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Endangered and Threatened Species: Proposed Listing Determinations for 27 ESUs of West Coast Salmonids; Proposed Rule

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Parts 223 and 224

[Docket No. 040525161–4161–01; I.D. No. 052104F]

RIN 0648–AR93

Endangered and Threatened Species: Proposed Listing Determinations for 27 ESUs of West Coast Salmonids

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Proposed rule; request for comments.

SUMMARY: NMFS has completed comprehensive status reviews for 26 West Coast salmon (chum, *Oncorhynchus keta;* coho, *O. kisutch, O. nerka;* chinook, *O. tshawytscha;* pink, *O. gorbuscha*) and *O. mykiss* (inclusive of anadromous steelhead and resident rainbow trout) Evolutionarily Significant Units (ESUs) previously listed as threatened and endangered species under the Endangered Species Act (ESA), as well as one ESU that was designated as a candidate species, for a total of 27 ESUs. Following a September 2001 U.S. District Court ruling that rejected how NMFS treats hatchery stocks in its listing determinations, the agency received several petitions seeking to delist, or to redefine and list, 17 salmon and steelhead ESUs on the basis of the Court's ruling. In response to these petitions NMFS initiated status reviews for 16 of these ESUs, and elected to conduct status reviews for an additional 11 ESUs. Based on these reviews, NMFS is now issuing a proposed rule to list four ESUs as endangered and 23 ESUs as threatened. Collectively, these 27 ESUs include 162 artificial propagation programs. NMFS also proposes amending existing protective regulations, promulgated under section 4(d) of the ESA, for threatened ESUs.

DATES: Comments must be received no later than 5 p.m. P.S.T. on September 13, 2004. (See **ADDRESSES**.) NMFS will announce the dates and locations of public hearings in California, Oregon, Washington, and Idaho in a separate **Federal Register** notice.

ADDRESSES: Comments should be submitted to Chief, Protected Resources Division, NMFS, 525 NE Oregon Street—Suite 500, Portland, OR 97232–2737. Comments on this proposed rule may be submitted by e-mail. The mailbox address for providing e-mail comments is *salmon.nwr@noaa.gov.* Include in the subject line of the e-mail comment the following document identifier: 040525161–4161–01. Comments may also be submitted via facsimile (fax) to 503–230–5435, or via the Internet at *http://www.nmfs.noaa.gov/ibrm.* Comments may also be submitted electronically through the Federal e-Rulemaking portal: *http://www.regulations.gov.*

FOR FURTHER INFORMATION CONTACT: For further information regarding this proposed rule contact Garth Griffin, NMFS, Northwest Region, (503) 231–2005; Craig Wingert, NMFS, Southwest Region, (562) 980–4021; or Marta Nammack, NMFS, Office of Protected Resources, (301) 713–1401.

SUPPLEMENTARY INFORMATION:

Organization of This Proposed Rule

This **Federal Register** notice describes the proposed listing determinations for 27 ESUs of West Coast salmon and *O. mykiss* under the ESA. The pages that follow review the information considered in formulating the proposed listing determinations. To assist the reader, this section briefly outlines the organization and content of this notice. Section headings listed in this outline are denoted in *bold text,* and subheadings in *italics* in the body of the notice.

I. Review of necessary *Background* information
- Statutory basis for Listing Species Under the Endangered Species Act
- NMFS' Previous Federal ESA Actions Related to West Coast Salmonids
- NMFS' Past Practice in Pacific Salmonid ESA Listing Determinations
- Recent court decisions (*Alsea Valley Alliance* v. *Evans*) and a Summary of Petitions seeking listing/delisting actions that precipitated the Initiation of Coast-wide ESA Status Reviews for Pacific Salmonids
- Overview of the Life History of West Coast Salmonids

II. Consideration of specific issues in Assessing Extinction Risk for Pacific Salmonids
- Consideration of Artificial Propagation in Listing Determinations
- Consideration of Resident O. mykiss Populations in Listing Determinations
- Consideration of Recent Ocean Conditions in Listing Determinations

III. Treatment of the four listing determination steps for each ESU under review
(1) Determination of ''Species'' under the ESA
(2) Review of the best available information for Updated Viability Assessments of ESUs
(3) Evaluation of Efforts Being Made to Protect West Coast Salmon and O. mykiss
(4) Proposed Listing Determinations of ''threatened,'' ''endangered,'' or ''not warranted,'' based on the foregoing information

IV. Take Prohibitions and Protective Regulations:
- Overview of the take prohibitions and protective regulations that presently apply to listed ESUs
- Description of a proposed amendment to these protective regulations

V. Summary of agency efforts in designating Critical Habitat for listed salmon and O. mykiss ESUs

VI. Description of the Public Comments Solicited and other opportunities for public involvement in this rulemaking process

VII. Description of the Classification, NMFS' compliance with various laws and executive orders with respect to this proposed rulemaking (*e.g.*, National Environmental Policy Act, Regulatory Flexibility Act)

VIII. Description of proposed amendments to the Code of Federal Regulations. This section itemizes the specific changes to federal law being proposed based on the foregoing information
- Proposed amendments to the list of threatened and endangered species
- Proposed amendment to the protective regulations for threatened West Coast salmon and *O. mykiss*

Background

Listing Species Under the Endangered Species Act

NMFS is responsible for determining whether species, subspecies, or distinct population segments (DPSs) of Pacific salmon and steelhead are threatened or endangered under the Endangered Species Act (ESA) (16 U.S.C. 1531 *et seq*). To be considered for listing under the ESA, a group of organisms must constitute a ''species,'' which is defined in section 3 of the ESA to include ''any subspecies of fish or wildlife or plants, and any *distinct population segment* [emphasis added] of any species of vertebrate fish or wildlife which interbreeds when mature.'' In this notice, NMFS is proposing listing determinations for DPSs of Pacific salmon and *O. mykiss.* NMFS has determined that, to qualify as a DPS, a Pacific salmon or *O. mykiss* population must be substantially reproductively isolated from other conspecific populations and represent an important component in the evolutionary legacy of the biological species. A population meeting these criteria is considered to be an ESU (56 FR 58612; November 20, 1991). In its listing determinations for Pacific salmonids under the ESA, NMFS has treated an ESU as constituting a DPS, and hence a ''species,'' under the ESA. The terms ''DPS'' and ''ESU'' are used synonymously in this document.

Section 3 of the ESA defines an endangered species as ''any species which is in danger of extinction throughout all or a significant portion of its range'' and a threatened species as one ''which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.'' The statute lists factors that may cause a species to be threatened or endangered (ESA section 4(a)(1)): (a) The present or threatened destruction, modification, or curtailment of its habitat or range; (b) overutilization for commercial, recreational, scientific, or educational purposes; (c) disease or predation; (d) the inadequacy of existing regulatory mechanisms; or (e) other natural or manmade factors affecting its continued existence.

Section 4(b)(1)(A) of the ESA requires NMFS to make listing determinations based solely on the best scientific and commercial data available after conducting a review of the status of the species and after taking into account efforts being made to protect the species (in this proposed rule the term ''status'' is used in the statutory context, referring to the ESA listing status of ''threatened,'' ''endangered,'' or listing not warranted). Accordingly, NMFS follows three steps in making its listing determinations for Pacific salmon and *O. mykiss:* (1) NMFS first determines whether a population or group of populations constitutes an ESU, that is, whether the population(s) are a ''species'' within the meaning of the ESA; (2) NMFS then determines the viability of the ESU and the factors that have led to its decline; and (3) NMFS assesses efforts being made to protect the ESU, determining if these efforts are adequate to mitigate threats to the species. Based on the foregoing information and the statutory listing criteria, NMFS then proposes a listing determination of whether the species is threatened or endangered in a significant portion of its range.

Previous Federal ESA Actions Related to West Coast Salmonids

Pacific salmon and *O. mykiss* ESUs in California and the Pacific Northwest have suffered broad declines over the past hundred years. (In this document the scientific name ''*O. mykiss*'' refers to both anadromous steelhead and resident rainbow trout life-history forms). NMFS has conducted several ESA status reviews and status review updates for six biological species of Pacific salmon and *O. mykiss* in California, Oregon, Washington, and Idaho, identifying 51 ESUs and listing 26 of these ESUs to date. Table 1 summarizes the previous NMFS scientific reviews of the viability of salmon and steelhead and the ESA listing determinations for the 27 ESUs addressed in this proposed rule.

TABLE 1.—SUMMARY OF PREVIOUS ESA LISTING ACTIONS RELATED TO THE 27 EVOLUTIONARILY SIGNIFICANT UNITS OF WEST COAST SALMON AND *Oncorhynchus Mykiss* UNDER REVIEW

Evolutionarily Significant Unit (ESU)	Current endangered species act (ESA) status	Year listed	Previous ESA listing determinations—Federal Register citations	Previous scientific viability reviews and updates
			56 FR 58619; 11/20/1991 (Final rule).	
Snake River sockeye ESU	Endangered	1991	56 FR 14055; 04/05/1991 (Proposed rule)	NMFS 1991a
			64 FR 14528; 03/25/1999 (Final rule)	NMFS 1998d
Ozette Lake sockeye ESU	Threatened	1999	63 FR 11750; 03/10/1998 (Proposed rule)	NMFS 1997f
			59 FR 440; 01/01/1994 (Final rule).	
			57 FR 27416; 06/19/1992 (Proposed rule).	
			55 FR 49623; 11/30/1990 (Final rule).	
			55 FR 12831, 04/06/1990 (Emergency rule).	
			55 FR 102260; 03/20/1990 (Proposed rule).	
			54 FR 10260; 08/04/1989 (Emergency rule).	
Sacramento River winter-run chinook ESU	Endangered	1994	52 FR 6041; 02/27/1987 (Final rule).	
			64 FR 50394; 09/16/1999 (Final rule)	NMFS 1998b.
Central Valley spring-run chinook ESU	Threatened	1999	63 FR 11482; 03/09/1998 (Proposed rule)	NMFS 1999d.
			64 FR 50394; 09/16/1999 (Final rule)	NMFS 1998b.
California Coastal chinook ESU	Threatened	1999	63 FR 11482; 03/09/1998 (Proposed rule)	NMFS 1999d.
				NMFS 1998b.
			64 FR 14308; 03/24/99 (Final rule)	NMFS 1998e.
Upper Willamette River chinook ESU	Threatened	1999	63 FR 11482; 03/09/1998 (Proposed rule)	NMFS 1999c.
				NMFS 1998b.
			64 FR 14308; 03/24/99 (Final rule)	NMFS 1998e.
Lower Columbia River chinook ESU	Threatened	1999	63 FR 11482; 03/09/1998 (Proposed rule)	NMFS 1999c.
Upper Columbia River spring-run chinook ESU.	Endangered	1999		
				NMFS 1998b.
			64 FR 14308; 03/24/99 (Final rule)	NMFS 1998e.
			63 FR 11482; 03/09/1998 (Proposed rule)	NMFS 1999c.

TABLE 1.—SUMMARY OF PREVIOUS ESA LISTING ACTIONS RELATED TO THE 27 EVOLUTIONARILY SIGNIFICANT UNITS OF WEST COAST SALMON AND *Oncorhynchus Mykiss* UNDER REVIEW—Continued

Evolutionarily Significant Unit (ESU)	Current endangered species act (ESA) status	Year listed	Previous ESA listing determinations—Federal Register citations	Previous scientific viability reviews and updates
				NMFS 1998b.
			64 FR 14308; 03/24/99 (Final rule)	NMFS 1998e.
Puget Sound chinook ESU	Threatened	1999	63 FR 11482; 03/09/1998 (Proposed rule)	NMFS 1999c.
			63 FR 1807; 0/12/1998 (Proposed withdrawn).	
			59 FR 66784; 12/28/1994 (Proposed rule).	
			59 FR 42529; 08/18/1994 (Emergency rule).	
			57 FR 23458; 06/03/1992 (Correction).	
			57 FR 14653; 04/22/1992 (Final rule)	NMFS 1991c.
Snake River fall-run chinook ESU	Threatened	1992	56 FR 29547; 06/27/1991 (Proposed rule)	NMFS 1999d.
			63 FR 1807; 0/12/1998 (Proposed withdrawn).	
			59 FR 66784; 12/28/1994 (Proposed rule).	
			59 FR 42529; 08/18/1994 (Emergency rule).	
			57 FR 23458; 06/03/1992 (Correction).	
			57 FR 34639; 04/22/1992 (Final rule)	NMFS 1991b.
Snake River spring/summer-run chinook ESU.	Threatened	1992	56 FR 29542; 06/27/1991 (Proposed rule)	NMFS 1998b.
			61 FR 56138;- 10/31/1996 (Final rule)	Bryant 1994
Central California Coast coho ESU.	Threatened	1996	60 FR 38011; 07/25/1995 (Proposed rule)	NMFS 1995a.
				NMFS 1997a.
				NMFS 1996c.
			62 FR 24588; 05/06/1997 (Final rule)	NMFS 1996e.
Southern Oregon/Northern California Coast coho ESU.	Threatened	1997	60 FR 38011; 07/25/1995 (Proposed rule)	NMFS 1995a.
			69 FR 19975; 04/15/2004 (Candidate list).	
			63 FR 42587; 08/10/1998 (Final rule)	NMFS 1997a.
			62 FR 24588; 05/06/1997 (Proposed withdrawn).	NMFS 1996b.
			61 FR 56138; 10/31/1996 (6 mo. extension)	NMFS 1996d.
Oregon Coast coho ESU	Threatened*	1998	60 FR 38011; 07/25/1995 (Proposed rule)	NMFS 1995a.
Lower Columbia River coho ESU	Candidate	1995	69 FR 19975; 04/15/2004 (Candidate list)	NMFS 1996e.
				NMFS 1995a.
			60 FR 38011; 07/25/1995 (Not warranted)	NMFS 1991a.
				NMFS 1997e.
			64 FR 145008; 03/25/1999 (Final rule) 3	NMFS 1999b.
Columbia River chum ESU	Threatened	1999	63 FR 11774; 03/10/1998 (Proposed rule)	NMFS 1999c.
				NMFS 1996d.
				NMFS 1997e.
			64 FR 14508; 03/25/1999 (Final rule)	NMFS 1999b.
Hood Canal summer-run chum ESU	Threatened	1999	63 FR 11774; 03/10/1998 (Proposed rule)	NMFS 1999c.
			67 FR 21568; 05/01/2002 (Redefinition of ESU).	
			62 FR 43937; 08/18/1997 (Final rule)	NMFS 1996b.

TABLE 1.—SUMMARY OF PREVIOUS ESA LISTING ACTIONS RELATED TO THE 27 EVOLUTIONARILY SIGNIFICANT UNITS OF WEST COAST SALMON AND *Oncorhynchus Mykiss* UNDER REVIEW—Continued

Evolutionarily Significant Unit (ESU)	Current endangered species act (ESA) status	Year listed	Previous ESA listing determinations—Federal Register citations	Previous scientific viability reviews and updates
Southern California steelhead ESU	Endangered	1997	61 FR 41541; 08/09/1996 (Proposed rule)	NMFS 1997b.
			62 FR 43937; 08/18/1997 (Final rule)	NMFS 1996b.
South-Central California Coast steelhead ESU.	Threatened	1997	61 FR 41541; 08/09/1996 (Proposed rule)	NMFS 1997b.
			62 FR 43937; 08/18/1997 (Final rule)	NMFS 1996b.
Central California Coast steelhead ESU	Threatened	1997	61 FR 41541; 08/09/1996 (Proposed rule)	NMFS 1997b.
				NMFS 1996b.
				NMFS 1997b.
			63 FR 13347; 03/19/1998 (Final rule)	NMFS 1997c.
			62 FR 43974; 08/18/1997 (6 mo. extension)	NMFS 1997d.
California Central Valley steelhead ESU	Threatened	1998	61 FR 41541; 08/09/1996 (Proposed rule)	NMFS 1998a.
			65 FR 36074; 06/07/2000 (Final rule).	
			65 FR 6960; 02/11/2000 (Proposed rule)	NMFS 1996b.
			63 FR 13347; 03/19/1998 (Not Warranted)	NMFS 1997c.
			62 FR 43974; 08/18/1997 (6 mo. extension)	NMFS 1998a.
Northern California steelhead ESU	Threatened	2000	61 FR 41541; 08/09/1996 (Proposed rule)	NMFS 2000.
			64 FR 14517; 03/25/1999 (Final rule)	NMFS 1996b.
			63 FR 11798; 03/10/1998 (Proposed rule)	NMFS 1997d.
Upper Willamette River steelhead ESU	Threatened	1999	62 FR 43974; 08/18/1997 (6 mo. extension)	NMFS 1999a.
			61 FR 41541; 08/09/1996 (Proposed rule)	NMFS 1999c.
				NMFS 1996b.
			63 FR 13347; 03/19/1998 (Final rule)	NMFS 1997c.
			62 FR 43974; 08/18/1997 (6 mo. extension)	NMFS 1997d.
Lower Columbia River steelhead ESU	Threatened	1998	61 FR 41541; 08/09/1996 (Proposed rule)	NMFS 1998a.
			64 FR 14517; 03/25/1999 (Final rule)	NMFS 1996b.
			63 FR 11798; 03/10/1998 (Proposed rule)	NMFS 1997d.
			62 FR 43974; 08/18/1997 (6 mo. extension)	NMFS 1999a.
Middle Columbia River steelhead ESU	Threatened	1999	61 FR 41541; 08/09/1996 (Proposed rule)	NMFS 1999c.
			62 FR 43937; 08/18/1997 (Final rule)	NMFS 1996b.
Upper Columbia River steelhead ESU	Endangered	1997	61 FR 41541; 08/09/1996 (Proposed rule)	NMFS 1997b.
			62 FR 43937; 08/18/1997 (Final rule)	NMFS 1996b.
Snake River Basin steelhead ESU	Threatened	1997	61 FR 41541; 08/09/1996 (Proposed rule)	NMFS 1997b.

*But see *Alsea Valley Alliance* v. *Evans*, 358 F.3d 1181 (9th Cir. Feb. 24, 2004).

Past Practice in Pacific Salmonid ESA Listing Determinations

In past ESA listing determinations, NMFS followed the four step approach described above. In the past, NMFS focused on whether the naturally spawned fish are, by themselves, self-sustaining in their natural ecosystem over the long term. NMFS listed as ''endangered'' those ESUs whose naturally spawned populations were found to have a present high risk of extinction, and listed as ''threatened'' those ESUs whose naturally spawned populations were found likely to become endangered in the foreseeable future (that is, whose present risk of extinction was not high, but whose risk of extinction was likely to become high within a foreseeable period of time).

In its listing determinations, NMFS did not explicitly consider the contribution of the hatchery fish to the overall viability of the ESU, or whether the presence of hatchery fish within the ESU might have the potential for reducing the risk of extinction of the ESU or the likelihood that the ESU would become endangered in the foreseeable future. (The listing of Snake River fall chinook, however, is an exception. See 57 FR 14653; April 22, 1992.) NMFS frequently evaluated artificial propagation only as a factor in the decline of the naturally spawned populations within an ESU.

For each ESU where hatchery fish were present, NMFS reviewed the associated hatchery populations to determine how closely related the hatchery populations were to the naturally spawned populations. This review focused on the origin of the hatchery fish and their similarity to locally adapted naturally spawned fish. Factors included in this consideration were: Genetic, life history, and habitat use characteristics; the degree to which the characteristics of the wild population may have been altered over time; and other factors that would affect the biological usefulness of hatchery fish for recovery.

Since 1993, NMFS has applied an interim policy on how it will consider artificial propagation in the listing and recovery of Pacific salmon and steelhead under the ESA (58 FR 17573, April 5, 1993). The 1993 policy provided guidance on the use of artificial propagation to assist in the conservation of these listed species and to help avoid additional species listings. The policy also provided guidance for evaluating artificial propagation in section 7 consultation, section 10 permitting, and recovery planning pursuant to the ESA.

When NMFS determined that an ESU should be listed as threatened or endangered, it applied its interim artificial propagation policy for Pacific salmon and steelhead. That policy provided that hatchery salmon and steelhead found to be part of the ESU would not be listed under the ESA unless they were found to be essential for recovery (*i.e.*, if NMFS determined that the hatchery population contained a substantial portion of the genetic diversity remaining in the ESU). The result of this policy was that a listing determination for an ESU depended solely upon the relative health of the naturally spawning component of the ESU. In most cases, hatchery fish within the ESUs were not relied upon to contribute to recovery, and therefore were not listed.

In addition, resident *O. mykiss* populations (*i.e.*, rainbow trout) included in steelhead ESUs were not listed when it was determined that the steelhead warranted listing because the U.S. Fish and Wildlife Service (FWS) retains ESA jurisdiction over resident rainbow trout.

Alsea Valley Alliance v. *Evans*

In September 2001, the U.S. District Court in Eugene, Oregon, in *Alsea Valley Alliance* v. *Evans* (161 F. Supp. 2d 1154, D. Oreg. 2001; *Alsea* decision), set aside NMFS' 1998 ESA listing of Oregon Coast coho salmon (63 FR 42587; 08/10/1998). The Court ruled that the ESA does not allow NMFS to list a subset of an ESU, and that NMFS had improperly excluded stocks from the listing once it had decided that certain hatchery stocks were part of the ESU. Although the Court's ruling affected only one ESU, the interpretive issue raised by the ruling called into question nearly all of NMFS' Pacific salmonid listing determinations. The Court struck down the 1998 final rule listing Oregon coast coho as a threatened species, thus removing the ESU from the protections of the ESA. The Court remanded the case to NMFS for reconsideration consistent with the *Alsea* decision. NMFS did not contest the Court's ruling and informed the Court it would comply. In November 2001 intervenors appealed the Court's ruling to the U.S. Ninth Circuit Court of Appeals. Pending resolution of the appeal, the Ninth Circuit stayed the District Court's remand order and invalidation of the 1998 listing. While the stay was in place, the Oregon Coast coho ESU was again afforded the protections of the ESA (*Alsea Valley Alliance* v. *Evans*, 9th Circuit appeal, No. 01–36071, December 14, 2001). On February 24, 2004, the Appeals Court dismissed the appeal, and dissolved its stay of the District Court's ruling in *Alsea*.

Following the District Court's ruling in the *Alsea* case, NMFS received several petitions (summarized below) addressing 17 listed salmonid ESUs, including five steelhead ESUs. These petitions cited the *Alsea* ruling and focused on NMFS' past practice of excluding certain ESU hatchery stocks from listing protection. Various litigants have also challenged the failure to list resident populations included in threatened and endangered steelhead ESUs. The anadromous form of *O. mykiss* (*i.e.*, steelhead) is presently under NMFS' jurisdiction, while the resident freshwater forms, usually called ''rainbow'' or ''redband'' trout, are under FWS jurisdiction. In *Environmental Defense Center et al.* v. *Evans et al.* (*EDC* v. *Evans*, SACV–00–1212–AHS (EEA)), the plaintiffs argue that NMFS failed to include resident populations in the endangered listing of the Southern California steelhead ESU (62 FR 43937; August 18, 1997). In *Modesto Irrigation District et al.* v. *Evans et al.* (*MID* v. *Evans*, CIV–F–02–6553 OWW DLB (E.D. Cal)), the plaintiffs seek to invalidate NMFS' 1997 threatened listing of the Central Valley California steelhead ESU (63 FR 13347; March 19, 1998) for failing to list hatchery and resident populations identified as part of the ESU. This same factual situation is found in all listed steelhead ESUs; the listings do not include hatchery and/or resident populations considered to be part of the ESUs. For the proposed listing determinations detailed in this proposed rule to be compliant with the Court's ruling in the *Alsea* case, all populations or stocks (natural, hatchery, resident, etc.) included in an ESU must be listed if it is determined that the ESU is threatened or endangered under the ESA.

Summary of Petitions

Following the ruling in the *Alsea* case, NMFS received several petitions seeking to delist, or to redefine and list, ESUs of Pacific salmon and steelhead. The petitioners made reference to the *Alsea* decision in arguing for NMFS to reconsider the listing status for certain ESUs. Between September 2001 and April 2002 NMFS received eight separate petitions addressing a total of 17 listed salmon and steelhead ESUs.

On September 19, 2001, NMFS received a petition from Interactive Citizens United to delist coho salmon in Siskiyou County, California. These fish are part of a larger ESU of Southern Oregon/Northern California Coast coho

salmon. NMFS determined that the Interactive Citizens United petition was not warranted, finding that it failed to present substantial scientific or commercial information to suggest that delisting may be warranted (67 FR 6215; February 11, 2002). On March 18, 2002, NMFS received a duplicate petition from the California State Grange to delist coho salmon in Siskiyou County, California. NMFS made a negative finding on the California State Grange petition (67 FR 40679; June 13, 2002), for the same reasons as for its finding on the Interactive Citizens United petition.

During October 2001, NMFS received 5 additional delisting petitions addressing 15 ESUs. On October 22, 2001, NMFS received a petition from the Washington State Farm Bureau, on the behalf of a coalition of agricultural organizations in Washington State, to delist 12 Pacific salmon ESUs including: One sockeye ESU (the endangered Snake River sockeye ESU); six chinook ESUs (the threatened Puget Sound, Snake River spring/summer, Snake River fall, and Lower Columbia River chinook ESUs, as well as the endangered Upper Columbia River spring-run chinook ESU); two chum ESUs (the threatened Hood Canal summer-run and Columbia River chum ESUs); and four steelhead ESUs (the threatened Lower Columbia River, Middle Columbia River, and Snake River steelhead ESUs, as well as the endangered Upper Columbia River steelhead ESU). On October 17, 2001, NMFS received a petition on behalf of the Columbia-Snake River Irrigators' Association to delist seven Pacific salmon ESUs including: One sockeye ESU (the endangered Snake River sockeye ESU); three chinook ESUs (the threatened Snake River fall and Snake River spring/summer chinook ESUs, as well as the endangered Upper Columbia River spring-run chinook ESU); and three steelhead ESUs (the threatened Middle Columbia River and Snake River steelhead ESUs, as well as the endangered Upper Columbia River steelhead ESUs). On October 17, 2001, NMFS received a petition on behalf of the Kitsap Alliance of Property Owners and the Skagit County Cattlemen's Association to delist the threatened Puget Sound chinook and Hood Canal summer-run chum ESUs. On October 23, 2001, NMFS received a petition on behalf of seven individuals to delist the threatened Southern Oregon/Northern California Coast coho ESU. On October 24, 2001, NMFS received a petition on behalf of the Greenberry Irrigation District to delist the threatened Upper Willamette River chinook and steelhead ESUs. NMFS determined that these petitions, in light of the *Alsea* decision, presented substantial scientific and commercial information indicating that delisting may be warranted for 14 of the 15 petitioned ESUs (67 FR 6215; February 11, 2002). In the case of the Snake River sockeye ESU, NMFS determined that the Washington State Farm Bureau and Columbia-Snake River Irrigators' Association petitions failed to present substantial scientific and commercial information that delisting may be warranted.

On March 14, 2002, NMFS received a petition from the Central Coast Forest Association to delist the threatened Central California Coast coho salmon ESU. On April 29, 2002, NMFS received two petitions from Trout Unlimited and several co-petitioners seeking to redefine and list a total of 15 ESUs including: Six chinook ESUs (the threatened Puget Sound, Upper Willamette River, Snake River spring/summer, Snake River fall, and Lower Columbia River chinook ESUs, as well as the endangered Upper Columbia River spring-run chinook ESU); two chum ESUs (the threatened Hood Canal summer and Columbia River chum ESUs); two coho ESUs (the threatened Oregon Coast and Southern Oregon/Northern California Coast coho ESUs); and five steelhead ESUs (the threatened Upper Willamette River, Snake River, Middle Columbia River, and Lower Columbia River steelhead ESUs, as well as the endangered Upper Columbia River steelhead ESU). The two Trout Unlimited petitions sought to redefine and list these ESUs as including only natural fish. NMFS determined that these three petitions presented substantial scientific and commercial information to suggest that the petitioned actions may be warranted (67 FR 48601; July 25, 2002).

The ESA requires that, as a consequence of accepting the above petitions, NMFS promptly commence a review of the species' status and make a finding within 12 months after receiving the petition, whether the petitioned action is warranted (ESA section 4(b)(3)). There are 16 ESUs (described above for the various accepted petitions) for which NMFS has statutory deadlines for the completion of ESA status reviews and listing determinations: Seven chinook ESUs (the Upper Willamette River, Lower Columbia River, Upper Columbia River spring-run, Puget Sound, Snake River fall-run, and Snake River spring/summer-run chinook ESUs); three coho ESUs (the Central California Coast, Southern Oregon/Northern California Coast, and Oregon Coast coho ESUs); two chum ESUs (the Columbia River and Hood Canal summer-run chum salmon ESUs); and five steelhead ESUs (the Upper Willamette River, Lower Columbia River, Middle Columbia River, Upper Columbia River, and Snake River Basin steelhead ESUs).

Initiation of Coast-Wide ESA Status Reviews

The ESUs addressed in this proposed rule include 26 previously listed West Coast salmon and steelhead ESUs, and one ESU designated as a candidate species (the Lower Columbia coho ESU). As part of its response to the ESA interpretive issues raised by the ruling in the *Alsea* case, NMFS elected to initiate status reviews for a total of 27 ESUs: 11 ESUs in addition to the 16 ESUs for which it had accepted delisting/listing petitions. As announced in a **Federal Register** notice published on February 11, 2002 (67 FR 6215), these 11 additional ESUs are: One sockeye ESU (the threatened Ozette Lake sockeye ESU); three chinook ESUs (the endangered Sacramento River winter-run chinook ESU, as well as the threatened Central Valley spring-run and California coastal chinook ESUs); three coho ESUs (the threatened Central California Coast and Oregon Coast coho ESUs, as well as the candidate Lower Columbia River coho ESU); and four steelhead ESUs (the threatened South-Central California Coast, Central California Coast, California Central Valley, and Northern California steelhead ESUs) (as noted above, NMFS subsequently accepted petitions addressing the Central California and Oregon Coast coho ESUs). On December 31, 2002, NMFS announced that it would also elect to review the ESA listing status of Snake River sockeye and Southern California steelhead ESUs (67 FR 79898). NMFS elected to conduct these additional status reviews to address any errors in the listing determinations brought to light by the *Alsea* decision, as well as to consider the most recent information available for these ESUs. At the time of the *Alsea* decision, NMFS was conducting a status review for the candidate Lower Columbia River coho ESU in response to a July 24, 2000, petition from Oregon Trout and co-petitioners (see 65 FR 66221, November 3, 2000). Accordingly, NMFS elected to include the Lower Columbia River coho ESU in this status review effort for the other 26 ESUs. NMFS did not elect to conduct status reviews for any other candidate ESUs (*e.g.*, the Puget Sound/Strait of Georgia coho, Central Valley fall and late-fall chinook, and Oregon Coast steelhead

ESUs) or ESUs that NMFS previously determined did not warrant ESA listing.

NMFS solicited information to ensure that the review of the ESA status for the 27 ESUs under review was based on the best available and most recent scientific and commercial data. Following an initial 60-day public comment period concerning 25 of the ESUs, which commenced on February 11, 2002 (67 FR 6215), NMFS re-opened the public comment period for an additional 30 days on June 13, 2002 (67 FR 40679). A 60-day public comment period was also opened concerning 16 petitioned ESUs with the published findings on the Central Coast Forest Association and Trout Unlimited *et al.* petitions on July 25, 2002 (67 FR 48601). Information and comment was solicited during an additional 60-day public comment period when NMFS announced that it would also be reviewing the status of the Snake River sockeye and Southern California steelhead ESUs (67 FR 79898; December 31, 2002). In this latter public comment period NMFS specifically requested information concerning resident *O. mykiss* populations in the 10 steelhead ESUs under review (67 FR at 79900).

