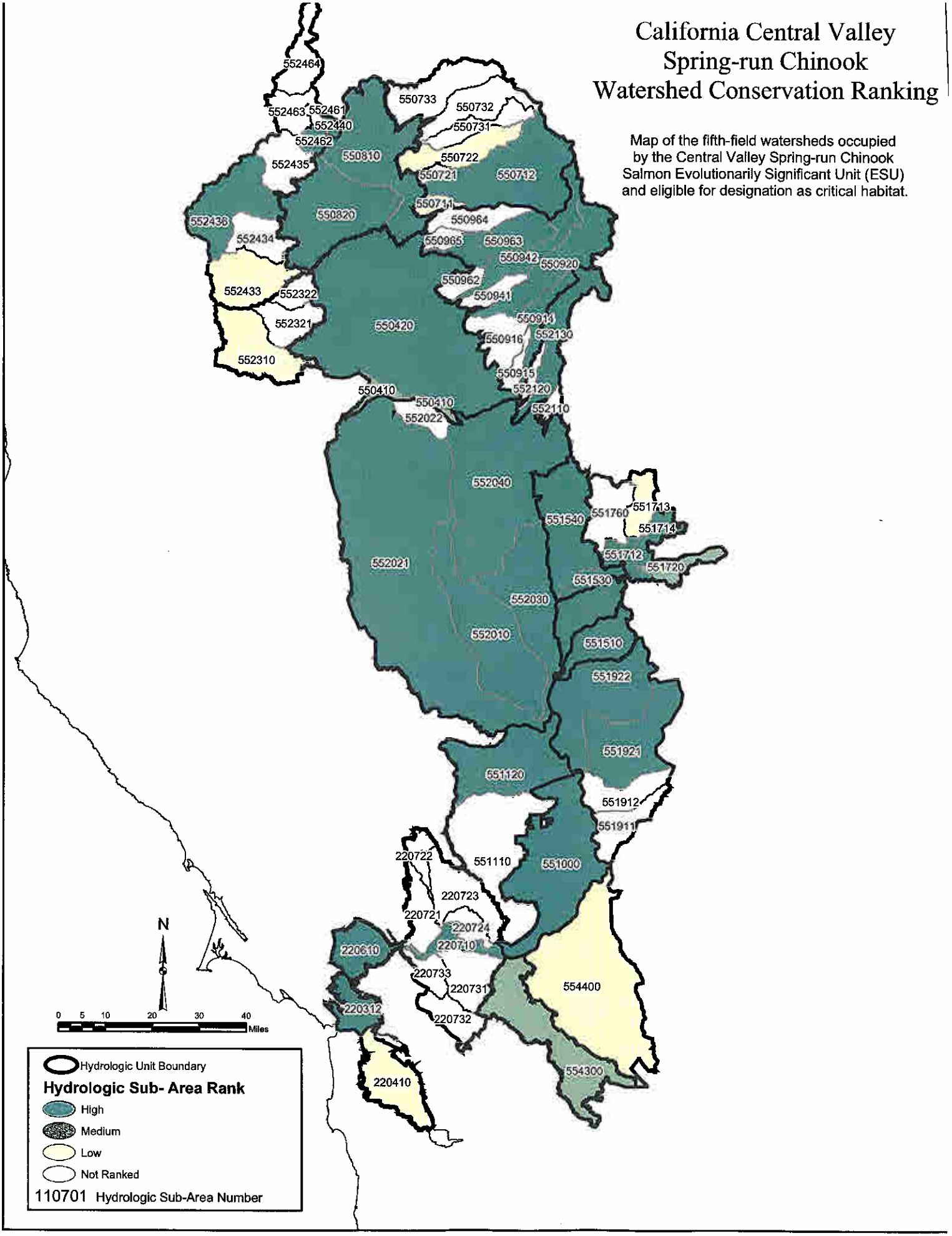
220330
220130
220732
220340
220210
220420
220410
220430
220440
220221
220520
220222
220510
220223
220550
220530
220230
5th Field Calwater Units around San Francisco Bay
Calwater Unit
San Francisco Bay

Map F17. Final CHART Ratings of Conservation Value for Calwater HSA Watersheds occupied by the Central Valley spring run chinook ESU

California Central Valley Spring-run Chinook Watershed Conservation Ranking

Map of the fifth-field watersheds occupied by the Central Valley Spring-run Chinook Salmon Evolutionarily Significant Unit (ESU) and eligible for designation as critical habitat.



Appendix G
Final CHART Assessment for the Central Valley Steelhead ESU

ESU Description

The CV Steelhead ESU was listed as a threatened species in 1998 (63 FR 13347; March 19, 1998). The ESU includes all naturally spawned populations of steelhead in the Sacramento and San Joaquin Rivers and their tributaries, but excludes steelhead from San Francisco and San Pablo Bays and their tributaries. Based on an updated status review (NMFS 2003a) and an assessment of hatchery populations located within the range of the ESU (NMFS 2003b), NMFS recently proposed that the ESU remain listed as a threatened species (69 FR 33102; June 14, 2004). In addition, we proposed that resident O. mykiss co-occurring with anadromous populations below impassable barriers (both natural and man made) and two artificially propagated populations (Coleman National Fish Hatchery on Battle Creek and Feather River Hatchery on the Feather River) also be included in the CV Steelhead ESU. Two artificially propagated steelhead stocks reside within the historical geographic range of the ESU (Nimbus Fish Hatchery on the American River and Mokelumne River Hatchery on the Mokelumne River), but are not considered part of the ESU because they are derived from out-of-ESU broodstock (69 FR 33102; June 14, 2004). NMFS recently determined that a 6-month extension in making a final listing determination for this and all other west coast steelhead/O. mykiss ESUs was warranted (70 FR 37219; June 28, 2005). A Technical Recovery Team has been established for the Central Valley recovery planning domain and had developed a preliminary assessment of the historic and extant population structure of this ESU. Additional technical recovery planning work is underway to identify viability criteria for independent populations and the ESU as a whole.

CHART Area Assessments

The preliminary CHART assessment for this ESU (NMFS 2004b) was prepared to support our December 10, 2004, critical habitat proposal (69 FR 71880). This final CHART assessment considered new information received during the public comment period regarding fish distribution, habitat use, and watershed conservation value. Based on information received from the public comment process, the CHART made a limited

number of changes including: 1) the addition of approximately 6 miles of occupied habitat in several tributaries to HSA 550810, 2) the removal of approximately 3 miles of occupied habitat from HSA 552440, and 3) changed the conservation value of two HSAs (551510 and 552110) from low to medium.

The final CHART assessment for the CV Steelhead ESU addressed 25 CALWATER Hydrologic Units (HUs) or subbasins containing 67 occupied CALWATER HSAs (Figures G1 and G2). The assessment included four HSAs that encompass the San Francisco-San Pablo-Suisun Bay complex which represents a migratory corridor for this ESU (Figure G3). The HSAs were chosen as freshwater and estuarine critical habitat units because they provided a convenient and systematic way to organize the CHART's watershed assessments for this and other ESUs. Information presented below for individual HUs (size, counties, total stream miles, occupied stream miles, and habitat use) were generated from GIS data sets compiled by NMFS Southwest Region and can be found in Table G1.

Unit 1. Tehama Subbasin (HU#5504)

The Tehama HU is located in the north central portion of the ESU and includes portions of the mainstem Sacramento River, the lower portions of two westside tributaries (Thomes and Stony Creeks), and the lower portions of three eastside tributaries (Mill Creek, Deer Creek, and Pine Creek). The HU encompasses an area approximately 1,119 mi^2 and occurs primarily in Tehama County, but also in portions of Butte and Glenn Counties. The HU contains 2 HSAs, both of which are occupied, and 1,879 stream miles (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 228 miles of occupied riverine in the 2 occupied HSAs (Table G1). The CHART concluded that these occupied HSAs contained one or more PCEs (i.e. spawning, rearing, and/or migratory habitat) and identified several management activities that may affect the PCEs. Table G2 summarizes the total miles of occupied riverine or estuarine habitat for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map G1 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The CHART did not identify any unoccupied habitat areas in this subbasin that may be essential for the conservation of the ESU.

Unit 2. Whitmore Subbasin (HU#5507)

The Whitmore HU is located in the northeastern part of the ESU and includes portions of upper Battle Creek (North and South Forks), upper Bear Creek, and the Cow Creek watershed. The HU encompasses an area approximately 913 mi^2 and occurs in Shasta and Tehama Counties. This HU contains 7 HSAs, all of which are occupied, and approximately 990 stream miles (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 177 miles of occupied riverine habitat in the 7 occupied HSAs (Table G1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) and identified management activities that may affect the PCEs. Table G2 summarizes the total miles of occupied riverine or estuarine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map G2 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The CHART did not identify any unoccupied habitat areas in this subbasin that may be essential for the conservation of the ESU.

Unit 3. Redding Subbasin (HU# 5508)

The Redding HU is located in the northernmost part of the ESU and includes portions of the upper Sacramento River mainstem, westside tributaries including Cottonwood Creek (portions of both the Middle and South Forks) and Clear Creek, and the lower portions of several eastside tributaries (Cow Creek, Bear Creek, and lower Battle Creek). The HU encompasses an area of approximately 705 mi^2 and occurs in Shasta and Tehama Counties. This HU contains 2 HSAs, both of which are occupied, and a total of 1,030 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 228 miles of occupied riverine habitat in the 2 occupied HSAs (Table G1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) and identified management activities that may affect the PCEs. Table G2 summarizes the total miles of occupied riverine or estuarine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map G3 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The CHART did not identify any unoccupied habitat areas in this subbasin that may be essential for the conservation of the ESU.

Unit 4. Eastern Tehama Subbasin (HU# 5509)

The Eastern Tehama HU is located in the northeastern portion of the ESU and includes portions of several significant watersheds including Mill Creek, Deer Creek, Antelope Creek, and the upper portion of Big Chico Creek. The HU encompasses an area of approximately 896 mi^2 and occurs primarily in Tehama County with small portions in Butte, Shasta and Plumas Counties. This HU contains 10 HSAs, 6 of which are occupied, and a total of 1,049 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 151 miles of occupied riverine habitat in the 6 occupied HSAs (Table G1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table G2 summarizes the total miles of occupied riverine and estuarine habitat for the HSAs that contains spawning/rearing, rearing/migration, or migration PCEs, as well as the management activities that may affect the PCEs in each HSA. Map G4 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation.

The CHART also concluded that inaccessible stream reaches in Upper Deer Creek above Upper Deer Creek Falls may be essential for the conservation of this ESU (NMFS 2004g). Historically, steelhead had access to this area when conditions allowed fish to pass the falls. A ladder was constructed in late 1940s but it provides poor attraction and passage conditions and has been closed since 2001. Deer Creek currently supports a population of steelhead and improved passage conditions into this reach would increase the amount of spawning, rearing and migration habitat available to the ESU.

Unit 5. Sacramento Delta (HU# 5510)

The Sacramento Delta HU is located in the south-central portion of the ESU. The HU encompasses an area of approximately 446 mi^2 and occurs in portions of Yolo, Sacramento, and Solano Counties. This HU contains a single HSA which is occupied, and approximately 355 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 194 miles of occupied riverine habitat in this HSA (Table G1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table G2 summarizes the total miles of occupied riverine/estuarine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well

as management activities that may affect the PCEs in each HSA. Map G5 depicts the specific areas in this HU that are occupied by the ESU and were consideration for critical habitat designation. The CHART did not identify any unoccupied habitat areas in this subbasin that may be essential for the conservation of the ESU.

Unit 6. Valley Putah-Cache Subbasin (HU# 5511)

The Valley Putah-Cache HU is located in the south-central portion of the ESU and includes a portion of the Yolo Bypass and portions of west side tributaries Putah, Ulatis, and Alamo Creeks. This HU encompasses an area of approximately 961 mi^2 and occurs primarily in Yolo and Solano Counties. This HU contains 3 HSAs, 2 of which are is occupied, and 751 miles of streams (at 1:100,000 hydrography). Portions of these occupied HSAs are outside the boundary of ESU and the unoccupied HSA is completely outside the ESU boundary. Fish distribution and habitat use data compiled by NMFS biologists identify approximately 83 miles of occupied riverine habitat in the occupied HSAs (Table G1). The CHART concluded that the occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table G2 summarizes the total miles of occupied riverine or estuarine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map G6 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation.

Within this subbasin, the team also concluded that unoccupied stream reaches in Middle Putah Creek from Solano Irrigation Dam to Monticello Dam may be essential to the conservation of this ESU (NMFS 2004g). Steelhead are thought to have historically utilized the upper watershed above Monticello Dam. There is currently a very small opportunistic population of steelhead in Lower Putah Creek, but habitat conditions in this area are not suitable for spawning or rearing. Providing fish passage past the Solano Irrigation Dam would provide access to suitable habitat for this ESU and efforts are currently underway to investigate the feasibility of providing passage beyond this dam. The team concluded that this unoccupied area may be essential to conservation of the ESU because populations of steelhead in the Central Valley are constrained by the lack of accessible habitat and access to this area would provide cold water rearing and spawning habitat for this population.

Unit 7. American River Subbasin (HU# 5514)

The American River HU is located in the eastern portion of the ESU and includes portions of upper Coon Creek, Doty Creek, and Auburn Ravine. This HU encompasses an area of approximately 1,642 mi^2 and occurs primarily in El Dorado and Placer Counties. This HU contains 15 HSAs all of which are outside the range of the ESU; however, one of the HSAs is partially occupied (#551422) by the ESU. There are 104 miles of streams (at 1:100,000 hydrography) in the occupied HSA, but fish distribution and habitat use data compiled by NMFS biologists identify only 20 miles of riverine habitat that is occupied HSA (Table G1). The CHART concluded that the occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table G2 summarizes the total miles of occupied riverine or estuarine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map G7 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The CHART did not identify any unoccupied habitat areas in this subbasin that may be essential for the conservation of the ESU.

Unit 8. Marysville Subbasin (HU# 5515)

The Marysville HU is located in the central portion of the ESU and includes portions of the Feather and Yuba Rivers. This HU encompasses an area of approximately 417 mi^2 and occurs primarily in Butte and Yuba Counties with smaller portions located in Sutter and Placer Counties. The HU contains 3 HSAs, all of which are occupied, and 562 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 75 miles of occupied riverine habitat in the 3 HSAs (Table G1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table G2 summarizes the total miles of occupied riverine or estuarine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map G8 depicts the specific areas in this HU that are occupied by the ESU and were considered for for critical habitat designation.

The CHART did not identify any unoccupied habitat areas in this subbasin that may be essential for the conservation of the ESU. However, the team did conclude that

inaccessible stream reaches in the adjacent subbasin (in HU#5518) which contains the Upper Feather River above Oroville Dam may be essential to the conservation of this ESU (NMFS 2004g). Specifically, the team identified the following stream reaches above Oroville Dam that may be essential for conservation of this ESU: from Oroville Dam upstream along the West Branch of the Feather River to the vicinity of Kimshew Falls; along the North Fork of the Feather River upstream of the location of Lake Almanor; along the East Branch of the NF Feather River including Indian Creek and Spanish Creek; the South Middle Fork of the Feather River, and the South Fork of the Feather River upstream to the first natural impassible barrier. Steelhead (and spring-run chinook salmon) historically occurred in the Upper Feather River prior to Pacific Gas and Electric's hydroelectric development in the North Fork watershed and the construction of Oroville Dam. Construction of Oroville Dam extirpated the steelhead (and spring-run chinook) population in this upper watershed. The team concluded that spawning, rearing, an migratory habitat is available above Oroville Dam in these inaccessible stream reaches, but it is in better condition for steelhead than spring-run chinook salmon. The feasibility of providing fish passage past Oroville Dam is currently being evaluated through the ongoing FERC relicensing process for this facility. The team concluded this inaccessible habitat may be essential for the conservation of this ESU because the natural production of steelhead in the lower Feather River is limited by the substantial lack of suitable spawning and rearing habitat below Oroville Dam, and access to the unoccupied habitat above the dam would allow for expansion of the population in this watershed.

Unit 9. Yuba River Subbasin (HU# 5517)

The Yuba River Santa Clara HU is located in the central and eastern portion of the ESU and includes part of the upper Yuba River watershed (Dry and Deer Creeks). This HU encompasses an area of approximately 1,436 mi^2 and occurs in several Counties including: Butte, Nevada, Placer, Plumas, Sierra, and Yuba. The HU contains 16 HSAs, 4 of which are occupied, and 2,048 miles of streams (at 1:100,000 hydrography); however, all but 2 HSAs are entirely outside the ESU boundary. Fish distribution and habitat use data compiled by NMFS biologists identify only approximately 22 miles of occupied riverine habitat in the 4 occupied HSAs (Table G1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table G2 summarizes the total miles of occupied riverine or estuarine habitat for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map G9

depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation.

The CHART concluded that inaccessible stream reaches of the Upper Yuba River above Englebright Dam may be essential to the conservation of this ESU, including those upstream reaches on the North Yuba to New Bullards Bar Dam, on the Middle Yuba to Milton Dam, and on the South Yuba to Lake Spaulding (NMFS 2004g). All three forks of the Upper Yuba River historically supported populations of steelhead (and spring chinook). The team determine this area may be essential for conservation because it provides one of the largest areas of suitable habitat in the Central Valley that can be accessed by providing passage at one relatively small dam. The Lower Yuba is also considered to have a good "seed" population of steelhead (and spring chinook) and the population is considered relatively free of hatchery influence. A large, multi-million dollar study program is underway through the CALFED Ecological Restoration Program to evaluate the feasibility of restoring anadromous salmonid populations to the Upper Yuba River.

Unit 10. Valley-American Subbasin (HU# 5519)

The Valley-American HU is located in the central-eastern part of the ESU and includes portions of the American River and lower Auburn Ravine. This HU encompasses an area of approximately 958 mi^2 and occurs primarily in Placer, Sacramento, Sutter, and Yuba Counties. The HU contains 4 HSAs, only 2 of which are occupied, and approximately 1,188 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 187 miles of occupied riverine habitat in the 2 HSAs (Table G1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table G2 summarizes the total miles of occupied riverine or estuarine habitat identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map G10 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The CHART did not identify any unoccupied habitat areas in this subbasin that may be essential for the conservation of the ESU.

Unit 11. Colusa Basin Subbasin (HU# 5520)

The Colusa Basin HU is located in the central portion of the ESU and includes portions

of the mainstem Sacramento River, lower Butte Creek, the Butte Creek-Sutter Bypass and Little Chico Creek. This HU encompasses an area of approximately 2,767 mi^2 and occurs in portions of Butte, Colusa, Glenn, Sutter, and Yolo Counties. The HU contains 5 HSAs, 3 of which are occupied, and 2,815 miles of streams (at 1:100,000 hydrography) although most of these stream miles are in unoccupied HSAs. Fish distribution and habitat use data compiled by NMFS biologists identify approximately 285 miles of occupied riverine habitat, including the Sutter Bypass, in the 3 HSAs (Table G1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table G2 summarizes the total miles of occupied riverine or estuarine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map G11 depicts the specific areas in this HU that are occupied by the ESU and were considered for the critical habitat designation. The CHART did not identify any unoccupied habitat areas in this subbasin that may be essential for the conservation of the ESU.

Unit 12. Butte Creek Subbasin (HU# 5521)

The Butte Creek HU is located in the northeastern portion of the ESU and contains portions of Butte Creek and Little Chico Creek. This HU encompasses an area of approximately 207 mi^2 and occurs primarily in Butte County. The HU contains 3 HSAs, all of which are occupied, and 310 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 38 miles of occupied riverine habitat in the single occupied HSA (Table G1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table G2 summarizes the total miles of occupied riverine or estuarine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map G12 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation.

The CHART also concluded that inaccessible reaches of Upper Butte Creek above Centerville Dam upstream to Butte Meadow may be essential to the conservation of this ESU (NMFS 2004g). It is uncertain whether this area was historically used by the steelhead, but resident rainbow trout were historically present and still occur above

Centerville Diversion Dam. Spawning, rearing, and migration habitat is present and thought to be in good condition. The team believed this area may be essential for conservation because current steelhead spawning in this watershed is all below an elevation of 1,000 ft. High water temperatures in the lower portion of Butte Creek have led to significant spring-run chinook pre-spawning mortalities in recent years, and the team concluded that improved fish passage over the Centerville Diversion Dam would increase the range for both the-spring run chinook and steelhead ESUs, as well as reduce the risk of adult losses in the lower stream reaches. The team expects that feasibility of passage at the Centerville Diversion Dam will be evaluated through the upcoming FERC re-licensing process for the facility.

Unit 13. Ball Mountain Subbasin (HU# 5523)

The Ball Mountain HU is located in the northwestern portion of the ESU and includes a portion of upper Thomes Creek and associated tributaries. This HU encompasses an area of approximately 334 mi^2 and occurs almost entirely in Tehama County. The HU contains 3 HSAs, only one of which is occupied, and 521 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 41 miles of occupied riverine habitat in the one occupied HSA (Table G1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table G2 summarizes the total miles of occupied riverine and estuarine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map G13 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The CHART did not identify any unoccupied habitat within this subbasin that may be essential for the conservation of this ESU.

Unit 14. Shasta Bally Subbasin (HU# 5524)

The Shasta Bally HU is located in the northwestern part of the ESU and includes portions of South Fork Cottonwood Creek and Beegum Creek among others. This HU encompasses an area of approximately 905 mi^2 and occurs primarily in Shasta and Tehama Counties. The HU contains 9 HSAs, 5 of which are occupied, and approximately 1,003 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 119 miles of occupied riverine habitat in the 5 HSAs (Table G1). The CHART concluded that these

occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table G2 summarizes the total miles of occupied riverine or estuarine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map G14 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The CHART did not identify any unoccupied habitat within this subbasin that may be essential for the conservation of this ESU.

Unit 15. North Valley Floor Subbasin (HU# 5531)

The North Valley Floor HU is located in the southeastern portion of the ESU and includes portions of the Calaveras, Mokelumne, and Cosumnes Rivers. This HU encompasses an area of approximately 1,378 mi^2 and occurs primarily in San Joaquin, Sacramento, and Calaveras counties. The HU contains 5 HSAs, 3 of which are occupied, and approximately 2,195 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify only about 189 miles of occupied riverine habitat in the 3 HSAs (Table G1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table G2 summarizes the total miles of occupied riverine or esturarine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map G15 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation.

The CHART team also concluded that inaccessible stream reaches of the Upper Mokelumne River above Comanche Dam up to Bald Rock Falls (which is 7 miles above Electra Dam) may be essential to the conservation of this ESU (NMFS 2004g). Portions of this inaccessible habitat area extend into the Middle Sierra Subbasin (HU#5532). The Upper Mokelumne River historically supported large runs of spring-run chinook salmon , and since steelhead and spring-run chinook use similar habitats it is assumed this area also supported large runs of steelhead. Suitable habitat exists above Comanche Dam, but it has been altered by Comanche and Pardee reservoirs. The team concluded that this area may be essential for conservation of the ESU because steelhead have been extirpated from the area above the dam and recovery of this ESU may require the re-establishment of multiple independent populations of steelhead throughout the Central Valley.