Life History of West Coast Salmonids

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 to the ocean to forage until maturity. The migration and spawning times vary considerably among and within species and populations (Groot and Margolis, 1991). At spawning, adults pair 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. Enroute 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 freshwater 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 in time 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 anadromous *O. mykiss* may return to the ocean and make repeat spawning migrations.

Below we provide brief descriptions of the life histories of the Pacific salmonid species under review. More complete descriptions can be found in the status review documents listed in Table 1.

West Coast Sockeye Salmon

Spawning populations of sockeye salmon range from the Columbia River in the south to the Noatak River in the north in North America, and from Hokkaido, Japan in the south to the Anadyr River in the north in Asia (Atkinson *et al.*, 1967; Burgner, 1991). Most sockeye salmon spawn in either inlet or outlet streams of lakes or in lakes themselves. The offspring of these ''lake-type'' sockeye salmon use lake environments for juvenile rearing for 1 to 3 years and then migrate to sea, returning to the natal lake system to spawn after spending 1 to 4 years in the ocean.

Certain self-perpetuating, nonanadromous populations of *O. nerka* that become resident in lake environments over long periods of time are called kokanee in North America. Genetic differentiation among sockeye salmon and kokanee populations indicates that kokanee have arisen from sockeye salmon on multiple independent occasions, and that kokanee and sockeye salmon may have either overlapping or distinct distributions. Numerous studies (reviewed in Gustafson *et al.*, 1997) indicate that sockeye salmon and kokanee exhibit a suite of heritable differences in morphology, early development rate, seawater adaptability, growth and maturation that appear to be divergent adaptations that have arisen from different selective regimes associated with anadromous vs. nonanadromous life histories. These studies also provide evidence that overlapping populations of sockeye salmon and kokanee can be both genetically distinct and reproductively isolated (see citations in Gustafson *et al.*, 1997). Occasionally, a proportion of juveniles in an anadromous sockeye population will remain in the rearing lake environment throughout life and will be observed on the spawning grounds together with their anadromous siblings. Ricker (1938) first used the terms ''residual sockeye'' and ''residuals'' to refer to these resident, non-migratory progeny of anadromous sockeye salmon.

West Coast Chinook Salmon

Chinook salmon, also commonly referred to as king, spring, quinnat, Sacramento, California, or tyee salmon, is the largest of the Pacific salmon (Myers *et al.*, 1998). The species historically ranged from the Ventura River in California to Point Hope, Alaska, and in northeastern Asia from Hokkaido, Japan to the Anadyr River in Russia (Healey, 1991). Additionally, chinook salmon have been reported in the Mackenzie River area of Northern Canada (McPhail and Lindsey, 1970). Chinook salmon exhibit diverse and complex life history strategies (Healey, 1986). Two generalized freshwater life-history types were initially described by Gilbert (1912): ''stream-type'' chinook salmon reside in freshwater for a year or more following emergence, whereas ''ocean-type'' chinook salmon migrate to the ocean predominately within their first year.

Of the two life history types, ocean-type chinook salmon exhibit the most varied and flexible life-history trajectories. Ocean-type chinook salmon juveniles emigrate to the ocean as fry, subyearling juveniles (during their first spring or fall), or as yearling juveniles (during their second spring), depending on environmental conditions. Ocean-type chinook salmon also undertake distinct, coastally oriented, ocean migrations. The timing of the return to freshwater and spawning is closely related to the ecological characteristics of a population's spawning habitat. Five different run times are expressed by different ocean-type chinook salmon populations: Spring, summer, fall, late-fall, and winter. In general, early run times (spring and summer) are exhibited by populations that use high spring flows to access headwater or interior regions. Ocean-type populations within a basin that express different run times appear to have evolved from a common source population.

Stream-type populations appear to be nearly obligate yearling outmigrants (although some 2-year-old smolts have been identified), undertake extensive off-shore ocean migrations, and

generally return to freshwater as spring- or summer-run fish. Stream-type populations are found in northern British Columbia and Alaska, and in the headwater regions of the Fraser River and Columbia River Basin inland tributaries.

West Coast Coho Salmon

Coho salmon is a widespread species of Pacific salmon, occurring in most major river basins around the Pacific Rim from Monterey Bay, California, north to Point Hope, Alaska, through the Aleutians, and from the Anadyr River south to Korea and northern Hokkaido, Japan (Laufle *et al.*, 1986). From central British Columbia south, the vast majority of coho salmon adults are 3-year-olds, having spent approximately 18 months in fresh water and 18 months in salt water (Gilbert, 1912; Pritchard, 1940; Sandercock, 1991). The primary exceptions to this pattern are ''jacks,'' sexually mature males that return to freshwater to spawn after only 5 to 7 months in the ocean. However, in southeast and central Alaska, the majority of coho salmon adults are 4-year-olds, having spent an additional year in fresh water before going to sea (Godfrey *et al.*, 1975; Crone and Bond, 1976). The transition zone between predominantly 3-year-old and 4-year-old adults occurs somewhere between central British Columbia and southeast Alaska.

West Coast coho smolts typically leave freshwater in the spring (April to June) and re-enter freshwater when sexually mature from September to November, and spawn from November to December and occasionally into January (Sandercock, 1991). Stocks from British Columbia, Washington, and the Columbia River often have very early (entering rivers in July or August) or late (spawning into March) runs in addition to ''normally'' timed runs.

West Coast Chum Salmon

Chum salmon has the widest natural geographic and spawning distribution of any Pacific salmonid, primarily because its range extends further along the shores of the Arctic Ocean than other salmonids. Chum salmon have been documented to spawn from Korea and the Japanese island of Honshu, east, around the Pacific rim, to Monterey Bay, California. Presently, major spawning populations are found only as far south as Tillamook Bay on the Northern Oregon coast. The species' range in the Arctic Ocean extends from the Laptev Sea in Russia to the Mackenzie River in Canada. Chum salmon may historically have been the most abundant of all salmonids; prior to the 1940s, it is estimated that chum salmon contributed almost 50 percent of the total biomass of all salmonids in the Pacific Ocean (Neave, 1961).

Chum salmon spawn primarily in freshwater, and apparently exhibit obligatory anadromy, as there are no recorded landlocked or naturalized freshwater populations (Randall *et al.*, 1987). Chum salmon generally spend more of their life history in marine waters than other Pacific salmonids. Chum salmon usually spawn in coastal areas, and juveniles out-migrate to seawater almost immediately after emerging from the gravel that covers their redds (Salo, 1991). This ocean-type migratory behavior contrasts with the stream-type behavior of some other species in the genus *Oncorhynchus* (*e.g.*, coastal cutthroat trout, anadromous *O. mykiss,* coho salmon, and most types of chinook and sockeye salmon), which usually migrate to sea at a larger size, after months or years of freshwater rearing. This means survival and growth in juvenile chum salmon depends less on freshwater conditions than on favorable estuarine conditions.

West Coast *O. mykiss*

Steelhead is the name commonly applied to the anadromous form of the biological species *O. mykiss.* The present distribution of steelhead extends from Kamchatka in Asia, east to Alaska, and down to the U.S.-Mexico border (Busby *et al.*, 1996; 67 FR 21586, May 1, 2002). *O. mykiss* exhibit perhaps the most complex suite of life history traits of any species of Pacific salmonid. They can be anadromous, or freshwater residents (and under some circumstances, apparently yield offspring of the opposite form). Those that are anadromous can spend up to 7 years in fresh water prior to smoltification, and then spend up to 3 years in salt water prior to first spawning. *O. mykiss* is also iteroparous (meaning individuals may spawn more than once), whereas the Pacific salmon species are principally semelparous (meaning individuals generally spawn once and die).

Within the range of West Coast steelhead, spawning migrations occur throughout the year, with seasonal peaks of activity. In a given river basin there may be one or more peaks in migration activity; since these ''runs'' are usually named for the season in which the peak occurs, some rivers may have runs known as winter, spring, summer, or fall steelhead. For example, large rivers, such as the Columbia, Rogue, and Klamath rivers, have migrating adult steelhead at all times of the year. There are local variations in the names used to identify the seasonal runs of steelhead; in Northern California, some biologists have retained the use of the terms spring and fall steelhead to describe what others would call summer steelhead.

Steelhead can be divided into two basic reproductive ecotypes, based on the state of sexual maturity at the time of river entry and duration of spawning migration (Burgner *et al.*, 1992). The ''stream-maturing'' type (summer steelhead in the Pacific Northwest and Northern California) enters fresh water in a sexually immature condition between May and October and requires several months to mature and spawn. The ''ocean-maturing'' type (winter steelhead in the Pacific Northwest and Northern California) enters fresh water between November and April with well-developed gonads and spawns shortly thereafter. In basins with both summer and winter steelhead runs, it appears that the summer run occurs where habitat is not fully utilized by the winter run or a seasonal hydrologic barrier, such as a waterfall, separates them. Summer steelhead usually spawn farther upstream than winter steelhead (Withler, 1966; Roelofs, 1983; Behnke, 1992). Coastal streams are dominated by winter steelhead, whereas inland steelhead of the Columbia River Basin are almost exclusively summer steelhead. Winter steelhead may have been excluded from inland areas of the Columbia River Basin by Celilo Falls or by the considerable migration distance from the ocean. The Sacramento-San Joaquin River Basin may have historically had multiple runs of steelhead that probably included both ocean-maturing and stream-maturing stocks (CDFG, 1995; McEwan and Jackson, 1996). These steelhead are referred to as winter steelhead by the California Department of Fish and Game (CDFG); however, some biologists call them fall steelhead (Cramer *et al.*, 1995).

Inland steelhead of the Columbia River Basin, especially the Snake River Subbasin, are commonly referred to as either ''A-run'' or ''B-run.'' These designations are based on a bimodal distribution of migration period of adult steelhead at Bonneville Dam (235 km from the mouth of the Columbia River) and differences in age (1 versus 2 years in the ocean) and adult size observed among Snake River steelhead. It is unclear, however, if the life history and body size differences observed upstream are correlated back to the groups forming the bimodal migration observed at Bonneville Dam. Furthermore, the relationship between patterns observed at the dams and the distribution of adults in spawning areas throughout the

Snake River Basin is not well understood. A-run steelhead are believed to occur throughout the steelhead-bearing streams of the Snake River Basin and the inland Columbia River. B-run steelhead are thought to be produced only in the Clearwater, Middle Fork Salmon, and South Fork Salmon Rivers (IDFG, 1994).

The ''half-pounder'' is an immature steelhead that returns to fresh water after only 2 to 4 months in the ocean, generally overwinters in fresh water, and then outmigrates again the following spring. Half-pounders are generally less than 400 mm and are reported only from the Rogue, Klamath, Mad, and Eel Rivers of Southern Oregon and Northern California (Snyder, 1925; Kesner and Barnhart, 1972; Everest, 1973; Barnhart, 1986); however, it has been suggested that as mature steelhead, these fish may only spawn in the Rogue and Klamath River Basins (Cramer *et al.*, 1995). Various explanations for this unusual life history have been proposed, but there is still no consensus as to what, if any, advantage it affords to the steelhead of these rivers.

Assessing Extinction Risk for Pacific Salmonids

Section 4(b) of the ESA requires the Secretary of Commerce (Secretary) to make listing determinations after conducting a review of the status of the species, and after taking into account those efforts, if any, being made to protect the species. Such efforts being made to protect the species include ''conservation'' practices, defined by the ESA to include propagation and transplantation methods and procedures (section 3(3)). The ESA requires that listing determinations be made solely on the basis of the best scientific and commercial data available to the Secretary. The ESA further requires that listing decisions must take into account all members of the defined species (*Alsea Valley Alliance* v. *Evans,* 161 F. Supp. 2d 1154, D. Oreg. 2001).

NMFS' Pacific Salmonid Biological Review Team (BRT) (an expert panel of scientists from several federal agencies including NMFS, FWS, and the U.S. Geological Survey) reviewed the viability and extinction risk of naturally spawning populations in the 27 ESUs that are the subject of this proposed rule (NMFS, 2003b). The BRT evaluated the risk of extinction based on the performance of the naturally spawning populations in each of the ESUs under the assumption that present conditions will continue into the future. The BRT did not explicitly consider artificial propagation in its evaluations.

The BRT assessed ESU-level extinction risk (as indicated by the viability of the naturally spawning populations) at two levels: first, at the simpler population level; then, at the overall ESU level. The BRT used criteria for ''Viable Salmonid Populations'' (VSP; McElhany *et al.*, 2000) to guide its risk assessments. The VSP criteria were developed to provide a consistent and logical reference for making viability determinations and are based on a review and synthesis of the conservation biology and salmon literature. Individual populations were evaluated according to the four VSP criteria: Abundance, growth rate/productivity, spatial structure, and diversity. These four parameters are universal indicators of species' viability, and individually and collectively function as reasonable predictors of extinction risk. After reviewing all relevant biological information for the populations in a particular ESU, the BRT ascribed an ESU-level risk score for each of the four VSP criteria.

The viability of salmon and steelhead ESUs is characterized by the health, abundance, productivity, spatial structure, and genetic/behavioral diversity of the individual populations within the ESU (McElhany *et al.*, 2001). An ESU with a greater abundance of productive populations will be more tolerant to environmental variation, catastrophic events, genetic processes, demographic stochasticity, ecological interactions, and other processes than one with a single or a few populations (Caughley and Gunn, 1996; Foley, 1997; Meffe and Carroll, 1994; Lande, 1993; Middleton and Nisbet, 1997). Similarly, an ESU that is distributed across a variety of well-connected habitats can better respond to environmental perturbations including catastrophic events, than ESUs in which connectivity between populations has been restricted or lost (Schlosser and Angermeier, 1995; Hanski and Gilpin, 1997; Tilman and Lehman, 1997; Cooper and Mangel, 1999). Genetic and behavioral diversity and the maintenance of local adaptations within an ESU allow for the exploitation of a wide array of environments, protect against short-term environmental changes, and provide the raw material for surviving long-term environmental change (Groot and Margolis, 1991; Wood, 1995).

ESUs with fewer populations have greater risk of becoming extinct due to catastrophic events, and have a lower likelihood that the necessary phenotypic and genotypic diversity will exist to maintain future viability than ESUs with more populations. ESUs with limited geographic range are similarly at increased extinction risk due to catastrophic events. ESUs with populations that are geographically distant from each other, or are separated by severely degraded habitat, may lack the connectivity to function as metapopulations and are more likely to become extinct than populations that can function as metapopulations. ESUs with limited life-history diversity are more likely to become extinct as the result of correlated environmental catastrophes or environmental change that occurs too rapidly for an evolutionary response. ESUs comprised of a small proportion of populations meeting or exceeding these viability criteria may lack the ''source'' populations to sustain the non-viable ''sink'' populations during environmental downturns. ESUs consisting of a single population are especially vulnerable in this regard.

Assessing an ESU involves evaluating the current biological viability of the populations that comprise the ESU. The fact that the current biological status of an ESU does not reflect historical abundance, productivity, spatial structure or diversity does not mean that it is currently not viable, but historical status serves as an informative benchmark against which to weigh viability. Whether, upon assessment, the biological status of an ESU meets the ESA's standard for listing as either threatened or endangered—*i.e.*, the ESU is in danger of extinction throughout all or a significant portion of its range or is likely to become so in the foreseeable future—depends on which viability criteria it fails to meet, what the past trend has been, whether that trend is likely to continue, and how far below the benchmark it is.

Factors considered in relating the population-level VSP criteria to ESU-level risk include: the total number of viable populations; the geographic distribution of these populations; the connectivity among populations; and the genetic, behavioral, and ecological diversity among populations. ESUs with fewer populations are more likely to become extinct due to catastrophic events, and 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 catastrophic events. ESUs with populations that are geographically distant from each other, or are separated by severely degraded habitat, may lack the connectivity to function as metapopulations (*i.e.*, a group of interconnected subpopulations) and are more likely to become extinct. ESUs with limited

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. ESUs comprised of a small proportion of populations meeting or exceeding VSP criteria may lack the source populations to sustain the non-viable declining populations during environmental down-turns. ESUs consisting of a single population are especially vulnerable in this regard. These considerations are described in the BRT's report (NMFS 2003b), and further detailed in McElhany *et al.* (2000) (and references therein). In short, a viable ESU has a negligible risk (over a time scale of 100 years) of going extinct as a result of normal environmental variation, genetic change, catastrophic events and human activity. Viable ESUs and populations have sufficient growth rates, possess variation in traits, and are spatially distributed to survive environmental variation and natural and human catastrophes.

After describing the ESU-level risk for each of the VSP criteria, the BRT assessed ESU-level extinction risk based on the performance of the naturally spawning populations. The BRT's assessment of ESU-level extinction risk uses categories that correspond to the definitions of endangered species and threatened species, respectively, in the ESA: in danger of extinction throughout all or a significant portion of its range, likely to become endangered within the foreseeable future throughout all or a significant portion of its range, or neither. As discussed above, these evaluations do not include consideration of hatchery stocks included in ESUs, and do not evaluate efforts being made to protect the species. Therefore, the BRT's findings are not to be considered recommendations regarding listing. The BRT's ESU-level extinction risk assessment reflects the BRT's professional scientific judgment, guided by the analysis of the VSP criteria, as well as by expectations about the likely interactions among the individual VSP criteria. For example, a single VSP criterion with a ''High Risk'' score might be sufficient to result in an overall extinction risk assessment of ''in danger of extinction,'' but a combination of several VSP criteria with more moderate risk scores could also lead to the same assessment, or a finding that the ESU is ''likely to become endangered.''

Consideration of Artificial Propagation in Listing Determinations

In proposed listing determinations described in this proposed rule, artificial propagation has been considered in (1) determining what constitutes an ESU, and (2) when evaluating the extinction risk of an entire ESU. NMFS' previous policy for these considerations for Pacific salmon and steelhead (58 FR 17573; April 5, 1993) requires revision due to the District Court's ruling in the *Alsea* case. In its February 2002 response to the *Alsea* decision and various petitions (67 FR 6215; February 11, 2002), NMFS announced its plans to revise this policy. NMFS had intended that rulemaking for the revised policy be completed prior to the formulation of the proposed listing determinations described in this notice. However, development of the revised policy has been delayed as NMFS resolved complex scientific and policy issues. Statutory and litigation deadlines compel NMFS to issue this proposed rule together with proposed policy guidance on the consideration of artificial propagation in its ESA listing determinations. A revised policy for the consideration of artificial propagation in ESA listing determinations (hereafter referred to as the proposed Hatchery Listing Policy) is proposed elsewhere in this issue of the **Federal Register**. The consideration of artificial propagation in the subject proposed listing determinations is based on the proposed Hatchery Listing Policy. Below, we summarize how artificial propagation was evaluated in determining ESU membership and evaluating extinction risk of an entire ESU. For further discussion of artificial propagation in the context of ESA listing decisions, the reader is directed to the proposed Hatchery Listing Policy.

Determining What Constitutes an ESU

In the *Alsea* ruling the Court affirmed NMFS' interpretation of what constitutes a ''distinct population segment'' (*i.e.*, the ESU Policy; 56 FR 58612; November 20, 1991), as a ''permissible agency construction of the ESA'' (*Alsea Valley Alliance* v. *Evans*, 1612 F. Supp. 2d 1154, 1161 (D. Oreg. 2001)). NMFS believes that the ESU policy provides appropriate guidance for the consideration of what populations (natural as well as hatchery or resident populations) constitute an ESU, and hence a ''species'' under the ESA. Under the ESU policy, a DPS of a Pacific salmonid species is considered an ESU if it meets two criteria: (a) It must be substantially reproductively isolated from other conspecific population units; and (b) it must represent an important component in the evolutionary legacy of the species. A key feature of the ESU concept is the recognition of genetic resources that represent the ecological and genetic diversity of the species. These genetic resources can reside in a fish spawned in a hatchery (hatchery fish) as well as in a fish spawned in the wild (natural fish).

In delineating an ESU that is to be considered for listing, NMFS has identified all populations that are part of the ESU including populations of natural fish (natural populations), populations of hatchery fish (hatchery populations), and populations that include both natural fish and hatchery fish (mixed populations). Hatchery fish with a level of genetic divergence between the hatchery stocks and the local natural populations that is no more than what would be expected between closely related populations within the ESU (hereafter described as ''genetically no more than moderately divergent from the natural population'') are considered part of the ESU and are considered in determining whether an entire ESU warrants listing under the ESA. Therefore, these hatchery fish must be included in any listing of the ESU (See proposed Hatchery Listing Policy published elsewhere in this issue of the **Federal Register**).

To assist NMFS in determining the ESU membership of individual hatchery stocks, a Salmon and Steelhead Hatchery Assessment Group (SSHAG), composed of NMFS scientists from the Northwest and Southwest Fisheries Science Centers, evaluated the best available information describing the relationships between hatchery stocks and natural ESA-listed salmon and anadromous *O. mykiss* populations in the Pacific Northwest and California. The SSHAG produced a report, entitled ''Hatchery Broodstock Summaries and Assessments for Chum, Coho, and Chinook Salmon and Steelhead Stocks within Evolutionarily Significant Units Listed under the Endangered Species Act'' (NMFS, 2003a), describing the relatedness of each hatchery stock on the basis of stock origin and the degree of known or inferred genetic divergence between the hatchery stock and the local natural population(s). NMFS used the information presented in the SSHAG Report to determine the ESU membership of those hatchery stocks determined to be within the historical geographic range of a given ESU. NMFS' assessment of individual hatchery stocks and its findings regarding the ESU membership are detailed in the Salmonid Hatchery Inventory and Effects Evaluation Report (NMFS, 2004b). The hatchery stocks included in a given ESU are listed below in the

''Determination of Species Under the ESA'' section.

Evaluating ESU Extinction Risk

Once ESU membership is determined, NMFS must assess the extinction risk faced by an entire ESU. As described above, the BRT evaluated the extinction risk for the naturally spawned component of an ESU. The proposed Hatchery Listing Policy published elsewhere in this issue of the **Federal Register** provides that status determinations for Pacific salmonid ESUs will be based on the status of an entire ESU (including both hatchery and natural components). For those ESUs with associated hatchery programs, the BRT's findings represent a partial assessment of the ESU's extinction risk. To assess the viability of an entire ESU, NMFS has also assessed the contributions of within-ESU hatchery programs to the viability of an ESU in-total.

There are, however, several reasons why long-term deleterious consequences of such supplementation may outweigh the short-term advantage of increased population size (NRC, 1995). In recent years, various studies and scientific works have identified some potential adverse effects of artificial propagation, including behavioral differences that result in diminished fitness and survival of hatchery fish relative to naturally spawned fish; genetic effects resulting from poor broodstock and rearing practices (*e.g.*, inbreeding, outbreeding, domestication selection); incidence of disease; and increased rates of competition with and predation on naturally spawned populations. In assessing the risks to any particular population, however, it is often difficult to demonstrate conclusively that adverse effects are actually occurring, and, if they are demonstrated, how serious they are (CDFG/NMFS, 2001).

In response to these concerns, there have been recent changes in hatchery practices seeking to mitigate risks and enhance benefits of artificial propagation. Continued scientific work is necessary to identify and to measure these risks and benefits more completely, and to assess the operations of hatcheries that implement modern management practices. In light of the developing science on the positive and negative effects of hatchery programs on natural populations, the legacy of hatchery programs and the existing requirements to maintain many of them present a challenge for developing a framework for consideration of hatchery fish in listing determinations.

Because NMFS must base its listing determinations for Pacific salmon and steelhead on the risk of extinction of the entire ESU, including both natural and hatchery fish, the agency must consider the likelihood that the hatchery and naturally spawned components will contribute to the continued existence of the ESU into the future.

NMFS' assessment of the effects of ESU hatchery programs on ESU viability and extinction risk is presented in the Salmonid Hatchery Inventory and Effects Evaluation Report (NMFS, 2004b). The Report evaluates the effects of hatchery programs on the likelihood of extinction of an ESU on the basis of the four VSP criteria (*i.e.*, abundance, productivity, spatial structure, and diversity) and how artificial propagation efforts within the ESU affect those criteria. In April 2004, NMFS convened an Artificial Propagation Evaluation Workshop of federal scientists and managers with expertise in salmonid artificial propagation. The Artificial Propagation Evaluation Workshop reviewed the BRT's findings (NMFS, 2003a), evaluated the Salmonid Hatchery Inventory and Effects Evaluation Report (NMFS, 2004b), and assessed the overall extinction risk of ESUs with associated hatchery stocks. Representatives of the BRT and NMFS' Northwest and Southwest Fisheries Science Centers attended the workshop in an advisory capacity to ensure that the BRT's findings were appropriately and accurately considered, as well as to help ensure that the workshop participants were aware of the best available scientific information. The discussions and conclusions of the Artificial Propagation Evaluation Workshop are detailed in a workshop report (NMFS, 2004c).

Finding on Trout Unlimited *et al.* Petitions

Two petitions from Trout Unlimited and co-petitioners, received by the agency on April 29, 2002, sought to redefine 15 ESUs as including only natural fish (*i.e.*, naturally spawned fish and their progeny, exclusive of all hatchery fish), and to list these redefined ESUs as threatened or endangered species under the ESA, as appropriate. In a **Federal Register** notice published on July 25, 2002 (67 FR 48601), NMFS found that these petitions presented substantial scientific and commercial information to suggest that the petitioned actions may be warranted. Although proposed listing determinations for the subject ESUs are included in this proposed rule, NMFS first addresses the petitioners' arguments that the ESUs should be redefined to include only natural fish.

The Trout Unlimited *et al.* petitions argue that hatchery stocks should not be included in ESUs containing natural fish. The petitioners contend that hatchery stocks are functionally distinct and reproductively isolated from naturally spawned populations. The petitioners present a substantial body of scientific information describing the potential threats posed by hatchery stocks to natural populations. Additionally, the petitioners present scientific information documenting differences between hatchery and natural populations in behavior, genetic composition, and reproductive fitness.

NMFS finds that the petitioners' argument that hatchery stocks are functionally distinct and reproductively isolated from naturally spawned populations is unsubstantiated. The derivation of hatchery stocks from local natural populations and the established practice of incorporating natural fish as hatchery broodstock results in hatchery and natural populations that share the same evolutionary genetic and ecological legacy. The SSHAG Report (NMFS, 2003a) and the Salmonid Hatchery Inventory and Effects Evaluation Report (NMFS, 2004b) describe the relationship of hatchery stocks to local natural populations, on the basis of stock origin and the degree of known or inferred genetic divergence between the hatchery stock and the local natural population(s). The shared evolutionary legacy of certain hatchery stocks with natural populations does not support the exclusion of these hatchery stocks from ESUs containing natural fish. Such an approach would also be inconsistent with NMFS' interpretation of the ESA that is contained in its ESU policy, a policy that was affirmed by the *Alsea* Court decision.

NMFS recognizes that artificial propagation under certain circumstances can pose threats to natural populations. However, it is not appropriate to include a consideration of the threats faced by an ESU (such as any risks posed by artificial propagation) when determining what constitutes a species under the ESA. Rather, such an evaluation of threats is conducted after the ''species'' has been defined, and the likelihood of extinction for the defined species is being assessed. NMFS also recognizes that hatchery stocks may exhibit differences in behavior, genetic composition, morphological traits, and reproductive fitness from natural populations. Indeed, the presence of such differences provides a valuable indicator of

divergence for determining whether a particular hatchery stock is representative of the evolutionary legacy of an ESU.

NMFS concludes that the best available scientific and commercial information does not support a finding that all hatchery stocks in the 15 petitioned ESUs should be redefined as distinct ESUs separate from the naturally spawned populations from which they are derived. Accordingly, NMFS finds that the action sought by the Trout Unlimited *et al.* petitions is not warranted.

Consideration of Resident O. mykiss Populations in Listing Determinations

In addition to an anadromous *O. mykiss* life history (*i.e.*, steelhead), *O. mykiss* exhibits nonanadromous or resident forms (*i.e.*, rainbow trout). Where the two forms co-occur, the offspring of resident fish may migrate to the sea, and the offspring of anadromous fish may remain in streams as resident fish. The change from the anadromous life form to the resident life form can also result from imposed physical or physiological barriers to migration. Genetic differences, when studied, have indicated greater differences among geographically separated *O. mykiss* populations of the same life-history form, than between anadromous and resident life-history forms in the same geographical area. No suite of morphological or genetic characteristics has been found that consistently distinguishes between the two life-history forms. As is the case with hatchery fish, it is important to determine the relationship of these resident fish to anadromous populations in the *O. mykiss* ESUs under consideration.

In its previous status reviews of steelhead ESUs (see Table 1), NMFS concluded that the available data suggest that resident rainbow trout and steelhead in the same area generally share a common gene pool (at least over evolutionary time periods), and included resident and anadromous populations in the same ESU. Resident populations above long-standing natural barriers, and those populations that have resulted from the introduction of non-native rainbow trout, were not considered part of these ESUs. In the case of resident populations upstream of impassable human-caused migration barriers (*e.g.*, large mainstem hydroelectric dams), NMFS found insufficient information to merit their inclusion in steelhead ESUs. The agency generally concluded that resident populations upstream of impassable manmade barriers must be evaluated on a case-by-case basis as more information becomes available on their relationships to below-barrier populations, or on the role these above-barrier resident populations might play in conserving below-barrier populations of *O. mykiss*.

In its previous steelhead ESA listing determinations, although NMFS considered co-occurring resident and anadromous populations as a single ESU, NMFS did not list resident populations when it was determined that the ESU in-total warranted listing. As noted above, the *Alsea* court has rejected listing under the ESA only a subset of an ESU or DPS. For the purposes of reviewing the viability of naturally spawned *O. mykiss* populations in this proposed rule, the BRT adopted a framework for determining the ESU/DPS membership of resident *O. mykiss* geographically associated with listed steelhead ESUs. These evaluations were guided by the same biological principles used to define ESUs of natural fish and determine ESU membership of hatchery fish: the extent of reproductive isolation and biological divergence from other populations within the ESU. Ideally, each resident population would be evaluated individually on a case-by-case basis, using all available biological information. In practice, little or no information is available for most resident *O. mykiss* populations. To facilitate determinations of the ESU/DPS membership of resident *O. mykiss*, the BRT identified three different cases, reflecting the range of geographic relationships between resident and anadromous forms within different watersheds: (1) No obvious physical barriers to interbreeding between resident and anadromous forms; (2) long-standing natural barriers (*e.g.*, a waterfall) between resident and anadromous forms; and (3) relatively recent (*e.g.*, within the last 100 years) human-imposed barriers (*e.g.*, a dam without a fish ladder) between resident and anadromous forms.

The BRT adopted the following working assumptions about ESU membership of resident fish falling in each of these three cases. Where there was no obvious physical barrier to interbreeding between the two life-history forms, resident fish were considered part of the ESU. Empirical studies show that resident and anadromous *O. mykiss* are typically very similar genetically when they co-occur with no physical barriers to migration or interbreeding. Where long-standing natural barriers separate resident and anadromous forms, resident populations were not regarded as part of the ESU. Many populations in this category have been isolated from contact with anadromous populations for thousands of years. Empirical studies show that in these cases the resident fish typically show substantial genetic and life-history divergence from the nearest downstream anadromous populations. In cases where the resident fish were separated from the anadromous form by relatively recent human actions (*e.g.*, impassable dams and culverts), the BRT was unable to justify any particular default assumption. The two life-history forms most likely coexisted without any barriers to interbreeding prior to the establishment of the manmade barrier(s). However, as a result of rapid divergence in a novel environment, or displacement by or genetic introgression from non-native hatchery rainbow trout, these resident populations may no longer represent the evolutionary legacy of the *O. mykiss* ESU. Given these uncertainties, the BRT left unresolved the ESU membership of *O. mykiss* above recent (usually man-made) impassable barriers. In the absence of information indicating that they are part of a common ESU, NMFS does not find such above-barrier populations to be part of the *O. mykiss* ESUs under review.

The BRT reviewed available information about individual resident populations of *O. mykiss* to determine which of the above scenarios best defined the level of reproductive isolation between the life-history forms, and whether any information exists to override the default assumptions described above about the ESU membership of resident populations. The best available information concerning resident *O. mykiss* in Columbia River Basin ESUs is summarized in the report ''The Biological Implications of Non-Anadromous *Oncorhynchus mykiss* in Columbia Basin Steelhead ESUs'' (Kostow, 2003).

As noted above, little or no population data are available for most resident *O. mykiss* populations, greatly complicating assessments of ESU-level extinction risk. Where available, the BRT incorporated information about resident populations into their analyses of the four VSP criteria and their assessments of extinction risk for *O. mykiss* ESUs. As was often the case, no data on the abundance, productivity, spatial structure, or diversity were available for resident populations in an ESU. The BRT noted that the presence of relatively numerous resident populations can significantly reduce risks to ESU abundance. However, there is considerable scientific uncertainty as to how the resident form affects

extinction risk through its influence on ESU productivity, spatial structure, and diversity. The threats to *O. mykiss* ESUs extend beyond low population size and include declining productivity, reduced resilience of productivity to environmental variation, curtailed range of distribution, impediments to population connectivity and reproductive exchange, depleted diversity stemming from loss or blockage of habitat and associated erosion of local adaptation, and erosion of the diversity of expressed migratory behaviors. Thus, the BRT concluded that, despite the reduced risk to abundance for certain *O. mykiss* ESUs due to numerically abundant residents, the collective contribution of the resident life-history form to the viability of an ESU in-total is unknown and may not substantially reduce extinction risks to an ESU in-total (NMFS, 2004). Based on present scientific understanding, the BRT could not exclude the possibility that complete loss of anadromous forms from within an ESU may be irreversible.

Consideration of Recent Ocean Conditions in Listing Determinations

In the last decade, evidence has shown: (1) Recurring, decadal-scale patterns of ocean-atmosphere climate variability in the North Pacific Ocean (Zang *et al.*, 1997; Mantua *et al.*, 1997); and (2) correlations between these oceanic productivity ''regimes'' and salmon population abundance in the Pacific Northwest and Alaska (Hare *et al.*, 1999; Mueter *et al.*, 2002). There is little doubt that survival rates in the marine environment are strong determinants of population abundance for Pacific salmon and *O. mykiss* (NMFS, 2003b). It is also generally accepted that for at least two decades, beginning about 1977, marine productivity conditions were unfavorable for the majority of salmon and *O. mykiss* populations in the Pacific Northwest (in contrast, many populations in Alaska attained record abundances during this period). Finally, there is evidence that an important shift in ocean-atmosphere conditions occurred around July 1998. One indicator of the ocean-atmosphere variation for the North Pacific is the Pacific Decadal Oscillation index (PDO). Negative PDO values are associated with relatively cool ocean temperatures (and generally high salmon productivity) off the Pacific Northwest, and positive values are associated with warmer, less productive conditions. These favorable ocean conditions may also be correlated with favorable conditions in the freshwater environment (*e.g.*, above-average rainfalls resulting in improved flow regimes for smolt outmigration). Increases in many salmon populations in recent years may be largely a result of more favorable ocean conditions. PDO values were mostly positive during the two decades preceding 1998, and this regime was generally characterized by less productive ocean conditions and declining salmonid abundances. Between July 1998 and July 2002 the PDO exhibited mostly negative values, associated with higher ocean productivity and increasing returns for many salmonid populations. It is worth noting that from August 2002 to April 2004 the PDO has exhibited positive values. It is not clear what impact, if any, these most recent conditions will have on salmonid populations. Although these facts are relatively well established, much less certainty can be attached to any predictions about what this means for the viability of salmon and *O. mykiss* ESUs into the future.

The confidence with which we can project ocean-climate regimes into the future is limited, and consequently so is our ability to project the future influence of ocean-climate conditions on salmonid productivity. There exists about a century of empirical evidence for ''cycles'' in the PDO, marine productivity, and salmon abundance. Such a timeseries represents only about three PDO periods of 20 to 40 years in duration. There are four main difficulties in inferring future behavior of a complex system from data records spanning only a couple cycles. First, the duration and magnitude of past cycles may not be indicative of future dynamics. Second, the past decade has seen particularly wide fluctuations not only in climatic indices (*e.g.*, the 1997–1998 El Nino was in many ways the most extreme ever recorded, and the 2001 drought was one of the most severe on record), but also in abundance of salmon populations. In general, as the magnitude of fluctuations in species' abundance increases, species extinction rates increase. Third, if there is anthropogenically caused climate change, it could affect future ocean productivity; however, how such change might be manifested cannot be predicted with any certainty (IPCC 2001). Finally, changes in the pattern of ocean-atmosphere interactions do not affect all species (or even all populations of a given species) in the same way (Peterman *et al.*, 1998).

Given all these uncertainties, the BRT was reluctant to make any specific assumptions about the future behavior of the ocean-atmospheric systems or their effects on the distribution and abundance of salmon and *O. mykiss*. The BRT was concerned, however, that even under the most optimistic scenario, increases in abundance might be only temporary and could mask a failure to address underlying factors for decline. The real conservation concern for West Coast salmon and *O. mykiss* is not how they perform during periods of high marine survival, but how prolonged periods of poor marine survival affect the VSP parameters of abundance, growth rate, spatial structure, and diversity. It is reasonable to assume that salmon populations have persisted over time, under pristine conditions through many such cycles in the past. Less certain is how the populations will fare in periods of poor ocean survival when their freshwater, estuary, and nearshore marine habitats are degraded.

Treatment of the Listing Determination Steps for Each ESU Under Review

Determinations of ''Species'' Under the ESA

To qualify for listing as a threatened or endangered species, a population (or group of populations) of West Coast salmonids must be considered a ''species'' as defined under the ESA. The ESA defines a species to include ''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'' (ESA section 3(16)). NMFS published a policy (56 FR 58612; November 20, 1991) describing the agency's application of the ESA definition of ''species'' to anadromous Pacific salmonid species. NMFS' policy provides that a Pacific salmonid population (or group of populations) will be considered a DPS, and hence a ''species'' under the ESA, if it represents an ESU of the biological species. An ESU must be reproductively isolated from other conspecific population units, and it must represent an important component in the evolutionary legacy of the biological species. The first criterion, reproductive isolation, need not be absolute, but must be strong enough to permit evolutionarily important differences to accrue in different population units. The second criterion is met if the population unit contributes substantially to the ecological and genetic diversity of the species in-total. Guidance on the application of this policy is contained in 56 FR 58612 (November 20, 1991) and Waples (1991). As noted in the ''*Alsea Valley Alliance* v. *Evans*'' section above, all components included in an ESU (natural populations, hatchery stocks, resident populations, etc.) must be listed if it is determined that the ESU in-

total is threatened or endangered under the ESA.

NMFS has reviewed the ESU relationships of hatchery salmon and anadromous *O. mykiss* stocks (NMFS, 2004b), as well as of resident *O. mykiss* populations. Hatchery stocks and resident populations are included in an ESU if it is determined that they are not reproductively isolated from populations in the ESU, and they are representative of the evolutionary legacy of the ESU (see the ''Consideration of Artificial Propagation in Listing Determinations'' section above). Hatchery stocks are not considered representative of the evolutionary legacy of an ESU, and hence not included in the ESU, if it is determined that they are genetically no more than moderately divergent from the natural population (See proposed Hatchery Listing Policy published elsewhere in this issue of the **Federal Register**). If a hatchery stock is more divergent from the local natural population, this indicates that the hatchery stock is reproductively isolated from the ESU. Co-occurring anadromous and resident *O. mykiss* populations below impassable barriers are likely not reproductively isolated, so that both represent important components of the evolutionary legacy of the species, and hence are considered an ESU (see the more detailed discussion above in the ''Consideration of Resident *O. mykiss* Populations in Listing Determinations'' section).

The hatchery and resident components are detailed below for each ESU, as applicable. More detailed descriptions of the hatchery stocks included in the ESUs below can be found in the Salmonid Hatchery Inventory and Effects Evaluation Report (NMFS, 2004b). More detailed descriptions of the impassible barriers and resident populations associated with *O. mykiss* ESUs are provided in the final BRT Report (NMFS, 2003b) as well as in ''The Biological Implications of Non-Anadromous *Oncorhynchus mykiss* in Columbia Basin Steelhead ESUs'' (Kostow, 2003).

A given hatchery stock determined to be part of an ESU may be propagated at multiple sites. To more clearly convey the hatchery fish that are included in a given ESU, the ESU descriptions below list the artificial propagation programs that propagate hatchery stocks determined to be part of the ESUs under review. A list of those specific artificial propagation programs by ESU is provided for reference in Table 2 at the end of this section.

The following descriptions of the 27 Pacific salmon and *O. mykiss* ESUs addressed in this document generally reaffirm the ESU determinations for naturally spawning populations detailed in previous ESA status reviews and listing determinations (see Table 1). The BRT focused primarily on risk assessments of the naturally spawned component of ESUs. Apart from the consideration of hatchery stock and resident *O. mykiss* populations, NMFS did not reconsider the geographic boundaries of the ESUs under review. There was no significant scientific and commercial information indicating that specific ESUs boundaries warrant reconsideration.

Snake River Sockeye ESU

The Snake River sockeye ESU includes populations of anadromous sockeye salmon from the Snake River Basin, Idaho (extant populations occur only in the Stanley Basin) (56 FR 58619; November 20, 1991), residual sockeye salmon in Redfish Lake, Idaho, as well as one captive propagation hatchery program (Table 2). Artificially propagated sockeye salmon from the Redfish Lake Captive Propagation program are considered part of this ESU. NMFS has determined that this artificially propagated stock is genetically no more than moderately divergent from the natural population (NMFS, 2004b).

Subsequent to the 1991 listing determination for the Snake River sockeye ESU, a ''residual'' form of Snake River sockeye (hereafter ''residuals'') was identified. The residuals often occur together with anadromous sockeye salmon and exhibit similar behavior in the timing and location of spawning. Residuals are thought to be the progeny of anadromous sockeye salmon, but are generally nonanadromous. In 1993 NMFS determined that the residual population of Snake River sockeye that exists in Redfish Lake is substantially reproductively isolated from kokanee (*i.e.*, nonanadromous populations of *O. nerka* that become resident in lake environments over long periods of time), represents an important component in the evolutionary legacy of the biological species, and thus merits inclusion in the Snake River sockeye ESU. Constituents and co-managers were subsequently advised that residual sockeye salmon in Redfish Lake are part of the ESU and are listed as an endangered species ''subject to all the protection, prohibitions, and requirements of the ESA that apply to Snake River sockeye salmon'' (letter from Acting NMFS Director Nancy Foster to Constituents, dated March 19, 1993).

Ozette Lake Sockeye ESU

The Ozette Lake sockeye ESU includes all naturally spawned populations of sockeye salmon in Ozette Lake and streams and tributaries flowing into Ozette Lake, Washington (64 FR 14528; March 25, 1999). Two artificial propagation programs are considered to be part of this ESU (Table 2): the Umbrella Creek and Big River sockeye hatchery programs. NMFS has determined that these artificially propagated stocks are genetically no more than moderately divergent from the natural population (NMFS, 2004b).

Sacramento Winter-run Chinook ESU

The Sacramento winter-run chinook ESU includes all naturally spawned populations of winter-run chinook salmon in the Sacramento River and its tributaries in California (59 FR 440; January 1, 1994), as well as two artificial propagation programs (Table 2): winter-run chinook from the Livingston Stone National Fish Hatchery (NFH), and winter run chinook in a captive broodstock program maintained at Livingston Stone NFH and the University of California Bodega Marine Laboratory. NMFS has determined that these artificially propagated stocks are no more than moderately diverged from the local natural population (NMFS 2004b).

Central Valley Spring-run Chinook ESU

The Central Valley spring-run chinook ESU includes all naturally spawned populations of spring-run chinook salmon in the Sacramento River and its tributaries in California (64 FR 50394; September 16, 1999). This ESU does not include any artificially propagated spring-run chinook stocks that reside within the historical geographic range of the ESU.

California Coastal Chinook ESU

The California Coastal chinook ESU includes all naturally spawned populations of chinook salmon from rivers and streams south of the Klamath River to the Russian River, California (64 FR 50394; September 16, 1999). Seven artificial propagation programs are considered to be part of the ESU (Table 2): the Humboldt Fish Action Council (Freshwater Creek), Yager Creek, Redwood Creek, Hollow Tree, Van Arsdale Fish Station, Mattole Salmon Group, and Mad River Hatchery fall-run chinook hatchery programs. NMFS has determined that these artificially propagated stocks are genetically no more than moderately divergent from the natural populations (NMFS, 2004b).

Upper Willamette River Chinook ESU

The Upper Willamette River chinook ESU includes all naturally spawned populations of spring-run chinook salmon in the Clackamas River and in the Willamette River, and its tributaries, above Willamette Falls, Oregon (64 FR 14208; March 24, 1999). Seven artificial propagation programs are considered to be part of the ESU (Table 2): the McKenzie River Hatchery (Oregon Department of Fish and Wildlife (ODFW) stock # 24), Marion Forks/North Fork Santiam River (ODFW stock # 21), South Santiam Hatchery (ODFW stock # 23) in the South Fork Santiam River, South Santiam Hatchery in the Calapooia River, South Santiam Hatchery in the Mollala River, Willamette Hatchery (ODFW stock # 22), and Clackamas hatchery (ODFW stock # 19) spring-run chinook hatchery programs. NMFS has determined that these artificially propagated stocks are genetically no more than moderately divergent from the natural populations (NMFS, 2004b).

Lower Columbia River Chinook ESU

The Lower Columbia River chinook ESU includes all naturally spawned populations of chinook salmon from the Columbia River and its tributaries from its mouth at the Pacific Ocean upstream to a transitional point between Washington and Oregon east of the Hood River and the White Salmon River, and includes the Willamette River to Willamette Falls, Oregon, exclusive of spring-run chinook salmon in the Clackamas River (64 FR 14208; March 24, 1999). Seventeen artificial propagation programs are considered to be part of the ESU (Table 2): the Sea Resources Tule chinook Program, Big Creek Tule chinook Program, Astoria High School (STEP) Tule chinook Program, Warrenton High School (STEP) Tule chinook Program, Elochoman River Tule chinook Program, Cowlitz Tule Chinook Program, North Fork Toutle Tule chinook Program, Kalama Tule chinook Program, Washougal River Tule chinook Program, Spring Creek NFH Tule chinook Program, Cowlitz spring chinook Program in the Upper Cowlitz River and the Cispus River, Friends of the Cowlitz spring chinook Program, Kalama River spring chinook Program, Lewis River spring chinook Program, Fish First spring chinook Program, and the Sandy River Hatchery (ODFW stock #11) chinook hatchery programs. NMFS has determined that these artificially propagated stocks are genetically no more than moderately divergent from the natural populations (NMFS, 2004b).

Upper Columbia River Spring-run Chinook ESU

The Upper Columbia River spring-run chinook ESU includes all naturally spawned populations of chinook salmon in all river reaches accessible to chinook salmon in Columbia River tributaries upstream of the Rock Island Dam and downstream of Chief Joseph Dam in Washington, excluding the Okanogan River (64 FR 14208; March 24, 1999). Six artificial propagation programs are considered to be part of the ESU (Table 2): the Twisp River, Chewuch River, Methow Composite, Winthrop NFH, Chiwawa River, and White River spring-run chinook hatchery programs. NMFS has determined that these artificially propagated stocks are genetically no more than moderately divergent from the natural populations (NMFS, 2004b).

Puget Sound Chinook ESU

The Puget Sound chinook ESU includes all naturally spawned populations of chinook salmon from rivers and streams flowing into Puget Sound including the Straits of Juan De Fuca from the Elwha River, eastward, including rivers and streams flowing into Hood Canal, South Sound, North Sound and the Strait of Georgia in Washington (64 FR 14208; March 24, 1999). Twenty-two artificial propagation programs are considered to be part of the ESU (Table 2): the Kendal Creek Hatchery, Marblemount Hatchery (fall, spring yearlings, spring subyearlings, and summer run), Harvey Creek Hatchery, Whitehorse Springs Pond, Wallace River Hatchery (yearlings and subyearlings), Tulalip Bay, Soos Creek Hatchery, Icy Creek Hatchery, Keta Creek Hatchery, White River Hatchery, White Acclimation Pond, Hupp Springs Hatchery, Voights Creek Hatchery, Diru Creek, Clear Creek, Kalama Creek, Dungeness/Hurd Creek Hatchery, Elwha Channel Hatchery chinook hatchery programs. NMFS has determined that these artificially propagated stocks are genetically no more than moderately divergent from the natural populations (NMFS, 2004b).

Snake River Fall-run Chinook ESU

The Snake River fall-run chinook ESU includes all naturally spawned populations of fall-run chinook salmon in the mainstem Snake River and in the Tucannon River, Grande Ronde River, Imnaha River, Salmon River, and Clearwater River subbasins (57 FR 14653, April 22, 1992; 57 FR 23458, June 3, 1992). Four artificial propagation programs are considered to be part of the ESU (Table 2): the Lyons Ferry Hatchery, Fall Chinook Acclimation Ponds Program, Nez Perce Tribal Hatchery, and Oxbow Hatchery fall-run chinook hatchery programs. NMFS has determined that these artificially propagated stocks are genetically no more than moderately divergent from the natural population (NMFS, 2004b).

Snake River Spring/Summer Chinook ESU

The Snake River spring/summer-run chinook ESU includes all naturally spawned populations of spring/summer-run chinook salmon in the mainstem Snake River and the Tucannon River, Grande Ronde River, Imnaha River, and Salmon River subbasins (57 FR 23458; June 3, 1992). Fifteen artificial propagation programs are considered to be part of the ESU (Table 2): the Tucannon River conventional Hatchery, Tucannon River Captive Broodstock Program, Lostine River, Catherine Creek, Lookingglass Hatchery Reintroduction Program (Catherine Creek stock), Upper Grande Ronde, Imnaha River, Big Sheep Creek, McCall Hatchery, Johnson Creek Artificial Propagation Enhancement, Lemhi River Captive Rearing Experiment, Pahsimeroi Hatchery, East Fork Captive Rearing Experiment, West Fork Yankee Fork Captive Rearing Experiment, and the Sawtooth Hatchery spring/summer-run chinook hatchery programs. NMFS has determined that these artificially propagated stocks are genetically no more than moderately divergent from the natural populations (NMFS, 2004b).

Central California Coast Coho ESU

The Central California Coast coho ESU includes all naturally spawned populations of coho salmon from Punta Gorda in northern California south to and including the San Lorenzo River in central California, as well as populations in tributaries to San Francisco Bay, excluding the Sacramento-San Joaquin River system (61 FR 56138; October 31, 1996). Four artificial propagation programs are considered part of this ESU (Table 2): the Don Clausen Fish Hatchery Captive Broodstock Program, Scott Creek/King Fisher Flats Conservation Program, Scott Creek Captive Broodstock Program, and the Noyo River Fish Station Egg-take Program coho hatchery programs. NMFS has determined that these artificially propagated stocks are genetically no more than moderately divergent from the natural populations (NMFS, 2004b).

Southern Oregon/Northern California Coast Coho ESU

The Southern Oregon/Northern California Coast coho ESU includes all

naturally spawned populations of coho salmon in coastal streams between Cape Blanco, Oregon, and Punta Gorda, California (62 FR 24588; May 6, 1997). Three artificial propagation programs are considered to be part of the ESU (Table 2): the Cole Rivers Hatchery (ODFW stock # 52), Trinity River Hatchery, and Iron Gate Hatchery coho hatchery programs. NMFS has determined that these artificially propagated stocks are no more than moderately diverged from the local natural populations (NMFS, 2004b).

Oregon Coast Coho ESU

The Oregon Coast coho ESU includes all naturally spawned populations of coho salmon in Oregon coastal streams south of the Columbia River and north of Cape Blanco (63 FR 42587; August 10, 1998). Five artificial propagation programs are considered part of the ESU (Table 2): the North Umpqua River (ODFW stock # 18), Cow Creek (ODFW stock # 37), Coos Basin (ODFW stock #37), Coquille River (ODFW stock # 44), and North Fork Nehalem River (ODFW stock # 32) coho hatchery programs. NMFS has determined that these artificially propagated stocks are genetically no more than moderately divergent from the natural populations (NMFS, 2004b).

Lower Columbia River Coho ESU

In NMFS' 1991 status review of Lower Columbia River (LCR) coho (NMFS, 1991d), the BRT limited the geographic scope of its review to the subject of the motivating listing petition: the LCR excluding the Willamette River. The 1991 BRT concluded that historical LCR coho populations were probably reproductively isolated from other coho populations, but the BRT was unable to identify whether an historical coho ESU still existed in the LCR. In the 1995 status review of West Coast coho salmon (NMFS, 1995a), the BRT considered new information suggesting that LCR coho may be part of a larger ESU, based on similarities in physical and biogeographical conditions, and preliminary genetic data. The 1995 BRT included LCR coho as part of a larger Southwestern Washington (SWW)/LCR coho ESU, and NMFS designated the SWW/LCR coho ESU as a candidate species (60 FR 38011; July 25, 1995). In 1996, NMFS' West Coast Coho Salmon BRT updated the 1995 status review, and concluded that the SWW/LCR ESU may warrant splitting into separate SWW and LCR ESUs (NMFS, 1996e).

In 2001 the BRT reconvened to update information on the viability of LCR coho and concluded that LCR coho is a separate ESU from SWW coho (NMFS, 2001). This conclusion was supported by new tagging data and analyses indicating that SWW and LCR coho populations have differing marine distributions and are genetically distinct (Shaklee *et al.*, 1999; NMFS, 2001). This finding is consistent with the stock structure exhibited by LCR chinook and *O. mykiss* populations (Myers *et al.*, 2003). The 2001 BRT also concluded that the historical ESU still exists in the LCR. The primary evidence to support this conclusion is the consistent genetic and life history differences between LCR coho salmon and populations from other areas. The BRT concluded that, because of presumably very low survival rates, stock transfers from Oregon coastal populations 40 to 80 years ago probably had relatively little permanent effect on the genetic makeup of LCR coho salmon. Nevertheless, the BRT recognized that the ESU as it presently exists is much altered from historical conditions, and evidence of appreciable natural production is limited to two Oregon populations (in the Sandy and Clackamas rivers) that represent the clearest link (through more or less continuous natural production) to historical populations within the ESU. Based on available information, most of the adult coho salmon returning to natural or hatchery areas outside these two streams appear to have themselves been reared as juveniles in hatcheries, or to have had parents that were reared in hatcheries. The 2001 BRT concluded that, collectively, these hatchery-produced fish contain a significant portion of the historical diversity of LCR coho salmon, albeit in somewhat altered form. In determining the upstream boundary of the LCR coho ESU, the 2001 BRT concluded that Upper Columbia River coho (now extinct) were likely not part of the LCR coho ESU, and that the Cascade Crest represents the most likely eastern terminus of the LCR coho ESU. The 2003 Pacific Salmonid BRT did not revisit the 2001 ESU boundaries for the LCR coho ESU.

Based on the foregoing, NMFS concludes that the LCR coho ESU includes all naturally spawned populations of coho salmon in the Columbia River and its tributaries from the mouth of the Columbia up to and including the Big White Salmon and Hood Rivers. Twenty-one artificial propagation programs are considered to be part of the ESU (Table 2): the Grays River, Sea Resources Hatchery, Peterson Coho Project, Big Creek Hatchery, Astoria High School (STEP) Coho Program, Warrenton High School (STEP) Coho Program, Elochoman Type-S Coho Program, Elochoman Type-N Coho Program, Cathlamet High School FFA Type-N Coho Program, Cowlitz Type-N Coho Program in the Upper and Lower Cowlitz Rivers, Cowlitz Game and Anglers Coho Program, Friends of the Cowlitz Coho Program, North Fork Toutle River Hatchery, Lewis River Type-N Coho Program, Lewis River Type-S Coho Program, Fish First Wild Coho Program, Fish First Type-N Coho Program, Syverson Project Type-N Coho Program, Sandy Hatchery, and the Bonneville/Cascade/Oxbow complex coho hatchery programs. NMFS has determined that these artificially propagated stocks are genetically no more than moderately divergent from the natural populations (NMFS, 2004b).

Columbia River Chum ESU

The Columbia River chum ESU includes all naturally spawned populations of chum salmon in the Columbia River and its tributaries in Washington and Oregon (64 FR 14508; March 25, 1999). Three artificial propagation programs are considered to be part of the ESU (Table 2): the Chinook River (Sea Resources Hatchery), Grays River, and Washougal River/Duncan Creek chum hatchery programs. NMFS has determined that these artificially propagated stocks are genetically no more than moderately divergent from the natural populations (NMFS, 2004b).

Hood Canal Summer-run Chum ESU

The Hood Canal summer-run chum includes all naturally spawned populations of summer-run chum salmon in Hood Canal and its tributaries as well as populations in Olympic Peninsula rivers between Hood Canal and Dungeness Bay, Washington (64 FR 14508; March 25, 1999). Eight artificial propagation programs are considered to be part of the ESU (Table 2): the Quilcene NFH, Hamma Hamma Fish Hatchery, Lilliwaup Creek Fish Hatchery, Union River/Tahuya, Big Beef Creek Fish Hatchery, Salmon Creek Fish Hatchery, Chimacum Creek Fish Hatchery, and the Jimmycomelately Creek Fish Hatchery summer-run chum hatchery programs. NMFS has determined that these artificially propagated stocks are genetically no more than moderately divergent from the natural populations (NMFS, 2004b).

Southern California *O. mykiss* ESU

The Southern California *O. mykiss* ESU includes all naturally spawned populations of steelhead in streams from the Santa Maria River, San Luis Obispo County, California (inclusive) to the U.S.-Mexico Border (62 FR 43937,

August 18, 1997; 67 FR 21586, May 1, 2002). Resident populations of *O. mykiss* below impassible barriers (natural and manmade) that co-occur with anadromous populations are included in the Southern California *O. mykiss* ESU. According to the framework discussed above (see the *Consideration of Resident O. mykiss Populations in Listing Determinations* section), the ESU membership of native resident populations above recent (usually man-made) impassable barriers, but below natural barriers, was not resolved. These resident populations are provisionally not considered to be part of the Southern California *O. mykiss* ESU, until such time that significant scientific information becomes available affording a case-by-case evaluation of their ESU relationships.

This ESU does not include any artificially propagated *O. mykiss* stocks that reside within the historical geographic range of the ESU.

South-Central California Coast *O. mykiss* ESU

The South-Central California Coast *O. mykiss* ESU includes all naturally spawned populations of steelhead in streams from the Pajaro River (inclusive) to, but not including the Santa Maria River, California (62 FR 43937; August 18, 1997). Resident populations of *O. mykiss* below impassible barriers (natural and manmade) that co-occur with anadromous populations are included in the South-Central California Coast *O. mykiss* ESU. According to the framework discussed above (*See* the *Consideration of Resident O. mykiss Populations in Listing Determinations* section), the ESU membership of native resident populations above recent (usually man-made) impassable barriers, but below natural barriers, was not resolved. These resident populations are provisionally not considered to be part of the South-Central California Coast *O. mykiss* ESU, until such time that significant scientific information becomes available affording a case-by-case evaluation of their ESU relationships.

This ESU does not include any artificially propagated *O. mykiss* stocks that reside within the historical geographic range of the ESU.

Central California Coast *O. mykiss* ESU

The Central California Coast *O. mykiss* ESU includes all naturally spawned populations of steelhead in California streams from the Russian River to Aptos Creek, and the drainages of San Francisco and San Pablo Bays eastward to the Napa River (inclusive), excluding the Sacramento-San Joaquin River Basin (62 FR 43937; August 18, 1997). Resident populations of *O. mykiss* below impassible barriers (natural and manmade) that co-occur with anadromous populations are included in the Central California Coast *O. mykiss* ESU. According to the framework discussed above (see the *Consideration of Resident O. mykiss Populations in Listing Determinations* section), the ESU membership of native resident populations above recent (usually man-made) impassable barriers, but below natural barriers, was not resolved. These resident populations are provisionally not considered to be part of the Central California Coast *O. mykiss* ESU, until such time that significant scientific information becomes available affording a case-by-case evaluation of their ESU relationships. Recent genetic data regarding three subpopulations of native fish above Rubber Dam 1 on Alameda Creek strongly suggest that they are part of the ESU. Nielson (2003) found that these subpopulations were most similar to each other and other populations within the ESU than they were to populations outside the ESU. NMFS, therefore, considers native resident *O. mykiss* populations above Dam 1 on Alameda Creek to be part of the Central California Coast *O. mykiss* ESU.

Two artificial propagation programs are considered to be part of the ESU (Table 2): the Don Clausen Fish Hatchery, and Kingfisher Flat Hatchery/Scott Creek (Monterey Bay Salmon and Trout Project) steelhead hatchery programs. NMFS has determined that these artificially propagated stocks are genetically no more than moderately divergent from the natural populations (NMFS, 2004b).

California Central Valley *O. mykiss* ESU

The California Central Valley *O. mykiss* ESU includes all naturally spawned populations of steelhead in the Sacramento and San Joaquin Rivers and their tributaries, excluding steelhead from San Francisco and San Pablo Bays and their tributaries (63 FR13347; March 19, 1998). Resident populations of *O. mykiss* below impassible barriers (natural and manmade) that co-occur with anadromous populations are included in the California Central Valley *O. mykiss* ESU. According to the framework discussed above (see the *Consideration of Resident O. mykiss Populations in Listing Determinations* section), the ESU membership of native resident populations above recent (usually man-made) impassable barriers, but below natural barriers, was not resolved. These resident populations are provisionally not considered to be part of the California Central Valley *O. mykiss* ESU, until such time that significant scientific information becomes available affording a case-by-case evaluation of their ESU relationships.

Two artificial propagation programs are considered to be part of the ESU (Table 2): the Coleman NFH, and Feather River Hatchery steelhead hatchery programs. NMFS has determined that these artificially propagated stocks are genetically no more than moderately divergent from the natural populations (NMFS, 2004b).

Two other artificial propagation programs, the Nimbus and Mokelumne River stocks, are derived from out-of-ESU broodstock, are genetically more than moderately divergent from the ESU populations, and are not considered part of this ESU.

Northern California *O. mykiss* ESU

The Northern California *O. mykiss* ESU includes steelhead in California coastal river basins from Redwood Creek south to the Gualala River (inclusive) (65 FR 36074; June 7, 2000). Resident populations of *O. mykiss* below impassible barriers (natural and manmade) that co-occur with anadromous populations are included in the Northern California *O. mykiss* ESU. According to the framework discussed above (see the *Consideration of Resident O. mykiss Populations in Listing Determinations* section), the ESU membership of native resident populations above recent (usually man-made) impassable barriers, but below natural barriers, was not resolved. These resident populations are provisionally not considered to be part of the Northern California *O. mykiss* ESU, until such time that significant scientific information becomes available affording a case-by-case evaluation of their ESU relationships.

Two artificial propagation programs are considered part of the ESU (Table 2): the Yager Creek Hatchery, and North Fork Gualala River Hatchery (Gualala River Steelhead Project) steelhead hatchery programs. NMFS has determined that these artificially propagated stocks are genetically no more than moderately divergent from the natural populations (NMFS, 2004b).