Unit 16. Middle Sierra Subbasin (HU# 5532)

The Middle Sierra HU is located in the eastern portion of the ESU and contains portions of the upper Cosumnes River watershed. This HU encompasses an area of approximately 1,424 mi^2 and occurs primarily in El Dorado, Amador, and Calaveras counties. The HU contains 6 HSAs, 4 of which are occupied, and 2,545 miles of streams. Fish distribution and habitat use data compiled by NMFS biologists identify only about 70 miles of occupied riverine habitat in the 4 HSAs (Table G1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table G2 summarizes the total miles of occupied riverine and estuarine habitat identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map G16 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. As discussed for Unit 15 above, inaccessible portions of the upper Mokelumne River which may be essential to the conservation of this ESU extend into this subbasin. The CHART did not identify any other unoccupied areas that may be essential to the conservation of the ESU.

Unit 17. Upper Calavera Subbasin (HU# 5533)

The Upper Calaveras HU is located in the eastern portion of the ESU and contains portions of the Calaveras River. This HU encompasses an area of approximately 362 mi^2 and occurs entirely in Calaveras county. The HU contains 3 HSAs, only one of which is occupied, and approximately 743 miles of streams (at 1:100,000 hydrography); however, there are only 17 miles of streams in the occupied HSA. Fish distribution and habitat use data compiled by NMFS biologists identify only about 6 miles of occupied riverine habitat in the HSA (Table G1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table G2 summarizes the total miles of occupied riverine and estuarine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map G17 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The CHART did not identify any unoccupied areas in this subbasin that may be essential to the conservation of the ESU.

Unit 18. Stanislaus River Subbasin (HU# 5534)

The Stanislaus River HU is located in the southeastern portion of the ESU and contains portions of the Stanislaus River. This HU encompasses an area of approximately 998 mi^2 and occurs primarily in Tuolumne, Calaveras and Alpine counties. The HU contains 8 HSAs; however, only one is in the ESU and occupied. The HU has approximately 1,708 miles of streams (at 1:100,000 hydrography); however, there are only 8 miles of streams in the single occupied HSA. Fish distribution and habitat use data compiled by NMFS biologists identify only about 3 miles of occupied riverine habitat in this HSA (Table G1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table G2 summarizes the total miles of occupied riverine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map G18 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation.

Within this subbasin, the CHART also concluded that inaccessible stream reaches in the Middle Stanislaus River from Goodwin Dam to New Melones Dam may be essential to the conservation of this ESU (NMFS 2004g). The Stanislaus River historically supported a large population of spring-run chinook salmon and because steelhead utilize similar habitats it is likely that this River system also supported a large population of steelhead. Construction of Goodwin Dam blocked access of steelhead to those portions of the Stanislaus River above the Dam and largely extirpated this population. Recently, however, dam operations have provided conditions that allowed a few steelhead to spawn below Goodwin Dam. Suitable habitat is thought to exist above Goodwin Dam for steelhead and fish passage is considered feasible because of its low height. Based on preliminary technical recovery planning for ESUs in the central valley, recovery of this ESU will likely require the establishment of multiple independent steelhead populations particularly in the San Joaquin portion of the central valley.

Unit 19. San Joaquin Valley Floor Subbasin (HU# 5535)

The San Joaquin Valley Floor HU is located in the southeastern part of the ESU and contains portions of the Merced, Tuolumne, and Stanislaus Rivers. This HU encompasses an area of approximately 1,932 mi^2 and occurs primarily in Merced and Stanislaus counties. The HU contains 9 HSAs, several of which occur outside or partially outside the geographic boundary of the ESU. Of the 9 HSAs, 7 are occupied

and contain approximately 1,313 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify only about 159 miles of occupied riverine habitat in these HSAs (Table G1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table G2 summarizes the total miles of occupied habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map G19 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation.

Within this subbasin, the CHART also concluded that inaccessible stream reaches in the Middle Tuolumne River (between LaGrange and New Don Pedro Dams) and the Middle Merced River (between Crocker-Huffman and Exchequer Dams) may be essential to the conservation of this ESU (NMFS 2004g). Both rivers historically supported large populations of spring-run chinook salmon and because steelhead utilize similar habitat it is likely that these rivers also supported large populations of steelhead. Although current central valley steelhead populations are considered winter-run, habitat conditions in most San Joaquin basins, including the Tuolumne and Merced, may have historically supported summer steelhead. With construction of LaGrange and Crocker-Huffman Dams, spring-chinook in both basins were extirpated, and most likely steelhead as well. Although steelhead cannot access the upper watersheds in the Tuolumne and Merced Rivers, dam operations in both watersheds have provided conditions allowing steelhead to spawn downstream of LaGrange and Crocker-Huffman Dams. The team believes that suitable habitat conditions exist above LaGrange and Crocker-Huffman Dams and that there may be opportunities to provide fish passage at each facility. Based on preliminary technical recovery planning for ESUs in the central valley, it is likely that recovery of this ESU will require the establishment of multiple independent steelhead populations particularly in the San Joaquin portion of the central valley.

Units 20 (Tuolumne River; HU#5536) and 21 (Merced River; HU#5537)

The Tuolumne River and Merced River HUs contains portions of the upper Tuolumne and Merced Rivers that are mostly or entirely outside the range of the ESU. The 2 HUs contain 18 HSAs and over 2,800 miles of streams (at 1:100,000 hydrography), but all are unoccupied by the ESU. The CHART team did not identify any areas in these subbasins that may be essential for the conservation of the ESU.

Unit 22. Delta-Mendota Canal Subbasin (HU#5541)

The Delta-Mendota Canal HU is located in the southernmost portion of the ESU and contains portions of the Delta-Mendota Canal. This HU encompasses an area of approximately 1,220 mi^2 and occurs primarily in Merced, Fresno, and Stanislaus counties. The HU contains 2 HSAs, both of which are occupied, and fish distribution and habitat use data compiled by NMFS biologists (at 1:100,000 hydrography) identify only about 50 miles of occupied riverine habitat in these HSAs (Table G1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table G2 summarizes the total miles of occupied riverine and estuarine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map G20 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The CHART did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 23. Middle West Side Subbasin (HU#5542)

The Middle West Side Subbasin is located in the southwestern portion of the ESU in the San Joaquin basin. The HU contain 4 HSAs and approximately 509 miles of streams (at 1:100,000 hydrography), but all are unoccupied by the ESU. The CHART did not identify any areas in these subbasins that may be essential for the conservation of the ESU.

Unit 24. North Diablo Range (HU# 5543)

The North Diablo Range HU is located in the southwestern portion of the ESU and includes portions of the south and central Delta channel complex. This HU encompasses an area of approximately 315 mi^2 and occurs primarily in Alameda, Contra Costa, and San Joaquin counties. The HU contains only a single HSA, which is partially occupied, and 336 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify only approximately 4 miles of occupied riverine/estuarine habitat in this HSA (Table G1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table G2 summarizes the total miles of occupied riverine and/or estuarine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration

PCEs, as well as management activities that may affect the PCEs in each HSA. Map G21 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The CHART did not identify any unoccupied habitat areas in this subbasin that may be essential for the conservation of the ESU.

Unit 25. San Joaquin Delta Subbasin (HU# 5544)

The San Joaquin Delta HU is located in the southwestern portion of the ESU and includes portions of the south and central Delta channel complex. This HU encompasses an area of approximately 628 mi^2 and occurs primarily in Contra Costa and San Joaquin counties. The HU contains a single HSA which is occupied, and approximately 455 miles of stream channels (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 276 miles of occupied riverine/estuarine habitat in this HSA (Table G1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table G2 summarizes the total miles of occupied riverine and/or estuarine habitat for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map G22 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The CHART did not identify any unoccupied habitat areas in this subbasin that may be essential for the conservation of the ESU.

Unit 26. Suisun Bay (HU# 2207), San Pablo Bay (HU#2206) and San Francisco Bay (HU#s 2203 and 2204)

Portions of four HUs (2207, 2206, 2203, 2204) comprise the Suisun Bay- San Pablo-San Francisco Bay complex that is utilized by this ESU. These four HUs contain a large number of HSAs which include Bay habitat as well as freshwater tributaries to the Bay complex, but only the four HSAs that comprise the Bay complex are occupied by this ESU (HSAs 220710, 220610, 220410, and 220312). These 4 HSAs encompass approximately 427 mi^2 of estuarine habitat that serves as a rearing and migratory corridor that provides connectivity between upstream freshwater spawning, rearing, and migratory habitats for this ESU and the ocean. The CHART concluded that these four HSAs were occupied and contained PCEs for migratory habitat that support this ESU, and identified management activities that may affect the PCEs. Table G2 summarizes the management activities that may affect the PCEs in each HSA. Figure G3 depicts the specific areas (i.e. HSAs) in these HUs that are occupied by the ESU and were considered for critical

habitat designation. The CHART did not identify any unoccupied habitat areas in this subbasin that may be essential for the conservation of this ESU.

Final CHART Conservation Value Rating

Freshwater and Estuarine Areas

After reviewing the best available scientific data regarding critical habitat for this ESU, the CHART concluded that most of the occupied HSAs were of high or medium conservation value to the ESU. Of the 67 occupied HSAs that were evaluated, 37 were rated as having high conservation value, 18 were rated as having medium conservation value, and 12 were rated as having low conservation value. Table G3 summaries the CHARTs PCE/watershed scores and final conservation value ratings (i.e. low, medium or high) for all occupied HSAs in this ESU. Map 23 shows the overall spatial distribution of conservation value ratings by occupied HSA for the ESU.

Marine Areas

NMFS determined that marine areas did not warrant consideration as critical habitat for this ESU.

References and Sources of Information

NMFS 2003a. Updated Status of Federally Listed ESUs of West Coast Salmon and Steelhead. West Coast Salmon Biological Review Team Report - NWFSC and SWFSC. July 2003.

NMFS 2003b. Hatchery and Broodstock Summaries and Assessment for Chum, Coho and Chinook Salmon and Steelhead Stocks within ESUs listed under the ESA. Salmon and Steelhead Hatchery Assessment Group - NWFSC and SWFSC. May 2003.

NMFS 2004b. Draft Findings of NMFS' Critical Habitat Development and Review Teams (CHARTs) for 7 ESUs of Salmon and O. mykiss ESUs in California. Main Report and 7 Appendices. Prepared by NMFS Southwest Region.

Federal Register Notices

63 FR 13347 - Final Listing Determination for Central Valley Steelhead ESU.

69 FR 33102 - Proposed Listing Determinations for 27 West Coast Salmon and Steelhead ESUs.

69 FR 71880 - Proposed Critical Habitat Designations for 7 Salmon and Steelhead ESUs in California

70 FR 37219 - 6-Month Extension of the Final Listing Determinations for 10 ESUs of West Coast Oncorhynchus mykiss.

Table G1. Central Valley Steelhead ESU: Occupancy, habitat use, and geographic area information by Hydrologic Unit and Hydrologic Subarea.

HSA falls within and outside of ESU
HSA falls entirely outside of ESU

Note: Occupied Miles totals can be misleading for units several valley floor units as mainstem Rivers straddle the unit boundaries

HU NUMBER	HU NAME	Major Stream / Watershed in HU	HU Occupied (Y or N)	Acres in HU	Square Miles in HU	Stream Miles (1:100k) in HU	Occupied Stream Miles	Occupied Stream Miles (Spawning)	Occupied Stream Miles (Rearing)	Occupied Stream Miles (Migration)	County HU Falls within	Acres of County in HU	Square Miles of County in HU	Percent of HU by County	HSA NUMBER	HSA NAME	HSA Occupied (Y or N)	Acres in HSA (contained within the HU)	Acres in HSA (limited to those acres that fall within the ESU only)	Square Miles in HSA (contained within the HU)	Square Miles in HSA (limited to those acres that fall within the ESU only)	Stream Miles (1:100K) contained within the HU	Stream Miles in HSA (limited to those acres that fall within the ESU only)
5504	Tehama	Valley sections of Oat-Elder Stony-Reed-Pine-Red Bank	Y	716,144	1119	1879	228	69	228	213	Tehama	579,211	905	81%										
											Butte	84,931	133	12%	550410	Lower Stony Creek	Y	29,069	29,069	45	45	91	91
											Glenn	52,002	81	7%	550420	Red Bluff	Y	687,076	687,076	1,073	1,073	1788	1788
5507	Whitmore	Upper NF Battle-NF Bear-South Cow-Clover-Oak Run	Y	584,320	913	990	177	176	177	177	Shasta	454,547	710	78%										
											Tehama	129,773	203	22%	550711	Inks Creek	Y	18,831	18,831	29	29	28	28
															550712	Battle Creek	Y	230,971	230,971	361	361	341	341
															550721	Ash Creek	Y	11,417	11,417	18	18	19	19
															550722	Inwood	Y	80,479	80,479	126	126	138	138
															550731	South Cow Creek	Y	50,429	50,429	79	79	85	85
															550732	Old Cow Creek	Y	84,122	84,122	131	131	153	153
															550733	Little Cow Creek	Y	108,071	108,071	169	169	227	227
5508	Redding	Valley sections of Cottonwood-Cow-Ash	Y	451,223	705	1030	228	228	228	223	Shasta	265,068	414	59%										
											Tehama	186,155	291	41%	550810	Enterprise Flat	Y	233,670	233,670	365	365	550	550
															550820	Lower Cottonwood	Y	217,553	217,553	340	340	481	481
5509	Eastern Tehama	Upper Deer-Mill-Antelope-Big Chico	Y	573,829	896	1049	151	148	151	151	Shasta	3,319	5	1%										
											Tehama	512,944	801	89%	550914	Big Chico Creek	Y	46,159	46,159	72	72	85	85
											Plumas	109	0	0%	550915	Mud Creek	N	19,323	19,323	30	30	59	59
											Butte	57,458	90	10%	550916	Pine Creek	N	69,300	69,300	108	108	171	171
															550920	Deer Creek	Y	133,316	133,316	208	208	206	206
															550941	Big Dry Creek	N	28,888	28,888	45	45	51	51
															550942	Upper Mill Creek	Y	83,637	83,637	131	131	128	128
															550962	Dye Creek	Y	26,006	26,006	41	41	55	55
															550963	Antelope Creek	Y	92,466	92,466	144	144	158	158
															550964	Paynes Creek	Y	55,702	55,702	87	87	105	105
															550965	Salt Creek	N	19,032	19,032	30	30	32	32
5510	Sacramento Delta	Sacramento River-Yolo Bypass	Y	285,422	446	355	194	0	194	194	Yolo	92,191	144	32%										
											Sacramento	112,178	175	39%	551000	Sacramento Delta	Y	285,422	233,003	446	364	355	293
											Solano	81,053	127	28%										
5511	Valley Putah-Cache	Putah	Y	615,528	961	751	83	8	83	83	Colusa	76	0	0%										
											Yolo	361,302	564	59%	551110	Elmira	Y	246,988	126,192	386	197	313	187
											Napa	115	0	0%	551120	Lower Putah Creek	Y	249,336	17,173	389	27	229	7
											Solano	254,036	397	41%	551130	Lower Cache Creek	N	119,203	0	186	0	209	0
5514	American River	Auburn Ravine-Coon-Doty-Antelope	Y	1,050,910	1,642	2994	20	20	20	20	Alpine	12,340	19	1%										
											Amador	10,714	17	1%	551421	Green Valley	N	52,399	0	82	0		0
											El Dorado	673,214	1,052	64%	551422	Auburn	Y	53,485	0	84	0	104	0
											Placer	353,421	552	34%	551423	Folsom Reservior	N	11,029	0	17	0		0
											Sacramento	1,221	2	0%	551431	Weber Creek	N	63,660	0	99	0		0
															551432	Coloma	N	159,174	0	249	0		0
															551433	Silver Creek	N	59,986	0	94	0		0
															551434	Union Valley	N	53,694	0	84	0		0
															551435	Kyburz	N	105,950	0	165	0		0
															551436	Silver Fork	N	71,281	0	111	0		0
															551441	Volcanoville	N	65,261	0	102	0		0
															551442	Duncan Canyon	N	127,008	0	198	0		0
															551443	Rubicon	N	92,251	0	144	0		0
															551444	Loon Lake	N	36,489	0	57	0		0
															551445	Hell Hole	N	73,307	0	115	0		0
															551451	Clementine	N	25,936	0	41	0		0
5515	Marysville	Feather-Yube-Bear	Y	266,718	417	562	75	58	75	75	Butte	104,775	164	39%										
											Yuba	117,208	183	44%	551510	Lower Bear River	Y	76,927	76,927	120	120	185	185
											Sutter	23,806	36	9%	551530	Lower Yuba River	Y	28,145	28,145	44	44	41	41
											Placer	21,729	34	8%	551540	Lower Feather River	Y	161,646	161,646	252	252	336	336
5517	Yuba River	Yuba-Dry	Y	919,595	1436	2048	22	22	22	22	Butte	47,088	74	5%										
											Nevada	338,354	529	37%	551712	Browns Valley	Y	32,753	32,753	51	51	82	82
											Placer	12,558	20	1%	551713	Mildred Lake	Y	46,056	0	72	0	94	0
											Plumas	12,005	19	1%	551714	Englebright	Y	35,512	0	55	0	86	0
											Sierra	309,482	483	34%	551720	Nevada City	Y	54,499	38,206	85	60	122	87
											Yuba	200,108	313	22%	551731	Shady Creek	N	30,179	0	47	0	71	0
															551732	North Bloomfield	N	69,907	0	109	0	165	0
															551733	Canyon Creek	N	32,997	0	52	0	53	0
															551734	Lake Spaulding	N	96,106	0	150	0	178	0
															551741	North San Juan	N	54,176	0	85	0	129	0
															551742	Camptonville	N	57,012	0	89	0	113	0
															551743	Middle Yuba	N	23,802	0	37	0	41	0
															551751	Bullards Bar	N	49,017	0	77	0	118	0
															551752	North Yuba	N	39,349	0	61	0	95	0
															551753	Goodyears Bar	N	131,999	0	206	0	311	0
															551754	Sierra City	N	90,498	0	141	0	172	0
															551760	South Honcut Creek	N	75,736	0	118	0	219	0
5519	Valley-American	American-Lower Coon-Auburn	Y	613,101	958	1188	187	55	187	187	El Dorado	1,569	2	0%										
											Placer	174,403	272	28%	551911	Franklin	N	62,182	62,182	97	97	99	99
											Sacramento	290,552	454	47%	551912		N	65,397	65,397	102	102	84	84
											Sutter	69,045	108	11%	551921	Lower American	Y	195,188	165,753	305	259	418	355
											Yolo	1,397	2	0%	551922	Pleasant Grove	Y	290,333	290,333	454	454	588	588
											Yuba	76,136	119	12%										