Upper Willamette River *O. mykiss* ESU

The Upper Willamette River *O. mykiss* ESU includes all naturally spawned populations of winter-run steelhead in the Willamette River, Oregon, and its tributaries upstream from Willamette Falls to the Calapooia River (inclusive) (64 FR 14517; March 25, 1999). Resident populations of *O.*

mykiss below impassible barriers (natural and manmade) that co-occur with anadromous populations are included in the Upper Willamette River *O. mykiss* ESU. Although there are no obvious physical barriers separating populations upstream of the Calapooia from those lower in the basin, resident *O. mykiss* in these upper basins are quite distinctive both phenotypically and genetically and are not considered part of the ESU. According to the framework discussed above (see the *Consideration of Resident O. mykiss Populations in Listing Determinations* section), the ESU membership of native resident populations above recent (usually man-made) impassable barriers, but below natural barriers, was not resolved. These resident populations are provisionally not considered to be part of the Upper Willamette River *O. mykiss* ESU, until such time that significant scientific information becomes available affording a case-by-case evaluation of their ESU relationships.

This ESU does not include any artificially propagated *O. mykiss* stocks that reside within the historical geographic range of the ESU. Hatchery summer steelhead occur in the Willamette Basin but are an out-of-basin stock that is not included as part of the ESU.

Lower Columbia River *O. mykiss* ESU

The Lower Columbia River *O. mykiss* ESU includes all naturally spawned populations of steelhead in streams and tributaries to the Columbia River between the Cowlitz and Wind Rivers, Washington (inclusive), and the Willamette and Hood Rivers, Oregon (inclusive). Excluded are steelhead in the upper Willamette River Basin above Willamette Falls and steelhead from the Little and Big White Salmon Rivers in Washington (62 FR43937; August 18, 1997). Resident populations of *O. mykiss* below impassible barriers (natural and manmade) that co-occur with anadromous populations are included in the Lower Columbia River *O. mykiss* ESU. According to the framework discussed above (see the *Consideration of Resident O. mykiss Populations in Listing Determinations* section), the ESU membership of native resident populations above recent (usually man-made) impassable barriers, but below natural barriers, was not resolved. These resident populations are provisionally not considered to be part of the Lower Columbia River *O. mykiss* ESU, until such time that significant scientific information becomes available affording a case-by-case evaluation of their ESU relationships.

Ten artificial propagation programs are considered to be part of the ESU (Table 2): the Cowlitz Trout Hatchery (in the Cispus, Upper Cowlitz, Lower Cowlitz, and Tilton Rivers), Kalama River Wild (winter- and summer-run), Clackamas Hatchery, Sandy Hatchery, and Hood River (winter- and summer-run) steelhead hatchery programs. NMFS has determined that these artificially propagated stocks are genetically no more than moderately divergent from the natural populations (NMFS, 2004b).

Middle Columbia River *O. mykiss* ESU

The Middle Columbia River *O. mykiss* ESU includes all naturally spawned populations of steelhead in streams from above the Wind River, Washington, and the Hood River, Oregon (exclusive), upstream to, and including, the Yakima River, Washington, excluding steelhead from the Snake River Basin (64 FR 14517; March 25, 1999). Resident populations of *O. mykiss* below impassible barriers (natural and manmade) that co-occur with anadromous populations are included in the Middle Columbia River *O. mykiss* ESU. According to the framework discussed above (see the *Consideration of Resident O. mykiss Populations in Listing Determinations* section), the ESU membership of native resident populations above recent (usually man-made) impassable barriers, but below natural barriers, was not resolved. These resident populations are provisionally not considered to be part of the Middle Columbia River *O. mykiss* ESU, until such time that significant scientific information becomes available affording a case-by-case evaluation of their ESU relationships.

Seven artificial propagation programs are considered part of the ESU (Table 2): the Touchet River Endemic, Yakima River Kelt Reconditioning Program (in Satus Creek, Toppenish Creek, Naches River, and Upper Yakima River), Umatilla River, and the Deschutes River steelhead hatchery programs. NMFS has determined that these artificially propagated stocks are genetically no more than moderately divergent from the natural populations (NMFS, 2004b).

Upper Columbia River *O. mykiss* ESU

The Upper Columbia River *O. mykiss* ESU includes all naturally spawned populations of steelhead in streams in the Columbia River Basin upstream from the Yakima River, Washington, to the U.S.-Canada border (62 FR 43937; August 18, 1997). Resident populations of *O. mykiss* below impassible barriers (natural and manmade) that co-occur with anadromous populations are included in the Upper Columbia River *O. mykiss* ESU. According to the framework discussed above (see the *Consideration of Resident O. mykiss Populations in Listing Determinations* section), the ESU membership of native resident populations above recent (usually man-made) impassable barriers, but below natural barriers, was not resolved. These resident populations are provisionally not considered to be part of the Upper Columbia River *O. mykiss* ESU, until such time that significant scientific information becomes available affording a case-by-case evaluation of their ESU relationships.

Six artificial propagation programs are considered part of the ESU (Table 2): the Wenatchee River, Wells Hatchery (in the Methow and Okanogan Rivers), Winthrop NFH, Omak Creek, and the Ringold steelhead hatchery programs. NMFS has determined that these artificially propagated stocks are genetically no more than moderately divergent from the natural populations (NMFS, 2004b).

Snake River Basin *O. mykiss* ESU

The Snake River Basin *O. mykiss* ESU includes all naturally spawned populations of steelhead in streams in the Snake River Basin of southeast Washington, northeast Oregon, and Idaho (62 FR 43937; August 18, 1997). Resident populations of *O. mykiss* below impassible barriers (natural and manmade) that co-occur with anadromous populations are included in the Snake River Basin *O. mykiss* ESU. According to the framework discussed above (see the *Consideration of Resident O. mykiss Populations in Listing Determinations* section), the ESU membership of native resident populations above recent (usually man-made) impassable barriers, but below natural barriers, was not resolved. These resident populations are provisionally not considered to be part of the Snake River Basin *O. mykiss* ESU, until such time that significant scientific information becomes available affording a case-by-case evaluation of their ESU relationships. Recent genetic data suggest that native resident *O. mykiss* above Dworshak Dam on the North Fork Clearwater River are part of this ESU. NMFS, therefore, considers native resident *O. mykiss* populations above Dworshak Dam on the North Fork Clearwater River to be part of the Snake River Basin *O. mykiss* ESU. Hatchery rainbow trout that have been introduced to the Clearwater River and other areas within the ESU are not considered part of the ESU.

Six artificial propagation programs are considered part of the ESU (Table 2): the

Tucannon River, Dworshak NFH, Lolo Creek, North Fork Clearwater, East Fork Salmon River, and the Little Sheep Creek/Imnaha River Hatchery steelhead hatchery programs. NMFS has determined that these artificially propagated stocks are genetically no more than moderately divergent from the natural populations (NMFS, 2004b).

TABLE 2.—LIST OF ARTIFICIAL PROPAGATION PROGRAMS INCLUDED IN EVOLUTIONARILY SIGNIFICANT UNITS (ESUS) OF WEST COAST SALMON AND *Oncorhynchus mykiss*

Evolutionarily significant unit (ESU)	Artificial propagation program	Run	Location (State)
Snake River sockeye ESU	Redfish Lake Captive Propagation Program.	n/a	Stanley Basin (Idaho).
Ozette Lake sockeye ESU	Umbrella Creek Hatchery—Makah Tribe	n/a	Ozette Lake (Washington).
	Big River Hatchery—Makah Tribe	n/a	Ozette Lake (Washington).
	Livingston Stone National Fish Hatchery (NFH) Conservation Program	Winter	Sacramento River (California), Livingston Stone NFH & Univ. of Calif.
Sacramento River winter-run chinook ESU.	Captive Broodstock Program	Winter	Bodega Marine Laboratory (California).
Central Valley spring-run chinook ESU	n/a.		
California Coastal chinook ESU	Freshwater Creek/Humboldt Fish Action Council.	Fall	Freshwater Creek, Humboldt Bay (California).
	Yager Creek Hatchery	Fall	Yager Creek, Van Duzen River (California). Redwood Creek, South Fork Eel River.
	Redwood Creek Hatchery	Fall	(California).
	Hollow Tree Creek Hatchery	Fall	Eel River (California).
	Mattole Salmon Group Hatchery	Fall	Squaw Creek, Mattole River (California).
	Van Arsdale Fish Station	Fall	Eel River (California).
	Mad River Hatchery	Fall	Mad River (California).
Upper Willamette River chinook ESU	McKenzie River Hatchery (Oregon Department of Fish & Wildlife (ODFW) stock #24).	Spring	McKenzie River (Oregon).
	Marion Forks Hatchery (ODFW stock #21).	Spring	North Fork Santiam River (Oregon).
	South Santiam Hatchery (ODFW stock #23).	Spring	South Fork Santiam River (Oregon).
		Spring	Calapooia River (Oregon).
		Spring	Mollala River (Oregon).
	Willamette Hatchery (ODFW stock #22)	Spring	Middle Fork Willamette River (Oregon).
	Clackamas Hatchery (ODFW stock #19)	Spring	Clackamas River (Oregon).
Lower Columbia River chinook ESU	Sea Resources Tule Chinook Program	Fall	Chinook River (Washington).
	Big Creek Tule Chinook Program	Fall	Big Creek (Oregon).
	Astoria High School (STEP) Tule Chinook Program.	Fall	Big Creek (Oregon).
	Warrenton High School (STEP) Tule Chinook Program.	Fall	Big Creek (Oregon).
	Elochoman River Tule Chinook Program.	Fall	Elochoman River (Washington).
	Cowlitz Tule Chinook Program	Fall	Lower Cowlitz River (Washington).
	North Folk Toutle Tule Chinook Program.	Fall	Cowlitz River (Washington).
	Kalama Tule Chinook Program	Fall	Kalama River (Washington).
	Washougal River Chinook Program	Fall	Washougal River (Washington).
	Spring Creek NFH Tule Chinook Program.	Fall	Upper Cowlitz River (Washington).
		Spring	Cispus River (Washington).
	Friends of Cowlitz spring chinook Program.	Spring	Upper Cowlitz River (Washington).
	Kalama River spring chinook Program	Spring	Kalama River (Washington).
	Lewis River spring chinook Program	Spring	Lewis River (Washington).
	Fish First spring chinook Program	Spring	Lewis River (Washington).
	Sandy River Hatchery (ODFW stock #11).	Spring	Sandy River (Washington).
Upper Columbia River spring chinook ESU.	Twisp River	Spring	Methow Spring (Washington).
	Chewuch River	Spring	Methow River (Washington).
	Methow Composite	Spring	Methow River (Washington).
	Winthrop NFH (Methow Composite stock).	Spring	Methow River (Washington).
	Chiwawa River	Spring	Wenatchee River (Washington).
	White River	Spring	Wenatchee River (Washington).
Puget Sound chinook ESU	Kendall Creek Hatchery	Spring	North Fork Nooksack River (Washington).
	Marblemount Hatchery	Fall	Lower Skagit River (Washington).
		Spring (Yearlings).	Upper Skagit River (Washington).

TABLE 2.—LIST OF ARTIFICIAL PROPAGATION PROGRAMS INCLUDED IN EVOLUTIONARILY SIGNIFICANT UNITS (ESUS) OF WEST COAST SALMON AND *Oncorhynchus mykiss*—Continued

Evolutionarily significant unit (ESU)	Artificial propagation program	Run	Location (State)
		Spring (sub-yearlings).	Upper Skagit River (Washington).
		Summer	Upper Skagit River (Washington).
	Harvey Creek Hatchery	Summer	North Fork Stillaguamish River (Washington).
	Whitehorse Springs Pond	Summer	North Fork Stillaguamish River (Washington).
	Wallace River Hatchery	Summer (yearlings).	Skykomish River (Washington).
		Summer (sub yearlings).	Skykomish River (Washington).
	Tulalip Bay (Bernie Kai-Kai Gobin Hatchery/Tulalip Hatchery).	Summer	Skykomish River/Tulalip Bay (Washington).
	Soos Creek Hatchery	Fall	Green River (Washington).
	Icy Creek Hatchery	Fall	Green River (Washington).
	Keta Creek—Muckleshoot Tribe	Fall	Green River (Washington).
	White River Hatchery	Spring	White River (Washington).
	White Acclimation Pond	Spring	White River (Washington).
	Hupps Springs Hatchery	Spring	White River (Washington).
	Voights Creek Hatchery	Fall	Puyallup River (Washington).
	Diru Creek	Fall	Puyallup River (Washington).
	Clear Creek	Fall	Nisqually River (Washington).
	Kalama Creek	Fall	Nisqually River (Washington).
	Dungeness/Hurd Creek Hatchery	Spring	Dungeness River (Washington).
	Elwha Channel Hatchery	Fall	Elwha River (Washington).
Snake River fall-run chinook ESU	Lyons Ferry Hatchery	Fall	Snake River (Idaho).
	Fall Chinook Acclimation Ponds Program—Pittsburg, Captain John, and Big Canyon ponds.	Fall	Snake River (Idaho).
	Nez Perce Tribal Hatchery—including North Lapwai Valley, Lakes Gulch, and Cedar Flat Satellite facilities.	Fall	Snake and Clearwater Rivers (Idaho).
	Oxbow Hatchery	Fall	Snake River (Oregon, Idaho).
Snake River spring/summer-run chinook ESU.	Tucannon River Hatchery (conventional)	Spring	Tucannon River (Idaho).
	Tucannon River Captive Broodstock Program.	Spring	Tucannon River (Idaho).
	Lostine River (captive/conventional)	Summer	Grande Ronde (Oregon).
	Catherine Creek (captive/conventional)	Summer	Grande Ronde (Oregon).
	Lookingglass Hatchery (reintroduction)	Summer	Grande Ronde (Oregon).
	Upper Grande Ronde (captive/conventional).	Summer	Grande Ronde (Oregon).
	Imnaha River	Spring/Summer	Imnaha River (Oregon).
	Big Sheep Creek	Spring/Summer	Imnaha River (Oregon).
	McCall Hatchery	Spring	South Fork Salmon River (Idaho).
	Johnson Creek Artificial Propagation Enhancement.	Spring	East Fork South Fork Salmon River (Idaho).
	Lemhi River Captive Rearing Experiment.	Spring	Lemhi River (Idaho).
	Pahsimeroi Hatchery	Summer	Salmon River (Idaho).
	East Fork Captive Rearing Experiment.	Spring	East Fork Salmon River (Idaho).
	West Fork Yankee Fork Captive Rearing Experiment.	Spring	Salmon River (Idaho).
	Sawtooth Hatchery	Spring	Upper Mainstem Salmon River (Idaho).
Central California Coast coho ESU	Don Clausen Fish Hatchery Captive Broodstock Program.	n/a	Dry Creek, Russian River (California).
	Scott Creek/Kingfisher Flat Hatchery Conservation Program (Monterey Bay Salmon and Trout Project).	n/a	Big Creek, Scott Creek (California).
	Scott Creek Captive Broodstock Program.	n/a	NOAA Southwest Fisheries Science Center, Santa Cruz (California).
	Noyo River Fish Station egg-take program.	n/a	Noyo River (California).
Southern Oregon/Northern California Coast coho ESU.	Cole Rivers Hatchery (ODFW stock #52).	n/a	Rogue River (Oregon).
	Trinity River Hatchery	n/a	Trinity River (California).
	Iron Gate Hatchery	n/a	Klamath River (California).
Oregon Coast coho ESU	North Umpqua River (ODFW stock #55)	n/a	Umpqua River (Oregon).
	Cow Creek (ODFW stock #18)	n/a	Umpqua River (Oregon).
	Coos Basin (ODFW stock #37)	n/a	Coos Basin (Oregon).

TABLE 2.—LIST OF ARTIFICIAL PROPAGATION PROGRAMS INCLUDED IN EVOLUTIONARILY SIGNIFICANT UNITS (ESUS) OF WEST COAST SALMON AND *Oncorhynchus mykiss*—Continued

Evolutionarily significant unit (ESU)	Artificial propagation program	Run	Location (State)
	Coquille River/Bandon Hatchery (ODFW stock #44).	n/a	Coquille River (Oregon).
	North Fork Nehalem River (ODFW stock #32).	n/a	Nehalem River (Oregon).
Lower Columbia River coho ESU	Grays River	Type-S	Grays River (Washington).
	Sea Resources Hatchery	Type-S	Grays River (Washington).
	Peterson Coho Project	Type-S	Grays River (Washington).
	Big Creek Hatchery (ODFW stock #13)	n/a	Big Creek (Oregon).
	Astoria High School (STEP) Coho Program.	n/a	Youngs Bay (Oregon).
	Warrention High School (STEP) Coho Program.	n/a	Youngs Bay (Oregon).
	Elochoman Type-S Coho Program	Type-S	Elochoman River (Washington).
	Elochoman Type-N Coho Program	Type-N	Elochoman River (Washington).
	Cathlamet High School FFA Type-N Coho Program.	Type-N	Elochoman River (Washington).
	Cowlitz Type-N Coho Program	Type-N	Upper Cowlitz River (Washington).
	Cowlitz Type-N Coho Program	Type-N	Lower Cowlitz River (Washington).
	Cowlitz Game and Anglers Coho Program.	n/a	Lower Cowlitz River (Washington).
	Friends of the Cowlitz Coho Program	n/a	Lower Cowlitz River (Washington).
	North Fork Toutle River Hatchery	Type-S	Cowlitz River (Washington).
	Lewis River Type-N Coho Program	Type-N	North Fork Lewis River (Washington).
	Lewis River Type-S Coho Program	Type-S	North Fork Lewis River (Washington).
	Fish First Wild Coho Program	n/a	North Fork Lewis River (Washington).
	Fish First Type-N Coho Program	Type-N	North Fork Lewis River (Washington).
	Syverson Project Type-N Coho program	Type-N	Salmon River (Washington).
	Sandy Hatchery (ODFW stock #11)	Late	Sandy River (Oregon).
	Bonneville/Cascade/Oxbow Complex (ODFW stock #14).	n/a	Lower Columbia River Gorge (Oregon)
Columbia River chum ESU	Chinook River/Sea Resources Hatchery	Fall	Chinook River (Washington).
	Grays River	Fall	Grays River (Washington).
	Washougal Hatchery/Duncan Creek	Fall	Washougal River (Washington).
Hood Canal summer-run chum ESU	Quilcene/Quilcene NFH	Summer	Big Quilcene River (Washington).
	Hamma Hamma Fish Hatchery	Summer	Western Hood Canal (Washington).
	Lilliwaup Creek Fish Hatchery	Summer	Southwestern Hood Canal (Washington).
	Union River/Tahuya	Summer	Union River (Washington).
	Big Beef Creek Fish Hatchery	Summer	North Hood Canal (Washington).
	Salmon Creek Fish Hatchery	Summer	Discovery Bay (Washington).
	Chimacum Creek Fish Hatchery	Summer	Port Townsend Bay (Washington).
	Jimmycomelately Creek Fish Hatchery	Summer	Sequim Bay (Washington).
Southern California *O. mykiss* ESU	n/a.		
South-Central California Coast *O. mykiss* ESU.	n/a.		
Central California Coast *O. mykiss* ESU	Scott Creek/Monterey Bay Salmon and Trout Project, Kingfisher Flat Hatchery.	Winter	Big Creek, Scott Creek (California).
	Don Clausen Fish Hatchery	Winter	Russian River (California).
California Central Valley *O. mykiss* ESU	Coleman NFH	Winter	Battle Creek, Sacramento River (California).
	Feather River Hatchery	Winter	Feather River (California).
Northern California *O. mykiss* ESU	Yager Creek Hatchery	Winter	Yager Creek, Van Duzen River (California).
	North Fork Gualala River Hatchery/Gualala River Steelhead Project.	Winter	North Fork Gualala River (California).
Upper Willamette River *O. mykiss* ESU	n/a.		
Lower Columbia River *O. mykiss* ESU	Cowlitz Trout Hatchery	Late Winter	Cispus River (Washington).
	Cowlitz Trout Hatchery	Late Winter	Upper Cowlitz River (Washington).
	Cowlitz Trout Hatchery	Late Winter	Tilton River (Washington).
	Cowlitz Trout Hatchery	Late Winter	Lower Cowlitz River (Washington).
	Kalama River Wild	Winter	Kalama River (Washington).
		Summer	Kalama River (Washington).
	Clackamas Hatchery (ODFW stock #122).	Late Winter	Clackamas River (Oregon).
	Sandy Hatchery (ODFW stock #11)	Late Winter	Sandy River (Oregon).
	Hood River (ODFW stock #50)	Winter	Hood River (Oregon).
		Summer	Hood River (Oregon).
Middle Columbia River *O. mykiss* ESU	Touchet River Endemic	Summer	Touchet River (Washington).
	Yakima River Kelt Reconditioning Program.	Summer	Satus Creek (Washington).

TABLE 2.—LIST OF ARTIFICIAL PROPAGATION PROGRAMS INCLUDED IN EVOLUTIONARILY SIGNIFICANT UNITS (ESUS) OF WEST COAST SALMON AND *Oncorhynchus mykiss*—Continued

Evolutionarily significant unit (ESU)	Artificial propagation program	Run	Location (State)
	.....	Summer	Toppenish Creek (Washington).
	.....	Summer	Naches River (Washington).
	.....	Summer	Upper Yakima River (Washington).
	Umatilla River (ODFW stock #91)	Summer	Umatilla River (Oregon).
	Deschutes River (ODFW stock #66)	Summer	Deschutes River (Oregon).
Upper Columbia River *O. mykiss* ESU ...	Wenatchee River Steelhead	Summer	Wenatchee River (Washington).
	Wells Hatchery Steelhead	Summer	Methow River (Washington).
	.....	Summer	Okanogan River (Washington).
	Winthrop NFH Steelhead (Wells Steelhead).	Summer	Methow River (Washington).
	Omak Creek Steelhead	Summer	Okanogan River (Washington).
	Ringold Hatchery (Wells Steelhead)	Summer	Middle Columbia River (Washington).
Snake River Basin *O. mykiss* ESU	Tucannon River	Summer	Tucannon River (Washington).
	Dworshak NFH	Summer	South Fork Clearwater River (Idaho).
	Lolo Creek	Summer	Salmon River (Idaho).
	North Fork Clearwater	Summer	North Fork Clearwater River (Idaho).
	East Fork Salmon River	Summer	East Fork Salmon River (Idaho).
	Little Sheep Creek/Imnaha River Hatchery (ODFW stock #29).	Summer	Imnaha River (Oregon).

Updated Viability Assessments of ESUs

NMFS' Pacific Salmonid BRT evaluated the risk of extinction faced by naturally spawning populations in each of the ESUs addressed in this proposed rule (NMFS, 2003b). As noted above, the BRT did not explicitly consider hatchery stocks or protective efforts in their evaluations. For each ESU the BRT evaluated overall extinction risk after assessing ESU-level risk for the four VSP criteria: abundance, productivity, spatial structure, and diversity. NMFS then assessed the effects of ESU hatchery programs on ESU viability and extinction risk relative to the BRT's assessment for the naturally spawning component of the ESU (Salmonid Hatchery Inventory and Effects Evaluation Report; NMFS, 2004b). The effects of hatchery programs on the extinction risk of an ESU in-total was evaluated on the basis of the factors that the BRT determined are currently limiting the ESU (*e.g.*, abundance, productivity, spatial structure, and diversity), and how artificial propagation efforts within the ESU affect those factors. The Artificial Propagation Evaluation Workshop (NMFS, 2004c) reviewed the BRT's findings (NMFS, 2003a), evaluated the Salmonid Hatchery Inventory and Effects Evaluation Report (NMFS, 2004b), and assessed the overall extinction risk of ESUs with associated hatchery stocks. The BRT and the Artificial Propagation Evaluation Workshop expressed the extinction risk for the naturally spawning populations in an ESU, and for the ESU in-total, respectively. The level of extinction risk was categorized into three categories: ''in danger of extinction;'' ''likely to become endangered within the foreseeable future;'' or ''not in danger of extinction or likely to become endangered within the foreseeable future.'' Although these overall risk categories resemble the definitions of ''endangered'' and ''threatened'' as defined in the ESA, the BRT and the Workshop did not evaluate protective efforts in assessing ESU extinction risk (efforts being made to protect the species are evaluated in the ''Evaluation of Protective Efforts'' section, below). Thus, the extinction risk assessments described in this section are not necessarily indicative of whether an ESU warrants listing as a threatened or endangered species. The reader is referred to the BRT's report (NMFS, 2003b), the Salmonid Hatchery Inventory and Effects Evaluation Report (NMFS, 2004b), and the Workshop Report (NMFS, 2004c) for more detailed descriptions of the viability of individual natural populations and hatchery stocks within these ESUs.

Snake River Sockeye ESU

The residual form of Redfish Lake sockeye, determined to be part of the ESU in 1993, is represented by a few hundred fish. Snake River sockeye historically was distributed in four lakes within the Stanley Basin, but the only remaining population resides in Redfish Lake. Only 16 naturally produced adults have returned to Redfish Lake since the Snake River sockeye ESU was listed as an endangered species in 1991. All 16 fish were taken into the Redfish Lake Captive Propagation Program, which was initiated as an emergency measure in 1991. The return of over 250 adults in 2000 was encouraging; however, subsequent returns from the captive program in 2001 and 2002 have been fewer than 30 fish.

The BRT found extremely high risks for each of the four VSP categories. Informed by this assessment, the BRT unanimously concluded that the Snake River sockeye ESU is ''in danger of extinction.''

There is a single artificial propagation program producing Snake River sockeye salmon in the Snake River basin. The Redfish Lake sockeye salmon stock was originally founded by collecting the entire anadromous adult return of 16 fish between 1990 and 1997, the collection of a small number of residual sockeye salmon, and the collection of a few hundred smolts migrating from Redfish Lake. These fish were put into a Captive Broodstock program as an emergency measure to prevent extinction of this ESU. Since 1997, nearly 400 hatchery-origin anadromous sockeye adults have returned to the Stanley Basin from juveniles released by the program. Redfish Lake sockeye salmon have also been reintroduced into Alturas and Pettit Lakes using progeny from the captive broodstock program. The captive broodstock program presently consists of several hundred fish of different year classes maintained at facilities in Eagle (Idaho) and Manchester (Washington).

NMFS' assessment of the effects of artificial propagation on ESU extinction risk concluded that the Redfish Lake Captive Broodstock Program does not substantially reduce the extinction risk of the ESU in-total (NMFS, 2004c). The Artificial Propagation Evaluation Workshop noted that the Captive

Broodstock Program has prevented likely extinction of the ESU. This program has increased the total number of anadromous adults, attempted to increase the number of lakes in which sockeye salmon are present in the upper Salmon River (Stanley Basin), and preserved what genetic diversity remains in the ESU. Although the program has increased the number of anadromous adults in some years, it has yet to produce consistent returns. The majority of the ESU now resides in the captive program composed of only a few hundred fish. The long-term effects of captive rearing are unknown. The consideration of artificial propagation does not substantially mitigate the BRT's assessment of extreme risks to ESU abundance, productivity, spatial structure, and diversity. Informed by the BRT's findings (NMFS, 2003b) and NMFS' assessment of the effects of artificial propagation on the viability of the ESU (NMFS, 2004b), the Artificial Propagation Evaluation Workshop concluded that the Snake River sockeye ESU in-total is ''in danger of extinction'' (NMFS, 2004c).

Ozette Lake Sockeye ESU

Evaluating extinction risk for the Ozette Lake sockeye ESU is complicated by incomplete data with uncertain errors and biases. The Makah Tribe's fisheries program, however, is engaged in significant efforts to improve sampling techniques and to adjust for biases in historical data. The number of returning adults has increased in recent years, but is believed to be well below historical levels. An uncertain fraction of the returns is of hatchery origin, generating uncertainty in evaluating the productivity of the naturally spawning component of the ESU. Accurately assessing trends in natural spawners is further complicated by the poor visibility in the lake. Habitat degradation, siltation, and a declining lake level have resulted in the loss of numerous beach spawning sites. The BRT expressed concern that the reduction in the number of spawning aggregations poses risks for ESU spatial structure and diversity.

The BRT expressed moderately high concern for each of the VSP risk categories. Informed by this risk assessment, the majority opinion of the BRT was that the naturally spawned component of the Ozette Lake sockeye ESU is ''likely to become endangered within the foreseeable future,'' with the minority being split between ''in danger of extinction'' and ''not in danger of extinction or likely to become endangered within the foreseeable future.''

There are two artificially propagated stocks considered to be part of the Ozette Lake sockeye salmon ESU (Table 2). The program, operated by the Makah Tribe, is derived from native broodstock and has the primary objective of establishing viable sockeye salmon spawning aggregations in two Ozette Lake tributaries where spawning has not been observed for many decades, if ever. The program includes research, monitoring, and evaluation activities designed to determine success in recovering the propagated populations to viable levels, and to determine the demographic, ecological, and genetic effects on target and non-target (*i.e.*, Ozette Lake beach) spawning aggregations. The Makah Program will sunset after 12 years of operation.

NMFS' assessment of the effects of artificial propagation on ESU extinction risk concluded that the Makah supplementation program at Umbrella Creek and Big River does not substantially reduce the extinction risk of the ESU in-total (NMFS, 2004c). The program has increased the abundance of natural spawners and natural-origin sockeye in the Ozette Lake tributaries. However, it is unknown whether these tributaries were historically spawning habitat. The program (by design) has not increased the abundance of natural spawners or natural origin beach spawners in Ozette Lake. Despite the relative increases in abundance due to the supplementation program, the total ESU abundance remains small for a single sockeye population. The contribution of artificial propagation to ESU productivity is uncertain. Only since 2000 have the hatchery returns been sufficient to meet the program's broodstock goals. The Makah program at present serves as an important genetic reserve with the continuing loss of beach spawning habitat. The reintroduction of spawners to Ozette Lake tributaries reduces risks to ESU spatial structure. However, the isolation of the hatchery program and adaptation to tributary habitats may cause the tributary spawning aggregations to diverge from founding beach spawning aggregations. Although the program has a beneficial effect on ESU abundance and spatial structure, it has neutral or uncertain effects on ESU productivity and diversity. Informed by the BRT's findings (NMFS, 2003b) and NMFS' assessment of the effects of artificial propagation programs on the viability of the ESU (NMFS, 2004b), the Artificial Propagation Evaluation Workshop concluded that the Ozette Lake sockeye ESU in-total is ''likely to become endangered in the foreseeable future'' (NMFS, 2004c).

Sacramento River Winter-run Chinook ESU

The Sacramento River winter-run ESU is represented by a single extant naturally spawning population that has been completely displaced from its historical spawning habitat by the construction of Shasta and Keswick Dams. The remaining spawning habitat is artificially maintained by cold-water releases from the reservoir behind Shasta Dam. The naturally spawning component of the ESU has exhibited marked improvements in abundance and productivity in recent years. The recent increases in abundance are encouraging, relative to the years of critically low abundance of the 1980s and early 1990s; however, the recent 5-year geometric mean is only 3 percent of the peak post-1967 5-year geometric mean. The BRT was particularly concerned about risks to the ESU's diversity and spatial structure. Construction of Shasta Dam merged at least four independent winter-run chinook populations into a single population, representing a substantial loss of genetic diversity, life-history variability, and local adaptation. Episodes of critically low abundance, particularly in the early 1990's, for the single remaining population imposed ''bottlenecks'' that further reduced genetic diversity. The BRT found extremely high risk for each of the four VSP risk categories. Informed by this risk assessment, the majority opinion of the BRT was that the naturally spawned component of the Sacramento winter-run ESU is ''in danger of extinction.'' The minority opinion of the BRT was that the ESU is ''likely to become endangered within the foreseeable future.''

Two artificial propagation programs are considered to be part of the Sacramento River winter-run chinook ESU (Table 2; NMFS, 2004b). The artificial propagation of winter-run chinook is carried out at the Livingston Stone National Fish Hatchery (NFH) on the mainstem Sacramento River above Keswick Dam. The captive broodstock program is maintained at two locations: the Livingston Stone NFH and at the University of California's Bodega Marine Laboratory. These programs have been operated for conservation purposes since the early 1990's and both were identified as high priority recovery actions in NMFS' 1997 Draft Recovery Plan for this ESU. The artificial propagation program was established to supplement the abundance of the naturally spawning winter-run chinook

population and thereby assist in its population growth and recovery. The captive broodstock program was established in the early 1990s when the naturally spawning population was at critically low levels (less than 200 spawners) in order to preserve the ESU's remaining genetic resources and to establish a reserve for potential use in the artificial propagation program. Because of increased natural escapement over the last several years, consideration is being given to terminating the captive broodstock program.

An assessment of the effects of these artificial propagation programs on the viability of the ESU in-total concluded that they decrease risk to some degree by contributing to increased ESU abundance and diversity, but have a neutral or uncertain effect on productivity and spatial structure of the ESU (NMFS, 2004b). Spawning escapement of winter-run has increased since the inception of the program and may account for up to 10 percent of the total number of fish spawning naturally in a given year. Improvements in freshwater habitat conditions, harvest management, as well as improved ocean conditions, however, are thought to be the major factors responsible for the increased abundance of the ESU since the early 1990s. Effects on productivity are uncertain, but studies are underway to assess the effect of artificial propagation on fitness and productivity of artificially propagated fish. Although abundance of spawners has increased, in part due to artificial propagation, the spatial distribution of spawners has not expanded. The primary reason is that the naturally spawning population is artificially maintained by cool water releases from Shasta/Keswick dams, and the spatial distribution of spawners is largely governed by water year type and the ability of the Central Valley Project to manage water temperatures in the upper Sacramento River. A second naturally spawning population is considered critical to the long-term viability of this ESU, and plans are underway to eventually establish a second population in the upper Battle Creek watershed using the artificial propagation program as a source of fish. However, the program has yet to be implemented because of the need to complete habitat restoration efforts in that watershed. The artificial propagation program has contributed to maintaining diversity of the ESU through careful use of spawning protocols and other tools that maximize genetic diversity of propagated fish and minimize impacts on naturally spawning populations. In addition, the artificial propagation and captive broodstock programs collectively serve as a genetic repository which serves to preserve the genome of the ESU.

Informed by the BRT's findings (NMFS, 2003b) and NMFS' assessment of the effects of artificial propagation programs on the viability of the ESU (NMFS, 2004b), the Artificial Propagation Evaluation Workshop concluded that this ESU in-total is ''in danger of extinction'' (NMFS, 2004c).

Central Valley Spring-run Chinook ESU

Extensive construction of dams throughout the Sacramento-San Joaquin basin has reduced the California Central Valley spring chinook ESU to only a small portion of its historical distribution, generating concerns about risks to the spatial structure and diversity of the ESU. The ESU has been reduced to only three extant natural populations from an estimated 17 historical populations. The remaining naturally spawning spring-run chinook populations (Mill, Deer, and Butte creek tributaries to the Sacramento River) are in close geographic proximity, increasing the ESU's vulnerability to disease or catastrophic events. The BRT was also concerned that the Feather River spring-run chinook hatchery population, which is not considered part of the ESU (see Table 2; NMFS, 2004b), represents a risk factor for the extant ESU natural populations. The Feather River Hatchery produces spring chinook fish that are genetically more similar to fall chinook, probably due to hybridization at the hatchery. The off-site release location for fish produced at the hatchery is believed to contribute to a high straying rate of hatchery fish which increases the likelihood of non-ESU hatchery fish interacting negatively with the extant natural populations in the ESU. Furthermore, few of the Feather River Hatchery fish are marked (approximately 10 percent), making their impact on ESU spring-run chinook populations difficult to resolve. Although the recent 5-year mean abundance for the three naturally spawning populations in the ESU remains small (ranging from nearly 500 to over 4,500 spawners), short- and long-term productivity trends are positive, and population sizes have shown continued increases over the abundance levels of the 1980s (with 5-year mean population sizes of 67 to 243 spawners). The BRT noted moderately high risk for the abundance, spatial structure, and diversity VSP criteria, and a lower risk for the productivity criterion reflecting recent positive trends. Informed by this risk assessment, the strong majority opinion of the BRT was that the Central Valley spring-run chinook ESU is ''likely to become endangered within the foreseeable future.'' The minority opinion of the BRT was that the ESU is ''in danger of extinction.'' There are no artificially propagated populations of spring chinook in this ESU that mitigate the BRT's assessment that the ESU is ''likely to become endangered within the foreseeable future.''

California Coastal Chinook ESU

Evaluation of the viability of the naturally spawning component of the California Coastal chinook ESU is hindered by the limited availability of data, particularly regarding the abundance and spatial distribution of natural populations within the ESU. Additionally, the data that are available are of varying type, quality and temporal coverage, and are generally not amenable to rigorous estimation of abundance or robust statistical analyses of trends. The little historical and current abundance information that is available indicates that (putative) natural ESU population abundance levels remain depressed relative to historical levels. Evidence suggests that populations have been extirpated or nearly extirpated in the southern part of the ESU, or are extremely low in abundance. This observation, in combination with the apparent loss of the spring-run chinook life history in the Eel River Basin and elsewhere in the ESU, indicates risks to the diversity of the ESU. Recently available natural abundance estimates in the Russian River are in excess of 1,300 fish for 2000–2002. These data suggest either the presence of a naturally producing population in the Russian River, or represent straying from other basins or ESUs. No data are available to assess the genetic relationship of the Russian River fish to populations in this or other ESUs. The BRT found moderately high risks for all VSP risk categories, and underscored a strong concern due to the paucity of information and the resultant uncertainty generated in evaluating ESU viability. Informed by this risk assessment and the related uncertainty, the majority opinion of the BRT was that the naturally spawned component of the California Coastal chinook ESU is ''likely to become endangered within the foreseeable future.'' The minority opinion of the BRT was that the naturally spawned component of the ESU is ''in danger of extinction.''

Seven artificial propagation programs that produce chinook salmon are considered to be part of the California Coastal chinook ESU (Table 2; NMFS,

2004b). Six of these programs (Freshwater Creek, Yager Creek, Redwood Creek, Hollow Tree Creek, Mattole River Salmon Group, and Mad River Hatchery) are relatively small programs with production goals of less than 80,000 fish that have been operated for restoration purposes for more than 20 years. Because of state funding limitations, it is likely that these programs will be terminated after 2004. These programs are small-scale supplementation facilities operated by local groups or companies in cooperation with the CDFG under its cooperative hatchery program. The Van Arsdale Fish Station has been operated for over 30 years by CDFG for supplementation purposes in the upper Eel River. Because of State funding limitations, the operations at the Station were terminated in 2003. The seven hatchery programs are primarily located in the northern portion of the ESU's range and most are in the Eel River.

An assessment of the effects of these small artificial propagation programs on the viability of the ESU in-total concluded that they collectively decrease risk to some degree by contributing to local increases in abundance, but have a neutral or uncertain effect on productivity, spatial structure or diversity of the ESU (NMFS, 2004b). There have been no demonstrable increases in natural abundance from the five cooperative hatchery programs, with the possible exception of increased abundance in the Freshwater Creek natural population and as a result of the rescue and rearing activities by the Mattole Salmon Group. In part, this is because there is limited natural population monitoring in the watersheds where the hatchery programs are located. No efforts have been undertaken to assess the productivity of hatchery produced fish or to assess the effects of hatchery produced fish on natural origin fish productivity. The seven hatchery populations in this ESU are primarily located in the northern portion of the ESU's range and overlap with natural origin fish populations. With the exception of Freshwater Creek where local distribution may have expanded in association with the natural population increase, there are no demonstrable beneficial effects on spatial structure. The six cooperative programs use only natural-origin fish as broodstock and mark all production with an adipose fin clip to ensure there is limited hatchery selection on fish that are released.

Informed by the BRT's findings (NMFS, 2003b) and NMFS' assessment of the effects of artificial propagation programs on the viability of the ESU (NMFS, 2004b), the Artificial Propagation Evaluation Workshop concluded that this ESU in-total is ''likely to become endangered within the foreseeable future'' (NMFS, 2004c).

Upper Willamette River Chinook ESU

There are no direct estimates of natural-origin spawner abundance for the Upper Willamette River chinook ESU. The abundance of adult spring chinook salmon (hatchery and natural fish) passing Willamette Falls has remained relatively steady over the past 50 years (ranging from approximately 20,000 to 70,000 fish), but is only a fraction of peak abundance levels observed in the 1920s (approximately 300,000 adults). Interpretation of abundance levels is confounded by a high but uncertain fraction of hatchery produced fish. The McKenzie River population has shown substantial increases in total abundance (hatchery origin and natural origin fish) in the last 2 years, while trends in other natural populations in the ESU are generally mixed. With the relatively large incidence of naturally spawning hatchery fish in the ESU, it is difficult to determine trends in productivity for natural-origin fish. The BRT estimated that despite improving trends in total productivity (including hatchery origin and natural origin fish) since 1995, productivity would be below replacement in the absence of artificial propagation. The BRT was particularly concerned that approximately 30 to 40 percent of total historical habitat is now inaccessible behind dams. These inaccessible areas, however, represent a majority of the historical spawning habitat. The restriction of natural production to just a few areas increases the ESU's vulnerability to environmental variability and catastrophic events. Losses of local adaptation and genetic diversity through the mixing of hatchery stocks within the ESU, and the introgression of out-of-ESU hatchery fall-run chinook, have represented threats to ESU diversity. However, the BRT was encouraged by the recent cessation of the fall-run hatchery, as well as by improved marking rates of hatchery fish to assist in monitoring and in the management of a marked-fish selective fishery.

The BRT found moderately high risks for all VSP categories. Informed by this risk assessment, the strong majority opinion of the BRT was that the naturally spawned component of the Upper Willamette River chinook ESU is ''likely to become endangered within the foreseeable future.'' The minority opinion was that this ESU is ''in danger of extinction.''

Seven artificial propagation programs in the Willamette River produce fish that are considered to be part of the Upper Willamette River chinook ESU. All of these programs are funded to mitigate for lost or degraded habitat and produce fish for harvest purposes.

NMFS' assessment of the effects of artificial propagation on ESU extinction risk concluded that these hatchery programs collectively do not substantially reduce the extinction risk of the ESU in-total (NMFS, 2004c). An increasing proportion of hatchery-origin returns has contributed to increases in total ESU abundance. However, it is unclear whether these returning hatchery and natural fish actually survive overwintering to spawn. Estimates of pre-spawning mortality indicate that a high proportion (>70 percent) of spring chinook die before spawning in most ESU populations. In recent years, hatchery fish have been used to reintroduce spring chinook back into historical habitats above impassible dams (*e.g.*, in the South Santiam, North Santiam, and McKenzie Rivers), slightly decreasing risks to ESU spatial structure. Within-ESU hatchery fish exhibit differing life-history characteristics from natural ESU fish. High proportions of hatchery-origin natural spawners in remaining natural production areas (*i.e.*, in the Clackamas and McKenzie Rivers) may thereby have negative impacts on within and among population genetic and life-history diversity. Collectively, artificial propagation programs in the ESU have a slight beneficial effect on ESU abundance and spatial structure, but neutral or uncertain effects on ESU productivity and diversity. Informed by the BRT's findings (NMFS, 2003b) and NMFS' assessment of the effects of artificial propagation programs on the viability of the ESU (NMFS, 2004b), the Artificial Propagation Evaluation Workshop concluded that the Upper Willamette River chinook ESU in-total is ''likely to become endangered in the foreseeable future'' (NMFS, 2004c).

Lower Columbia River Chinook ESU

Many populations within the Lower Columbia River chinook ESU have exhibited pronounced increases in abundance and productivity in recent years, possibly due to improved ocean conditions. Abundance estimates of naturally spawned populations in this ESU, however, are uncertain due to a high (approximately 70 percent) fraction of naturally spawning hatchery fish and a low marking rate (only 1 to 2 percent) of hatchery produced fish. Abundance estimates of naturally produced spring chinook have improved since 2001 due

to the marking of all hatchery spring chinook releases, allowing for the enumeration of hatchery spring chinook at weirs, traps and on spawning grounds. Despite recent improvements, long term trends in productivity are below replacement for the majority of populations in the ESU. It is estimated that 8 to 10 historical populations in the ESU have been extirpated or nearly extirpated. Although approximately 35 percent of historical habitat has been lost in this ESU due to the construction of dams and other impassable barriers, this ESU exhibits a broad spatial distribution in a variety of watersheds and habitat types. Natural production currently occurs in approximately 20 populations, although only one population has a mean spawner abundance exceeding 1,000 fish. The BRT expressed concern that the spring-run populations comprise most of the extirpated populations. The disproportionate loss of the spring-run life history represents a risk for ESU diversity. Additionally, of the four hatchery spring-run chinook populations considered to be part of this ESU, two are propagated in rivers that are within the historical geographic range of the ESU but that likely did not support spring-run populations. High hatchery production in the Lower Columbia River poses genetic and ecological risks to the natural populations in the ESU, and complicates assessments of their performance. The BRT also expressed concern over the introgression of out-of-ESU hatchery stocks.

The BRT found moderately high risk for all VSP categories. Informed by this risk assessment, the majority opinion of the BRT was that the naturally spawned component of the Lower Columbia River chinook ESU is ''likely to become endangered within the foreseeable future,'' with the minority being split between ''in danger of extinction'' and ''not in danger of extinction or likely to become endangered within the foreseeable future.''

There are seventeen artificial propagation programs releasing hatchery chinook salmon that are considered to be part of the Lower Columbia River chinook ESU (Table 2). All of these programs are designed to produce fish for harvest, with three of these programs also being implemented to augment the naturally spawning populations in the basins where the fish are released. These three programs integrate naturally produced spring chinook salmon into the broodstock in an attempt to minimize the genetic effects of returning hatchery adults that spawn naturally.

NMFS' assessment of the effects of artificial propagation on ESU extinction risk concluded that these hatchery programs collectively do not substantially reduce the extinction risk of the ESU in-total (NMFS, 2004c). Hatchery programs have increased total returns and numbers of fish spawning naturally, thus reducing risks to ESU abundance. Although these hatchery programs have been successful at producing substantial numbers of fish, their effect on the productivity of the ESU in-total is uncertain. Additionally, the high level of hatchery production in this ESU poses potential genetic and ecological risks to the ESU, and confounds the monitoring and evaluation of abundance trends and productivity. The Cowlitz River spring chinook salmon program produces parr for release into the upper Cowlitz River basin in an attempt to re-establish a naturally spawning population above Cowlitz Falls Dam. Such reintroduction efforts increase the ESU's spatial distribution into historical habitats, and slightly reduce risks to ESU spatial structure. The few programs that regularly integrate natural fish into the broodstock may help preserve genetic diversity within the ESU. However, the majority of hatchery programs in the ESU have not converted to the regular incorporation of natural broodstock, thus limiting this risk-reducing feature at the ESU scale. Past and ongoing transfers of broodstock among hatchery programs in different basins represent a risk to within and among population diversity. Collectively, artificial propagation programs in the ESU provide slight benefits to ESU abundance, spatial structure, and diversity, but have neutral or uncertain effects on ESU productivity. Informed by the BRT's findings (NMFS, 2003b) and NMFS' assessment of the effects of artificial propagation programs on the viability of the ESU (NMFS, 2004b), the Artificial Propagation Evaluation Workshop concluded that the Lower Columbia River chinook ESU in-total is ''likely to become endangered in the foreseeable future'' (NMFS, 2004c).

Upper Columbia River Spring-run Chinook ESU

All populations in the Upper Columbia River spring-run chinook ESU exhibited pronounced increases in abundance in 2001. These increases are particularly encouraging following the last decade of steep declines to record, critically low escapements. Despite strong returns in 2001, both recent 5-year and long term productivity trends remain below replacement. The five hatchery spring-run chinook populations considered to be part of this ESU (Table 2) are programs aimed at supplementing natural production areas. These programs have contributed substantially to the abundance of fish spawning naturally in recent years. However, little information is available to assess the impact of these high levels of supplementation on the long-term productivity of natural populations. Spatial structure in this ESU was of little concern as there is passage and connectivity among almost all ESU populations. The current geographical range of the ESU is approximately the same as its historical range. During years of critically low escapement (1996 and 1998) extreme management measures were taken in one of the three major spring chinook producing basins by collecting all returning adults into hatchery supplementation programs. Such actions reflect the ongoing vulnerability of certain segments of this ESU. The BRT expressed concern that these actions, while appropriately guarding against the catastrophic loss of populations, may have compromised ESU population structure and diversity.

The BRT's assessment of risk for the four VSP categories reflects strong concerns regarding abundance and productivity, and comparatively less concern for ESU spatial structure and diversity. The BRT's assessment of overall extinction risk faced by the naturally spawned component of the Upper Columbia River spring-run chinook ESU was divided between ''in danger of extinction'' and ''likely to become endangered within the foreseeable future,'' with a slight majority opinion that the ESU is ''in danger of extinction.''

Six artificial propagation programs in the Upper Columbia River basin produce spring-run chinook in the Methow and Wenatchee Rivers that are considered to be part of the Upper Columbia River spring-run chinook ESU (Table 2). The Entiat NFH operating in the Entiat River is not included in the ESU, and is intended to remain isolated from the local natural population. The within-ESU hatchery programs are conservation programs intended to contribute to the recovery of the ESU by increasing the abundance and spatial distribution of naturally spawned fish, while maintaining the genetic integrity of populations within the ESU. Three of the conservation programs incorporate local natural broodstock to minimize adverse genetic effects, and follow broodstock protocols guarding against the overcollection of the natural run. The remaining within-ESU hatchery programs are captive broodstock programs. These programs also adhere

to strict protocols for the collection, rearing, maintenance, and mating of the captive brood populations. All of the six artificial propagation programs considered to be part of the ESU include extensive monitoring and evaluation efforts to continually evaluate the extent and implications of any genetic and behavioral differences that might emerge between the hatchery and natural stocks.

Genetic evidence suggests that the within-ESU programs remain closely related to the naturally spawned populations and maintain local genetic distinctiveness of populations within the ESU. The captive broodstock programs may exhibit lower fecundity and younger average age-at-maturity compared to the natural populations from which they were derived. However, the extensive monitoring and evaluation efforts employed afford the adaptive management of any unintended adverse effects. Habitat Conservation Plans (HCPs) with the Chelan and Douglas Public Utility Districts and binding mitigation agreements ensure that these programs will have secure funding and will continue into the future. These hatchery programs have undergone ESA section 7 consultation to ensure that they do not jeopardize the continued existence of the ESU, and they have received ESA section 10 permits for production through 2007. Annual reports and other specific information reporting requirements ensure that the terms and conditions as specified by NMFS are followed. These programs, through adherence to best professional practices, have not experienced disease outbreaks or other catastrophic losses.

NMFS' assessment of the effects of artificial propagation on ESU extinction risk concluded that these hatchery programs collectively do not substantially reduce the extinction risk of the ESU in-total (NMFS, 2004c). Overall, the hatchery programs in the ESU have increased the total abundance of fish considered to be part of the ESU. Specifically, the two hatchery programs in the Wenatchee Basin have contributed to reducing abundance risk. However, it is uncertain whether the four programs in the Methow Basin have provided a net benefit to abundance. The contribution of ESU hatchery programs to the productivity of the ESU in-total is uncertain. The overall impact of the hatchery programs on ESU spatial structure is neutral. The Wenatchee Basin programs are managed to promote appropriate spatial structure, and they likely reduce spatial structure risk in that basin. The Methow Basin hatchery programs, however, concentrate spawners near the hatchery facilities, altering population spatial structure and increasing vulnerability to catastrophic events. Overall, within-ESU hatchery programs do not moderate risks to ESU diversity. The Wenatchee Basin programs do help preserve population diversity though the incorporation of natural-origin fish into broodstock. The Methow Basin programs, however, incorporate few natural fish with hatchery-origin fish predominating on the spawning grounds. Additionally, the presence of out-of-ESU Carson stock chinook in the Methow Basin remains a concern, although the stock is in the process of being terminated. The out-of-ESU Entiat hatchery program is a source of significant concern to the ESU. The Entiat stock may have introgressed significantly with or replaced the native population. Although the artificial propagation programs in the ESU have a slight beneficial effect on ESU abundance, they do not mitigate other key risk factors identified by the BRT. Informed by the BRT's findings (NMFS, 2003b) and NMFS' assessment of the effects of artificial propagation programs on the viability of the ESU (NMFS, 2004b), the Artificial Propagation Evaluation Workshop concluded that the Upper Columbia River spring-run chinook ESU in-total is ''in danger of extinction'' (NMFS, 2004c).

Puget Sound Chinook ESU

Assessing extinction risk for the Puget Sound chinook ESU is complicated by high levels of hatchery production and a limited availability of information on the fraction of natural spawners that are of hatchery-origin. Although populations in the ESU have not experienced the dramatic increases in abundance in the last 2 to 3 years that have been evident in many other ESUs, more populations have shown modest increases in escapement in recent years than have declined (13 populations versus 9). Most populations have a recent 5-year mean abundance of fewer than 1,500 natural spawners, with the Upper Skagit population being a notable exception (the recent 5-year mean abundance for the Upper Skagit population approaches 10,000 natural spawners). Currently observed abundances of natural spawners in the ESU are several orders of magnitude lower than estimated historical spawner capacity, and well below peak historical abundance (approximately 690,000 spawners in the early 1900s). Recent 5-year and long-term productivity trends remain below replacement for the majority of the 22 extant populations of Puget Sound chinook. The BRT was concerned that the concentration of the majority of natural production in just a few sub-basins represents a significant risk. Natural production areas, due to their concentrated spatial distribution, are vulnerable to extirpation due to catastrophic events. The BRT was concerned by the disproportionate loss of early run populations and its impact on the diversity of the Puget Sound chinook ESU. The Puget Sound Technical Recovery Team has identified 31 historical populations (Ruckelshaus *et al.*, 2002), nine of which are believed to be extinct, most of which were ''early run'' or ''spring'' populations. Past hatchery practices that transplanted stocks among basins within the ESU and present programs using transplanted stocks that incorporate little local natural broodstock represent additional risk to ESU diversity. In particular, the BRT noted that the pervasive use of Green River stock, and stocks subsequently derived from the Green River stock, throughout the ESU may reduce the genetic diversity and fitness of naturally spawning populations.

The BRT found moderately high risks for all VSP categories. Informed by this risk assessment, the strong majority opinion of the BRT was that the naturally spawned component of the Puget Sound chinook ESU is ''likely to become endangered within the foreseeable future.'' The minority opinion was in the ''not in danger of extinction or likely to become endangered within the foreseeable future'' category.

There are currently 22 programs artificially propagating Puget Sound chinook salmon that are considered to be part of the ESU (Table 2). Eight of the programs are directed at conservation, and are specifically implemented to preserve and increase the abundance of native populations in their natal watersheds where habitat needed to sustain the populations naturally at viable levels has been lost or degraded. Each of these conservation hatchery programs includes research, monitoring, and evaluation activities designed to determine success in recovering the propagated populations to viable levels, and to determine the demographic, ecological, and genetic effects of each program on target and non-target salmonid populations. The remaining programs considered to be part of the ESU are operated primarily for fisheries harvest augmentation purposes (some of which also function as research programs) using transplanted within-ESU-origin chinook salmon as broodstock.

NMFS' assessment of the effects of artificial propagation on ESU extinction

risk concluded that these hatchery programs collectively do not substantially reduce the extinction risk of the ESU in-total (NMFS, 2004c). The conservation and hatchery augmentation programs collectively have increased the total abundance of the ESU. The conservation programs have increased the abundance of naturally spawning chinook, and likely have reduced abundance risks for these populations. The large numbers of chinook produced by the harvest augmentation programs, however, have resulted in considerable numbers of strays. Any potential benefits from these programs to abundance likely are offset by increased ecological and genetic risks. There is no evidence that any of the twenty-two ESU hatchery programs have contributed to increased abundances of natural-origin chinook, despite decades of infusing natural spawning areas with hatchery fish. The contribution of ESU hatchery programs to the productivity of the ESU in-total is uncertain. Four programs are planting hatchery fish above impassible dams, providing some benefit to ESU spatial structure. However, the ongoing practice of transplanting stocks within the ESU and incorporating little natural local-origin broodstock continues to pose significant risks to ESU spatial structure and diversity. The conservation hatchery programs function to preserve remaining genetic diversity, and likely have prevented the loss of several populations. Among the harvest augmentation programs are yearling chinook release programs. Yearling chinook programs may be harmful to local natural-origin populations due to increased risks of predation and the reduction of within-population diversity. Collectively, artificial propagation programs in the ESU provide a slight beneficial effect to ESU abundance and spatial structure, but neutral or uncertain effects to ESU productivity and diversity. Informed by the BRT's findings (NMFS, 2003b) and NMFS' assessment of the effects of artificial propagation programs on the viability of the ESU (NMFS, 2004b), the Artificial Propagation Evaluation Workshop concluded that the Puget Sound chinook ESU in-total is ''likely to become endangered in the foreseeable future'' (NMFS, 2004c).

Snake River Fall-run Chinook ESU

The abundance of natural-origin spawners in the Snake River fall-run chinook ESU for 2001 (2,652 adults) was in excess of 1,000 fish for the first time since counts began at the Lower Granite Dam in 1975. The recent 5-year mean abundance of 871 naturally produced spawners, however, generated concern that despite recent improvements, the abundance level is very low for an entire ESU. With the exception of the marked increase in 2001, the ESU has fluctuated between approximately 500 to 1,000 natural spawners since 1975, suggesting a higher degree of stability in growth rate at low population levels than is seen in other salmonid populations. Increasing returns reflect improved ocean conditions, improved management of the mainstem hydrosystem flow regime, decreased harvest, and an increasing contribution from the Lyons Ferry Hatchery supplementation program. However, due to the large fraction of naturally spawning hatchery fish, it is difficult to assess the productivity of the natural population. Depending upon the assumption made regarding the reproductive contribution of hatchery fish, long-term and short-term trends in productivity are at or above replacement. It is estimated that approximately 80 percent of historical spawning habitat was lost with the construction of a series of Snake River mainstem dams. The loss of spawning habitats and the restriction of the ESU to a single extant naturally spawning population increase the ESU's vulnerability to environmental variability and catastrophic events. The diversity associated with populations that once resided above the Snake River dams has been lost, and the impact of straying out-of-ESU fish has the potential to further compromise ESU diversity. Recent improvements in the marking of out-of-ESU hatchery fish and their removal at Lower Granite Dam have reduced the impact of these strays. However, introgression below Lower Granite Dam remains a concern. The BRT voiced concern that the practice of collecting fish below Lower Granite Dam for broodstock incorporates non-ESU strays into the Lyons Ferry Hatchery program, and poses additional risks to ESU diversity. Straying of out-of-ESU hatchery fall chinook salmon from outside the Snake River basin was identified as a major risk factor in the late 1980's to mid 1990's. Out-of-ESU hatchery strays have been much reduced due to the removal of hatchery strays at downstream dams, and a reduction in the number of fish released into the Umatilla River (where the majority of out-of-ESU strays originated).

The BRT found moderately high risk for all VSP categories. Informed by this risk assessment, the majority opinion of the BRT was that the naturally spawned component of the Snake River fall-run chinook ESU is ''likely to become endangered within the foreseeable future.'' The minority opinion assessed ESU extinction risk as ''in danger of extinction,'' although a slight minority fell in the ''not in danger of extinction or likely to become endangered within the foreseeable future'' category.

There are four artificial propagation programs producing Snake River fall chinook salmon in the Snake River basin, all based on the Lyons Ferry Hatchery stock and considered to be part of the Snake River fall-run chinook ESU (Table 2). When naturally spawning fall chinook declined to fewer than 100 fish in 1991, most of the genetic legacy of this ESU was preserved in the Lyons Ferry Hatchery broodstock (NMFS, 1991c). These four hatchery programs are managed to enhance listed Snake River fall chinook salmon and presently include the Lyons Ferry Hatchery, Fall Chinook Acclimation Ponds Program, Nez Perce Tribal Hatchery, and Oxbow Hatchery (an Idaho Power Company mitigation hatchery). These existing programs release fish into the mainstem Snake River and Clearwater River which represent the majority of the remaining habitat available to this ESU.

NMFS' assessment of the effects of artificial propagation on ESU extinction risk concluded that these hatchery programs collectively do not substantially reduce the extinction risk of the ESU in-total (NMFS, 2004c). These hatchery programs have contributed to the recent substantial increases in total ESU abundance, including both natural-origin and hatchery-origin ESU components. Spawning escapement has increased to several thousand adults (from a few hundred in the early 1990's) due in large part to increased releases from these hatchery programs. These programs collectively have had a beneficial effect on ESU abundance in recent years. The BRT noted, however, that the large but uncertain fraction of naturally spawning hatchery fish complicates assessments of ESU productivity. The contribution of ESU hatchery programs to the productivity of the ESU in-total is uncertain. As ESU abundance has increased in recent years, ESU spatial distribution has increased. The Snake River fall-run chinook hatchery programs contributed to this reduction in risk to ESU spatial distribution. The Lyons Ferry stock has preserved genetic diversity during critically low years of abundance. However, the ESU-wide use of a single hatchery broodstock may pose long-term genetic risks, and may limit adaptation to different habitat areas. Although the

ESU likely historically consisted of a single independent population, it was most likely composed of diverse production centers. Additionally, the broodstock collection practices employed pose risks to ESU spatial structure and diversity. Release strategies practiced by the ESU hatchery programs (*e.g.*, extended captivity for about 15 percent of the fish before release) is in conflict with the Snake River fall-run chinook life history, and may compromise ESU diversity. Collectively, artificial propagation programs in the ESU provide slight benefits to ESU abundance, spatial structure, and diversity, but have neutral or uncertain effects on ESU productivity. Informed by the BRT's findings (NMFS, 2003b) and NMFS' assessment of the effects of artificial propagation programs on the viability of the ESU (NMFS, 2004b), the Artificial Propagation Evaluation Workshop concluded that the Snake River fall-run chinook ESU in-total is ''likely to become endangered in the foreseeable future'' (NMFS, 2004c).

Snake River Spring/Summer Chinook ESU

The aggregate return (including hatchery and natural-origin fish) of Snake River spring/summer-run chinook in 2001 exhibited a large increase over recent abundances. Many, but not all, of the 29 natural production areas within the ESU experienced large abundance increases in 2001 as well, with two populations nearing the abundance levels specified in NMFS' 1995 Proposed Snake River Recovery Plan (NMFS, 1995b). However, approximately 79 percent of the 2001 return of spring-run chinook, was of hatchery origin. Short-term productivity trends were at or above replacement for the majority of natural production areas in the ESU, although long-term productivity trends remain below replacement for all natural production areas, reflecting the severe declines since the 1960s. Although the number of spawning aggregations lost in this ESU due to the establishment of the Snake River mainstem dams is unknown, this ESU has a wide spatial distribution in a variety of locations and habitat types. The BRT considered it a positive sign that the out-of-ESU Rapid River broodstock has been phased out of the Grande Ronde system. There is no evidence of wide-scale straying by hatchery stocks, thereby alleviating diversity concerns somewhat. Nonetheless, the high level of hatchery production in this ESU complicates the assessments of trends in natural abundance and productivity.

The BRT found moderately high risk for the abundance and productivity VSP criteria, and comparatively lower risk for spatial structure and diversity. Informed by this risk assessment, the majority opinion of the BRT was that the naturally spawned component of the Snake River spring/summer-run chinook ESU is ''likely to become endangered within the foreseeable future.'' The minority opinion assessed ESU extinction risk as ''in danger of extinction,'' although a slight minority concluded that the ESU is ''not in danger of extinction or likely to become endangered within the foreseeable future'' category.