5520	Colusa Basin	Sutter Bypass- Colusa Drain-	Y	1,771,171	2767	2815	285	56	285	285	Butte	301,676	471	17%										
											Colusa	562,586	879	32%	552010	Sycamore-Sutter	Y	246,952	246,952	386	386	155	155
											Glenn	434,829	679	25%	552021	Colusa Trough	N	891,690	53,349	1,393	83	1648	62
											Sutter	297,222	464	17%	552022	Orland	N	36,543	0	57	0	12	0
											Yolo	174,865	273	10%	552030	Sutter Bypass	Y	183,595	183,595	287	287	168	168
															552040	Butte Basin	Y	412,391	4,493	644	7	833	11
5521	Butte Creek	Butte- Little Chico	Y	132,405	207	310	38	38	38	38	Tehama	5,767	9	4%										
											Plumas	688	1	1%	552110	Upper Dry Creek	Y	15,877	15,877	25	25	50	50
											Butte	125,949	197	95%	552120	Upper Butte Creek	Y	17,761	17,761	28	28	49	49
															552130	Upper Little Chico	Y	98,767	98,767	154	154	211	211
5523	Ball Mountain	Upper Thomes-Elder	Y	213,899	334	521	41	41	41	41	Trinity	94	0	0%										
											Tehama	213,712	334	100%	552310	Thomes Creek	Y	123,466	123,466	193	193	301	301
											Mendocino	92	0	0%	552321	Elder Creek	N	60,503	60,503	95	95	149	149
															552322	Red Bank Creek	N	29,930	29,930	47	47	71	71
5524	Shasta Bally	SF-MF-NF- Cottonwood- Clear Creek	Y	579,290	905	1003	119	119	119	119	Trinity	825	1	0%										
											Shasta	360,702	563	62%	552433	South Fork	Y	110,519	110,519	173	173	192	192
											Tehama	217,763	340	38%	552434	Wells Creek	N	61,780	61,780	96	96	120	120
															552435	Oino	Y	72,938	72,938	114	114	116	116
															552436	Platina	Y	140,502	140,502	219	219	264	264
															552440	Spring Creek	Y	34,898	10,257	55	16	67	17
															552461	Whiskeytown Lake	N	6,880	6,880	11	11	9	9
															552462	Kanaka Peak	Y	18,113	18,113	28	28	37	37
															552463	Middle Clear	N	47,350	47,350	74	74	77	77
															552464	French Gulch	N	86,311	6,859	135	11	122	10
5531	North Valley Floor	Cosumnes- Calaveras- Mokelumne	Y	882,000	1,378	2195	189	87	172	190	Sacramento	201,592	315	23%										
											Amador	64,511	101	7%	553111	Herald	Y	258,174	258,174	403	403	778	778
											Calaveras	141,604	221	16%	553112	Lower Deer Creek	N	19,266	14,266	30	22	46	45
											San Joaquin	404,155	631	46%	553120	Lower Mokelumne	Y	215,303	186,855	336	292	392	305
											Stanislaus	70,139	110	8%	553130	Lower Calaveras	Y	149,365	149,365	233	233	374	
															553140	Duck-Littlejohns	N	239,893	239,893	375	375	604	604
5532	Middle Sierra	Sutter- Jackson-Dry Creek	Y	911,452	1,424	2545	70	70	70	70	El Dorado	333,916	522	37%										
											Sacramento	16,271	25	2%	553221	Big Canyon Creek	Y	93,876	0	147	0		0
											Amador	312,293	488	34%	553222	Upper Deer Creek	N	46,751	415	73	1		1
											Alpine	82,932	130	9%	553223	North Fork Cosumnes	Y	135,647	0	212	0		0
											Calaveras	166,041	259	18%	553224	Omo Ranch	Y	128,498	0	201	0		0
															553240	Sutter Creek	Y	135,632	135,632	212	212	403	403
															553260	Upper Mokelumne	N	371,048	0	580	0	902	0
5533	Upper Calaveras	Upper Calaveras	Y	232,023	362	743	6	6	6	6	Calaveras	232,023	362	100%										
															553310	New Hogan Reservoir	Y	39,209	5,058	61	8	130	17
															553320	North Fork Calaveras	N	78,427	78,427	123	123	235	0
															553330	South Fork Calaveras	N	114,388	114,388	179	179	378	0
5534	Stanislaus River	Upper Stanislaus	Y	638,887	998	1708	3	3	3	3	Alpine	84,640	132	13%										
											Calaveras	123,531	193	19%	553410	Table Mountain	Y	5,321	5,321	8	8	18	18
											Mono	75	0	0%	553421	New Melones Reservoir	N	1,927	0	3	0	17	0
											Stanislaus	32	0	0%	553422	Angels Camp	N	161,446	0	252	0	432	0
											Tuolumne	430,610	673	67%	553430	South Fork Stanislaus	N	68,585	0	107	0	191	0
															553441	Middle Fork Stanislaus	N	181,432	0	283	0	470	0
															553442	Beardsley Lake	N	710	0	1	0	6	0
															553450	North Fork Stanislaus	N	175,820	0	275	0	461	0
			Y												553460	Clark Fork	N	43,748	0	68	0	115	0
5535	San Joaquin Valley Floor	Lower Stanislaus- Tuolumne- Merced		1,236,613	1,932	1313	159	54	150	159	Calaveras	19	0	0%										
											Madera	191	0	0%	553510	Manteca	Y	95,014	95,014	148	148	5	5
											Mariposa	12,897	20	1%	553520	Valley Home	N	28,437	28,437	44	44	29	29
											Merced	638,143	997	52%	553530	Riverbank	Y	162,934	162,934	255	255	137	137
											San Joaquin	106,346	166	9%	553540	Waterville	N	75,483	44,568	118	70	158	84
											Stanislaus	474,742	742	38%	553550	Turlock	Y	204,096	204,096	319	319	57	57
											Tuolumne	4,275	7	0%	553560	Monpelier	Y	149,985	12,818	234	20	285	245
															553570	El Nido-Stevinson	Y	220,471	0	345	0	213	0
															553580	Merced	Y	173,550	0	271	0	180	0
															553590	Fahr Creek	Y	126,643	7,587	198	12	249	21
5536	Tuolumne River	Upper Tuolumne	N	1,051,685	1,643	2282	0	0	0	0	Mariposa	612	1	0%										
											Merced	147	0	0%	553620	Vizard Creek	N	65,390	65,390	102	102		
											Mono	605	1	0%	553622		N	7,413	7,413	12	12		
											Stanislaus	27,360	43	3%	553631	Sonora	N	168,884	0	264	0		
											Tuolumne	1,022,961	1,598	97%	553632	Don Pedro Reservoir	N	11,273	0	18	0		
															553640	Clavey River	N	229,940	0	359	0		
															553651	Mercut Peak	N	147,305	0	230	0		
															553652	Cherry Lake	N	1,767	0	3	0		
															553653	Lake Eleanor	N	1,015	0	2	0		
															553660	Hetch Hetchy	N	314,578	0	491	0		
															553670	Middle Tuolumne	N	46,387	0	72	0		
															553680	South Fork Tuolumne	N	57,732	0	90	0		
5537	Merced River	Upper Merced	N	706,626	1,104	1391	0	0	0	0	Madera	101,714	159	14%										
											Mariposa	591,672	924	84%	553710	Kassenbaum Flats	N	42,100	25,818	66	40		30
											Merced	10,835	17	2%	553721	Coulterville	N	74,845	0	117	0		0
											Mono	39	0	0%	553722	Lake McClure	N	5,590	0	9	0		0
											Stanislaus	1,432	2	0%	553730	North Fork Merced	N	161,007	0	251	0		0
											Tuolumne	933	1	0%	553740	South Fork Merced	N	154,236	0	241	0		0
															553750	Yosemite	N	122,029	0	191	0		0
															553760	Mount Starr King	N	146,819	0	229	0		0
5541	Delta-Mendota Canal	Delta-Mendota Canal	Y	781,231	1,220	2596	50	0	48	50	Fresno	242,206	378	31%										
											Madera	1,071	2	0%	554110	Patterson	Y	185,971	185,971	290	290	172	172
											Merced	349,782	546	45%	554120	Los Banos	Y	595,260	0	930	0	485	0
											San Joaquin	28,427	44	4%										
											Stanislaus	159,745	250	20%										
5542	Middle West Side	Orestimba- Del Puerto-	N	325,884	509	782	0	0	0	0	Alameda	7	0	0%										
											Merced	72,006	112	22%	554210	Del Puerto Creek	N	133,954	133,954	209	209	329	329
											San Joaquin	17,653	28	5%	554220	Orestimba Creek	N	109,237	76,656	171	120	293	208
											Santa Clara	269	0	0%	554231	Romero Creek	N	69,792	0	109	0	130	0
											Stanislaus	235,949	369	72%	554232	San Luis Reservoir	N	12,900	0	20	0	30	0

		Garzas																				
5543	North Diablo Range	Upper Mountain House Corral Hollow	Y	201.825	315	336	4	0	4	4	Alameda	43.692	68	22%	554300	North Diablo Range	Y	201.825	201.825	315	315	336	336
											Contra Costa	96.766	151	48%									
											Sacramento	1.460	2	1%									
											San Joaquin	59.908	94	30%									
5544	San Joaquin Delta	Lower San Joaquin	Y	402.211	628	455	276	0	272	276	Alameda	3.428	5	1%	554400	San Joaquin Delta	Y	402.211	402.211	628	628	455	455
											Contra Costa	92.390	144	23%									
											Sacramento	11.399	18	3%									
											San Joaquin	294.902	461	73%									
											Stanislaus	93	0	0%									

Table G2. Summary of Occupied Subbasins/Watersheds. PCE's and Management Activities Affecting PCE's for the Central Valley Steelhead ESU

Map Code	Basin	HSA NAME	HSA NUMBER	Spawning/Rearing PCEs (mi)	Rearing/Migration PCEs (mi)	Presence/Migration Only PCEs (mi)	Management Activities*
	San Francisco Bay	Bay Waters	220312				AW, MW, PP, IS, DK, BS, ID
	San Francisco Bay	Bay Channel	220410				AW, MW, PP, IS, DK, BS, ID
	San Francisco Bay	San Pablo Bay	220610				AW, MW, PP, IS, DK, BS, ID
	Suisun Bay	Suisun Bay	220710				AW, MW, PP, IS, HR, DK, BS, WE, ID
	Tehama	Lower Stony Creek	550410	25	25	25	AW, FP, DO
	Tehama	Red Bluff	550420	203	203	203	AW, MW, PP, DK, BS, UD, RM
	Whitmore	Inks Creek	550711	2	2	2	RM
	Whitmore	Battle Creek	550712	82	82	82	AW, FP, WD
	Whitmore	Ash Creek	550721	9	9	9	RM
	Whitmore	Inwood	550722	33	33	33	AW, MW, UD
	Whitmore	South Cow Creek	550731	18	18	18	AW, FM, RM
	Whitmore	Old Cow Creek	550732	19	19	19	AW, RM, FM
	Whitmore	Little Cow Creek	550733	16	16	16	AW, RM, FM
	Redding	Enterprise Flat	550810	153	153	147	WS, DO, FP, PP, GM
	Redding	Lower Cottonwood	550820	75	75	75	AW, FP, RM
	Eastern Tehama	Big Chico Creek	550914	9	9	9	FP, FM, RM, RD
	Eastern Tehama	Mud Creek	550915				
	Eastern Tehama	Pine Creek	550916				
	Eastern Tehama	Deer Creek	550920	35	35	35	FM, RM
	Eastern Tehama	Big Dry Creek	550941				
	Eastern Tehama	Upper Mill Creek	550942	48	48	48	FM, RM
	Eastern Tehama	Dye Creek	550962	7	7	7	RM
	Eastern Tehama	Antelope Creek	550963	34	34	34	FM, AW, MW, RM
	Eastern Tehama	Paynes Creek	550964	17	17	17	RM, AW, FM
	Eastern Tehama	Salt Creek	550965				
	Sacramento Delta	Sacramento Delta	551000	194	194	194	AW, PP, IS, DK, BS
	Valley Putah-Cache	Elmira	551110	68	68	68	UD, AW, FP
	Valley Putah-Cache	Lower Putah Creek	551120	16	16	16	UD, AW, FP
	American River	Green Valley	551421				
	American River	Auburn	551422	20	20	20	UD, IW,
	American River	Folsom Reservior	551423				
	American River	Weber Creek	551431				
	American River	Coloma	551432				
	American River	Silver Creek	551433				
	American River	Union Valley	551434				
	American River	Kyburz	551435				
	American River	Silver Fork	551436				
	American River	Volcanoville	551441				
	American River	Duncan Canyon	551442				
	American River	Rubicon	551443				
	American River	Loon Lake	551444				
	American River	Hell Hole	551445				
	American River	Clementine	551451				
	Marysville	Lower Bear River	551510	17	17	17	AW, BS, UD
	Marysville	Lower Yuba River	551530	19	19	19	PP, AW, MW, DK, BS, FP
	Marysville	Lower Feather River	551540	40	40	40	HD, WS, PP, HM, DO
	Yuba River	Browns Valley	551712	17	17	17	AW, MW
	Yuba River	Mildred Lake	551713	0.4	0.4	0.4	AW
	Yuba River	Englebright	551714	1	1	1	AW, FP, DO
	Yuba River	Nevada City	551720	4	4	4	AW
	Yuba River	South Honcut Creek	551760				

	Valley-American	Franklin	551911				
	Valley-American	Lower American	551921	71	71	71	AW, MW, WS, UD, DO, PP, HM
	Valley-American	Pleasant Grove	551922	111	111	111	AW, FP, DK, BS, PP
	Colusa Basin	Sycamore-Sutter	552010	83	83	83	AW, HR, PP, DK, BS
	Colusa Basin	Colusa Trough	552021				AW, WH, AP, SF
	Colusa Basin	Orland	552022				
	Colusa Basin	Sutter Bypass	552030	70	70	70	AW, IS, SF, FP, WH
	Colusa Basin	Butte Basin	552040	131	131	131	AW, PP, FP, SF, DK, BS
	Butte Creek	Upper Dry Creek	552110	5	5	5	UD, RM, AW
	Butte Creek	Upper Butte Creek	552120	11	11	11	UD, RM, AW
	Butte Creek	Upper Little Chico	552130	22	22	22	WD
	Bull Mountain	Thomes Creek	552310	41	41	41	FM, AW, MW, RM
	Bull Mountain	Elder Creek	552321				
	Bull Mountain	Red Bank Creek	552322				
	Shasta Bally	South Fork	552433	43	43	43	FM, RM, RD
	Shasta Bally	Wells Creek	552434				
	Shasta Bally	Ono	552435	15	15	15	FM, RM, RD, WS
	Shasta Bally	Platina	552436	45	45	45	FM, RM, RD, WS
	Shasta Bally	Spring Creek	552440	9	9	9	WD, WS, PP, HM, DO
	Shasta Bally	Whiskeytown Lake	552461				
	Shasta Bally	Kanaka Peak	552462	7	7	7	HR, GM, WD, WS, DO
	Shasta Bally	Middle Clear	552463				
	Shasta Bally	French Gulch	552464				
	North Valley Floor	Herald	553111	78	78	78	AW, RM
	North Valley Floor	Lower Deer Creek	553112				
	North Valley Floor	Lower Mokelumne	553120	36	52	52	AW, DO, HM
	North Valley Floor	Lower Calaveras	553130	57	59	59	AW, MW, FP, CH, DK, BS
	North Valley Floor	Duck-Littlejohns	553140				
	Middle Sierra	Big Canyon Creek	553221	19	19	19	AW, FM
	Middle Sierra	Upper Deer Creek	553222				
	Middle Sierra	North Fork Cosumnes	553223	17	17	17	AW, FM
	Middle Sierra	Omo Ranch	553224	25	25	25	AW, FM
	Middle Sierra	Sutter Creek	553240	10	10	10	UD, HG, RM
	Middle Sierra	Upper Mokelumne	553260				
	Upper Calaveras	New Hogan Reservoir	553310	6	6	6	AW, MW, WS, GM
	Upper Calaveras	North Fork Calaveras	553320				
	Upper Calaveras	South Fork Calaveras	553330				
	Stanislaus River	Table Mountain	553410	3	3	3	FP, AW, WS, DO
	Stanislaus River	New Melones Reservoi	553421				
	Stanislaus River	Angels Camp	553422				
	Stanislaus River	South Fork Stanislaus	553430				
	Stanislaus River	Middle Fork Stanislaus	553441				
	Stanislaus River	Beardsley Lake	553442				
	Stanislaus River	North Fork Stanislaus	553450				
	Stanislaus River	Clark Fork	553460				
	San Joaquin Valley Floor	Manteca	553510	1	1	1	AW, FP, DK, BS
	San Joaquin Valley Floor	Valley Home	553520				
	San Joaquin Valley Floor	Riverbank	553530	54	54	54	AW, FP, DK, BS
	San Joaquin Valley Floor	Warnersville	553540				
	San Joaquin Valley Floor	Turlock	553550	39	39	39	AW, DK, BS, FP
	San Joaquin Valley Floor	Montpelier	553560	14	14	14	AW, FP
	San Joaquin Valley Floor	El Nido-Stevinson	553570	2	11	11	AW, MW, UD
	San Joaquin Valley Floor	Merced	553580	33	33	33	AW, MW, UD
	San Joaquin Valley Floor	Fahr Creek	553590	7	7	7	AW
	Tuolumne River	Vizard Creek	553620				

	Tuolumne River	Sonora	553631				
	Tuolumne River	Don Pedro Reservoir	553632				
	Tuolumne River	Clavey River	553640				
	Tuolumne River	Mercut Peak	553651				
	Tuolumne River	Cherry Lake	553652				
	Tuolumne River	Lake Eleanor	553653				
	Tuolumne River	Hetch Hetchy	553660				
	Tuolumne River	Middle Tuolumne	553670				
	Tuolumne River	South Fork Tuolumne	553680				
	Merced River	Kassenbaum Flats	553710				
	Merced River	Coulterville	553721				
	Merced River	Lake McClure	553722				
	Merced River	North Fork Merced	553730				
	Merced River	South Fork Merced	553740				
	Merced River	Yosemite	553750				
	Merced River	Mount Starr King	553760				
	Delta-Mendota Canal	Patterson	554110	48	48	48	AW, MW, IS, PP, DG
	Delta-Mendota Canal	Los Banos	554120	0	1	1	AW, MW, UD
	Middle West Side	Del Puerto Creek	554210				
	Middle West Side	Orestimba Creek	554220				
	Middle West Side	Romero Creek	554231				
	Middle West Side	San Luis Reservoir	554232				
	North Diablo Range	North Diablo Range	554300	4	4	4	AW, MW, IS, PP
	San Joaquin Delta	San Joaquin Delta	554400	272	276	276	AW, MW, IS, PP, EF

*Management Activities Codes:

AP, Adult passage
AW - Agricultural water withdrawls
BS - Streamband stabilization for flood control
CH - channelization
DG - Dredging
DK - Diking
DO - Dam operations
EF - Entrainment and flow alterations
FM - Forest management
FP - Fish passage
GM - Gravel mining
HG - Historic gold mining
HM - Hatchery management
HR - Habitat restoration
ID - Industrial development
IS - Invasive/non-native species
MW - Municipal water withdrawls
PP - Point and non-point water pollution
RD - Roads
RM- Rangeland management
SF - Seasonal flooding for flood control
UD - Urban development
WD - Water diversion for hydroelectric
WE - Wetland/Estuary management
WH - Wildlife habitat management
WS - Water storage for flood control

Table G3. Summary of Preliminary Scores and Overall Rankings of Conservation Values for Critical Habitat for HSA watersheds occupied by the Central Valley Steelhead ESU

Map Code	Basin	Watershed	Calwater Unit	Total Score (0-18)	Comments / Other Considerations	Conservation Value
	San Francisco Bay	Bay Waters	220312	10		High
	San Francisco Bay	Bay Channel	220410	5		Low
	San Francisco Bay	San Pablo Bay	220610	10		High
	Suisun Bay	Suisun Bay	220710	10		High
	Tehama	Lower Stony Creek	550410	8		Medium
	Tehama	Red Bluff	550420	15		High
	Whitmore	Inks Creek	550711	5		Low
	Whitmore	Battle Creek	550712	17		High
	Whitmore	Ash Creek	550721	5		Low
	Whitmore	Inwood	550722	9		Medium
	Whitmore	South Cow Creek	550731	9		Medium
	Whitmore	Old Cow Creek	550732	11		High
	Whitmore	Little Cow Creek	550733	11		High
	Redding	Enterprise Flat	550810	14		High
	Redding	Lower Cottonwood	550820	10		High
	Eastern Tehama	Big Chico Creek	550914	12		High
	Eastern Tehama	Mud Creek	550915	0		Not Occupied
	Eastern Tehama	Pine Creek	550916	0		Not Occupied
	Eastern Tehama	Deer Creek	550920	15		High
	Eastern Tehama	Big Dry Creek	550941	0		Not Occupied
	Eastern Tehama	Upper Mill Creek	550942	15		High
	Eastern Tehama	Dye Creek	550962	5		Low
	Eastern Tehama	Antelope Creek	550963	14		High
	Eastern Tehama	Paynes Creek	550964	9		Medium
	Eastern Tehama	Salt Creek	550965	0		Not Occupied
	Sacramento Delta	Sacramento Delta	551000	13		High
	Valley Putah-Cache	Elmira	551110	9		Medium
	Valley Putah-Cache	Lower Putah Creek	551120	10	Medium ranking because of no connectivity	Medium
	American River	Green Valley	551421	0		Not Occupied
	American River	Auburn	551422	9		Medium
	American River	Folsom Reservior	551423	0		Not Occupied
	American River	Weber Creek	551431	0		Not Occupied
	American River	Coloma	551432	0		Not Occupied
	American River	Silver Creek	551433	0		Not Occupied
	American River	Union Valley	551434	0		Not Occupied
	American River	Kyburz	551435	0		Not Occupied
	American River	Silver Fork	551436	0		Not Occupied
	American River	Volcanoville	551441	0		Not Occupied
	American River	Duncan Canyon	551442	0		Not Occupied
	American River	Rubicon	551443	0		Not Occupied
	American River	Loon Lake	551444	0		Not Occupied
	American River	Hell Hole	551445	0		Not Occupied
	American River	Clementine	551451	0		Not Occupied
	Marysville	Lower Bear River	551510	10		Medium
	Marysville	Lower Yuba River	551530	16		High
	Marysville	Lower Feather River	551540	13		High
	Yuba River	Browns Valley	551712	15		High
	Yuba River	Mildred Lake	551713	6		Low

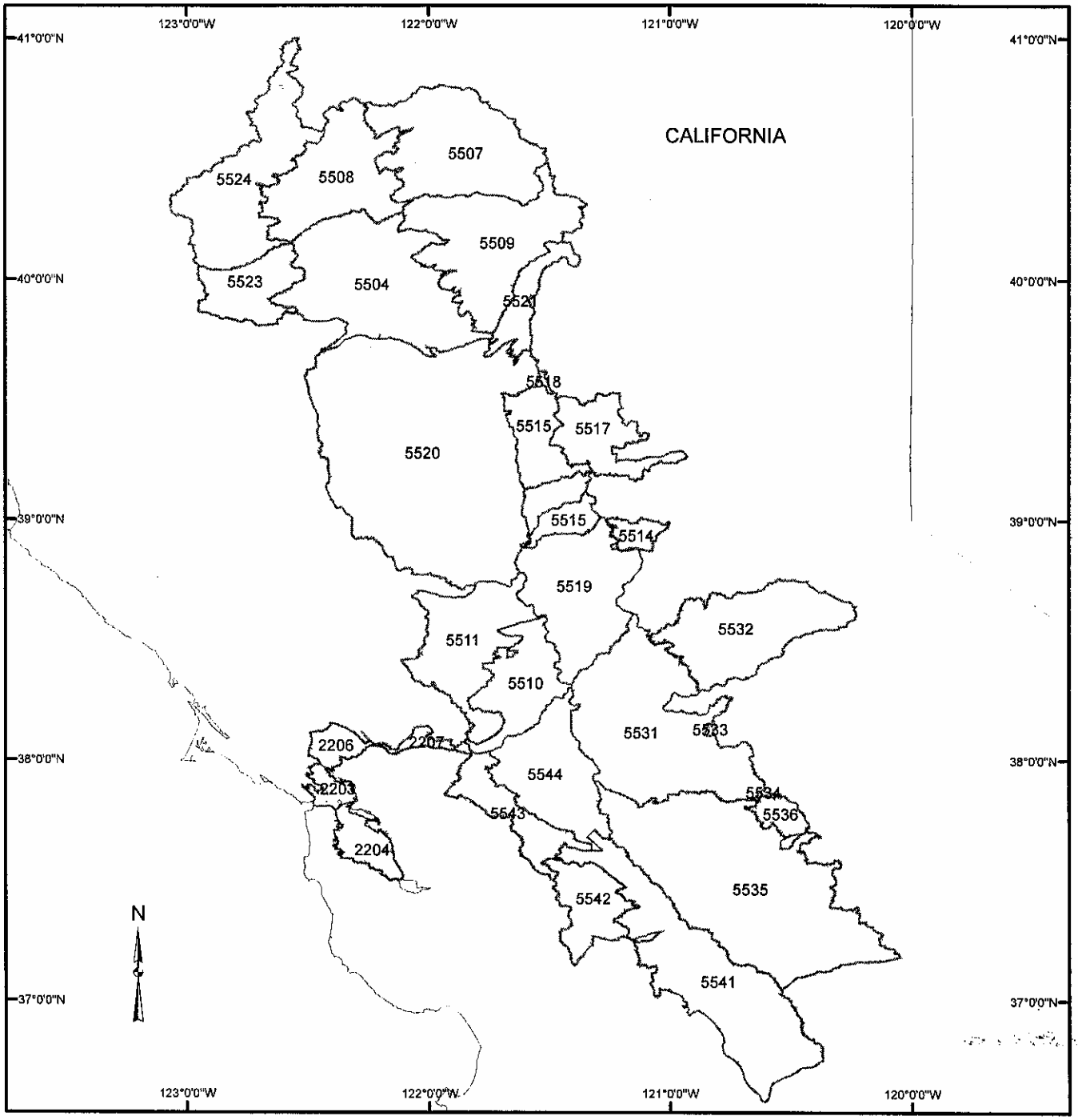
	Yuba River	Englebright	551714	10		High
	Yuba River	Nevada City	551720	6		Low
	Yuba River	South Honcut Creek	551760	0		Not Occupied
	Valley-American	Franklin	551911	0		Not Occupied
	Valley-American	Lower American	551921	13		High
	Valley-American	Pleasant Grove	551922	10		High
	Colusa Basin	Sycamore-Sutter	552010	12		High
	Colusa Basin	Colusa Trough	552021	5		High
	Colusa Basin	Orland	552022	0		Not Occupied
	Colusa Basin	Sutter Bypass	552030	10		High
	Colusa Basin	Butte Basin	552040	11		High
	Butte Creek	Upper Dry Creek	552110	8		Medium
	Butte Creek	Upper Butte Creek	552120	5		Low
	Butte Creek	Upper Little Chico	552130	11		High
	Bull Mountain	Thomes Creek	552310	14		High
	Bull Mountain	Elder Creek	552321	0		Not Occupied
	Bull Mountain	Red Bank Creek	552322	0		Not Occupied
	Shasta Bally	South Fork	552433	8		Medium
	Shasta Bally	Wells Creek	552434	0		Not Occupied
	Shasta Bally	Ono	552435	9		Medium
	Shasta Bally	Platina	552436	9		Medium
	Shasta Bally	Spring Creek	552440	12		High
	Shasta Bally	Whiskeytown Lake	552461	0		Not Occupied
	Shasta Bally	Kanaka Peak	552462	14		High
	Shasta Bally	Middle Clear	552463	0		Not Occupied
	Shasta Bally	French Gulch	552464	0		Not Occupied
	North Valley Floor	Herald	553111	7		Low
	North Valley Floor	Lower Deer Creek	553112	0		Not Occupied
	North Valley Floor	Lower Mokelumne	553120	9		Medium
	North Valley Floor	Lower Calaveras	553130	12		High
	North Valley Floor	Duck-Littlejohns	553140	0		Not Occupied
	Middle Sierra	Big Canyon Creek	553221	7		Low
	Middle Sierra	Upper Deer Creek	553222	0		Not Occupied
	Middle Sierra	North Fork Cosumnes	553223	7		Low
	Middle Sierra	Omo Ranch	553224	7		Low
	Middle Sierra	Sutter Creek	553240	6		Low
	Middle Sierra	Upper Mokelumne	553260	0		Not Occupied
	Upper Calaveras	New Hogan Reservoir	553310	12		High
	Upper Calaveras	North Fork Calaveras	553320	0		Not Occupied
	Upper Calaveras	South Fork Calaveras	553330	0		Not Occupied
	Stanislaus River	Table Mountain	553410	13		High
	Stanislaus River	New Melones Reservoir	553421	0		Not Occupied
	Stanislaus River	Angels Camp	553422	0		Not Occupied
	Stanislaus River	South Fork Stanislaus	553430	0		Not Occupied
	Stanislaus River	Middle Fork Stanislaus	553441	0		Not Occupied
	Stanislaus River	Beardsley Lake	553442	0		Not Occupied
	Stanislaus River	North Fork Stanislaus	553450	0		Not Occupied
	Stanislaus River	Clark Fork	553460	0		Not Occupied
	San Joaquin Valley Floor	Manteca	553510	12		High
	San Joaquin Valley Floor	Valley Home	553520	0		Not Occupied
	San Joaquin Valley Floor	Riverbank	553530	12		High