There are fifteen artificial propagation programs producing spring/summer-run chinook salmon that are considered to be part of the Snake River spring/summer-run chinook ESU (Table 2). A portion of these programs are managed to enhance listed natural populations, including the use of captive broodstock hatcheries in the upper Salmon River, Lemhi River, East Fork Salmon River, and Yankee Fork populations. These enhancement programs all use broodstocks founded from the local native populations. Currently, the use of non-ESU broodstock sources is restricted to Little Salmon/Rapid River (lower Salmon River tributary), mainstem Snake River at Hells Canyon, and the Clearwater River. These non-ESU programs appear to be isolated from natural production areas and are thought to have little negative impact on this ESU.

NMFS' assessment of the effects of artificial propagation on ESU extinction risk concluded that these hatchery programs collectively do not substantially reduce the extinction risk of the ESU in-total (NMFS, 2004c). Overall, these hatchery programs have contributed to the increases in total ESU abundance and in the number of natural spawners observed in recent years. The contribution of ESU hatchery programs to the productivity of the ESU in-total is uncertain. Some reintroduction and outplanting of hatchery fish above barriers and into vacant habitat has occurred, providing a slight benefit to ESU spatial structure. All of the within-ESU hatchery stocks are derived from local natural populations and employ management practices designed to preserve genetic diversity. The Grande Ronde Captive Broodstock programs likely have prevented the extirpation of the local natural populations. Additionally, hatchery releases are managed to maintain wild fish reserves in the ESU in an effort to preserve natural local adaptation and genetic variability. Collectively, artificial propagation programs in the ESU provide benefits to ESU abundance, spatial structure, and diversity, but have neutral or uncertain effects on ESU productivity. Informed by the BRT's findings (NMFS, 2003b) and NMFS' assessment of the effects of artificial propagation programs on the viability of the ESU (NMFS, 2004b), the Artificial Propagation Evaluation Workshop concluded that the Snake River spring/summer-run chinook ESU in-total is ''likely to become endangered in the foreseeable future'' (NMFS, 2004c).

Central California Coast Coho ESU

Information on the abundance and productivity trends for the naturally spawning component of the Central California Coast coho ESU is extremely limited. There are no long-term time series of spawner abundance for individual river systems. Analyses of juvenile coho presence-absence information, juvenile density surveys, and irregular adult counts for the South Fork Noyo River indicate low abundance and long-term downward trends for the naturally spawning populations throughout the ESU. Improved ocean conditions coupled with favorable stream flows and harvest restrictions have contributed to increased returns in 2001 in streams in the northern portion of the ESU, as indicated by an increase in the observed presence of fish in historically occupied streams. Data are particularly lacking for many river basins in the southern two-thirds of the ESU where naturally spawning populations are considered to be at the greatest risk. The extirpation or near extirpation of natural coho salmon populations in several major river basins, and across most of the southern historical range of the ESU, represents a significant risk to ESU spatial structure and diversity. Artificial propagation of coho salmon within the Central California Coast ESU has declined since the ESU was listed in 1996 though it continues at the Noyo River and Scott Creek facilities, and two captive broodstock populations have recently been established. Genetic diversity risk associated with out-of-basin transfers appears to be minimal, but diversity risk from domestication selection and low effective population sizes in the remaining hatchery programs remains a concern. An out-of-ESU artificial propagation program for coho was operated at the Don Clausen hatchery on the Russian River through the mid 1990's, but was terminated in 1996. Termination of this program was considered by the BRT a positive development for naturally produced coho in this ESU. For the naturally

spawning component of the ESU, the BRT found very high risk for the abundance, productivity, and spatial structure VSP parameters and comparatively moderate risk with respect to the diversity VSP parameter. The lack of direct estimates of the performance of the naturally spawned populations in this ESU, and the associated uncertainty this generates, was of specific concern to the BRT. Informed by the VSP risk assessment and the associated uncertainty, the strong majority opinion of the BRT was that the naturally spawned component of the Central California Coast coho ESU was ''in danger of extinction.'' The minority opinion was that this ESU is ''likely to become endangered within the foreseeable future.''

Four artificial propagation programs are considered to be part of the Central California Coast coho ESU (Table 2; NMFS, 2004b). The Noyo River program is an augmentation program located in the northern portion of the ESU which regularly incorporates local natural-origin fish into the broodstock and releases fish into the Noyo River watershed. The program has been in operation for over 50 years, but the program has recently been discontinued. The Monterey Bay Salmon and Trout Project is an artificial propagation program that is operated as a conservation program designed to supplement the local natural population, located in the southern portion of the ESU (south of San Francisco) where natural populations are at the highest risk of extinction. Relatively small numbers of fish are spawned and released from this program on Scott Creek, but natural-origin fish are routinely incorporated into the broodstock. Recently, captive broodstock programs have been established for the Russian River and Scott Creek populations in order to preserve the genetic resources of these two naturally spawning populations and for use in artificial programs. Artificially propagated fish from these two captive broodstock programs will be outplanted in the Russian River and Scott Creek watersheds to supplement local natural populations. The Russian River program is integrated with a habitat restoration program designed to improve habitat conditions and subsequent survival for outplanted coho juveniles.

An assessment of the effects of these four artificial propagation programs on the viability of the ESU in-total concluded that they decrease risk of extinction to some degree by contributing to increased ESU abundance and diversity, but have a neutral or uncertain effect on the productivity or spatial structure of the ESU (NMFS, 2004b). The three conservation programs are considered crucial to the recovery of this ESU, but it is unclear if they have had any beneficial effect on natural spawner abundance. The Noyo River program which had been operated for over 50 years is being terminated because it has not met CDFG's goal of increasing coho salmon abundance. Productivity of coho salmon in the Noyo River is thought to be reduced or unaffected by long term artificial propagation in that watershed. It is uncertain how effective the captive broodstock and rearing programs in the Russian River and Scott Creek will be in increasing productivity, but efforts in the Russian River are coupled with a major habitat restoration effort which may improve natural population productivity. The two captive broodstock programs will hopefully contribute to future abundance and improved spatial structure of the ESU, but outplanting has yet to be implemented so long term benefits are uncertain. The Monterey Bay Salmon and Trout Program is thought to be responsible for sustaining the presence of natural origin coho salmon in Scott Creek, which is at the southern extent of the ESU's range. Both of the captive broodstock programs, particularly the Scott Creek program, are genetic repositories which serve to preserve the genome of the ESU thereby reducing genetic diversity risks. Informed by the BRT's findings (NMFS, 2003b) and NMFS' assessment of the effects of artificial propagation programs on the viability of the ESU (NMFS, 2004b), the Artificial Propagation Evaluation Workshop concluded that the Central California Coast coho ESU in-total is ''in danger of extinction'' (NMFS, 2004c).

Southern Oregon/Northern California Coast Coho ESU

The only reliable time series of adult abundance for the naturally spawning component of the Southern Oregon/Northern California Coast coho ESU is for the Rogue River population in southern Oregon. The California portion of the ESU is characterized by a paucity of data, with only a few available spawner indices and presence-absence surveys. The recent 5-year mean abundance for the Rogue River is approximately 5,000 natural spawners and is the highest such abundance for the Rogue River data series (since 1980). Both long- and short-term productivity trends for Rogue River natural spawners are above replacement. The BRT concluded, based on an analysis of pre-harvest abundance, however, that these positive trends for the Rogue River population reflect the effects of reduced harvest rather than improved freshwater conditions and population productivity. Less reliable indices of spawner abundance in several California populations suggest flat or declining trends. Relatively low levels of observed presence in historically occupied coho streams (32–56 percent from 1986 to 2000) indicate continued low abundance in the California portion of this ESU. Indications of stronger 2001 returns in several California populations, presumably due to favorable freshwater and ocean conditions, is encouraging but must be evaluated in the context of more than a decade of generally poor performance. Nonetheless, the high occupancy rate of historical streams in 2001 suggests that much habitat remains accessible to coho salmon. Although extant populations reside in all major river basins within the ESU, the BRT was concerned about the loss of local populations in the Trinity, Klamath, and Rogue river systems. The high hatchery production in these systems may mask trends in ESU population structure and pose risks to ESU diversity. The recent termination of several out-of-ESU hatcheries in California is expected to result in decreased risks to ESU diversity. The BRT found moderately high risks for abundance and productivity VSP categories, with comparatively lower risk for spatial structure and diversity. Informed by this risk assessment, the strong majority opinion of the BRT was that the naturally spawned component of the Southern Oregon/Northern California Coast coho ESU is ''likely to become endangered within the foreseeable future.'' The minority opinion assessed ESU extinction risk as ''in danger of extinction,'' although a slight minority concluded that the ESU is ''not in danger of extinction or likely to become endangered within the foreseeable future'' category.

There are three artificial propagation programs releasing hatchery coho salmon that are considered to be part of the Southern Oregon/Northern California Coast Coho ESU. The Rogue River hatchery in Oregon and the Trinity River and Iron Gate hatcheries (Klamath River) in California are all mitigation programs designed to produce fish for harvest, but they integrate naturally produced coho salmon into the broodstock in an attempt to minimize the genetic effects of returning hatchery adults that spawn naturally. All three programs have been in operation for several decades with smolt production goals ranging from 75,000 to 500,000 fish.

An assessment of the effects of these three artificial propagation programs on the viability of the ESU in-total concluded that they decrease risk of extinction by contributing to increased ESU abundance, but have a neutral or uncertain effect on the productivity, spatial structure and diversity of the ESU (NMFS, 2004b). Abundance of the ESU in-total has been increased as a result of these artificial propagation programs, particularly in the Rogue and Trinity Rivers. In the Rogue River, hatchery origin fish have averaged approximately half of the returning spawners over the past 20 years. In the Trinity River, most naturally spawning fish are thought to be of hatchery origin based on weir counts at Willow Creek. The effects of these artificial propagation programs on ESU productivity and spatial structure are limited. Only three rivers have hatchery populations and natural populations are depressed throughout the range of the ESU. The effects of these hatchery programs on ESU diversity are likely limited. Natural origin fish have been incorporated into the broodstock but the magnitude of natural fish use is unknown. Informed by the BRT's findings (NMFS, 2003b) and NMFS'' assessment of the effects of artificial propagation programs on the viability of the ESU (NMFS, 2004b), the Artificial Propagation Evaluation Workshop concluded that the Southern Oregon/ Northern California Coast coho ESU in-total is ''likely to become endangered in the foreseeable future'' (NMFS, 2004c).

Oregon Coast Coho ESU

The abundance of natural spawners in the Oregon Coast coho ESU for 2001 and 2002 (163,000 and 264,000 spawners, respectively) far exceeded the abundance observed for the past several decades, and preliminary projections for 2003 (approximately 118,000 spawners) suggest that these substantial increases may be sustained. Furthermore, increases in natural spawner abundance have occurred in many populations in the northern portion of the ESU, populations that were the most depressed at the time of the last review (NMFS, 1997a). However, when the abundance data are evaluated by coho brood year, it is apparent the strong year-classes of the last three years were preceded by three years of recruitment failure. Recruitment failure (meaning that a given year class of natural spawners failed to replace itself when its offspring returned to the spawning grounds 3 years later) occurred for the 1994, 1995, and 1996 brood years returning in 1997, 1998, and 1999, respectively. These three years of recruitment failure are the only such instances that have been observed in the entire time series of data collected for Oregon Coast coho salmon. Although the recent dramatic increases in spawner abundance are encouraging, the long-term trends in ESU productivity are still negative due to the poor performance of the 1994–1996 brood years. The majority of the BRT felt that the recent increases in coho returns were most likely attributable to favorable ocean conditions and reduced harvest rates. The BRT was uncertain as to whether such favorable marine conditions would continue into the future. Despite the likely benefits to spawner abundance levels gained by the dramatic reduction of direct harvest of Oregon Coast coho populations (PFMC, 1998), harvest management can no longer compensate for declining productivity due to other factors. The BRT was concerned that if the long-term decline in productivity reflects deteriorating conditions in freshwater habitat, this ESU could face very serious risks of local extirpations if ocean conditions reverted back to poor productivity conditions. Approximately 30 percent of the ESU has suffered habitat fragmentation by culverts and thermal barriers, generating concerns about ESU spatial structure. Additionally, the lack of response to favorable ocean conditions for some populations in smaller streams, and the distinct patterns between north and south coast populations may indicate compromised connectivity among populations. The degradation of many lake habitats, and the resultant impacts on several lake populations in the Oregon Coast coho ESU, also poses risks to ESU diversity. The BRT noted that hatchery closures, reductions in the number of hatchery smolt releases, and improved marking rates of hatchery fish have reduced risks to diversity associated with artificial propagation.

The BRT found high risk in the productivity VSP category, and comparatively lower risk for the other VSP categories. Informed by this risk assessment, the majority opinion of the BRT was that the naturally spawned component of the Oregon Coast coho ESU is ''likely to become endangered within the foreseeable future.'' However, a substantial minority of the BRT concluded that the ESU is ''not in danger of extinction or likely to become endangered within the foreseeable future.'' The minority felt that the large number of spawners in 2001–2002, and the high projected abundance for 2003, demonstrate that this ESU is not ''in danger of extinction'' or ''likely to become endangered within the foreseeable future.'' Furthermore, the minority felt that recent strong returns following 3 years of recruitment failure demonstrate that populations in this ESU exhibit considerable resilience.

At present, there are five coastal coho artificial propagation programs that are considered to be part of the Oregon Coast coho ESU (Table 2). All of these programs are operated by the State of Oregon to provide harvest opportunities. Substantial changes in coho salmon propagation have occurred over the previous 10 years to achieve a balance between obligations to help conserve coastal coho and to mitigate for habitat degradation, and maintain fishing opportunities. These changes include a dependence on local origin fish for broodstock, management actions to reduce straying (10 percent is the objective), and the cessation of stocking coho in five coastal rivers. Coastal coho stocking has decreased by 84 percent since 1993. These programs are not managed to contribute to ESU abundance, productivity, spatial structure, or diversity.

NMFS' assessment of the effects of artificial propagation on ESU extinction risk concluded that these hatchery programs collectively do not substantially reduce the extinction risk of the ESU in-total (NMFS, 2004c). Although these hatchery programs contribute to the increased total abundance for 4 of the 19 ESU populations, the effect on the abundance of the ESU in-total is slight. In an attempt to avoid potentially adverse effects of naturally spawning hatchery fish on ESU natural populations, the State of Oregon manages these hatchery populations to limit the numbers of hatchery fish on the spawning grounds. The contribution of ESU hatchery programs to the productivity of the ESU in-total is uncertain, however, given the low proportion of naturally spawning hatchery fish in the ESU, any contribution is likely negligible. There is little to no effect of the ESU hatchery programs on the spatial structure of the ESU in-total, as most populations are not affected by artificial propagation. The spatial distribution of some natural populations, however, is negatively affected by the operation of hatchery facilities and weirs. There is little to no benefit of the Oregon Coast coho hatchery programs to ESU diversity. Those programs that incorporate natural fish into the broodstock are contributing to reducing past risks to ESU diversity posed by artificial propagation. Two out-of-ESU hatchery programs (the Salmon River (ODFW stock # 33) and

Trask River (ODFW stock # 34) hatchery programs), however, do not incorporate natural fish into the broodstock and remain a threat to ESU diversity. Collectively, artificial propagation programs in the ESU provide a slight beneficial effect to ESU abundance, but have neutral or uncertain effects on ESU productivity, spatial structure, and diversity. Informed by the BRT's findings (NMFS, 2003b) and NMFS' assessment of the effects of artificial propagation programs on the viability of the ESU (NMFS, 2004b), the Artificial Propagation Evaluation Workshop concluded that the Oregon Coast coho ESU in-total is ''likely to become endangered in the foreseeable future'' (NMFS, 2004c).

Lower Columbia River Coho ESU

There are only two extant populations in the Lower Columbia River coho ESU with appreciable natural production (the Clackamas and Sandy River populations), from an estimated 23 historical populations in the ESU. Although adult returns in 2000 and 2001 for the Clackamas and Sandy River populations exhibited moderate increases, the recent 5-year mean of natural-origin spawners for both populations represents less than 1,500 adults. The Sandy River population has exhibited recruitment failure in 5 of the last 10 years, and has exhibited a poor response to reductions in harvest. During the 1980s and 1990s natural spawners were not observed in the lower tributaries in the ESU. Coincident with the 2000–2001 abundance increases in the Sandy and Clackamas populations, a small number of coho spawners of unknown origin have been surveyed in some lower tributaries. Short- and long-term trends in productivity are below replacement. Approximately 40 percent of historical habitat is currently inaccessible, which restricts the number of areas that might support natural production, and further increases the ESU's vulnerability to environmental variability and catastrophic events. The extreme loss of naturally spawning populations, the low abundance of extant populations, diminished diversity, and fragmentation and isolation of the remaining naturally produced fish confer considerable risks to the ESU. The paucity of naturally produced spawners in this ESU is contrasted by the very large number of hatchery produced adults. The abundance of hatchery coho returning to the Lower Columbia River in 2001 and 2002 exceeded one million and 600,000 fish, respectively. The BRT expressed concern that the magnitude of hatchery production continues to pose significant genetic and ecological threats to the extant natural populations in the ESU. However, these hatchery stocks at present collectively represent a significant portion of the ESU's remaining genetic resources. The twenty-one hatchery stocks considered to be part of the ESU (Table 2), if appropriately managed, may prove essential to the restoration of more widespread naturally spawning populations.

The BRT found extremely high risks for each of the VSP categories. Informed by this risk assessment, the strong majority opinion of the BRT was that the naturally spawned component of the Lower Columbia River coho ESU is ''in danger of extinction.'' The minority opinion was that the ESU is ''likely to become endangered within the foreseeable future.''

All of the 21 hatchery programs included in the Lower Columbia River coho ESU are designed to produce fish for harvest, with two small programs designed to also augment the natural spawning populations in the Lewis River Basin. Artificial propagation in this ESU continues to represent a threat to the genetic, ecological, and behavioral diversity of the ESU. Past artificial propagation efforts imported out-of-ESU fish for broodstock, generally did not mark hatchery fish, mixed broodstocks derived from different local populations, and transplanted stocks among basins throughout the ESU. The result is that the hatchery stocks considered to be part of the ESU represent a homogenization of populations. Several of these risks have recently begun to be addressed by improvements in hatchery practices. Out-of-ESU broodstock is no longer used, and near 100-percent marking of hatchery fish is employed to afford improved monitoring and evaluation of broodstock and (hatchery- and natural-origin) returns. However, many of the within-ESU hatchery programs do not adhere to best hatchery practices. Eggs are often transferred among basins in an effort to meet individual program goals, further compromising ESU spatial structure and diversity. Programs may use broodstock that does not reflect what was historically present in a given basin, limiting the potential for artificial propagation to establish locally adapted naturally spawning populations. Many programs lack Hatchery and Genetic Management Plans that establish escapement goals appropriate for the natural capacity of each basin, and that identify goals for the incorporation of natural-origin fish into the broodstock.

NMFS' assessment of the effects of artificial propagation on ESU extinction risk concluded that hatchery programs collectively mitigate the immediacy of extinction risk for the Lower Columbia River coho ESU in-total in the short term, but that these programs do not substantially reduce the extinction risk of the ESU in the foreseeable future (NMFS, 2004c). At present, within ESU hatchery programs significantly increase the abundance of the ESU in-total. Without adequate long-term monitoring, the contribution of ESU hatchery programs to the productivity of the ESU in-total is uncertain. The hatchery programs are widely distributed throughout the Lower Columbia River, reducing the spatial distribution of risk to catastrophic events. Additionally, reintroduction programs in the Upper Cowlitz River may provide additional reduction of ESU spatial structure risks. As mentioned above, the majority of the ESU's genetic diversity exists in the hatchery programs. Although these programs have the potential of preserving historical local adaptation and behavioral and ecological diversity, the manner in which these potential genetic resources are presently being managed poses significant risks to the diversity of the ESU in-total. At present, the Lower Columbia River coho hatchery programs reduce risks to ESU abundance and spatial structure, provide uncertain benefits to ESU productivity, and pose risks to ESU diversity. Overall, artificial propagation mitigates the immediacy of ESU extinction risk in the short-term, but is of uncertain contribution in the long term.

Over the long term, reliance on the continued operation of these hatchery programs is risky (NMFS, 2004b). Several Lower Columbia River coho hatchery programs have been terminated, and there is the prospect of additional closures in the future. With each hatchery closure, any potential benefits to ESU abundance and spatial structure are reduced. Risks of operational failure, disease, and environmental catastrophes further complicate assessments of hatchery contributions over the long term. Additionally, the two extant naturally spawning populations in the ESU were described by the BRT as being ''in danger of extinction.'' Accordingly, it is likely that the Lower Columbia River coho ESU may exist in hatcheries only within the foreseeable future. It is uncertain whether these isolated hatchery programs can persist without the incorporation of natural-origin fish into the broodstock. Although there are

examples of salmonid hatchery programs having been in operation for relatively long periods of time, these programs have not existed in complete isolation. Long-lived hatchery programs historically required infusions of wild fish in order to meet broodstock goals. The long-term sustainability of such isolated hatchery programs is unknown. It is uncertain whether the Lower Columbia River coho isolated hatchery programs are capable of mitigating risks to ESU abundance and productivity into the foreseeable future. In isolation, these programs may also become more than moderately diverged from the evolutionary legacy of the ESU, and hence no longer merit inclusion in the ESU. Under either circumstance, the ability of artificial propagation to buffer the immediacy of extinction risk over the long-term is uncertain. Informed by the BRT's findings (NMFS, 2003b) and NMFS' assessment of the short- and long-term effects of artificial propagation programs on the viability of the ESU (NMFS, 2004b), the Artificial Propagation Evaluation Workshop concluded that the Lower Columbia coho ESU in-total is ''likely to become endangered in the foreseeable future'' (NMFS, 2004c).

Columbia River Chum ESU

Approximately 90 percent of the historical populations in the Columbia River chum ESU are extirpated or nearly so. During the 1980s and 1990s, the combined abundance of natural spawners for the Lower and Upper Columbia River Gorge, Washougal, and Grays River populations was below 4,000 adults. In 2002, however, the abundance of natural spawners exhibited a substantial increase evident at several locations in the ESU. The preliminary estimate of natural spawners is approximately 20,000 adults. The cause of this dramatic increase in abundance is unknown. Improved ocean conditions, the initiation of a supplementation program in the Grays River, improved flow management at Bonneville Dam, favorable freshwater conditions, and increased survey sampling effort may all have contributed to the elevated 2002 abundance. However, long- and short-term productivity trends for ESU populations are at or below replacement. The loss of off-channel habitats and the extirpation of approximately 17 historical populations increase the ESU's vulnerability to environmental variability and catastrophic events. The populations that remain are low in abundance, and have limited distribution and poor connectivity.

The BRT found high risks for each of the VSP categories, particularly for ESU spatial structure and diversity. Informed by this risk assessment, the majority opinion of the BRT was that the naturally spawned component of the Columbia River chum ESU is ''likely to become endangered within the foreseeable future,'' with a minority opinion that it is ''in danger of extinction.''

There are three artificial propagation programs producing chum salmon considered to be part of the Columbia River chum ESU. These are conservation programs designed to support natural production. The Washougal Hatchery artificial propagation program provides artificially propagated chum salmon for re-introduction into recently restored habitat in Duncan Creek, Washington. This program also provides a safety-net for the naturally spawning population in the mainstem Columbia River below Bonneville Dam, which can access only a portion of spawning habitat during low flow conditions. The other two programs are designed to augment natural production in the Grays River and the Chinook River in Washington. All these programs use naturally produced adults for broodstock. These programs were only recently established (1998–2002), with the first hatchery chum returning in 2002.

NMFS' assessment of the effects of artificial propagation on ESU extinction risk concluded that these hatchery programs collectively do not substantially reduce the extinction risk of the ESU in-total (NMFS, 2004c). The Columbia River chum hatchery programs have only recently been initiated, and are beginning to provide benefits to ESU abundance. The contribution of ESU hatchery programs to the productivity of the ESU in-total is uncertain. The Sea Resources and Washougal Hatchery programs have begun to provide benefits to ESU spatial structure through reintroductions of chum salmon into restored habitats in the Chinook River and Duncan Creek, respectively. These three programs have a neutral effect on ESU diversity. Collectively, artificial propagation programs in the ESU provide a slight beneficial effect to ESU abundance and spatial structure, but have neutral or uncertain effects on ESU productivity and diversity. Informed by the BRT's findings (NMFS, 2003b) and NMFS' assessment of the effects of artificial propagation programs on the viability of the ESU (NMFS, 2004b), the Artificial Propagation Evaluation Workshop concluded that the Columbia River chum ESU in-total is ''likely to become endangered in the foreseeable future'' (NMFS, 2004c).

Hood Canal Summer Chum ESU

Adult returns for some populations in the Hood Canal summer-run chum ESU showed modest improvements in 2000, with upward trends continuing in 2001 and 2002. The recent 5-year mean abundance is variable among populations in the ESU, ranging from one fish to nearly 4,500 fish. Hood Canal summer-run chum are the focus of an extensive rebuilding program developed and implemented since 1992 by the state and tribal co-managers. Two populations (the combined Quilcene and Union River populations) are above the conservation thresholds established by the rebuilding plan. However, most populations remain depressed. Estimates of the fraction of naturally spawning hatchery fish exceed 60 percent for some populations, indicating that reintroduction programs are supplementing the numbers of total fish spawning naturally in streams. Long-term trends in productivity are above replacement for only the Quilcene and Union River populations. Buoyed by recent increases, seven populations are exhibiting short-term productivity trends above replacement. Of an estimated 16 historical populations in the ESU, seven populations are believed to have been extirpated or nearly extirpated. Most of these extirpations have occurred in populations on the eastern side of Hood Canal, generating additional concern for ESU spatial structure. The widespread loss of estuary and lower floodplain habitat was noted by the BRT as a continuing threat to ESU spatial structure and connectivity. There is some concern that the Quilcene hatchery stock is exhibiting high rates of straying, and may represent a risk to historical population structure and diversity. However, with the extirpation of many local populations, much of this historical structure has been lost, and the use of Quilcene hatchery fish may represent one of a few remaining options for Hood Canal summer-run chum conservation.

The BRT found high risks for each of the VSP categories. Informed by this risk assessment, the majority opinion of the BRT was that the naturally spawned component of the Hood Canal summer-run chum ESU is ''likely to become endangered within the foreseeable future,'' with a minority opinion that the ESU is ''in danger of extinction.''

There are currently eight programs releasing summer chum salmon that are considered to be part of the Hood Canal summer chum ESU (Table 2). Six of the

programs are supplementation programs implemented to preserve and increase the abundance of native populations in their natal watersheds. These supplementation programs propagate and release fish into the Salmon Creek, Jimmycomelately Creek, Big Quilcene River, Hamma Hamma River, Lilliwaup Creek, and Union River watersheds. The remaining two programs use transplanted summer-run chum salmon from adjacent watersheds to reintroduce populations into Big Beef Creek and Chimacum Creek, where the native populations have been extirpated. Each of the hatchery programs includes research, monitoring, and evaluation activities designed to determine success in recovering the propagated populations to viable levels, and to determine the demographic, ecological, and genetic effects of each program on target and non-target salmonid populations. All the Hood Canal summer-run chum hatchery programs will be terminated after 12 years of operation.

NMFS'' assessment of the effects of artificial propagation on ESU extinction risk concluded that these hatchery programs collectively do not substantially reduce the extinction risk of the ESU in-total (NMFS 2004c). The hatchery programs are benefiting ESU abundance by increasing total ESU abundance as well as the number of naturally spawning summer-run chum salmon. Several of the programs have likely prevented further population extirpations in the ESU. The contribution of ESU hatchery programs to the productivity of the ESU in-total is uncertain. The hatchery programs are benefiting ESU spatial structure by increasing the spawning area utilized in several watersheds and by increasing the geographic range of the ESU through reintroductions. These programs also provide benefits to ESU diversity. By bolstering total population sizes, the hatchery programs have likely stemmed adverse genetic effects for populations at critically low levels. Additionally, measures have been implemented to maintain current genetic diversity, including the use of native broodstock and the termination of the programs after 12 years of operation to guard against long-term domestication effects. Collectively, artificial propagation programs in the ESU presently provide a slight beneficial effect to ESU abundance, spatial structure, and diversity, but uncertain effects to ESU productivity. The long-term contribution of these programs after they are terminated is uncertain. Despite the current benefits provided by the comprehensive hatchery conservation efforts for Hood Canal summer-run chum, the ESU remains at low overall abundance with nearly half of historical populations extirpated. Informed by the BRT's findings (NMFS, 2003b) and NMFS'' assessment of the effects of artificial propagation programs on the viability of the ESU (NMFS, 2004b), the Artificial Propagation Evaluation Workshop concluded that the Hood Canal summer-run chum ESU in-total is ''likely to become endangered in the foreseeable future'' (NMFS, 2004c).

Southern California *O. mykiss* ESU

Assessing the extinction risk for the Southern California *O. mykiss* ESU is made difficult by the general lack of historical or recent data for this ESU, and the uncertainty generated by this paucity of information. The historical steelhead run for four of the major river systems in the ESU is estimated to have been between 32,000 and 46,000 adults. Recent run size for the same four systems, however, has been estimated to be fewer than 500 total adults. Run sizes in river systems within the ESU are believed to range between less than five anadromous adults per year, to less than 100 anadromous adults per year. However, the available data are insufficient to estimate abundance levels or trends in productivity. Of 65 river drainages where *O. mykiss* is known to have occurred historically, between 26 and 52 percent are still occupied (uncertainty in this estimate is the result of the inaccessibility of 17 basins to population surveys). Colonization events of *O. mykiss* were documented during 1996–2002 in Topanga and San Mateo Creeks. These colonization events were represented by few spawning adults or the observation of a single individual. Twenty-two basins are considered vacant, extirpated, or nearly extirpated due to dewatering or the establishment of impassable barriers below all spawning habitats. Except for the colonization of a small population in San Mateo Creek in northern San Diego County, the anadromous form of the Southern California *O. mykiss* ESU appears to have been completely extirpated from nearly all systems in the southern portion of the ESU from Malibu Creek to the Mexican border. Recently, the presence and spawning of anadromous *O. mykiss* has been observed in two streams south of Malibu Creek (in Topanga and San Mateo Creeks), prompting the extension of the ESU's boundaries to the U.S.-Mexico border in 2000 (67 FR 21586; May 1, 2002).

Historically, resident fish are believed to have occurred in all areas in the ESU used by steelhead, although the current distribution is more restricted. Little or no information is available regarding resident populations considered to be part of this ESU. Due to the extremely low numbers of anadromous fish in this ESU, resident populations may comprise a substantial proportion of fish in the ESU. For some BRT members, the presence of relatively numerous resident fish reduces risks to ESU abundance, but provides an uncertain contribution to ESU productivity, spatial structure, and diversity (NMFS, 2003b; 2004a).

The BRT found extremely high risks for each of the four VSP categories. Informed by this assessment, the strong majority opinion of the BRT was that the Southern California *O. mykiss* ESU is ''in danger of extinction.'' The minority opinion was that the ESU is ''likely to become endangered within the foreseeable future.'' There are no artificially propagated populations of *O. mykiss* in this ESU that mitigate the BRT's assessment that the ESU is ''in danger of extinction.''