	San Joaquin Valley Floor	Warnersville	553540	0		Not Occupied
	San Joaquin Valley Floor	Turlock	553550	11		High
	San Joaquin Valley Floor	Montpelier	553560	13		High
	San Joaquin Valley Floor	El Nido-Stevinson	553570	7		Medium
	San Joaquin Valley Floor	Merced	553580	7		Medium
	San Joaquin Valley Floor	Fahr Creek	553590	9		Medium
	Tuolumne River	Vizard Creek	553620	0		Not Occupied
	Tuolumne River	Sonora	553631	0		Not Occupied
	Tuolumne River	Don Pedro Reservoir	553632	0		Not Occupied
	Tuolumne River	Clavey River	553640	0		Not Occupied
	Tuolumne River	Mercut Peak	553651	0		Not Occupied
	Tuolumne River	Cherry Lake	553652	0		Not Occupied
	Tuolumne River	Lake Eleanor	553653	0		Not Occupied
	Tuolumne River	Hetch Hetchy	553660	0		Not Occupied
	Tuolumne River	Middle Tuolumne	553670	0		Not Occupied
	Tuolumne River	South Fork Tuolumne	553680	0		Not Occupied
	Merced River	Kassenbaum Flats	553710	0		Not Occupied
	Merced River	Coulterville	553721	0		Not Occupied
	Merced River	Lake McClure	553722	0		Not Occupied
	Merced River	North Fork Merced	553730	0		Not Occupied
	Merced River	South Fork Merced	553740	0		Not Occupied
	Merced River	Yosemite	553750	0		Not Occupied
	Merced River	Mount Starr King	553760	0		Not Occupied
	Delta-Mendota Canal	Patterson	554110	10		High
	Delta-Mendota Canal	Los Banos	554120	5	Medium ranking because of connectivity	Medium
	Middle West Side	Del Puerto Creek	554210	0		Not Occupied
	Middle West Side	Orestimba Creek	554220	0		Not Occupied
	Middle West Side	Romero Creek	554231	0		Not Occupied
	Middle West Side	San Luis Reservoir	554232	0		Not Occupied
	North Diablo Range	North Diablo Range	554300	8		Medium
	San Joaquin Delta	San Joaquin Delta	554400	10		High

Figures G1, G2 and G3:

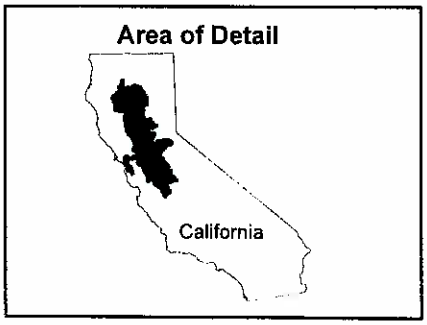
G1 - CALWATER Hydrologic Units (HU) for the Central Valley Steelhead ESU
G2 - CALWATER Hydrologic Subareas (HSAs) for the Central Valley Steelhead ESU
G3 - CALWATER HSAs comprising the San Francisco-San Pablo-Suisun Bay Complex occupied by the Central Valley Steelhead ESU

Map of the California Central Valley Steelhead ESU

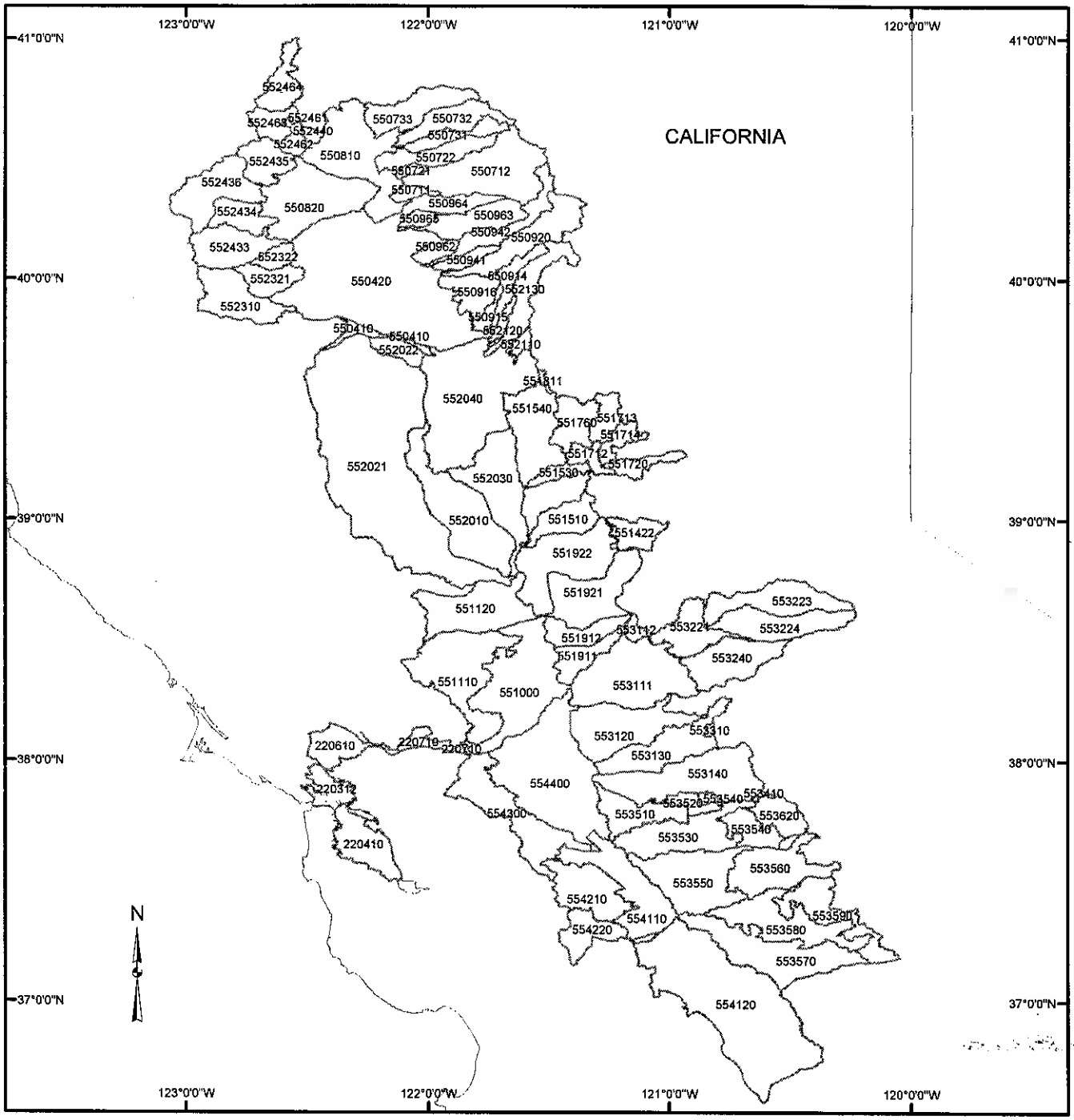


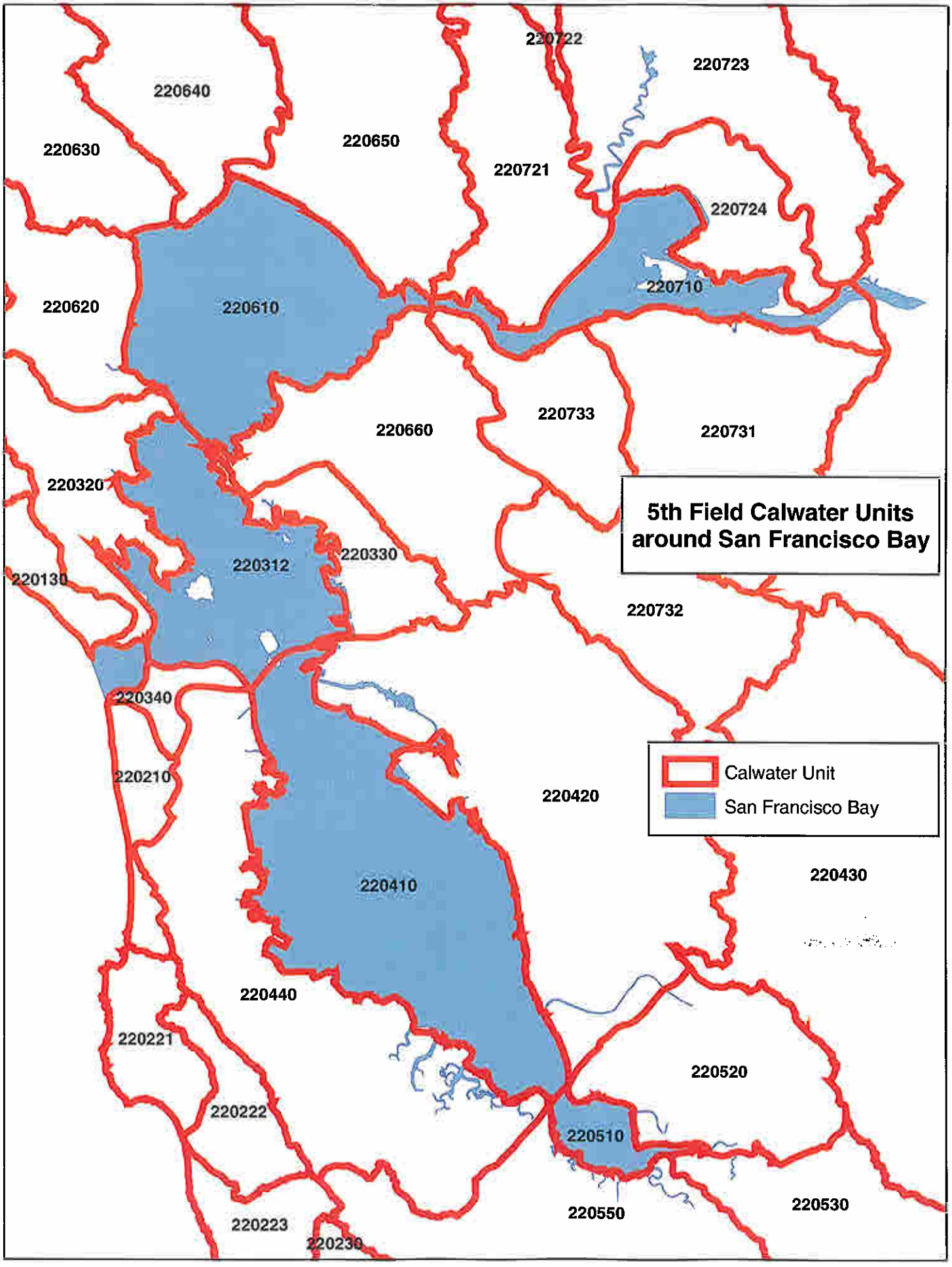
Hydrologic Unit Boundaries

State Boundary



Map of the California Central Valley Steelhead ESU

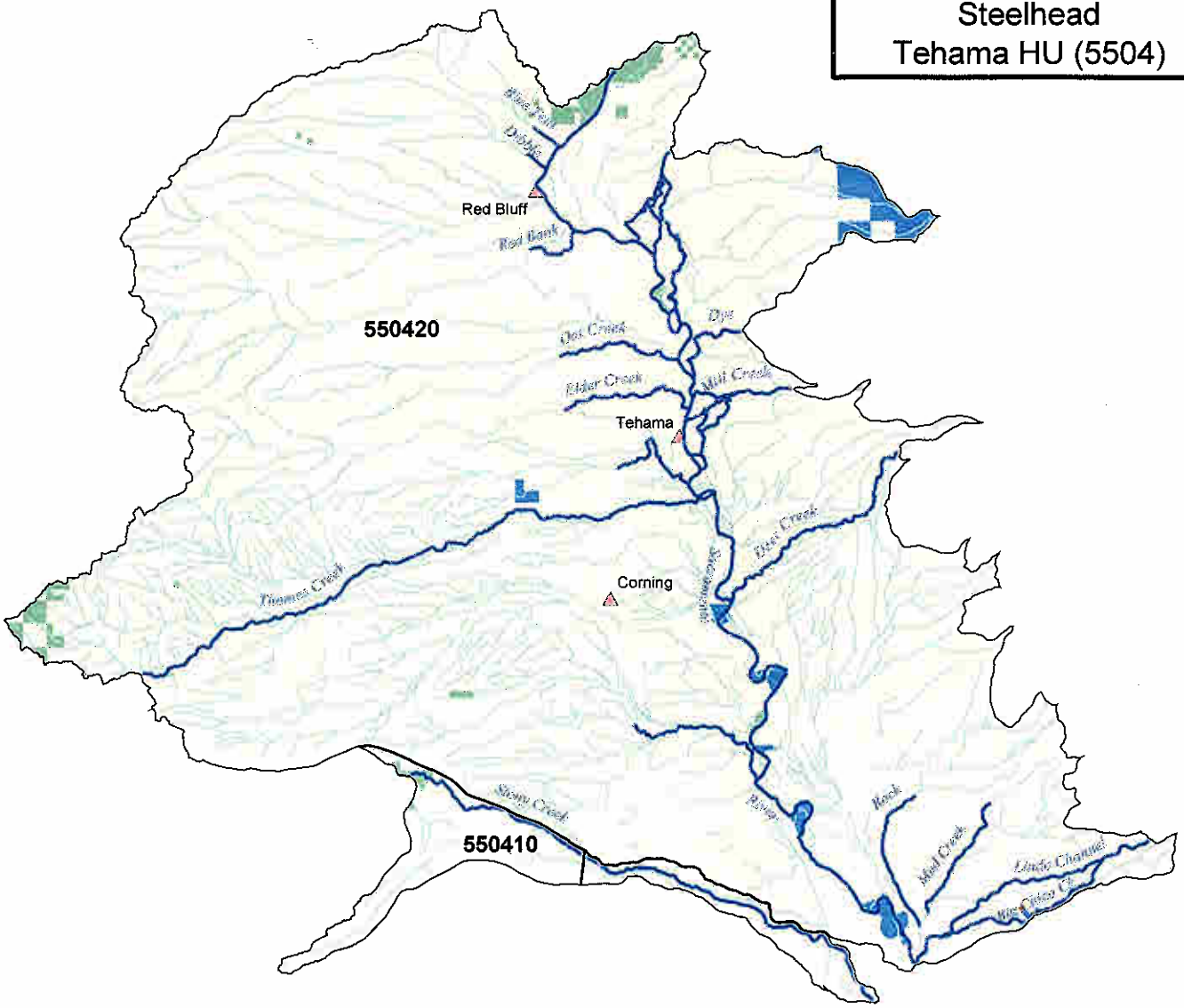



220722
220723
220640
220650
220630
220721
220724
220710
220620
220610
220733
220660
220731
220320
220312
220330
220130
220732
220340
220210
220420
220410
220430
220440
220221
220520
220222
220510
220550
220530
220223
220230
5th Field Calwater Units around San Francisco Bay
Calwater Unit
San Francisco Bay

Maps G1 through G22 : Central Valley Steelhead ESU - Habitat Areas (Units) Considered for Critical Habitat Designation

G1 - Unit 5504 (Tehama HU)
G2 - Unit 5507 (Whitmore HU)
G3 - Unit 5508 (Redding HU)
G4 - Unit 5509 (Eastern Tehama HU)
G5 - Unit 5510 (Sacramento Delta HU)
G6 - Unit 5511 (Valley Putah-Cache HU)
G7 - Unit 5514 (American River HU)
G8 - Unit 5515 (Marysville HU)
G9 - Unit 5517 (Yuba River HU)
G10 - Unit 5519 (Valley-American HU)
G11 - Unit 5520 (Colusa Basin HU)
G12 - Unit 5521 (Butte Creek HU)
G13 - Unit 5523 (Ball Mountain HU)
G14 - Unit 5524 (Shasta Bally HU)
G15 - Unit 5531 (North Valley Floor HU)
G16 - Unit 5532 (Middle Sierra HU)
G17 - Unit 5533 (Upper Calaveras HU)
G18 - Unit 5534 (Stanislaus River HU)
G19 - Unit 5535 (San Joaquin Valley Floor HU)
G20 - Unit 5541 (Delta-Mendota Canal HU)
G21 - Unit 5543 (North Diablo Range HU)
G22 - Unit 5544 (San Joaquin HU)

Land Ownership
California Central Valley Steelhead
Tehama HU (5504)



Cities
Steelhead Presence Streams
Hydrologic Unit Boundary

Land Ownership*

Tribal
Federal
State/Local
Private/Other
Water

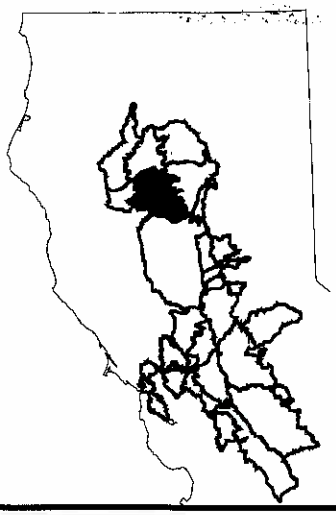
*Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is for general reference only

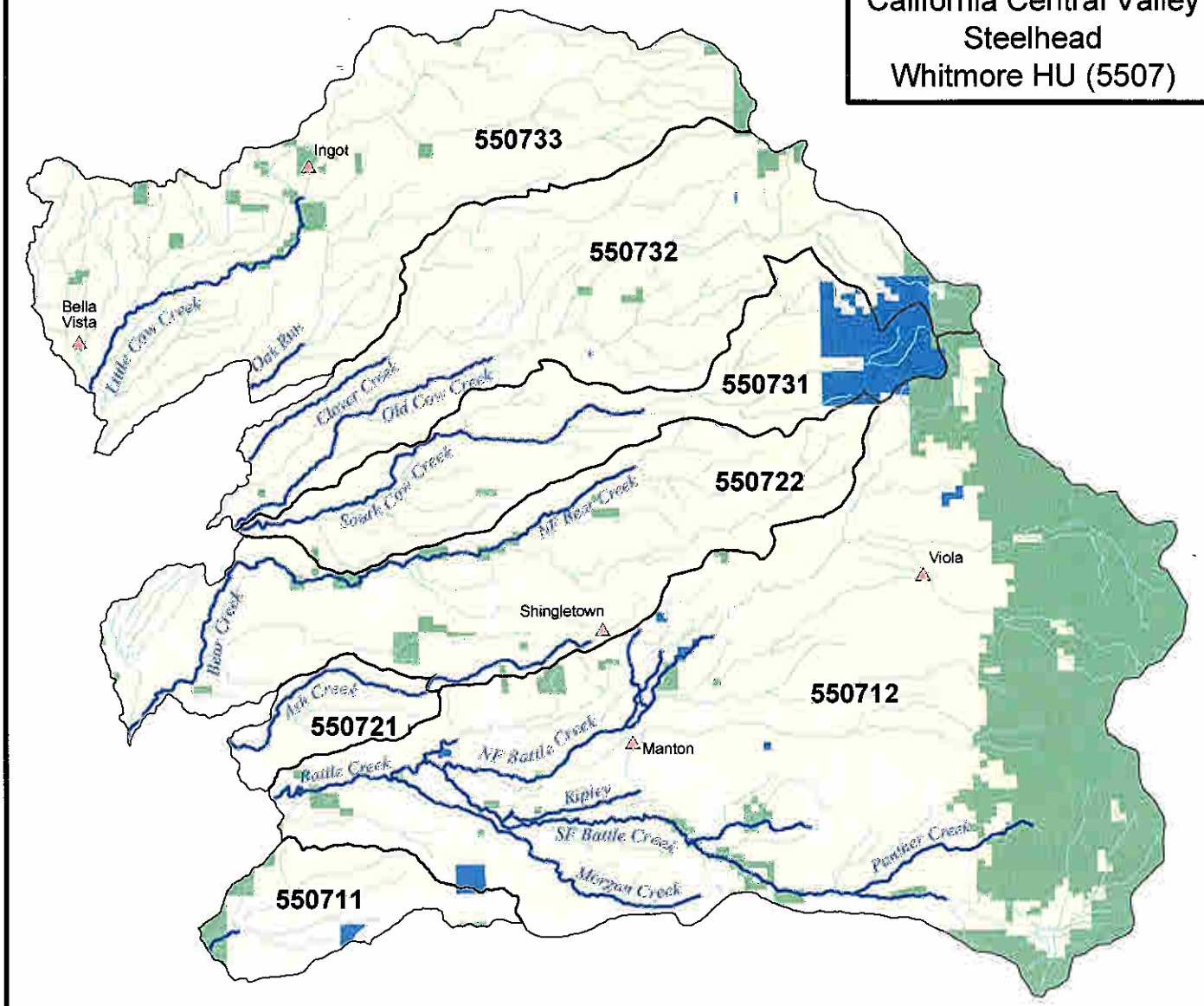
N

0 2.5 5 Miles

California Central Valley Steelhead ESU



Land Ownership
California Central Valley Steelhead
Whitmore HU (5507)