South-Central California Coast O. mykiss ESU

There is a paucity of abundance information for the South-Central California Coast *O. mykiss* ESU. Data are not available for the two largest river systems in the ESU, the Pajaro and Salinas basins. These systems are much degraded and are expected to have steelhead runs reduced in size from historical levels. Data available for the Carmel River underscore the population's vulnerability to drought conditions, as well as its dependence on the intensive management of the river system. The most recent 5-year mean abundance of fish in the Carmel River is approximately 600 adults. Despite observed and inferred declines in abundance, the current spatial distribution of the anadromous life form in the ESU does not appear to be much reduced from what occurred historically. *O. mykiss* are present in approximately 86 to 95 percent of historically occupied streams (the uncertainty in the estimated occupancy is due to three streams that could not be accessed for population surveys). The BRT was concerned, however, that the larger Pajaro and Salinas basins are spatially and ecologically distinct from other ESU populations, such that further degradation of these areas will negatively impact ESU spatial structure and diversity. Historically, resident fish are believed to have occurred in all areas in the ESU used by steelhead, although current distribution is more restricted. For some BRT members,

presence of relatively numerous resident fish reduces risks to ESU abundance, but provides an uncertain contribution to ESU productivity, spatial structure, and diversity (NMFS, 2003b; 2004a). The BRT found high risks for each of the four VSP categories, particularly for spatial structure. Informed by this assessment, the strong majority opinion of the BRT was that the South-Central Coast *O. mykiss* ESU is ''likely to become endangered within the foreseeable future.'' The minority opinion was that the ESU is ''in danger of extinction.'' There are no artificially propagated populations of *O. mykiss* in this ESU that mitigate the BRT's assessment that the ESU is ''likely to become endangered within the foreseeable future.''

Central California Coast *O. mykiss* ESU

There are no time series of population abundance data for the naturally spawning component of the Central California Coast *O. mykiss* ESU. The naturally spawning population in the largest river system in the ESU, the Russian River, is believed to have declined seven-fold since the mid-1960s. Juvenile density information is available for five ''representative'' populations, and each exhibits a downward decline over the last 8 years of available data. Predation by increasing numbers of California sea lions at river mouths and during the ocean phase was noted as a recent development also posing significant risk. Juvenile *O. mykiss* have been observed in approximately 82 percent of historically occupied streams, indicating that the ESU continues to be spatially well distributed. However, impassible dams have cut off substantial portions of spawning habitat in some basins, generating concern about the spatial structure of the naturally spawning component of the ESU. Historically, resident fish are believed to have occurred in all areas in the ESU used by steelhead, although current distribution is more restricted. For some BRT members, the presence of resident fish reduces risks to ESU natural abundance, but provides an uncertain contribution to ESU productivity, spatial structure, and diversity (NMFS, 2003b; 2004a). The BRT found moderately high risk for the abundance and productivity VSP risk categories for naturally spawning fish, and comparatively less risk for the spatial structure and diversity categories. Informed by this risk assessment, the majority opinion of the BRT was that the naturally spawned component of the Central California Coast *O. mykiss* ESU is ''likely to become endangered within the foreseeable future.'' The minority opinion was that the ESU is ''in danger of extinction.''

Two artificial propagation programs are considered to be part of the Central California Coast *O. mykiss* ESU (Table 2; NMFS, 2004b). One program is located in the northernmost river in the ESU (Don Clausen hatchery on the Russian River), while the other is located in the southern portion of the ESU (Monterey Bay Salmon and Trout Project on the Scott River) where the extinction risk for local populations is thought to be higher. The hatchery on the Russian River is a relatively large-scale mitigation program which is primarily intended to support recreational fisheries for steelhead in this watershed. This program was established primarily with local broodstock, but has not integrated natural-origin fish into the broodstock since 2000, and is, therefore, isolated from the natural spawning component of the ESU. Escapement to the hatchery is substantial, but there are no estimates of overall Russian River *O. mykiss* abundance, nor are there any estimates of the contribution of hatchery-origin fish to overall abundance. The artificial propagation program on Scott Creek is much smaller than the Russian River program. It incorporates natural-origin fish from Scott Creek and nearby San Lorenzo Creek for broodstock and is currently operated for the purpose of restoring the local natural population.

NMFS' assessment of the effects of these two artificial propagation programs on the viability of the ESU in-total concluded that they decrease risk to some degree by contributing to increased ESU fish abundance, but have neutral or uncertain effects on productivity, spatial structure or diversity of the ESU (NMFS, 2004b). Hatchery origin steelhead from the Don Clausen hatchery program on the Russian River have been increasing in abundance for the past several years, but many fish return to the hatchery or are harvested and there is no information documenting the extent to which hatchery origin fish spawn naturally. Though there is natural spawning of steelhead in the Russian River system, the abundance of spawners has not been documented. There is no information documenting whether the Monterey Bay Salmon and Trout Project program is increasing local abundance of natural steelhead, but the program was recently converted from one that supported a fishery to one that is attempting to restore the local natural population. Effects of these artificial propagation programs on productivity are uncertain, and no efforts are currently underway to assess the effects of productivity on the naturally spawning component of the ESU. The Don Clausen hatchery population has been increasing in abundance and has a relatively high level of productivity, but it is managed to support a fishery rather than to augment naturally spawning local populations. Hatchery origin steelhead from both programs generally occur in the same areas as natural origin fish, and there is no information indicating that either program has resulted in an expanded distribution of the ESU in-total, thus effects to ESU spatial structure are likely neutral. The Don Clausen program uses only hatchery-origin fish for broodstock, and this is likely to lead to divergence of the hatchery stock from the local natural population and pose a risk to local populations. The Monterey Bay Salmon and Trout Program uses wild broodstock to minimize domestication effects and is operated to assist in the restoration of local stocks. However, it is uncertain to what extent the program serves to preserve genetic diversity in the ESU. Informed by the BRT's findings (NMFS, 2003b) and NMFS' assessment of the effects of artificial propagation programs on the viability of the ESU (NMFS, 2004b), the Artificial Propagation Evaluation Workshop concluded that the Central California Coast *O. mykiss* ESU in-total is ''likely to become endangered in the foreseeable future'' (NMFS, 2004c).

California Central Valley *O. mykiss* ESU

Little information is available regarding the viability of the naturally spawning component of the California Central Valley *O. mykiss* ESU. Anadromous *O. mykiss* spawning above the Red Bluff Diversion Dam (RBDD) have a small population size (the most recent 5-year mean is less than 2,000 adults) and exhibit strongly negative trends in abundance and population growth rate. However, there have not been any escapement estimates made for the area above RBDD since the mid 1990's. The only recent ESU-level estimate of abundance is a crude extrapolation from the incidental catch of out-migrating juvenile steelhead captured in a midwater-trawl sampling program for juvenile chinook salmon below the confluence of the Sacramento and San Joaquin Rivers. The extrapolated abundance of naturally spawning female steelhead involves broad assumptions about female fecundity (number of eggs produced per female) and egg-to-smolt survival rates. Based on this extrapolation, it is estimated that on average during 1998–2000, approximately 181,000 juvenile

steelhead were produced naturally each year in the Central Valley by approximately 3,600 spawning female steelhead. It is estimated that there were 1 to 2 million spawners in the Central Valley prior to 1850, and approximately 40,000 spawners in the 1960s. Although it appears that *O. mykiss* remain widely distributed in Sacramento River tributaries, the vast majority of historical spawning areas are currently above impassable dams. The BRT also expressed concern about the effects of significant production of out-of-ESU hatchery steelhead in the American (Nimbus Hatchery) and Mokelumne (Mokelumne River Hatchery) Rivers. Historically, resident fish are believed to have occurred in all areas in the ESU used by steelhead, although current distribution is more restricted. For some BRT members, the presence of resident fish reduces risks to ESU abundance somewhat, but provides an uncertain contribution to ESU productivity, spatial structure, and diversity (NMFS, 2003b; 2004a). The BRT found high risk for the abundance, productivity, and spatial structure VSP categories, and moderately high risk for the diversity category. Informed by this risk assessment, the majority opinion of the BRT was that the naturally spawned component of the California Central Valley *O. mykiss* ESU is ''in danger of extinction.'' The minority opinion was that the naturally spawned component of the ESU is ''likely to become endangered within the foreseeable future.''

There are two artificial propagation programs considered to be part of the Central Valley *O. mykiss* ESU (Table 2; NMFS, 2004b). Both programs are located in the Sacramento River Basin and are large-scale mitigation facilities intended to support recreational fisheries for steelhead rather than to supplement naturally spawning populations. The Coleman NFH is located on Battle Creek, a tributary in the upper Sacramento River. The program has been in operation for several decades and has a production goal of 600,000 smolts per year. Broodstock was originally derived from local or nearby Sacramento River stocks, and all hatchery production is marked to facilitate harvest management and minimize impacts on natural origin fish. The natural population of *O. mykiss* in Battle Creek is integrated with the hatchery population, though the hatchery bypasses natural origin fish into the upper portion of the watershed above the hatchery. The Feather River Hatchery is located on the Feather River, a major tributary in the upper Sacramento River basin. The program has also been operated for several decades and has a production goal of 400,000 smolts per year. Broodstock was originally derived from local or nearby stocks, and all hatchery production is marked to allow harvest and also minimize impacts on natural origin fish. The natural population in the Feather River is integrated with the hatchery population.

NMFS' assessment of the effects of these two artificial propagation programs on the viability of the ESU in-total concluded that they decrease risk to some degree by contributing to increased abundance of the ESU, but have a neutral or uncertain effect on productivity, spatial structure and diversity of the ESU (NMFS, 2004b). Both the Coleman NFH and Feather River hatchery programs have increased abundance of fish in the ESU in-total; however, both programs are operated to support recreational harvest rather than to supplement natural spawning populations. Thus, much of the production is targeted for harvest and for use as broodstock, and the contribution to naturally spawning populations is uncertain. In the future, Coleman NFH may use some hatchery fish as part of an effort to supplement steelhead production in Upper Battle Creek above the hatchery. Effects of these programs on ESU diversity are uncertain, but both programs incorporate natural origin fish into the broodstock to minimize divergence from naturally spawning local populations. The available genetic information suggests that both hatchery populations are genetically similar to natural origin fish in the upper Sacramento River basin. Effects on productivity are uncertain, but the Coleman NFH program is conducting a study to evaluate hatchery origin steelhead productivity relative to natural origin fish in Battle Creek. There is limited spawning habitat in both the Feather River and lower Battle Creek, so it is possible that high returns of hatchery fish to these watersheds will compete with local natural origin spawners for habitat, thereby reducing overall productivity. The Feather River hatchery program does not affect ESU spatial structure, however, the Coleman NFH program may have some limited beneficial effects in the future. The hatchery currently passes all natural origin fish into the upper Battle Creek watershed, but may supplement this with hatchery origin fish in coordination with ongoing restoration efforts in upper Battle Creek. Informed by the BRT's findings (NMFS, 2003b) and NMFS' assessment of the effects of artificial propagation programs on the viability of the ESU (NMFS, 2004b), the Artificial Propagation Evaluation Workshop concluded that the California Central Valley *O. mykiss* ESU in-total is ''in danger of extinction'' (NMFS, 2004c).

Northern California *O. mykiss* ESU

There is little historical abundance information for the naturally spawning portion of the Northern California *O. mykiss* ESU. However, the available data (dam counts on the Eel and Mad Rivers) indicate a substantial decline from the abundance levels of the 1930s. The three available summer steelhead data sets exhibit recent 5-year mean abundance levels from three to 418 adults, and exhibit downward short- and long-term trends. The short- and long-term abundance trends for the one current winter steelhead data series show a slightly positive trend. However, the recent 5-year mean abundance level is extremely low (32 adults). The juvenile density data for six of ten (putative) independent populations exhibit declining trends. Despite low abundance and downward trends, *O. mykiss* appears to be still widely distributed throughout this ESU. The BRT expressed concern about ESU diversity due to the low effective population sizes in the ESU, and concern over interactions with the Mad River Hatchery stock that is not considered to be part of the ESU. This hatchery program is being terminated in 2004. Thus potential genetic risks associated with propagation of this non-ESU stock will decline in the future. Historically, resident fish are believed to have occurred in all areas in the ESU used by steelhead, although current distribution is more restricted. In this ESU, resident fish do not substantially increase the total ESU abundance. The BRT did not consider resident fish to reduce risks to ESU abundance, and their contribution to ESU productivity, spatial structure, and diversity is uncertain (NMFS, 2003b; 2004a). The BRT found high risk for the abundance VSP category, and moderately high risk for productivity. The ESU spatial structure and diversity categories were of comparatively lower concern. Informed by this assessment, the majority opinion of the BRT was that the naturally spawned component of the Northern California *O. mykiss* ESU is ''likely to become endangered within the foreseeable future.'' The minority BRT opinion was split between the ''in danger of extinction'' and ''not in danger of extinction or likely to become

endangered within the foreseeable future.''

There are two small artificial propagation programs producing steelhead considered to be part of the Northern California *O. mykiss* ESU (Table 2; NMFS, 2004b). These propagation programs (Yager Creek and N.F. Gualala River hatchery) are very small ventures aimed at augmenting local steelhead abundance, and both were in operation for over two decades. The Yager Creek hatchery has not been in operation for the past few years, and there are currently no plans to reopen it. The Gualala River Project has terminated the hatchbox portion of its operation but is continuing with a juvenile rescue and rearing program.

NMFS' assessment of the effects of these two artificial propagation programs on the viability of the ESU in-total concluded that they may decrease risk to some degree by contributing to increased abundance of the ESU, but have a neutral or uncertain effect on productivity, spatial structure and diversity of the ESU (NMFS, 2004b). Both programs may have increased local natural population abundance to a limited degree in the past, but with the termination of the artificial propagation activities in both programs' future, benefits to ESU abundance are unlikely to continue. Effects on ESU productivity are uncertain, but continuation of the rescue and rearing program by the Gualala River project may provide some limited benefits locally through the salvage of fish that would otherwise be lost from the population. There is no information to assess whether either program had any effect on ESU spatial structure, but because of their relatively small size it is unlikely to have had much effect. Past operations at both hatchery facilities used local stock and incorporated only local natural origin fish in the broodstock. Thus adverse effects on local population diversity were minimized. The juvenile rescue and rearing program operated by the Gualala River project rescues up to 15,000 fish of all year classes in some years. Thus it can serve to preserve local genetic diversity that would otherwise be lost due to adverse habitat conditions. Informed by the BRT's findings (NMFS, 2003b) and NMFS' assessment of the effects of artificial propagation programs on the viability of the ESU (NMFS, 2004b), the Artificial Propagation Evaluation Workshop concluded that the Northern California *O. mykiss* ESU in-total is ''likely to become endangered in the foreseeable future'' (NMFS, 2004c).

Upper Willamette River *O. mykiss* ESU

The BRT was encouraged by significant increases in adult returns (exceeding 10,000 total fish) in 2001 and 2002 for the Upper Willamette River *O. mykiss* ESU. The recent 5-year mean abundance, however, remains low for an entire ESU (5,819 adults), and individual populations remain at low abundance. Long-term trends in abundance are negative for all populations in the ESU, reflecting a decade of consistently low returns during the 1990s. Short-term trends, buoyed by recent strong returns, are positive. Approximately one-third of the ESU's historically accessible spawning habitat is now blocked. Notwithstanding the lost spawning habitat, the ESU continues to be spatially well distributed in the ESU, occupying each of the four major subbasins (the Mollala, North Santiam, South Santiam, and Calapooia Rivers). There is some uncertainty about the historical occurrence of *O. mykiss* in the Oregon Coastal Range drainages. Coastal cutthroat trout is a dominant species in the Willamette Basin, and thus *O. mykiss* is not expected to have been as widespread in this ESU as they are east of the Cascade Mountains. The BRT considered the cessation of the ''early'' winter-run hatchery program a positive sign for ESU diversity risk, but remained concerned that releases of non-native summer steelhead continue. Because coastal cutthroat trout is dominant in the basin, resident *O. mykiss* are not as abundant or widespread here as in the inland *O. mykiss* ESUs. The BRT did not consider resident fish to reduce risks to ESU abundance, and their contribution to ESU productivity, spatial structure, and diversity is uncertain (NMFS, 2003b; 2004a).

The BRT found moderate risks for each of the VSP categories. Based on this risk assessment, the majority opinion of the BRT was that the Upper Willamette River *O. mykiss* ESU is ''likely to become endangered within the foreseeable future.'' The minority BRT opinion was that the ESU is ''not in danger of extinction or likely to become endangered within the foreseeable future.''

Lower Columbia River *O. mykiss* ESU

Some anadromous populations in the Lower Columbia River *O. mykiss* ESU, particularly summer-run steelhead populations, have shown encouraging increases in abundance in the last 2 to 3 years. However, population abundance levels remain small (no population has a recent 5-year mean abundance greater than 750 spawners). The BRT could not conclusively identify a single population that is naturally viable. A number of populations have a substantial fraction of hatchery-origin spawners, and are hypothesized to be sustained largely by hatchery production. Long-term trends in spawner abundance are negative for seven of nine populations for which there are sufficient data, and short-term trends are negative for five of seven populations. It is estimated that four historical populations have been extirpated or nearly extirpated, and only one-half of 23 historical populations currently exhibit appreciable natural production. Although approximately 35 percent of historical habitat has been lost in this ESU due to the construction of dams or other impassible barriers, the ESU exhibits a broad spatial distribution in a variety of watersheds and habitat types. The BRT was particularly concerned about the impact on ESU diversity of the high proportion of hatchery-origin spawners in the ESU, the disproportionate declines in the summer steelhead life history, and the release of non-native hatchery summer steelhead in the Cowlitz, Toutle, Sandy, Lewis, Elochoman, Kalama, Wind, and Clackamas Rivers. Resident fish are not as abundant in this ESU as they are in the inland *O. mykiss* ESUs. The BRT did not consider resident fish to reduce risks to ESU abundance, and their contribution to ESU productivity, spatial structure, and diversity is uncertain (NMFS, 2003b; 2004a).

The BRT found moderate risks in each of the VSP categories. Informed by this assessment the majority opinion of the BRT was that the naturally spawned component of the Lower Columbia River *O. mykiss* ESU is ''likely to become endangered within the foreseeable future.'' The minority opinion was that the ESU is ''not in danger of extinction or likely to become endangered within the foreseeable future.''

There are 10 artificial propagation programs releasing hatchery steelhead that are considered to be part of the Lower Columbia River *O. mykiss* ESU (Table 2). All of these programs are designed to produce fish for harvest, but several are also implemented to augment the natural spawning populations in the basins where the fish are released. Four of these programs are part of research activities to determine the effects of artificial propagation programs that use naturally produced steelhead for broodstock in an attempt to minimize the genetic effects of returning hatchery adults that spawn naturally. One of these programs, the Cowlitz River late-run winter steelhead

program, is also producing fish for release into the upper Cowlitz River Basin in an attempt to re-establish a natural spawning population above Cowlitz Falls Dam.

NMFS' assessment of the effects of artificial propagation on ESU extinction risk concluded that these hatchery programs collectively do not substantially reduce the extinction risk of the ESU in-total (NMFS, 2004c). The hatchery programs have reduced risks to ESU abundance by increasing total ESU abundance and the abundance of fish spawning naturally in the ESU. The contribution of ESU hatchery programs to the productivity of the ESU in-total is uncertain. It is also uncertain if reintroduced steelhead into the Upper Cowlitz River will be viable in the foreseeable future, as outmigrant survival appears to be quite low. As noted by the BRT, out-of-ESU hatchery programs have negatively impacted ESU productivity. The within-ESU hatchery programs provide a slight decrease in risks to ESU spatial structure, principally through the re-introduction of steelhead into the Upper Cowlitz River Basin. The eventual success of these reintroduction efforts, however, is uncertain. Harvest augmentation programs that have instituted locally-adapted natural broodstock protocols (*e.g.*, the Sandy, Clackamas, Kalama, and Hood River programs) have reduced adverse genetic effects and benefited ESU diversity. Non-ESU hatchery programs in the Lower Columbia River remain a threat to ESU diversity. Collectively, artificial propagation programs in the ESU provide a slight beneficial effect to ESU abundance, spatial structure, and diversity, but uncertain effects to ESU productivity. Informed by the BRT's findings (NMFS, 2003b) and NMFS' assessment of the effects of artificial propagation programs on the viability of the ESU (NMFS, 2004b), the Artificial Propagation Evaluation Workshop concluded that the Lower Columbia River *O. mykiss* ESU in-total is ''likely to become endangered in the foreseeable future'' (NMFS, 2004c).

Middle Columbia River *O. mykiss* ESU

The abundance of natural populations in the Middle Columbia River *O. mykiss* ESU has increased substantially over the past 5 years. The Deschutes and Upper John Day Rivers have recent 5-year mean abundance levels in excess of their respective interim recovery target abundance levels (NMFS, 2002). Due to an uncertain proportion of out-of-ESU strays in the Deschutes River, the recent increases in this population are difficult to interpret. (It is worth noting that these interim recovery targets articulate the geometric mean of natural-origin spawners to be sustained over a period of 8 years or approximately two salmonid generations, as well as a geometric mean natural replacement rate greater than one). The Umatilla River recent 5-year mean natural population abundance is approximately 72 percent of its interim recovery target abundance level. The natural populations in the Yakima River, Klickitat River, Touchet River, Walla Walla River, and Fifteenmile Creek, however, remain well below their interim recovery target abundance levels. Long-term trends for 11 of the 12 production areas in the ESU were negative, although it was observed that these downward trends are driven, at least in part, by a peak in returns in the middle to late 1980s, followed by relatively low escapement levels in the early 1990s. Short-term trends in the 12 production areas were mostly positive from 1990 to 2001. The continued low number of natural returns to the Yakima River (10 percent of the interim recovery target abundance level, historically a major production center for the ESU) generated concern among the BRT. However, anadromous and resident *O. mykiss* remain well distributed in the majority of subbasins in the Middle Columbia River ESU. The presence of substantial numbers of out-of-basin (and largely out-of-ESU) natural spawners in the Deschutes River, raised substantial concern regarding the genetic integrity and productivity of the native Deschutes population. The extent to which this straying is an historical natural phenomenon is unknown. The cool Deschutes River temperatures may attract fish migrating in the comparatively warmer Columbia River waters, thus inducing high stray rates. The BRT noted the particular difficulty in evaluating the contribution of resident fish to ESU-level extinction risk. Several sources indicate that resident fish are very common in the ESU and may greatly outnumber anadromous fish. The BRT concluded that the relatively abundant and widely distributed resident fish in the ESU reduce risks to overall ESU abundance, but provide an uncertain contribution to ESU productivity, spatial structure, and diversity (NMFS, 2003b; 2004a).

The BRT found moderate risk in each of the VSP categories, with the greatest relative risk being attributed to the ESU abundance category. Informed by this assessment, the opinion of the BRT was closely divided between the ''likely to become endangered within the foreseeable future'' and ''not in danger of extinction or likely to become endangered within the foreseeable future'' extinction risk categories.

There are seven hatchery steelhead programs considered to be part of the Middle Columbia River *O. mykiss* ESU. These programs propagate steelhead in three of 16 ESU populations, and improve kelt (post-spawned steelhead) survival in one population. There are no artificial programs producing the winter-run life history in the Klickitat River and Fifteenmile Creek populations. All of the ESU hatchery programs are designed to produce fish for harvest, although two are also implemented to augment the natural spawning populations in the basins where the fish are released. The artificial propagation programs that produce these latter two hatchery stocks in the Umatilla River (Oregon) and the Touchet River (Washington) use naturally produced adults for broodstock. The remaining programs do not incorporate natural adults into the broodstock.

NMFS' assessment of the effects of artificial propagation on ESU extinction risk concluded that these hatchery programs collectively do not substantially reduce the extinction risk of the ESU in-total (NMFS, 2004c). ESU hatchery programs may provide a slight benefit to ESU abundance. Artificial propagation increases total ESU abundance, principally in the Umatilla and Deschutes Rivers. The kelt reconditioning efforts in the Yakima River do not augment natural abundance, but do benefit the survival of the natural populations. The Touchet River hatchery program has only recently been established, and its contribution to ESU viability is uncertain. The contribution of ESU hatchery programs to the productivity of the three target populations, and the ESU in-total, is uncertain. The hatchery programs affect a small proportion of the ESU, providing a negligible contribution to ESU spatial structure. Overall the impacts to ESU diversity are neutral. The Umatilla River program, through the incorporation of natural broodstock, likely limits adverse effects to population diversity. The Deschutes River hatchery program may be decreasing population diversity. The recently initiated Touchet River endemic program is attempting to reduce adverse effects to diversity through the elimination of out-of-ESU Lyons Ferry Hatchery steelhead stock. Collectively, artificial propagation programs in the ESU provide a slight beneficial effect to ESU abundance, but have neutral or uncertain effects on ESU productivity, spatial structure, and

diversity. Informed by the BRT's findings (NMFS, 2003b) and NMFS' assessment of the effects of artificial propagation programs on the viability of the ESU (NMFS, 2004b), the Artificial Propagation Evaluation Workshop concluded that the Middle Columbia River *O. mykiss* ESU in-total is ''likely to become endangered in the foreseeable future'' (NMFS, 2004c).

Upper Columbia River *O. mykiss* **ESU**

The last 2–3 years have seen an encouraging increase in the number of naturally produced fish in the Upper Columbia River *O. mykiss* ESU. The 1996–2001 average return through the Priest Rapids Dam fish ladder (just below the upper Columbia steelhead production areas) was approximately 12,900 total adults (including both hatchery and natural origin fish), compared to 7,800 adults for 1992–1996. However, the recent 5-year mean abundances for naturally spawned populations in this ESU are 14 to 30 percent of their interim recovery target abundance levels. Despite increases in total abundance in the last few years, the BRT was frustrated by the general lack of detailed information regarding the productivity of natural populations. The BRT did not find data to suggest that the extremely low replacement rate of naturally spawning fish (0.25–0.30 at the time of the last status review in 1998) has appreciably improved. The predominance of hatchery-origin natural spawners (approximately 70 to 90 percent of adult returns) is a significant source of concern for ESU diversity, and generates uncertainty in evaluating trends in natural abundance and productivity. However, the natural component of the anadromous run over Priest Rapids Dam has increased from an average of 1,040 (1992–1996) to 2,200 (1997–2001). This pattern however is not consistent for other production areas within the ESU. The mean proportion of natural-origin spawners declined by 10 percent from 1992–1996 to 1997–2001. For many BRT members, the presence of relatively numerous resident fish reduces risks to ESU abundance, but provides an uncertain contribution to ESU productivity, spatial structure, and diversity (NMFS, 2003b; 2004a).

The BRT found high risk for the productivity VSP category, with comparatively lower risk for the abundance, diversity, and spatial structure categories. Informed by this risk assessment, the slight majority BRT opinion concerning the naturally spawned component of the Upper Columbia River *O. mykiss* ESU was in the ''in danger of extinction'' category, and the minority opinion was that the ESU is ''likely to become endangered within the foreseeable future.''

Six artificial propagation programs that produce hatchery steelhead in the Upper Columbia River basin are considered to be part of the Upper Columbia River *O. mykiss* ESU. These programs are intended to contribute to the recovery of the ESU by increasing the abundance of natural spawners, increasing spatial distribution, and improving local adaptation and diversity (particularly with respect to the Wenatchee River steelhead). Research projects to investigate the spawner productivity of hatchery-reared fish are being developed. Some of the hatchery-reared steelhead adults that return to the basin may be in excess of spawning population needs in years of high survival conditions, potentially posing a risk to the naturally spawned populations in the ESU. The artificial propagation programs included in this ESU adhere to strict protocols for the collection, rearing, maintenance, and mating of the captive brood populations. The programs include extensive monitoring and evaluation efforts to continually evaluate the extent and implications of any genetic and behavioral differences that might emerge between the hatchery and natural stocks. Genetic evidence suggests that these programs remain closely related to the naturally-spawned populations and maintain local genetic distinctiveness of populations within the ESU. HCPs (with the Chelan and Douglas Public Utility Districts) and binding mitigation agreements ensure that these programs will have secure funding and will continue into the future. These hatchery programs have undergone ESA section 7 consultation to ensure that they do not jeopardize the recovery of the ESU, and they have received ESA section 10 permits for production though 2007. Annual reports and other specific information reporting requirements are used to ensure that the terms and conditions as specified by NMFS are followed. These programs, through adherence to best professional practices, have not experienced disease outbreaks or other catastrophic losses.

NMFS' assessment of the effects of artificial propagation on ESU extinction risk concluded that hatchery programs collectively mitigate the immediacy of extinction risk for the Upper Columbia River *O. mykiss* ESU in-total in the short term, but that the contribution of these programs in the foreseeable future is uncertain (NMFS, 2004c). The ESU hatchery programs substantially increase total ESU returns, particularly in the Methow Basin where hatchery-origin fish comprise on average 92 percent of all returns. The contribution of hatchery programs to the abundance of naturally spawning fish is uncertain. The contribution of ESU hatchery programs to the productivity of the ESU in-total is uncertain. However, large numbers of hatchery-origin steelhead in excess of broodstock needs and what the available spawning habitat can support may decrease ESU productivity in-total. With increasing ESU abundance in recent years, naturally spawning hatchery-origin fish have expanded the spawning areas being utilized. Since 1996 efforts are being undertaken to establish the Wenatchee Basin programs separately from the Wells steelhead hatchery program. These efforts are expected to increase ESU diversity over time. There is concern that the high proportion of Wells hatchery steelhead spawning naturally in the Methow and Okanogan Basins may pose risks to ESU diversity by decreasing local adaptation. The Omak Creek program, although small in size, likely will increase population diversity over time. There has been concern that the early spawning components of the Methow and Wenatchee hatchery programs may represent a risk to ESU diversity. The recent transfer of these early-run components to the Ringold Hatchery on the mainstem Columbia River will benefit the diversity of the tributary populations, while establishing a genetic reserve on the mainstem Columbia River. Collectively, artificial propagation programs in the ESU benefit ESU abundance and spatial structure, but have neutral or uncertain effects on ESU productivity and diversity. Benefits of artificial propagation are more substantial in the Wenatchee Basin for abundance, spatial structure, and diversity. Informed by the BRT's findings (NMFS, 2003b) and NMFS' assessment of the effects of artificial propagation programs on the viability of the ESU (NMFS, 2004b), the Artificial Propagation Evaluation Workshop concluded that the Upper Columbia River *O. mykiss* ESU in-total is ''likely to become endangered in the foreseeable future'' (NMFS, 2004c).

Snake River Basin *O. mykiss* ESU

The paucity of information on adult spawning escapement for specific tributary production areas in the Snake River Basin *O. mykiss* ESU makes a quantitative assessment of viability difficult. Annual return estimates are limited to counts of the aggregate return over Lower Granite Dam, and spawner estimates for the Tucannon, Grande Ronde, and Imnaha Rivers. The 2001 Snake River steelhead return over Lower Granite Dam was substantially higher

relative to the low levels seen in the 1990s; the recent 5-year mean abundance (14,768 natural returns) is approximately 28 percent of the interim recovery target level. The abundance surveyed in sections of the Grande Ronde Imnaha and Tucannon Rivers was generally improved in 2001. However, the recent 5-year abundance and productivity trends were mixed. Five of the nine available data series exhibit positive long- and short-term trends in abundance. The majority of long-term population growth rate estimates for the nine available series were below replacement. The majority of short-term population growth rates were marginally above replacement, or well below replacement, depending upon the assumption made regarding the effectiveness of hatchery fish in contributing to natural production. The BRT noted that the ESU remains spatially well distributed in each of the 6 major geographic areas in the Snake River Basin. The BRT was concerned that the Snake River Basin steelhead ''B-run'' (steelhead with a 2-year ocean residence and larger body size that are believed to be produced only in the Clearwater, Middle Fork Salmon, and South Fork Salmon Rivers) was particularly depressed. The BRT was also concerned about the predominance of hatchery produced fish in this ESU, the inferred displacement of naturally produced fish by hatchery-origin fish, and the potential impacts on ESU diversity. High straying rates exhibited by some hatchery programs generated concern about the possible homogenization of population structure and diversity within the Snake River Basin ESU. Recent efforts to improve the use of local broodstock and release hatchery fish away from natural production areas, however, are encouraging. For many BRT members, the presence of relatively numerous resident fish reduces risks to ESU abundance, but provides an uncertain contribution to ESU productivity, spatial structure, and diversity (NMFS, 2003b; 2004a).