- Cities
- Steelhead Presence Streams
- Hydrologic Unit Boundary

Land Ownership*

- Tribal
- Federal
- State/Local
- Private/Other
- Water

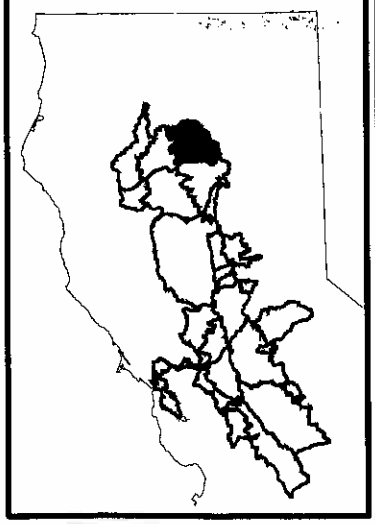
*Source: California Environmental Resources Evaluation System (CERES), 1999

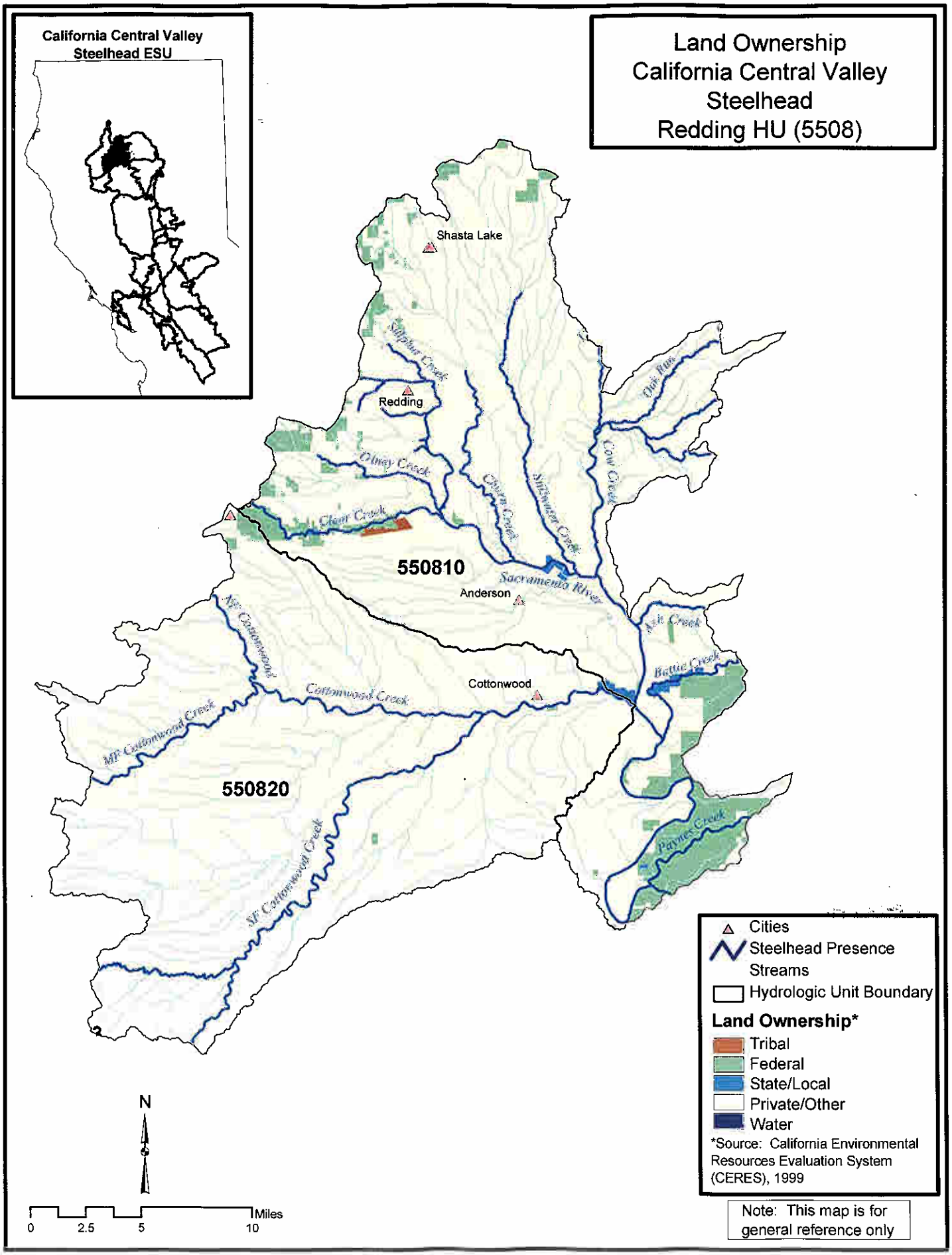
Note: This map is for general reference only

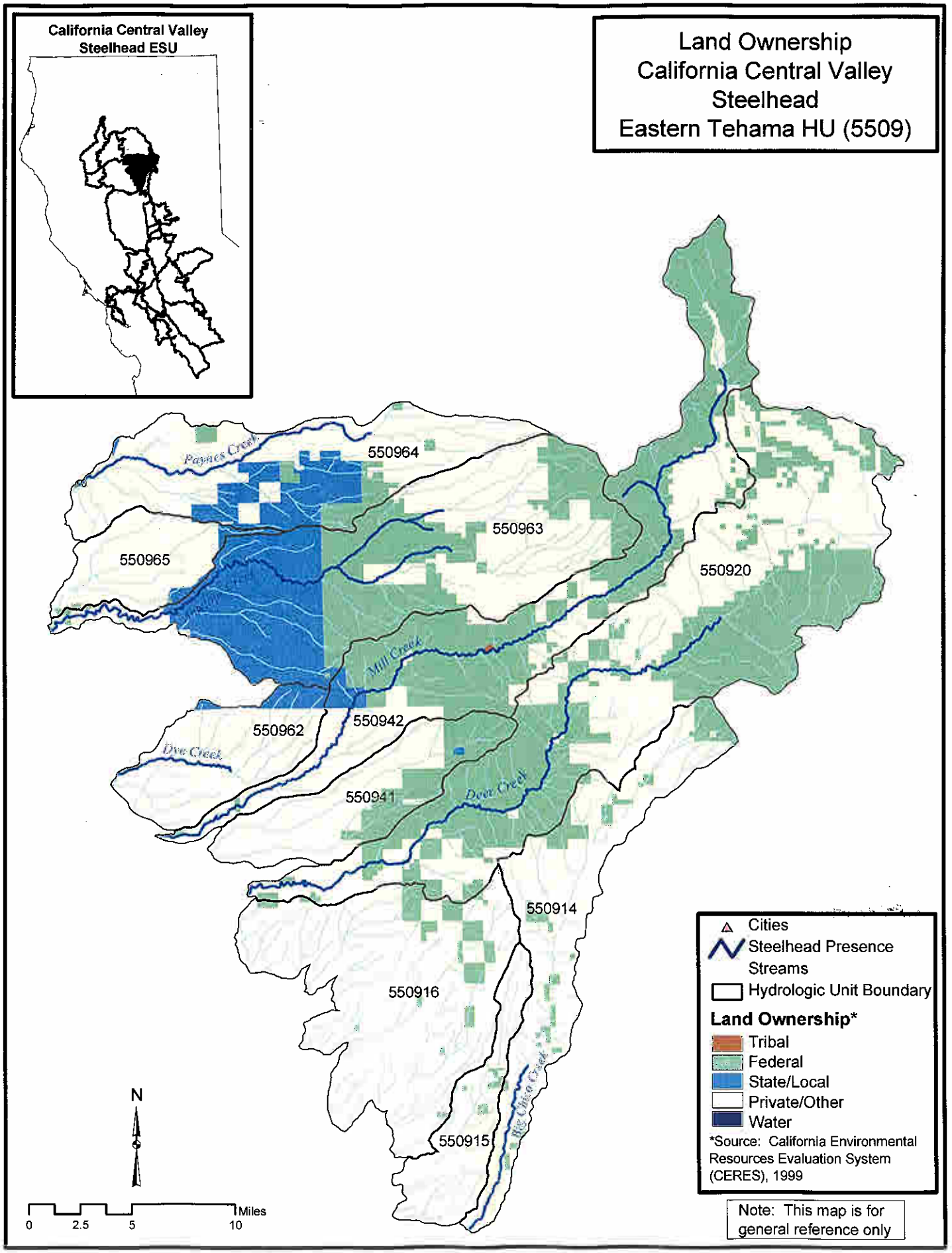
N

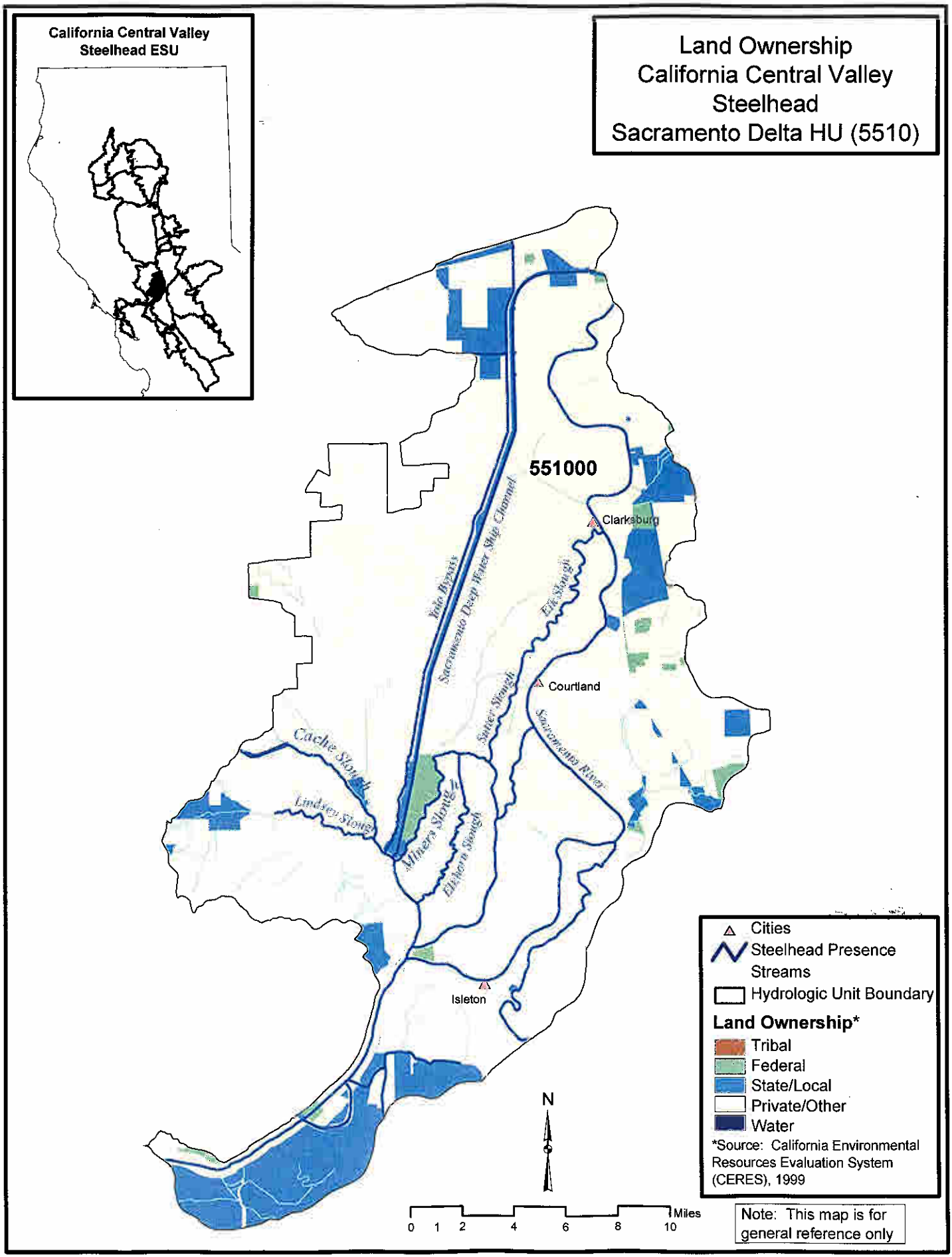
0 2.5 5 10 Miles

California Central Valley Steelhead ESU

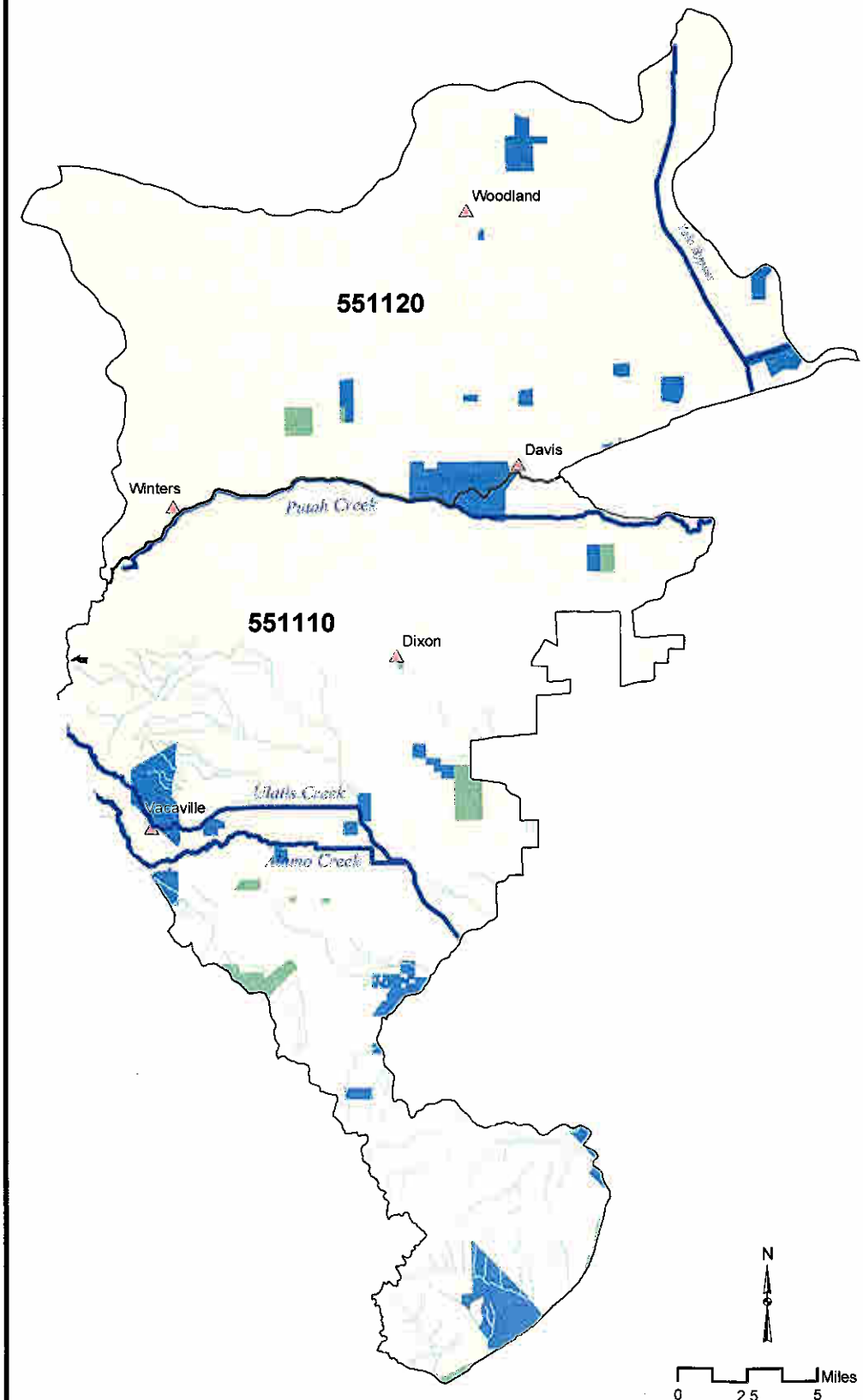


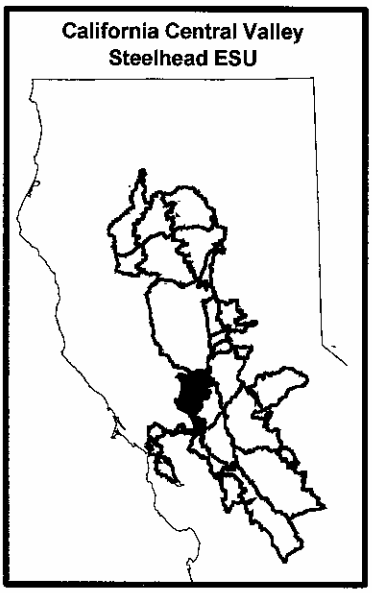

California Central Valley Steelhead ESU
Land Ownership
California Central Valley
Steelhead
Redding HU (5508)
Shasta Lake
Redding
Anderson
Cottonwood
Sacramento River
Clear Creek
Olney Creek
Churn Creek
Stillwater Creek
Cow Creek
Oak Run
Ash Creek
Battle Creek
Paynes Creek
Cottonwood Creek
NF Cottonwood
MF Cottonwood Creek
SF Cottonwood Creek
550810
550820
N
0
2.5
5
10
Miles
Cities
Steelhead Presence Streams
Hydrologic Unit Boundary
Land Ownership*
Tribal
Federal
State/Local
Private/Other
Water
*Source: California Environmental Resources Evaluation System (CERES), 1999
Note: This map is for general reference only


California Central Valley Steelhead ESU
Land Ownership
California Central Valley
Steelhead
Eastern Tehama HU (5509)
550964
550963
550965
550920
550962
550942
550941
550914
550916
550915
Paynes Creek
Mill Creek
Dye Creek
Deer Creek
Big Chico Creek
N
0
2.5
5
10
Miles
Cities
Steelhead Presence Streams
Hydrologic Unit Boundary
Land Ownership*
Tribal
Federal
State/Local
Private/Other
Water
*Source: California Environmental Resources Evaluation System (CERES), 1999
Note: This map is for general reference only


California Central Valley Steelhead ESU
Land Ownership
California Central Valley
Steelhead
Sacramento Delta HU (5510)
551000
Clarksburg
Courtland
Isleton
Yolo Bypass
Sacramento Deep Water Ship Channel
Elk Slough
Sutter Slough
Sacramento River
Cache Slough
Lindsey Slough
Miners Slough
Elkhorn Slough
N
0 1 2 4 6 8 10 Miles
Cities
Steelhead Presence
Streams
Hydrologic Unit Boundary
Land Ownership*
Tribal
Federal
State/Local
Private/Other
Water
*Source: California Environmental Resources Evaluation System (CERES), 1999
Note: This map is for general reference only

Land Ownership
California Central Valley Steelhead
Valley Putah-Cache HU (5511)





Cities
Steelhead Presence Streams
Hydrologic Unit Boundary

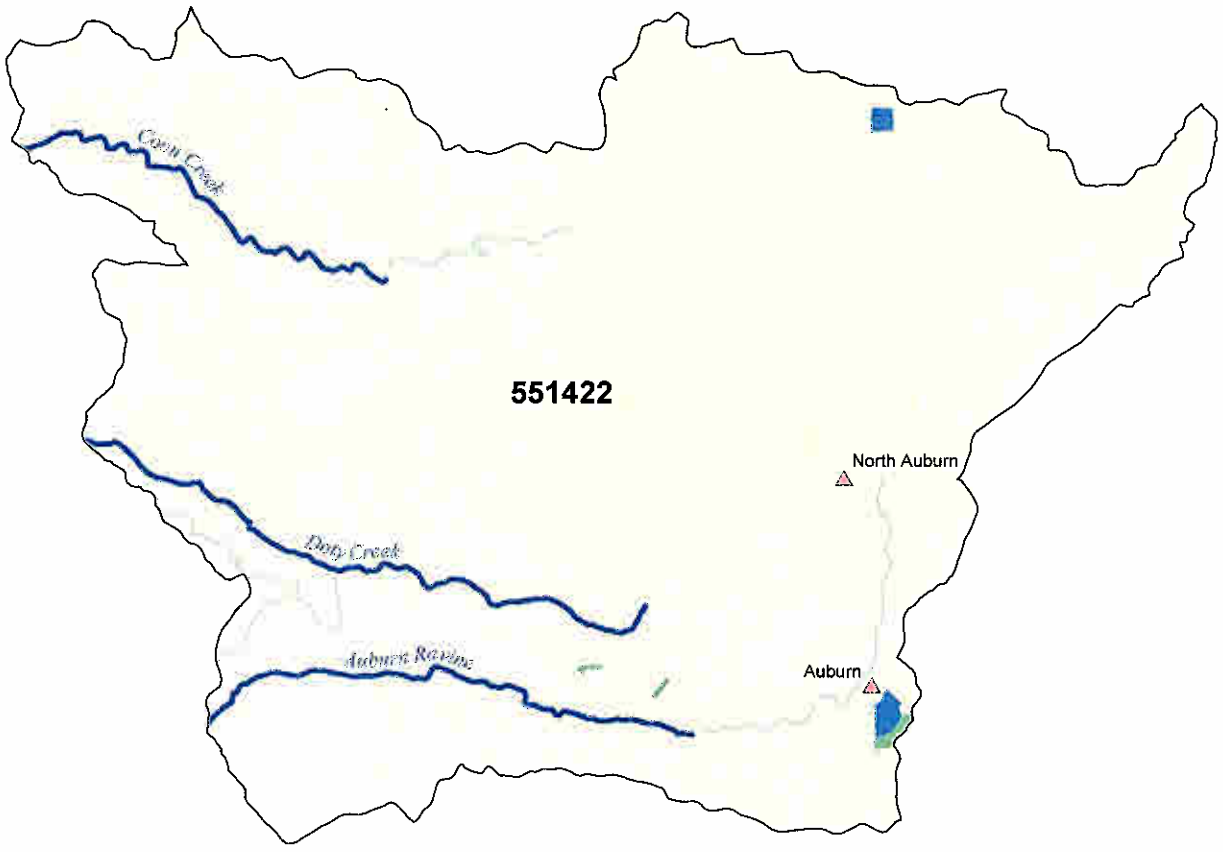
Land Ownership*

Tribal
Federal
State/Local
Private/Other
Water

*Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is for general reference only

Land Ownership
California Central Valley
Steelhead
American River HU (5514)



Cities
Steelhead Presence Streams
Hydrologic Unit Boundary

Land Ownership*
Tribal
Federal
State/Local
Private/Other
Water

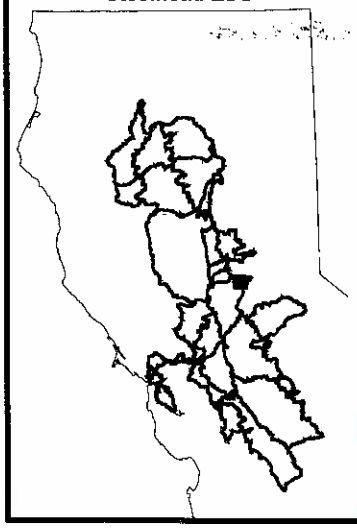
*Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is for general reference only

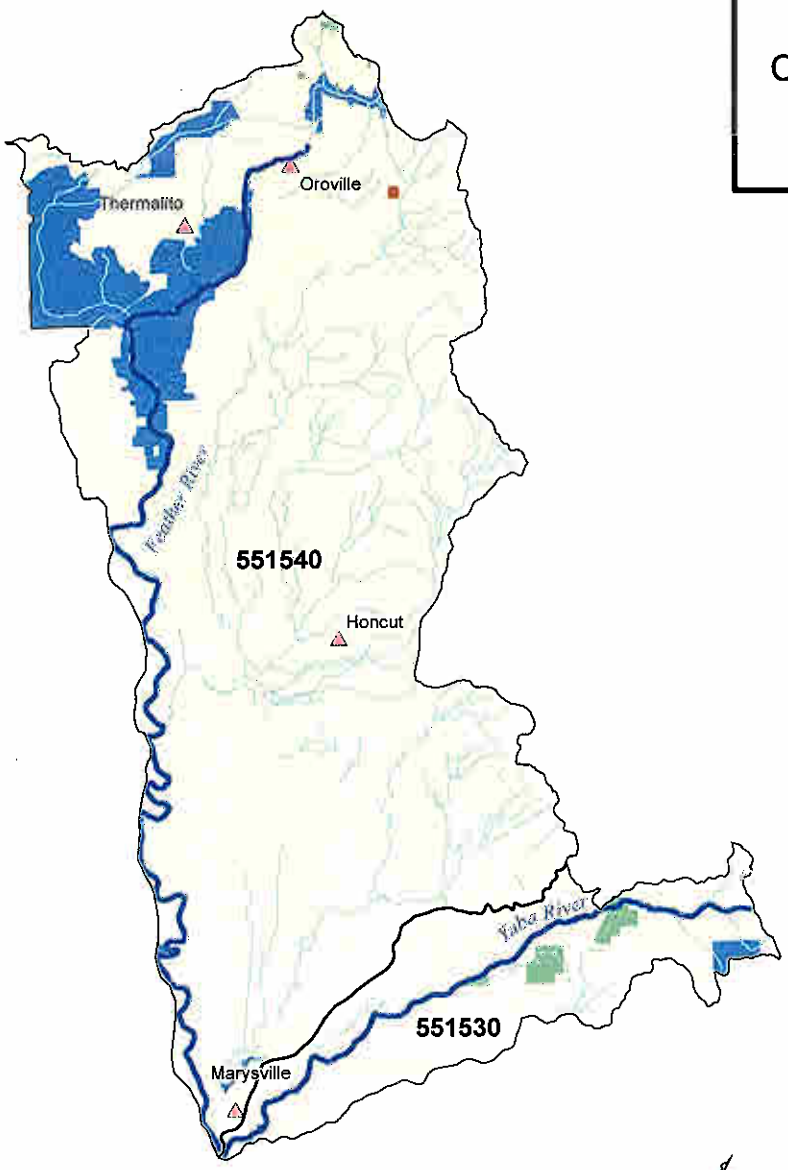
N

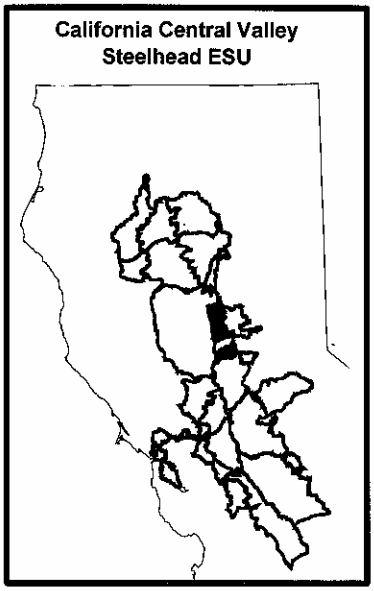
0 0.5 1 2 3 4 5 Miles

California Central Valley Steelhead ESU



Land Ownership
California Central Valley Steelhead
Marysville HU (5515)





- Cities
- Steelhead Presence Streams
- Hydrologic Unit Boundary

Land Ownership*

- Tribal
- Federal
- State/Local
- Private/Other
- Water

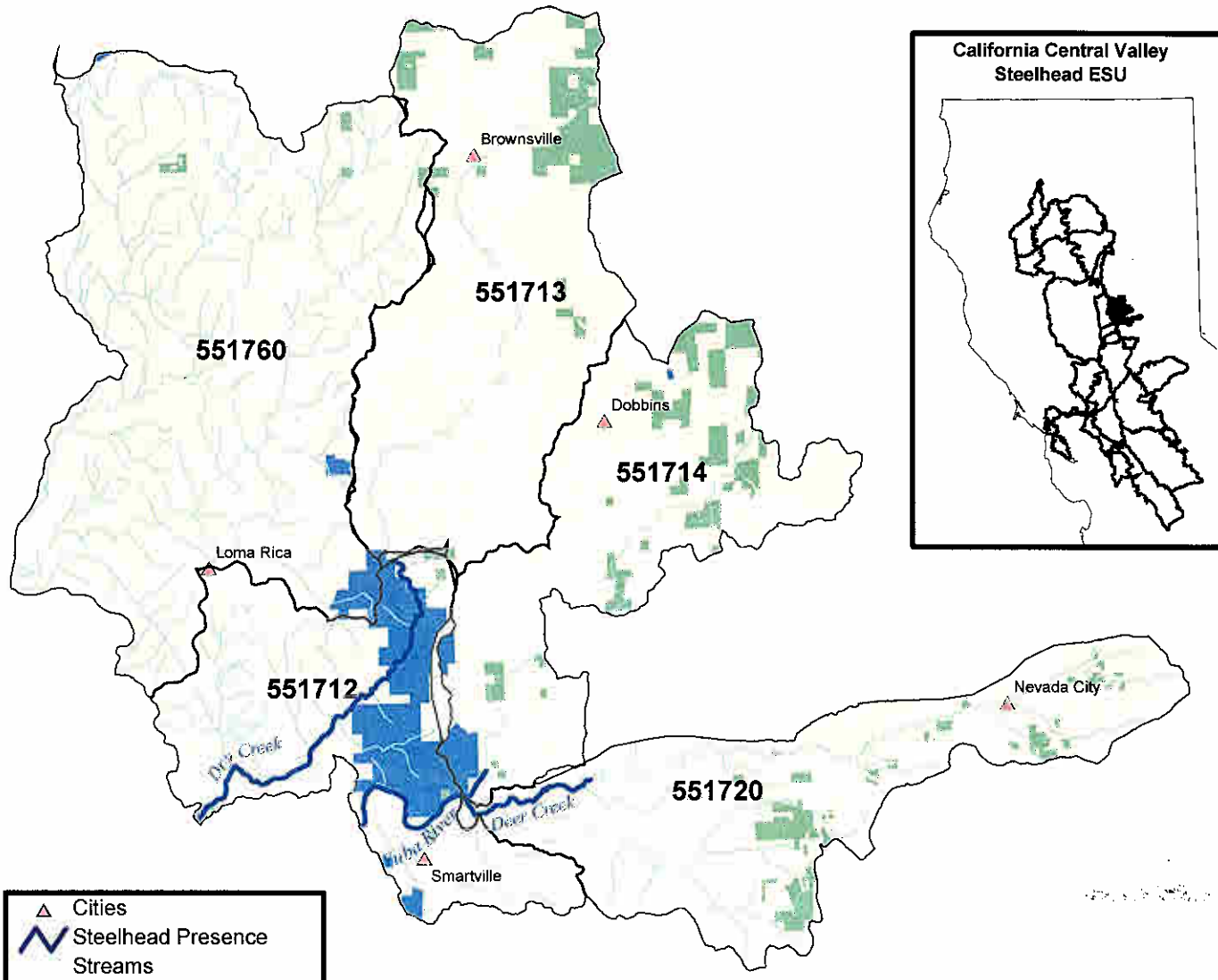
*Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is for general reference only

N

0 2.5 5 Miles

Land Ownership
California Central Valley Steelhead
Yuba River HU (5517)



Cities
Steelhead Presence Streams
Hydrologic Unit Boundary

Land Ownership*

Tribal
Federal
State/Local
Private/Other
Water

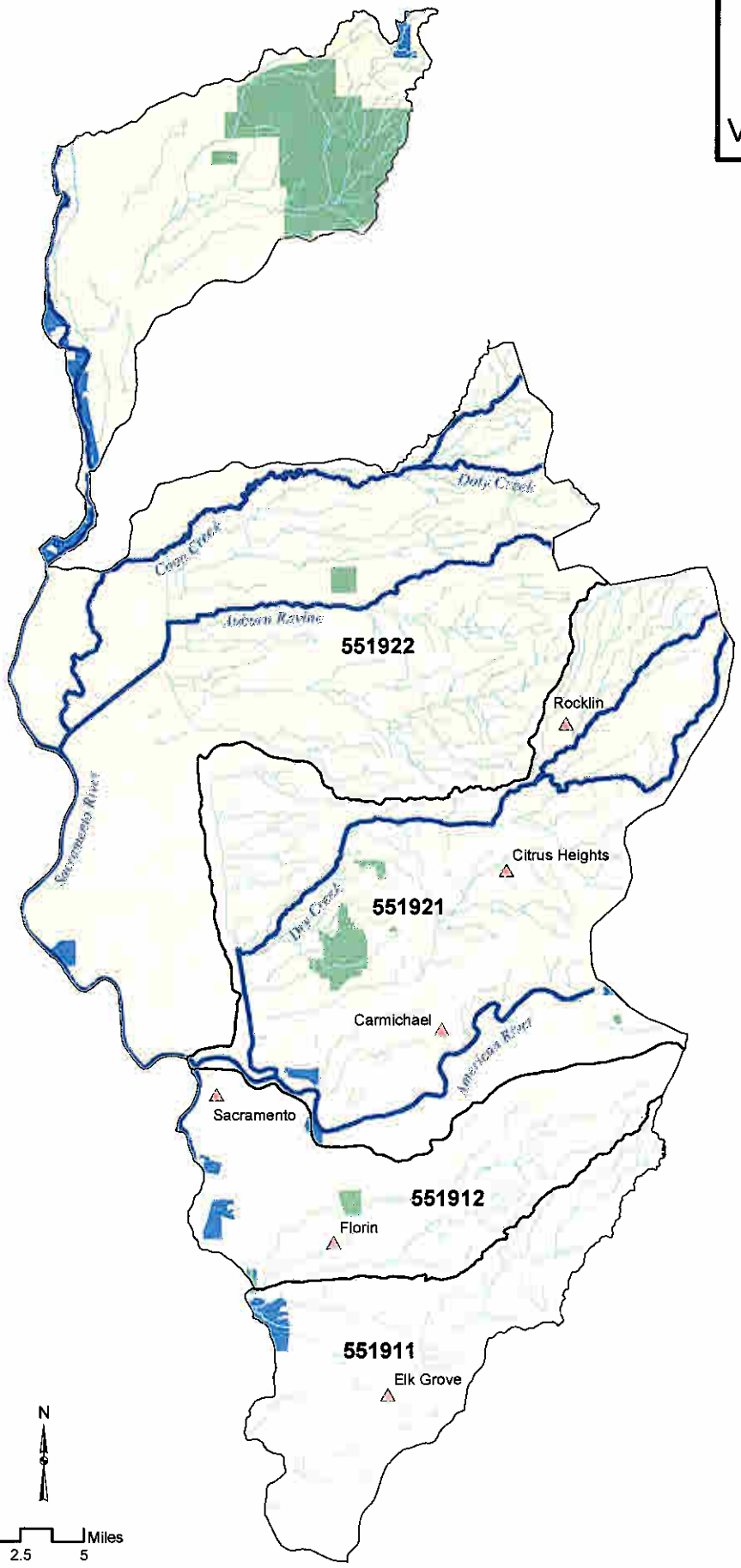
*Source: California Environmental Resources Evaluation System (CERES), 1999

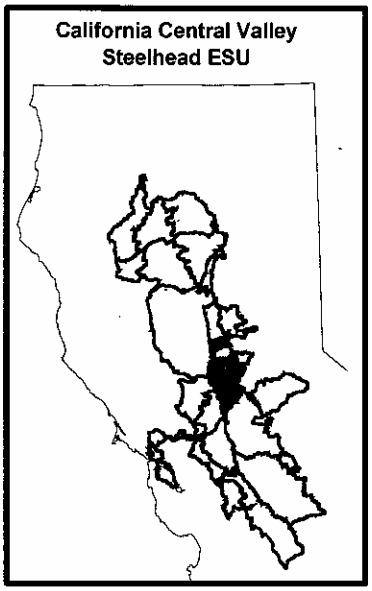
Note: This map is for general reference only

N

0 2.5 5 10 Miles

Land Ownership
California Central Valley Steelhead
Valley-American HU (5519)





Cities
Steelhead Presence Streams
Hydrologic Unit Boundary

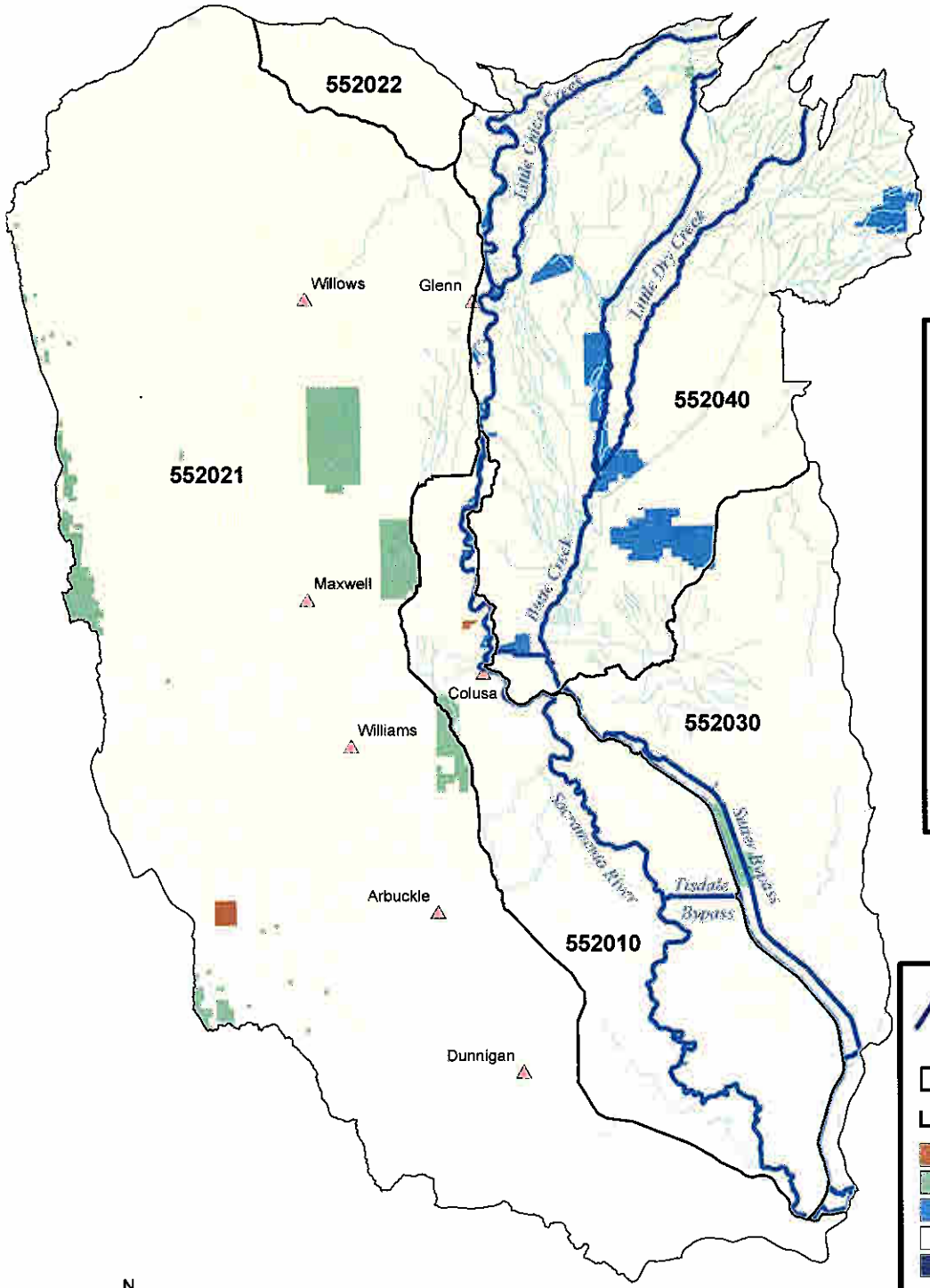
Land Ownership*

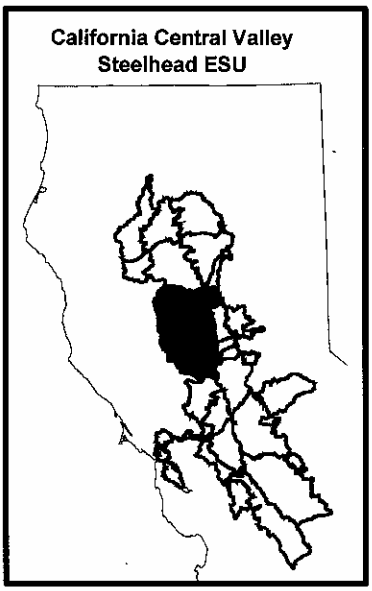
Tribal
Federal
State/Local
Private/Other
Water

*Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is for general reference only

Land Ownership
California Central Valley Steelhead
Colusa Basin HU (5520)



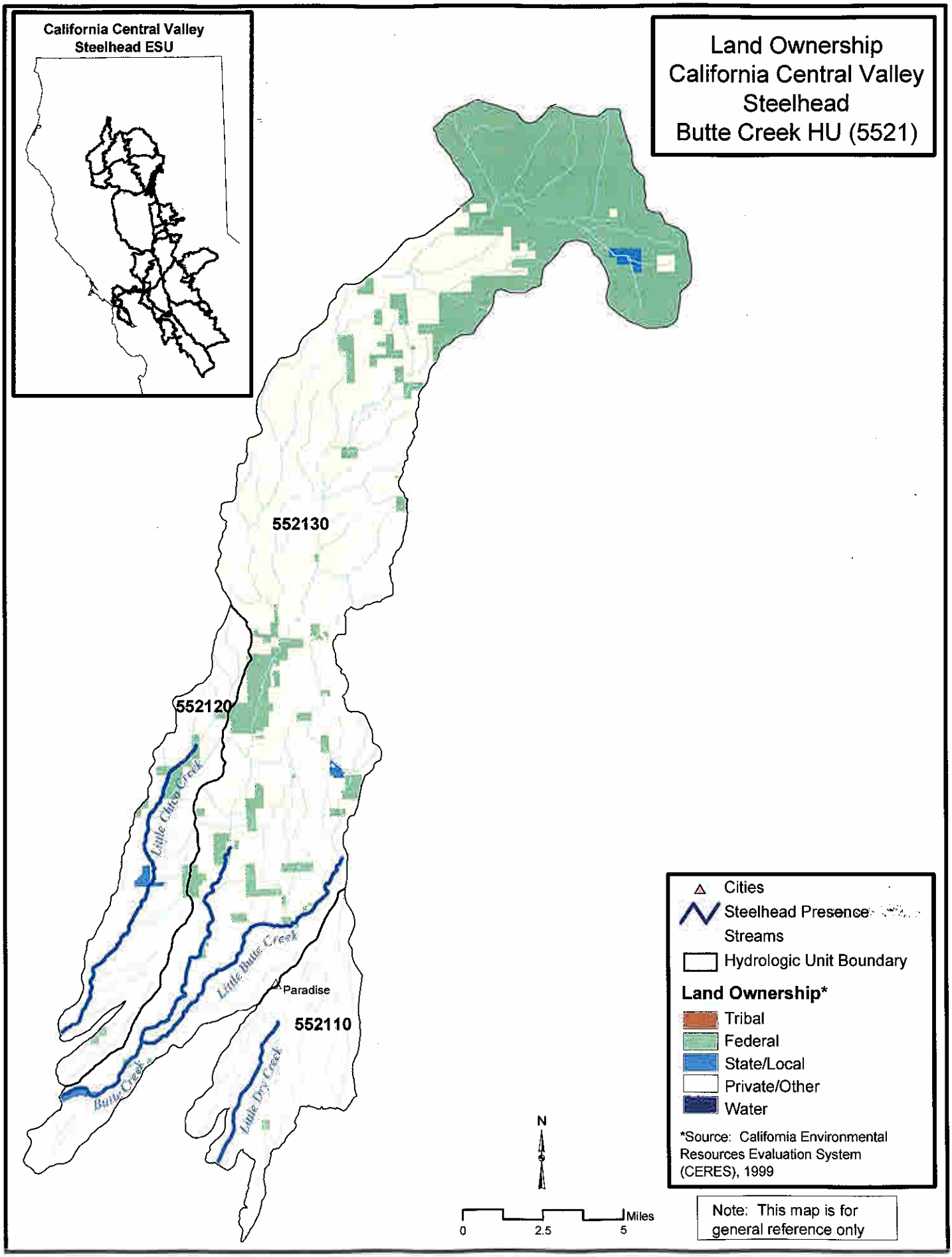


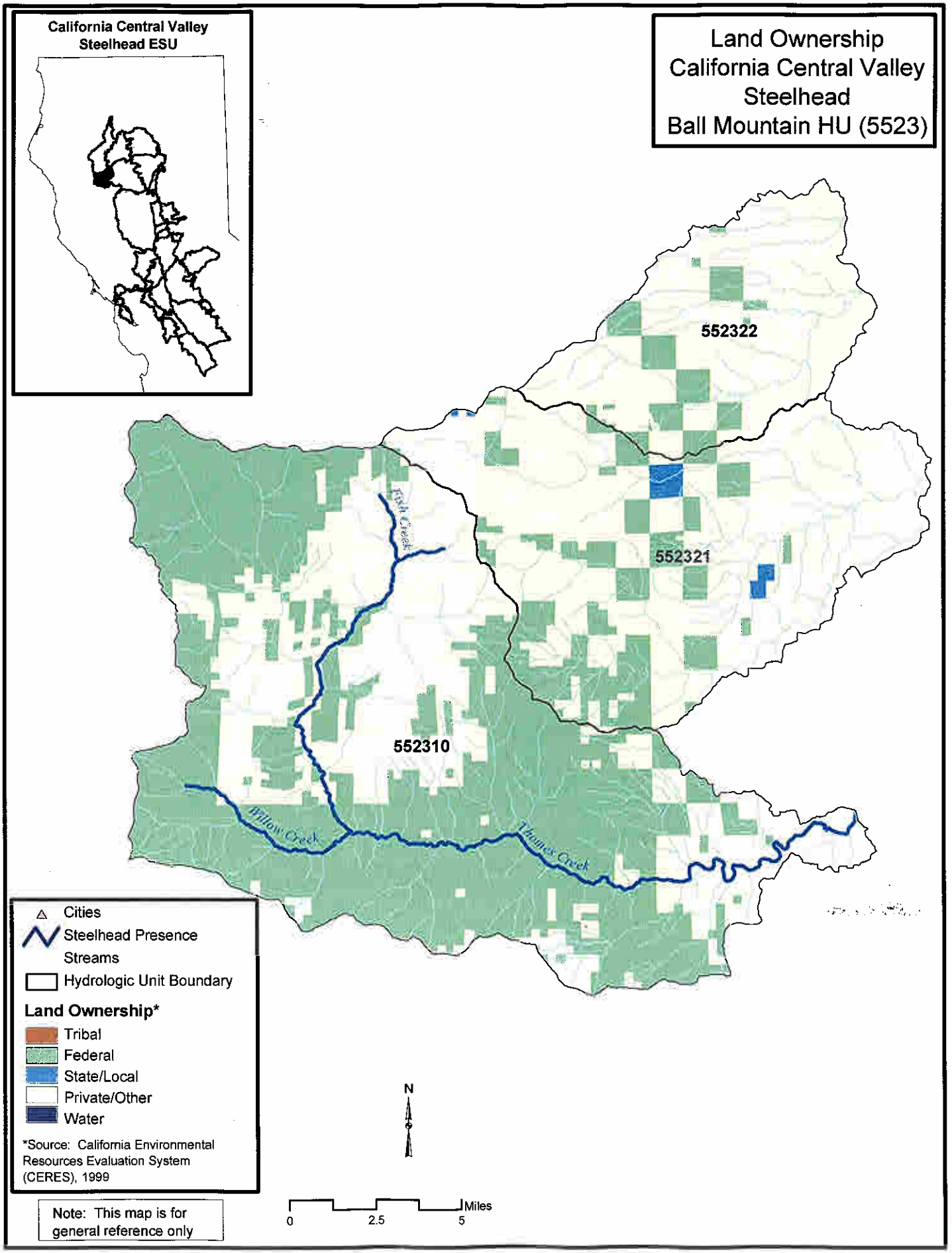
Cities
Steelhead Presence Streams
Hydrologic Unit Boundary

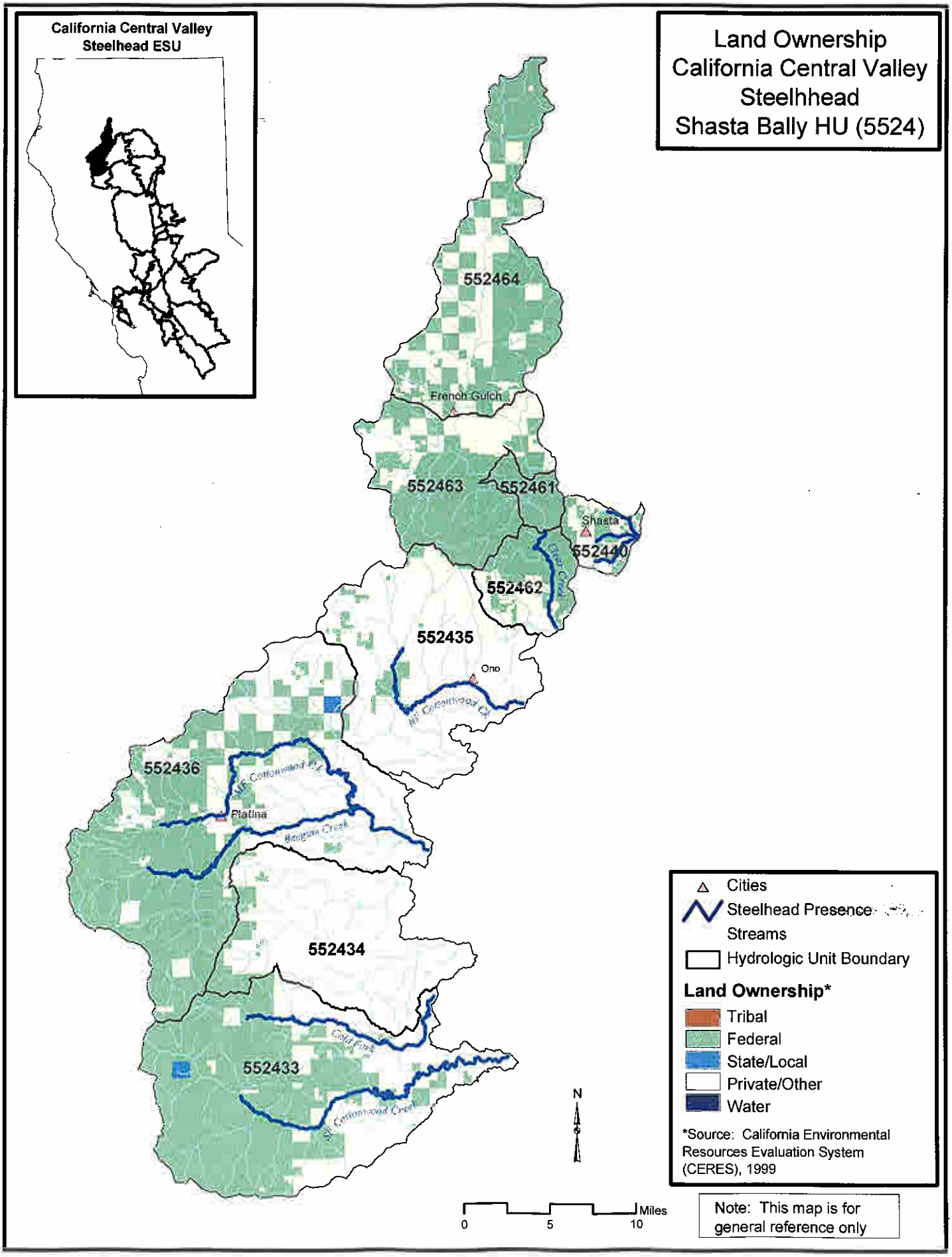
Land Ownership*
- Tribal
- Federal
- State/Local
- Private/Other
- Water

*Source: California Environmental Resources Evaluation System (CERES), 1999

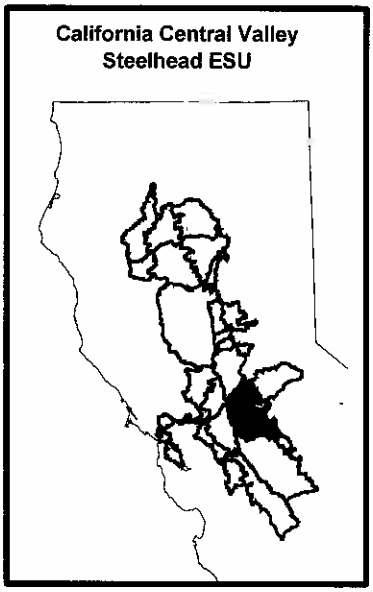
Note: This map is for general reference only


California Central Valley Steelhead ESU
Land Ownership
California Central Valley
Steelhead
Butte Creek HU (5521)
552130
552120
552110
Little Chico Creek
Little Butte Creek
Butte Creek
Little Dry Creek
Paradise
Cities
Steelhead Presence
Streams
Hydrologic Unit Boundary
Land Ownership*
Tribal
Federal
State/Local
Private/Other
Water
*Source: California Environmental Resources Evaluation System (CERES), 1999
N
0
2.5
5
Miles
Note: This map is for general reference only


California Central Valley Steelhead ESU
Land Ownership
California Central Valley
Steelhead
Ball Mountain HU (5523)
552322
552321
552310
Fish Creek
Willow Creek
Thomes Creek
Cities
Steelhead Presence
Streams
Hydrologic Unit Boundary
Land Ownership*
Tribal
Federal
State/Local
Private/Other
Water
*Source: California Environmental Resources Evaluation System (CERES), 1999
Note: This map is for general reference only
N
0
2.5
5
Miles


California Central Valley Steelhead ESU
Land Ownership
California Central Valley
Steelhhead
Shasta Bally HU (5524)
552464
French Gulch
552463
552461
Shasta
552440
552462
552435
Ono
552436
Platina
552434
552433
Cities
Steelhead Presence
Streams
Hydrologic Unit Boundary
Land Ownership*
Tribal
Federal
State/Local
Private/Other
Water
*Source: California Environmental Resources Evaluation System (CERES), 1999
N
0
5
10
Miles
Note: This map is for general reference only

Land Ownership
California Central Valley
Steelhead
North Valley Floor HU (5531)



553112

553111

553120

553130

553140

Cosumnes River

Dry Creek

Galt

Mokelumne River

Lodi

Mosher Creek

Calaveras River

Mormon Slough

Stockton

Cities

Steelhead Presence Streams

Hydrologic Unit Boundary

Land Ownership*

Tribal

Federal

State/Local

Private/Other

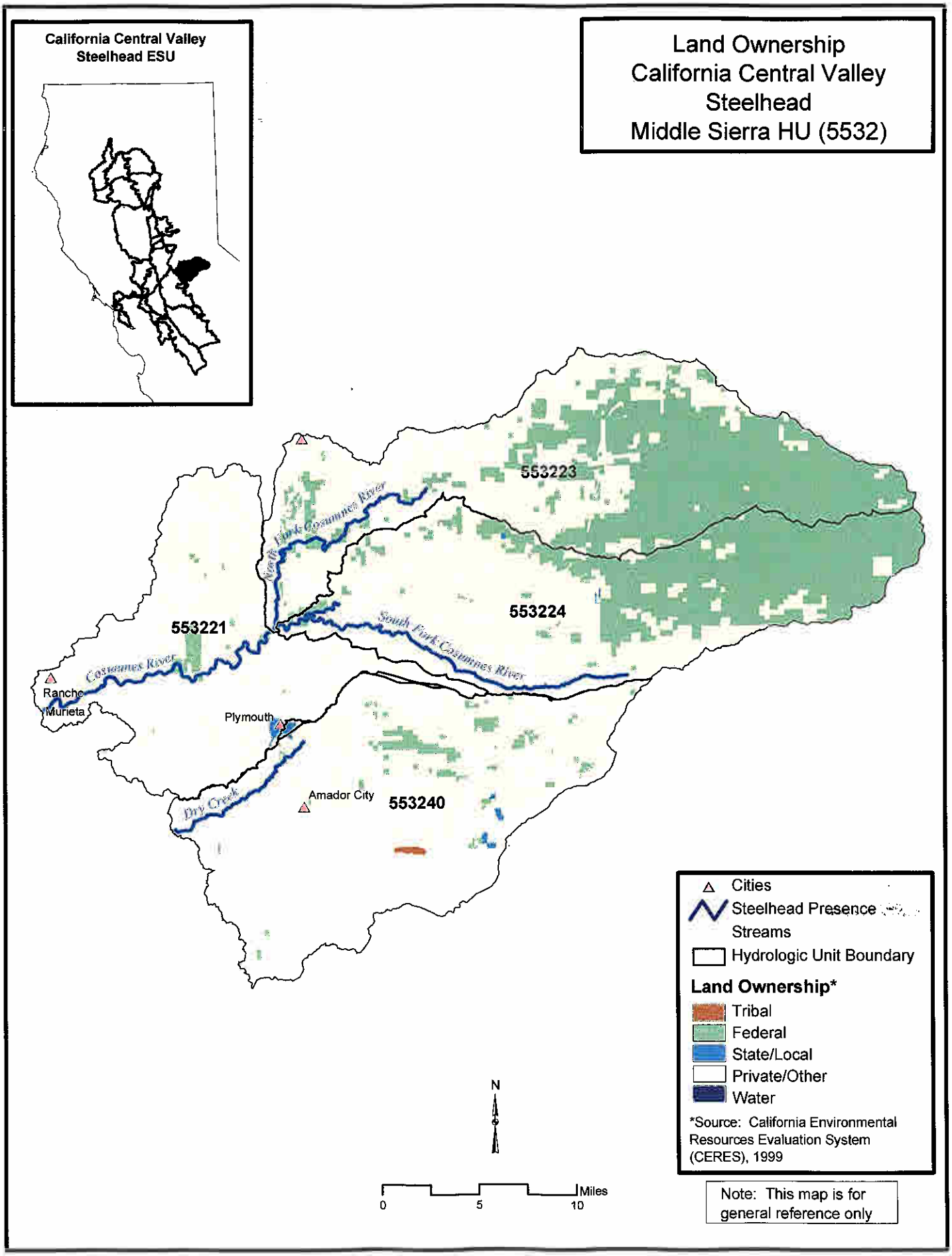
Water

*Source: California Environmental Resources Evaluation System (CERES), 1999

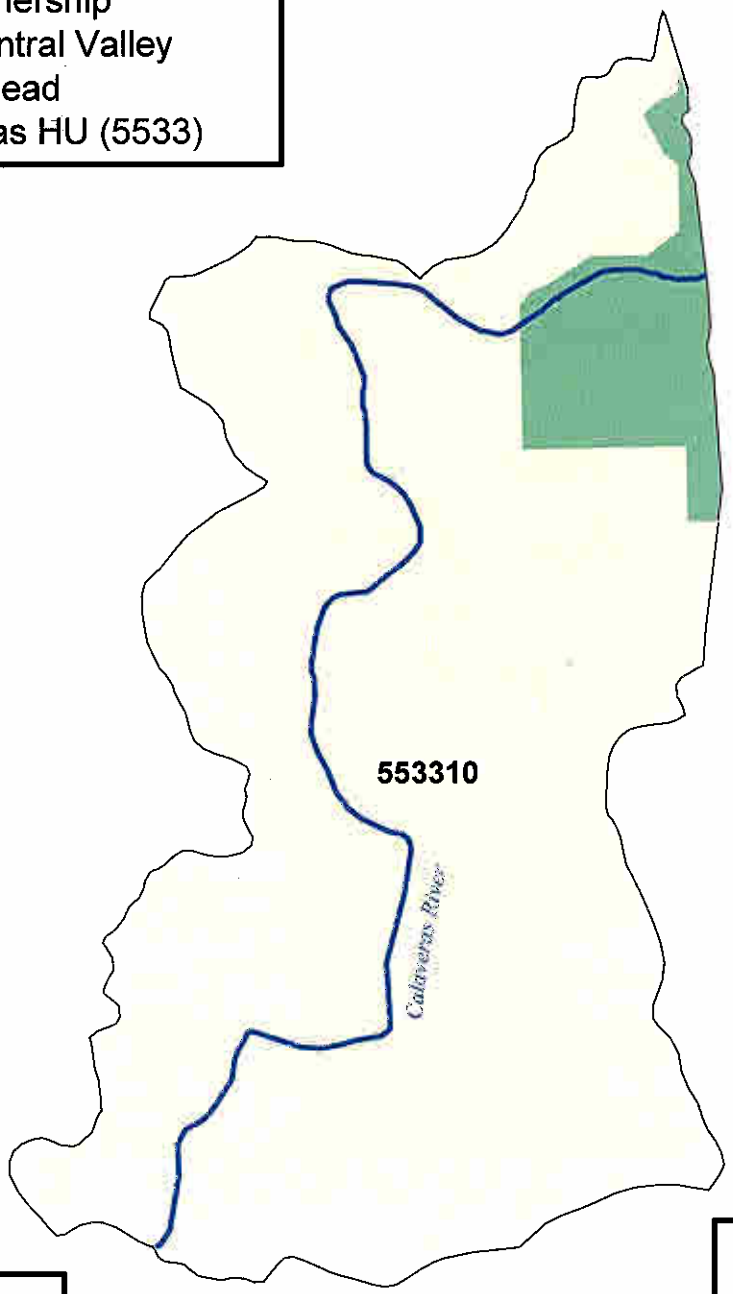
N

0 5 10 Miles

Note: This map is for general reference only


California Central Valley Steelhead ESU
Land Ownership
California Central Valley
Steelhead
Middle Sierra HU (5532)
553223
553224
553221
553240
North Fork Cosumnes River
South Fork Cosumnes River
Cosumnes River
Dry Creek
Rancho Murieta
Plymouth
Amador City
Cities
Steelhead Presence
Streams
Hydrologic Unit Boundary
Land Ownership*
Tribal
Federal
State/Local
Private/Other
Water
*Source: California Environmental Resources Evaluation System (CERES), 1999
N
0
5
10
Miles
Note: This map is for general reference only

Land Ownership
California Central Valley
Steelhead
Upper Calaveras HU (5533)



- Cities
- Steelhead Presence Streams
- Hydrologic Unit Boundary

Land Ownership*

- Tribal
- Federal
- State/Local
- Private/Other
- Water

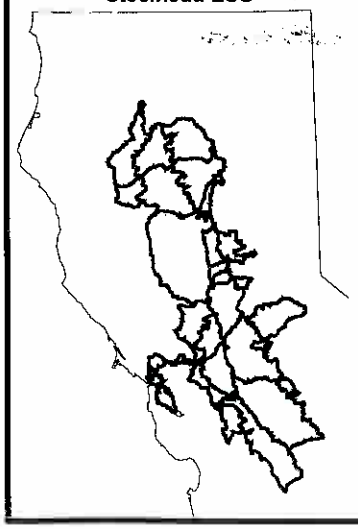
*Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is for general reference only

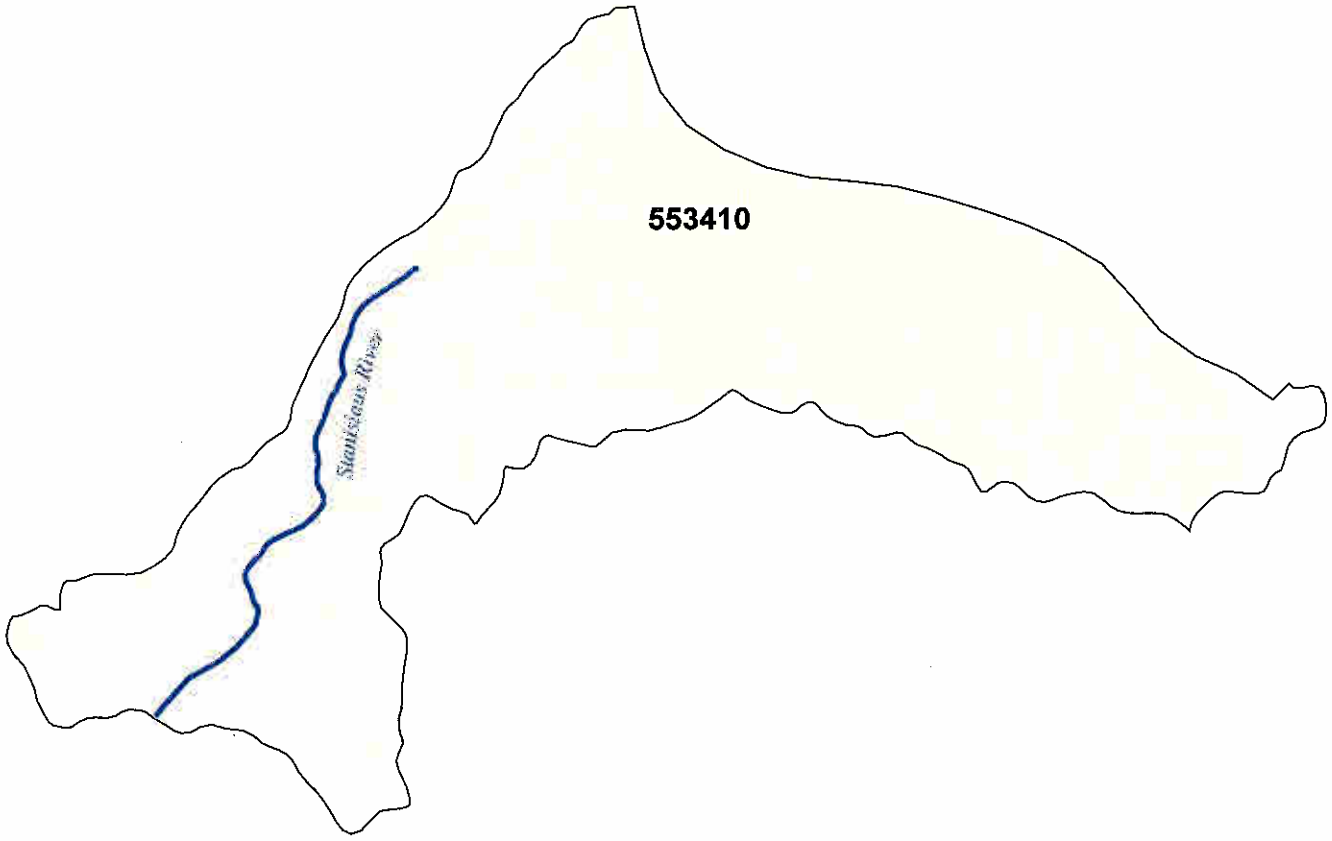
N

0 0.125 0.25 0.5 0.75 1 Miles

California Central Valley Steelhead ESU



Land Ownership
California Central Valley
Steelhead
Stanislaus River HU (5534)



- Cities
- Steelhead Presence Streams
- Hydrologic Unit Boundary

Land Ownership*

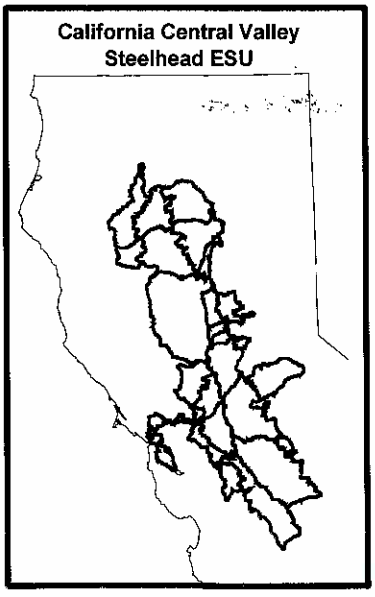
- Tribal
- Federal
- State/Local
- Private/Other
- Water

*Source: California Environmental Resources Evaluation System (CERES), 1999

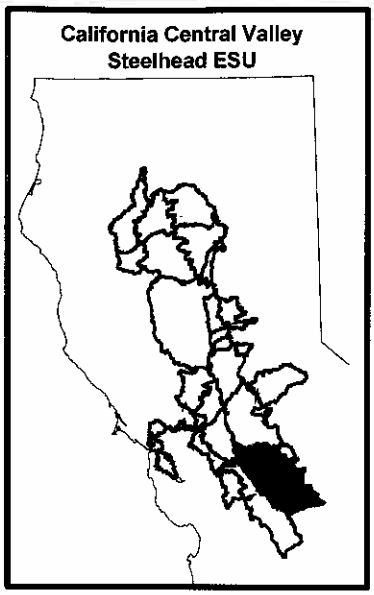
Note: This map is for general reference only

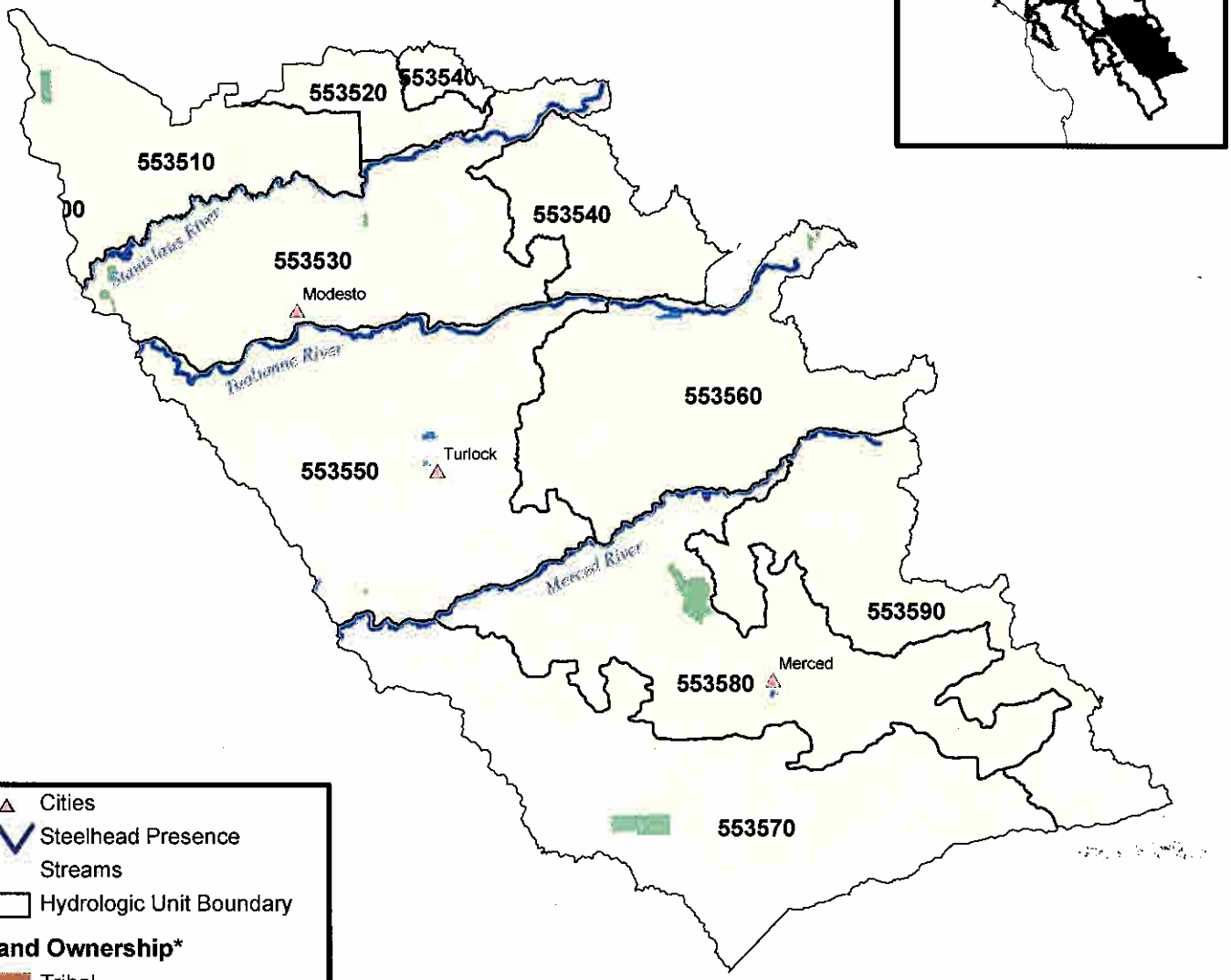
N

0 0.5 1 2 Miles



Land Ownership
California Central Valley
Steelhead
San Joaquin Valley Floor HU (5535)





- Cities
- Steelhead Presence Streams
- Hydrologic Unit Boundary

Land Ownership*

- Tribal
- Federal
- State/Local
- Private/Other
- Water

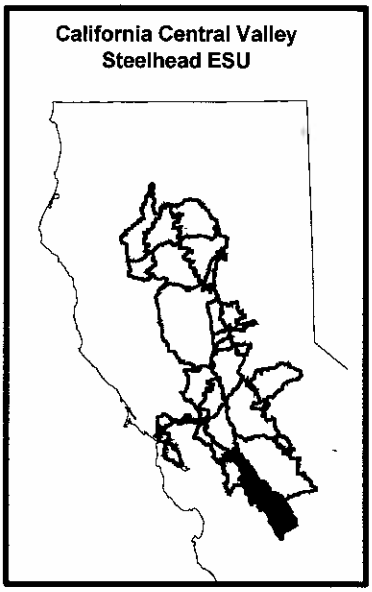
*Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is for general reference only

N

0 2.5 5 10 Miles

Land Ownership
California Central Valley Steelhead
Delta-Mendota Canal HU (5541)



Patterson

San Joaquin River

554110

Gustine

554120

Cities
Steelhead Presence Streams
Hydrologic Unit Boundary

Land Ownership*

Tribal
Federal
State/Local
Private/Other
Water

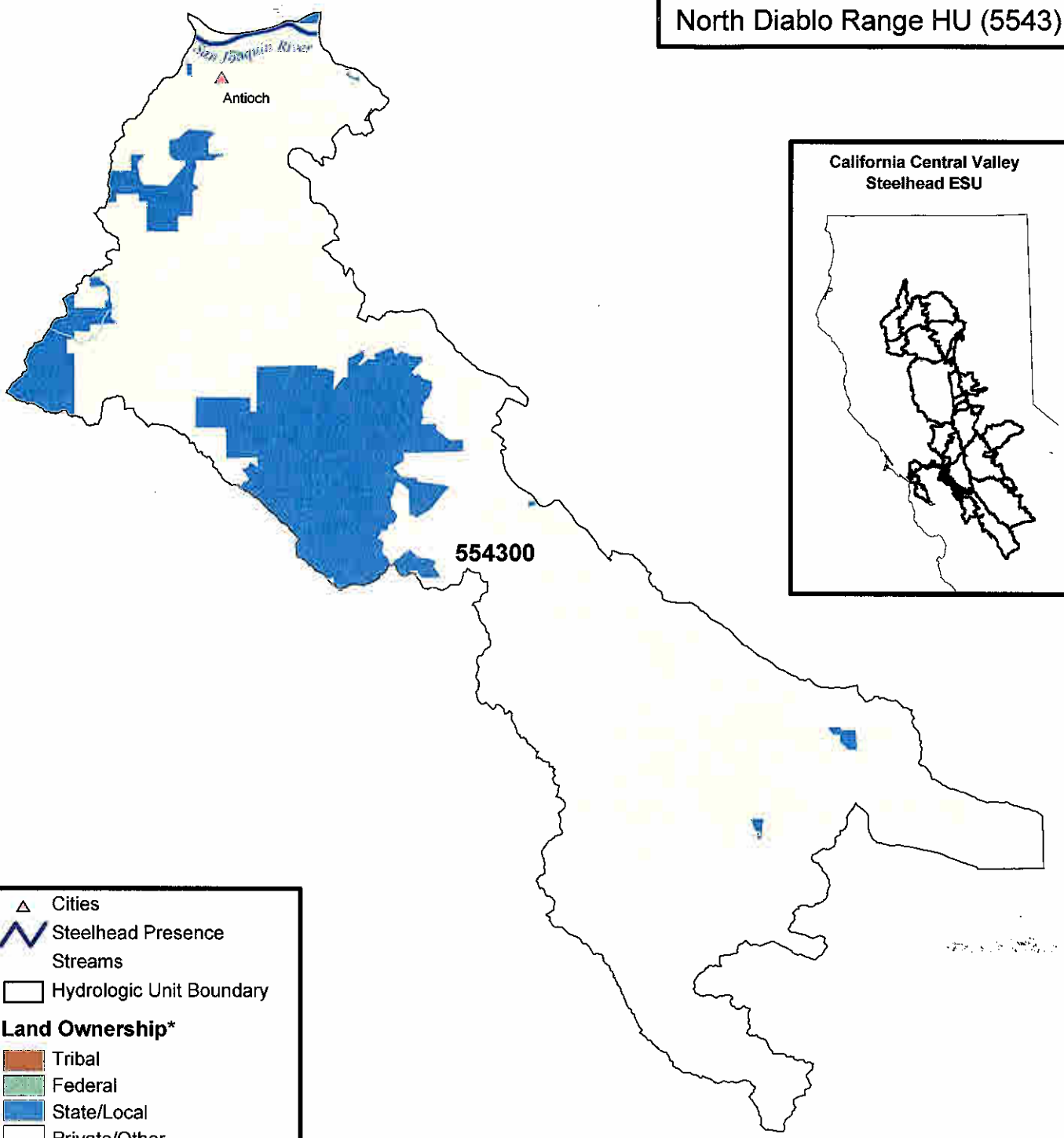
*Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is for general reference only

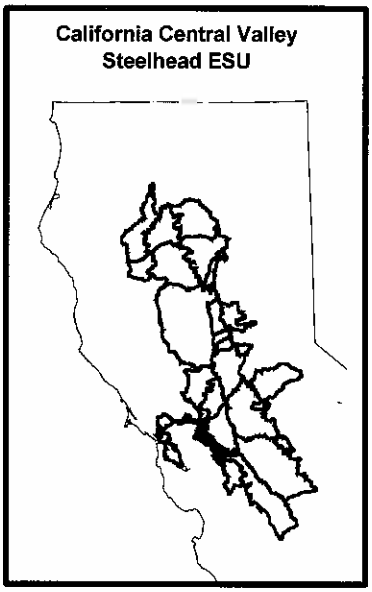
N

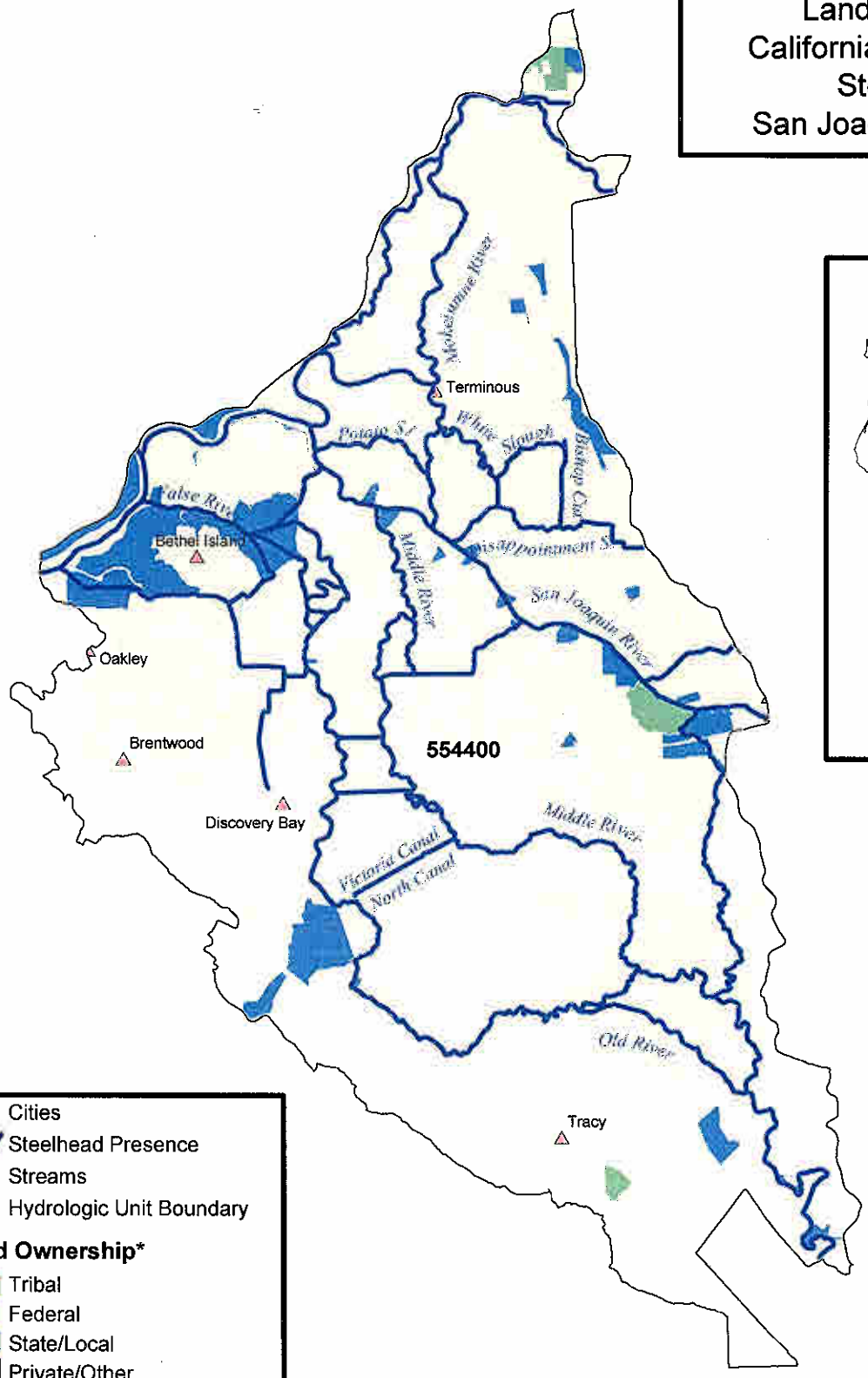
0 2.5 5 10 Miles

Land Ownership
California Central Valley Steelhead
North Diablo Range HU (5543)



Land Ownership
California Central Valley
Steelhhead
San Joaquin HU (5544)





- Cities
- Steelhead Presence Streams
- Hydrologic Unit Boundary

Land Ownership*

- Tribal
- Federal
- State/Local
- Private/Other
- Water

*Source: California Environmental Resources Evaluation System (CERES), 1999

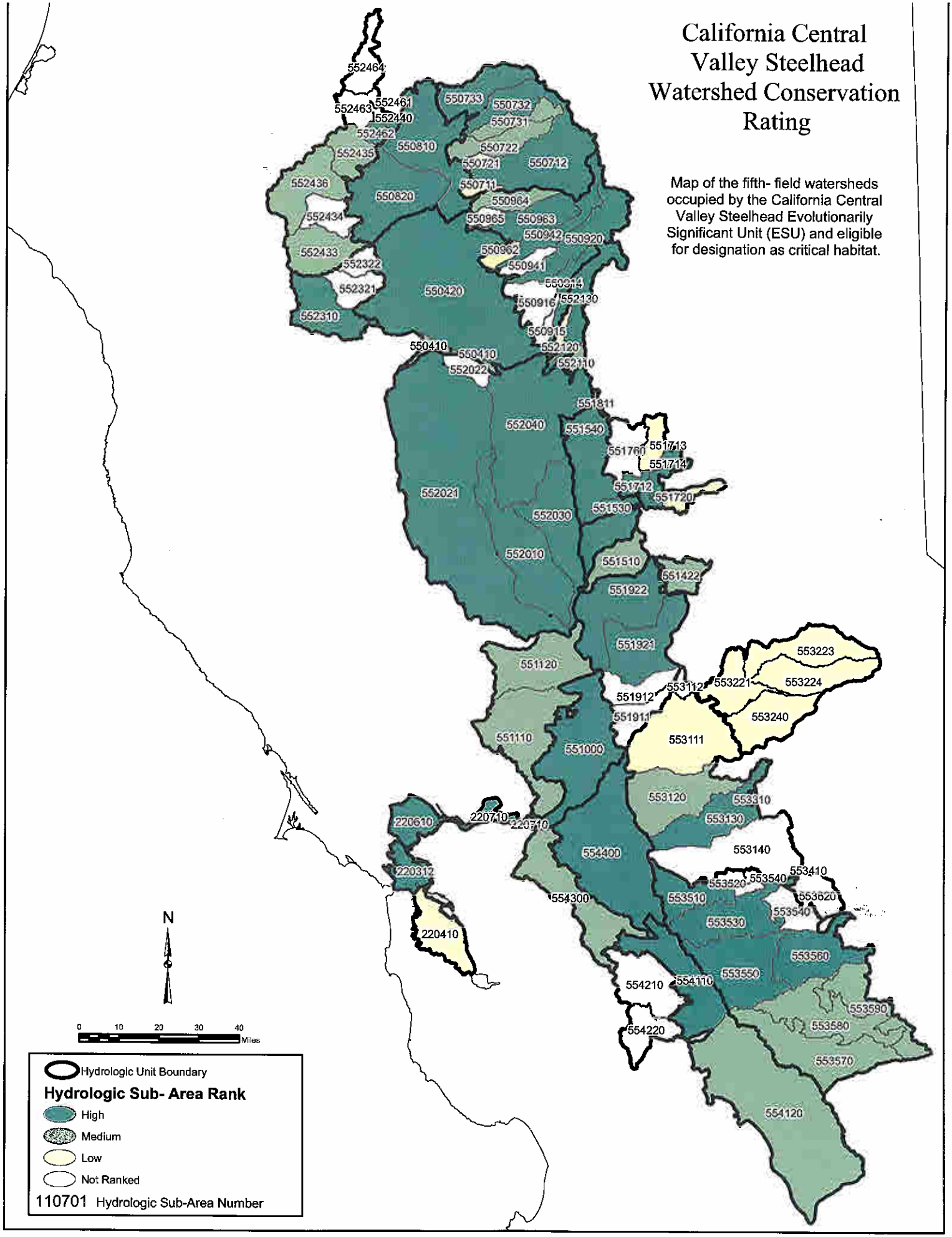
Note: This map is for general reference only

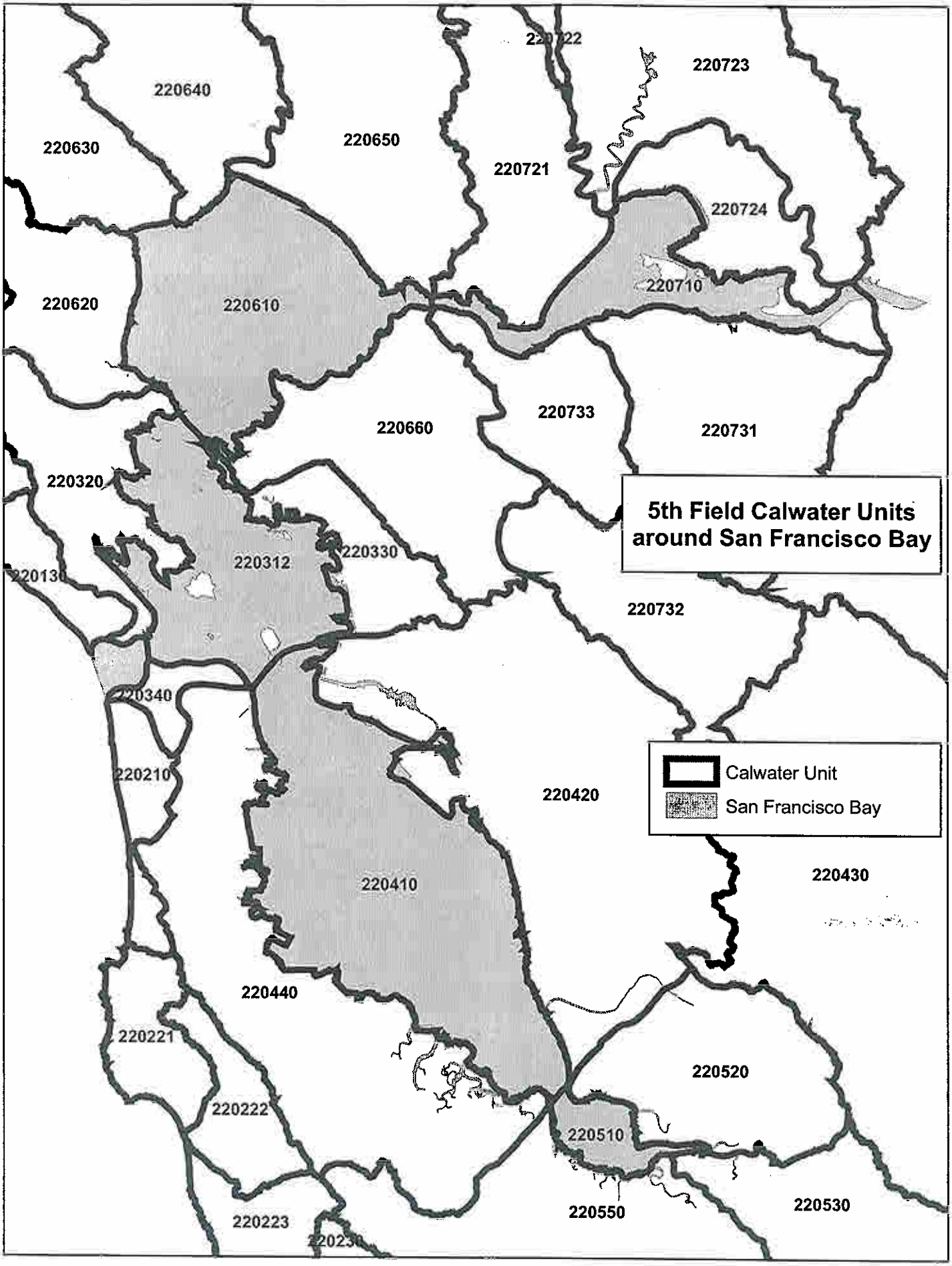
N

0 5 10 Miles

California Central Valley Steelhead Watershed Conservation Rating

Map of the fifth- field watersheds occupied by the California Central Valley Steelhead Evolutionarily Significant Unit (ESU) and eligible for designation as critical habitat.




220640
220630
220650
220721
220723
220724
220710
220620
220610
220660
220733
220731
220320
220312
220330
220130
220732
220340
220210
220420
220410
220430
220440
220221
220520
220222
220510
220223
220550
220530
5th Field Calwater Units around San Francisco Bay
Calwater Unit
San Francisco Bay

Map G23. Preliminary CHART Ratings of Conservation Value for Calwater HSA Watersheds occupied by the Central Valley Steelhead ESU