The BRT found moderate risk for the abundance, productivity, and diversity VSP categories, and comparatively lower risk in the spatial structure category. Informed by this risk assessment, the majority opinion of the BRT was that the naturally spawned component of the Snake River Basin *O. mykiss* ESU is ''likely to become endangered within the foreseeable future.'' The minority BRT opinion was split between the ''in danger of extinction'' and ''not in danger of extinction or likely to become endangered within the foreseeable future'' extinction risk categories.

There are six artificial propagation programs producing steelhead in the Snake River Basin that are considered to be part of the Snake River Basin *O. mykiss* ESU (Table 2). Artificial propagation enhancement efforts occur in the Imnaha River (Oregon), Tucannon River (Washington), East Fork Salmon River (Idaho, in the initial stages of broodstock development), and South Fork Clearwater River (Idaho). In addition, Dworshak Hatchery acts as a gene bank to preserve the North Fork Clearwater River ''B''-run steelhead population, which no longer has access to historical habitat due to construction of Dworshak Dam.

NMFS' assessment of the effects of artificial propagation on ESU extinction risk concluded that these hatchery programs collectively do not substantially reduce the extinction risk of the ESU in-total (NMFS, 2004c). Snake River Basin hatchery programs may be providing some benefit to the local target, but only the Dworshak-based programs have appreciably benefited the number of total adult spawners. The Little Sheep hatchery program is contributing to total abundance in the Imnaha River, but has not contributed to increased natural production. The Tucannon and East Fork Salmon River programs have only recently been initiated, and have yet to produce appreciable adult returns. The overall contribution of the hatchery programs in reducing risks to ESU abundance is small. The contribution of ESU hatchery programs to the productivity of the ESU in-total is uncertain. Most returning Snake River Basin hatchery steelhead are collected at hatchery weirs or have access to unproductive mainstem habitats, limiting potential contributions to the productivity of the entire ESU. The artificial propagation programs affect only a small portion of the ESU's spatial distribution and confer only slight benefits to ESU spatial structure. Large steelhead programs, not considered to be part of the ESU, occur in the mainstem Snake, Grande Ronde, and Salmon Rivers and may adversely affect ESU diversity. These out-of-ESU programs are currently undergoing review to determine the level of isolation between the natural and hatchery stocks and to define what reforms may be needed. Collectively, artificial propagation programs in the ESU provide a slight beneficial effect to ESU abundance and spatial structure, but have neutral or uncertain effects on ESU productivity and diversity. Informed by the BRT's findings (NMFS, 2003b) and NMFS' assessment of the effects of artificial propagation programs on the viability of the ESU (NMFS, 2004b), the Artificial Propagation Evaluation Workshop concluded that the Snake River Basin *O. mykiss* ESU in-total is ''likely to become endangered in the foreseeable future'' (NMFS, 2004c).

Summary of Factors Affecting the Species

Section 4(a)(1) of the ESA and NMFS' implementing regulations (50 CFR part 424) set forth procedures for listing species. The Secretary of Commerce (Secretary) must determine, through the regulatory process, if a species is endangered or threatened because of any one or a combination of the following factors: (1) The present or threatened destruction, modification, or curtailment of its habitat or range; (2) overutilization for commercial, recreational, scientific, or educational purposes; (3) disease or predation; (4) inadequacy of existing regulatory mechanisms; or (5) other natural or human-made factors affecting its continued existence. NMFS has previously detailed the impacts of various factors contributing to the decline of Pacific salmon and *O. mykiss* (*e.g.*, citations for ESU listing determinations in Table 1; NMFS 1997c, ''Factors Contributing to the Decline of Chinook Salmon—An Addendum to the 1996 West Coast Steelhead Factors for Decline Report;'' NMFS 1996a, ''Factors for Decline—A Supplement to the Notice of Determination for West Coast Steelhead Under the Endangered Species Act''). These **Federal Register** notices and technical reports conclude that all of the factors identified in section 4(a)(1) of the ESA have played a role in the decline of West Coast salmon and *O. mykiss* ESUs. The reader is referred to the above **Federal Register** notices and technical reports for a more detailed treatment of the relevant factors for decline for specific ESUs. The following discussion briefly summarizes findings regarding the principal factors for decline across the range of West Coast salmon and *O. mykiss*. While these factors are treated in general terms, it is important to underscore that impacts from certain factors are more acute for specific ESUs.

A. The Present or Threatened Destruction, Modification, or Curtailment of Its Habitat or Range

West Coast salmon and *O. mykiss* have experienced declines in abundance over the past several decades as a result of loss, damage or change to their natural environment. Water diversions for agriculture, flood control, domestic,

and hydropower purposes (especially in the Columbia River and Sacramento-San Joaquin Basins) have greatly reduced or eliminated historically accessible habitat and degraded remaining habitat. Forestry, agriculture, mining, and urbanization have degraded, simplified, and fragmented habitat. Studies indicate that in most western states, about 80 to 90 percent of the historical riparian habitat has been eliminated (Botkin *et al.*, 1995; Norse, 1990; Kellogg, 1992; California State Lands Commission, 1993). The destruction or modification of estuarine areas has resulted in the loss of important rearing and migration habitats. Washington and Oregon wetlands are estimated to have diminished by one-third, while California has experienced a 91 percent loss of its wetland habitat. Losses of habitat complexity and habitat fragmentation have also contributed to the decline of West Coast salmonids. For example, in national forests in western and eastern Washington, there has been a 58 percent reduction in large, deep pools due to sedimentation and loss of pool forming structures such as boulders and large wood (FEMAT, 1993). Similarly, in Oregon, the abundance of large, deep pools on private coastal lands has decreased by as much as 80 percent (FEMAT, 1993). Sedimentation from extensive and intensive land use activities (*e.g.*, timber harvests, road building, livestock grazing, and urbanization) is recognized as a primary cause of habitat degradation throughout the range of West Coast salmon and *O. mykiss*.

B. Overutilization for Commercial, Recreational, Scientific or Educational Purposes

Historically, salmon and *O. mykiss* were abundant in many western coastal and interior waters of the United States. These species have supported, and continue to support, important tribal, commercial and recreational fisheries throughout their range, contributing millions of dollars to numerous local economies, as well as providing important cultural and subsistence needs for Native Americans. Overfishing in the early days of European settlement led to the depletion of many stocks of salmonids, prior to extensive modifications and degradation of natural habitats. However, following the degradation of many west coast aquatic and riparian ecosystems, exploitation rates were higher than many populations could sustain. Therefore, harvest may have contributed to the further decline of some populations.

C. Disease or Predation

Introductions of non-native species and habitat modifications have resulted in increased predator populations in numerous rivers and lakes. Predation by marine mammals (principally seals and sea lions) is also of concern in areas experiencing dwindling run sizes of salmon and *O. mykiss*. However, although fishes form the principal food sources of many marine mammals, salmonids appear to be a minor component of their diet (Scheffer and Sperry, 1931; Jameson and Kenyon, 1977; Graybill, 1981; Brown and Mate, 1983; Roffe and Mate, 1984; Hanson, 1993). Predation by marine mammals may significantly influence salmonid abundance in some local populations when other prey species are absent and physical conditions lead to the concentration of salmonid adults and juveniles (Cooper and Johnson, 1992). Predation by seabirds can also influence the survival of juvenile salmon and *O. mykiss* in some locations. For example, it has been estimated that Caspian terns (*Sterna caspia*) in the lower Columbia River and estuary consume approximately 13 percent of the out-migrating smolts reaching the estuary in some years (Collis *et al.*, 2001).

Infectious disease is one of many factors that can influence adult and juvenile salmon and *O. mykiss* survival. Salmonids are exposed to numerous bacterial, protozoan, viral, and parasitic organisms in spawning and rearing areas, hatcheries, migratory routes, and the marine environment. Specific diseases such as bacterial kidney disease, ceratomyxosis, columnaris, furunculosis, infectious hematopoietic necrosis virus, redmouth and black spot disease, erythrocytic inclusion body syndrome, and whirling disease, among others, are present and are known to affect West Coast salmonids (Rucker *et al.*, 1953; Wood, 1979; Leek, 1987; Foott *et al.*, 1994; Gould and Wedemeyer, undated). In general, very little current or historical information exists to quantify changes in infection levels and mortality rates attributable to these diseases. However, studies have shown that naturally spawned fish tend to be less susceptible to pathogens than hatchery-reared fish (Buchanon *et al.*, 1983; Sanders *et al.*, 1992). Native salmon and *O. mykiss* populations have co-evolved with specific communities of these organisms, but the widespread use of artificial propagation has introduced exotic organisms not historically present in a particular watershed. Habitat conditions such as low water flows and high temperatures can exacerbate susceptibility to infectious diseases.

D. The Inadequacy of Existing Regulatory Mechanisms

A variety of Federal, state, tribal, and local laws, regulations, treaties and measures affect the abundance and survival of West Coast salmon and *O. mykiss*, and the quality of their habitats. The adequacy of existing regulatory mechanisms is treated below in the context of evaluating the likelihood of implementation and effectiveness of efforts being made to protect West Coast salmon and *O. mykiss*, including specific regulatory measures (see the ''Efforts Being Made to Protect West Coast Salmon and *O. mykiss*'' section).

E. Other Natural or Manmade Factors Affecting Its Continued Existence

Variability in ocean and freshwater conditions can have profound impacts on the productivity of salmon and *O. mykiss* populations. Natural climatic conditions have at different times exacerbated or mitigated the problems associated with degraded and altered riverine and estuarine habitats (see the ''Consideration of Recent Ocean Conditions in Listing Determinations'' section).

Extensive hatchery programs have been implemented throughout the range of West Coast salmon and *O. mykiss*. While some of these programs have succeeded in providing fishing opportunities and increasing the total number of fish on spawning grounds, the long-term impacts of these programs on native, naturally reproducing stocks are not well understood. Artificial propagation may play an important role in salmon and *O. mykiss* recovery. The state natural resource agencies (CDFG, Oregon Department of Fish and Wildlife, Idaho Department of Fish and Game, and the Washington Department of Fish and Wildlife) have adopted or are implementing natural salmonid policies designed to ensure that the use of artificial propagation is conducted in a manner consistent with the conservation and recovery of natural, indigenous salmon and *O. mykiss* stocks. While these efforts are encouraging, the careful monitoring and management of current programs, and the scrutiny of proposed programs is necessary to minimize impacts on listed species.

Efforts Being Made to Protect West Coast Salmon and O. mykiss

Section 4(b)(1)(A) of the ESA requires the Secretary to make listing determinations solely on the basis of the best scientific and commercial data available after taking into account efforts being made to protect a species.

Therefore, in making its listing determinations, NMFS first assesses ESU extinction risk and identifies factors that have led to its decline. NMFS then assesses existing efforts being made to protect the species to determine if those measures ameliorate the risks faced by the ESU.

In judging the efficacy of existing protective efforts, NMFS relies on the joint NMFS–FWS ''Policy for Evaluation of Conservation Efforts When Making Listing Decisions'' (''PECE;'' 68 FR 15100; March 28, 2003). PECE provides direction for the consideration of protective efforts identified in conservation agreements, conservation plans, management plans, or similar documents (developed by federal agencies, State and local governments, Tribal governments, businesses, organizations, and individuals) that have not yet been implemented, or have been implemented but have not yet demonstrated effectiveness. The policy articulates several criteria for evaluating the certainty of implementation and effectiveness of protective efforts to aid in determination of whether a species warrants listing as threatened or endangered. Evaluations of the certainty an effort will be implemented include whether: the necessary resources (*e.g.*, funding and staffing) are available; the requisite agreements have been formalized such that the necessary authority and regulatory mechanisms are in place; there is a schedule for completion and evaluation of the stated objectives; and (for voluntary efforts) the necessary incentives are in place to ensure adequate participation. The evaluation of the certainty of an effort's effectiveness is made on the basis of whether the effort or plan: establishes specific conservation objectives; identifies the necessary steps to reduce threats or factors for decline; includes quantifiable performance measures for the monitoring of compliance and effectiveness; incorporates the principles of adaptive management; and is likely to improve the species' viability at the time of the listing determination.

The PECE also notes several important caveats. Satisfaction of the above mentioned criteria for implementation and effectiveness establishes a given protective effort as a candidate for consideration, but does not mean that an effort will ultimately change the risk assessment. The policy stresses that just as listing determinations must be based on the viability of the species at the time of review, so they must be based on the state of protective efforts at the time of the listing determination. The PECE does not provide explicit guidance on how protective efforts affecting only a portion of a species' range may affect a listing determination, other than to say that such efforts will be evaluated in the context of other efforts being made and the species' overall viability. There are circumstances where threats are so imminent, widespread, and/or complex that it may be impossible for any agreement or plan to include sufficient efforts to result in a determination that listing is not warranted.

Evaluation of Protective Efforts

As discussed above, NMFS assesses ESU viability on the basis of the four VSP criteria: abundance, productivity, spatial structure and diversity (McElhany *et al.*, 2000). These four parameters are universal indicators of species viability and individually and collectively function as reasonable predictors of extinction risk. NMFS evaluated protective efforts on the basis of these four VSP criteria. The efforts addressing habitat, harvest and fish passage issues are organized by regional protective efforts, followed by federal and non-federal protective efforts in the individual states. The collective contribution of all protective efforts in mitigating ESU-level extinction risk for each ESU is described in the ''Proposed Listing Determinations'' section that follows.

Regional Protective Efforts

Federal Efforts—NMFS conducts hundreds of ESA section 7 consultations concerning ongoing and proposed activities that may affect salmonid habitats within the range of listed West Coast salmon and *O. mykiss* ESUs. Biological assessments (BAs) and biological opinions cover a wide range of management activities, including forest and/or resource area-wide routine and non-routine road maintenance, hazardous tree removal, range allotment management, watershed and instream restoration, special use permits (*e.g.*, mining, ingress/egress), flood control, water supply/irrigation, and timber sale programs (*e.g.*, green tree, fuel reduction, thinning, regeneration, and salvage). These BAs and biological opinions include region-specific best management practices, necessary measures to minimize impacts for listed anadromous salmonids, monitoring, and environmental baseline checklists for each project. In addition to the numerous consultations involving Federal land management actions, NMFS has also consulted on a variety of activities involving private actions requiring Federal authorization or approval. Examples of these actions include significant instream projects such as building boat ramps and docks, water withdrawals, and dredging activities. NMFS' involvement in these consultations, and the resultant biological opinions, have resulted in a more consistent approach to management of public lands throughout the range of West Coast salmon and *O. mykiss* ESUs.

The 2000 Federal Columbia River Power System (FCRPS) biological opinion incorporates 199 alternative actions addressing operation of the FCRPS and 19 Bureau of Reclamation (BOR) projects. The alternative actions are aimed at protecting or improving the survival of listed salmon and *O. mykiss* stocks. The actions span a wide range of activities, including updating annual operations of the FCRPS, short- and long-term construction at FCRPS projects, early action offsite mitigation proposals, and research efforts aimed at gaining future improvements. The biological opinion outlines comprehensive monitoring and evaluation programs, as well as specific research actions. Additionally, discretionary conservation measures are suggested to minimize or avoid the potential adverse effects of a proposed action on listed species, to minimize or avoid adverse modification of critical habitat, to develop additional information, or to assist the Federal agencies in complying with the obligations under section 7(a)(1) of the ESA. These recommendations include: conduct research to identify and address factors for decline; conduct research on requirements for spill operation, intake screen, bypass system, and turbine operation to improve the survival of migrating salmonids through the Snake River/Lower Columbia hydropower system; improve water quality management of Columbia River total dissolved gas and temperature; improve management of mainstem Columbia River instream flows; institute predator controls; improve spawning and rearing habitats in the mainstem Columbia River and its tributaries; reduce habitat blockages in Columbia River tributaries; reduce the negative effects of hatchery practices on wild salmonid stocks; reduce the negative impacts of harvest on wild stocks; and improve estuary habitat and reduce deleterious Columbia River plume effects. These objectives, if achieved, would significantly increase downstream/upstream and migrant survival, increase spawning and rearing survival, provide access to currently blocked or degraded habitat, and allow for the expression of a wider range of life-history strategies and run timing. Recently in *National Wildlife Federation*

et al. v. *NMFS,* the U.S. District Court for the District of Oregon remanded the 2000 FCRPS biological opinion to NMFS. While NMFS reconsiders the biological opinion, it remains in place. It is worth noting that the conservation program under the FCRPS biological opinion has significant overlap with the Northwest Power and Conservation Council's Fish and Wildlife Program (NPCC–FWP, discussed further below) and should not be considered as an entirely independent effort.

The NPCC–FWP works to protect, mitigate, and enhance fish and wildlife of the Columbia River Basin. Locally developed subbasin plans, scheduled to be completed by May 2004, are being written in 62 subbasins in the Columbia River system. Once adopted by the Council, the plans are intended to guide Bonneville Power Administration funding of projects for the NPCC–FWP. The completed subbasin plans are intended to provide a resource for use by NMFS and FWS as part of threatened and endangered species recovery planning. The success of the subbasin planning process depends on adequate funding and on high quality plans in compliance with the Council's ''Technical Guide for Subbasin Planning.'' Implementation of these plans may contribute to improvements in fish passage at road crossing and irrigation diversion dams, and the further screening of irrigation withdrawals—two significant limiting factors for Columbia Basin ESUs. It is less clear if the plans, and the supporting Fish and Wildlife Program, will help resolve other limiting factors, particularly low stream flow and riparian habitat protection.

NMFS (and FWS) are also engaged in an ongoing effort to assist in the development of multiple species Habitat Conservation Plans (HCPs) for state and privately owned lands. While section 7 of the ESA addresses species protection associated with Federal actions and lands, Habitat Conservation Planning under section 10 of the ESA addresses species protection on non-Federal lands. HCPs are particularly important since much of the habitat in the range of West Coast salmon and *O. mykiss* ESUs is in non-Federal ownership. Within the range of currently-listed salmonids there are approximately 11 completed HCPs, and approximately 50 HCPs under development. Where HCPs are in place, NMFS expects that the activities they cover will be consistent with the recovery of salmon and *O. mykiss* ESUs.

Under the Northwest Forest Plan, the U.S. Forest Service (USFS) and Bureau of Land Management (BLM) have established protective riparian reserves beside streams, implemented habitat restoration actions (*e.g.,* large wood placement, channel restoration, culvert replacements and removals), revised road construction guidelines, and adopted other best management practices. These efforts have been undertaken to reduce adverse effects to aquatic and riparian dependent species, including salmon and *O. mykiss,* and to mitigate for past adverse effects resulting from Federal land management activities (*e.g.,* timber harvest, roads, recreation). NMFS has consulted on the standards of the Northwest Forest Plan and concluded that where the standards are implemented, the resulting conditions will be consistent with the recovery of salmon and *O. mykiss* ESUs.

PACFISH is a cooperative effort between USFS and BLM to develop coordinated Management and Land Use Plans for the Federal lands they manage in eastern Oregon and Washington, Idaho, and portions of Northern California. PACFISH is intended to provide protection of anadromous fish aquatic and riparian habitat conditions while a longer term, basin scale aquatic conservation strategy is developed. PACFISH provides objective standards and guidelines that are applied to all Federal land management activities such as timber harvest, road construction, mining, grazing, and recreation.

Ocean fisheries are managed by the Pacific Fishery Management Council (PFMC). Since the listings of Pacific salmon and *O. mykiss* under the ESA, substantial harvest reform has been instituted to reduce impacts to listed stocks from ocean fisheries. Each year the PFMC develops fishing regulations that are within the guidelines established by NMFS in section 7 consultations for listed ESUs in California, Oregon, Washington, and Idaho. The ocean fisheries have been implemented consistent with NMFS' requirements and have been effective at reducing harvest impacts to listed salmon and *O. mykiss* ESUs.

The 1999 Agreement between Canada and the United States under the Pacific Salmon Treaty resulted in a major restructuring of the fishery management approach for ocean chinook fisheries off the west coast of Canada and in Southeast Alaska. Most notably, the ''fixed ceiling'' approach, which formerly resulted in higher harvest rates in years of lower overall abundance, was replaced with an abundance-driven approach. Harvest rates in major chinook fisheries in the ocean off Canada and Southeast Alaska now vary in response to annual fluctuations in abundance, resulting in a general lowering of harvest rates in years of reduced abundance. The new approach also includes additional measures that will further reduce fishery impacts if identified natural stocks fail to achieve escapement objectives. The 1999 Agreement prescribes a complementary regime for the ocean chinook fisheries off Washington and Oregon and in terminal areas. There, specific reductions in harvest rates must be implemented in chinook fisheries as necessary to meet established escapement goals for key indicator (natural) stocks. The 1999 Agreement also resulted in a major change in the management of coho fisheries, primarily those affecting Washington and British Columbia stocks, by prescribing an abundance-based approach driven by the annual abundance of natural coho salmon.

Protective Efforts in California

Federal Efforts—Since 2000 NMFS has conducted approximately 2,300 ESA section 7 consultations with over 20 Federal action agencies that fund, conduct, or authorize projects in California. Of this total, approximately 1,500 consultations involved projects in coastal watersheds occupied by listed coho, chinook, and *O. mykiss* ESUs. The remaining section 7 consultations addressed projects in California's Central Valley within the range of listed chinook and *O. mykiss* ESUs. NMFS has also provided technical assistance to Federal agencies on hundreds of additional projects throughout the State of California. The vast majority of consultations have been with the BOR, U.S. Army Corps of Engineers (USACE), Federal Highway Administration, FWS, USFS, BLM, and Bureau of Indian Affairs. These consultations have evaluated impacts to ESA-listed salmonid ESUs from a wide variety of Federal projects including: irrigation and water diversion, timber harvest, watershed restoration, fish passage, gravel mining, grazing, and transportation projects. In addition to consulting with other Federal agencies, NMFS has also consulted with itself regarding the effects of recreational and commercial ocean salmon fishing on listed salmonid ESUs. These consultations have improved, or minimized adverse impacts to, listed salmonid and their habitats throughout coastal and central valley watersheds in California.

Several significant consultations have been conducted on water projects in coastal watersheds and in the central valley. Among the most important have been consultations on the Klamath Project, Potter Valley Project (Eel and

Russian Rivers), Cachuma Project (Santa Ynez River), Robles Diversion Dam (Ventura River) and the Central Valley Project (Sacramento-San Joaquin Basin). Other important water projects related consultations are ongoing in the Russian River (USACE and Sonoma County Water Agency) and on the Santa Clara River (United Water Conservation District).

The Central Valley Project consultation, in particular, likely has contributed to recent improvements in the Sacramento River winter-run chinook ESU. In 1992 NMFS issued a jeopardy biological opinion to the BOR that addressed long-term operation of the Central Valley Project and its impacts on winter-run chinook salmon. Since that time, implementation of the reasonable and prudent alternative contained in the 1992 opinion has provided substantial benefits to winter-run chinook by improving habitat and fish passage conditions in the Sacramento River and Delta. The improved habitat conditions provided by the reasonable and prudent alternative have likely been a major factor contributing to substantial increases in population abundance and productivity over the past decade. Key elements of the reasonable and prudent alternative which have benefited winter run chinook include: (1) Allocation of water to contractors using a more conservative water supply forecast approach; (2) maintenance of higher end-of-year reservoir storage levels in Lake Shasta; (3) maintenance of minimum flows in the Sacramento during the fall and winter months; (4) implementation of specified ramp-down criteria when flows from Keswick Dam are reduced; (5) establishment of water temperature criteria to support spawning and rearing in the mainstem Sacramento River upstream of the Red Bluff Diversion Dam and water releases from Shasta Dam designed to meet the specified temperature criteria; (6) re-operation of the Red Bluff Diversion Dam gates to provide improved adult and juvenile passage; (7) closures of the Delta Cross Channel gates to divert juveniles from the Delta; and (8) constraints on Delta water exports to reduce impacts on juvenile outmigrants.

The Northwest Forest Plan was implemented in 1994 and represents a coordinated ecosystem management strategy for Federal lands administered by the USFS and the BLM within the range of the Northern spotted owl which overlaps considerably with the freshwater range of listed coho, chinook and *O. mykiss* ESUs in northern California. The most significant element of the Northwest Forest Plan for anadromous fish is its Aquatic Conservation Strategy, a regional-scale aquatic ecosystem conservation strategy that includes: (1) Special land allocations, such as key watersheds, riparian reserves, and late-successional reserves, to provide aquatic habitat refugia; (2) special requirements for project planning and design in the form of standards and guidelines; and (3) new watershed analysis, watershed restoration, and monitoring processes. These Strategy components collectively are designed to support Federal land management actions in achieving a set of nine Aquatic Conservation Strategy objectives, including salmon habitat conservation. The Aquatic Conservation Strategy strives to maintain and restore ecosystem health at watershed and landscape scales to protect habitat for fish and other riparian-dependent species and resources and to restore currently degraded habitats. The approach seeks to prevent further degradation and to restore habitat on Federal lands over broad landscapes. The Northwest Forest Plan region-wide management direction was either amended or was incorporated into the land and resource management plans (LRMPs) for the National Forests and BLM Resources Areas in northern California within the range of listed coho, chinook and *O. mykiss* ESUs. Through programmatic and site-specific ESA section 7 consultation efforts, NMFS has worked with the USFS and the BLM over the last several years to ensure the Northwest Forest Plan and its Aquatic Conservation Strategy is implemented in California. NMFS believes that continued implementation of the Northwest Forest Plan will result in substantially improved habitat conditions for listed coho, chinook and *O. mykiss* ESUs over the next few decades and into the future. Improved habitat conditions will result in increased survival of the freshwater life stages of these fish. The components of the Aquatic Conservation Strategy include watershed analysis, watershed restoration, reserve and refugia land allocations, and development of associated standards and guidelines. Implementation of actions consistent with the Aquatic Conservation Strategy objectives will provide high levels of aquatic ecosystem understanding, protection, and restoration for aquatic-habitat dependent species.

Under the authority of the 1984 Trinity River Fish and Wildlife Management Act, the Trinity River Task Force was convened to develop a plan to restore fish and wildlife populations on the Trinity River. The December 2000 plan includes flow allocations, direct in-channel actions, as well as continued watershed restoration activities, replacement of bridges and structures in the flood plain, monitoring and adaptive management. Implementation of the plan has been delayed pending further analysis of effects of alternatives on California's energy supply and Central Valley water users.

The Klamath River Basin Fisheries Task Force was established by the Klamath River Basin Fishery Resources Restoration Act of 1986 to provide recommendations to the Secretary of Interior on the formulation, establishment, and implementation of a 20-year program to restore anadromous fish populations in Klamath Basin to optimal levels. NMFS participates as a member of the Task Force as well as of the Technical Work Group which provides technical and scientific input to the Task Force. In 1991, the Task Force developed the Long Range Plan for the Klamath River Basin Conservation Area Fishery Restoration Program to help direct fishery restoration programs and projects throughout the Klamath River. Several sub-basin watershed restoration plans have been developed since the inception of the Klamath Act, including the Lower Klamath River Sub-Basin Watershed Restoration Plan developed by the Yurok Tribe in 2000 and the Mid-Klamath Sub-Basin Fisheries Resource Recovery Plan in 2001.

The Redwood National and State Parks have developed several plans that will help to protect and enhance anadromous salmonid habitats, including the Redwood National and State Park General Management Plan (1999) and the Redwood National Park Final Management Plan (1999). These plans identify actions that the National and State Parks will undertake to restore aquatic and terrestrial ecological functions within Park(s) boundaries. Recently, the state parks, in conjunction with several environmental organizations, raised funds to purchase Mill Creek, a lower tributary to the Smith River, from Rellim Redwood Company. A management plan has also been developed for the Mill Creek Watershed, which is the largest tributary producing coho salmon in the Smith River Basin. Humboldt Redwoods State Park has also developed a State Park General Plan (2001) which will provide the vision and management direction for the next 20 or more years. One of the many goals for the state park plan is to restore and protect terrestrial and aquatic habitats and species in accordance with Federal and state laws.

Two dam removal projects in southern California will provide benefits to the Southern California *O. mykiss* ESU (the Matilija Dam and Rindge Dam projects). The Matilija Dam Ecosystem Restoration project is being undertaken by a consortium of Federal, state and local agencies with the goal of removing the dam, restoring instream habitat above and below the dam site, and restoring natural sediment transport to the mainstem Ventura River below the dam. The Rindge Dam Ecosystem Restoration project is being undertaken by the USACE and the California Department of Parks and Recreation. There are no current projections for completing a Feasibility Study or commencement of the project, though there remains strong support for the project by the local/non-federal sponsor. If implemented, the project would include removal of Rindge Dam, restoration of the instream habitats above and below the dam, and restoration of steelhead access to approximately 12 miles (19.3 km) of suitable spawning and rearing habitat in Malibu Creek.

In the Central Valley of California, there are two large, comprehensive conservation programs that provide a wide range of ecosystem and species-specific protective efforts that provide benefits to listed chinook (winter run and spring run) and *O. mykiss* ESUs. These include the California Bay-Delta Authority Program (or CALFED) and the Central Valley Project Improvement Act (Central Valley PIA).

CALFED is a cooperative effort of more than 20 state and Federal agencies that work with local communities to improve water quality and reliability of California's water supplies, while reviving the San Francisco Bay-Delta ecosystem. This partnership was formed in 1994 and provides policy direction and process oversight for: water quality standards formulation; coordination of the State Water Project and the Central Valley Project operations; and long-term solutions to Bay-Delta estuary problems. Full implementation of the CALFED program is anticipated to take 30 years, but much progress has already been made through close collaboration with local agencies, stakeholders, and special interest groups. There are four key program objectives: water quality, ecosystem quality, water supply and levee system integrity. The main components that make up the four objectives are: (1) Improve and increase aquatic and terrestrial habitats and improve ecological functions in support of sustainable populations of diverse and valuable plant and animal species; (2) reduce the mismatch between Bay-Delta water supplies and current and projected beneficial uses dependent on the Bay-Delta system; and (3) reduce the risk to land use and associated economic activities, water supply, infrastructure to protect the ecosystem from catastrophic breaching of Delta levees. The ecosystem restoration element of CALFED is being achieved through the Ecosystem Restoration Program. The Program has funded projects involving: habitat restoration; flood plain restoration and/or protection; instream habitat restoration; riparian habitat restoration/protection; fish screening and passage projects; research on and eradication of non-native species; research on and management of contaminants; research on and monitoring of fishery resources; and watershed stewardship and education outreach efforts. In addition to implementation of restoration actions as part of the Ecosystem Restoration Program, the CALFED program established the Environmental Water Account that is used to offset losses of juvenile fish at the Delta pumps, and to provide higher instream flows for salmon and steelhead in the Yuba River, Stanislaus River, American River, and Merced River.

The Central Valley PIA attempts to balance the priorities of fish and wildlife protection, restoration, and mitigation with irrigation, domestic water use, fish and wildlife enhancement, and power generation. Since passage of the Central Valley PIA, the BOR and the FWS, with the assistance of many partners, have conducted numerous studies and investigations, implemented hundreds of actions representing significant progress towards achieving the Central Valley PIA's goals and objectives. These actions include: modification of Central Valley Project operations; management and acquisition of water for fish and wildlife needs; mitigation for water export pumping plant operations; resolution of fish passage problems; improvement in flow management for fish migration and passage (*e.g.,* pulse flows, increased flows, and seasonal fish barriers); replenishment of spawning gravels; restoration of riparian habitats; and diversion screening.

The Central Valley PIA is the cornerstone of many actions aimed at restoring natural production of anadromous fish in the Central Valley. Emphasis in the Delta has been on offsetting effects of Central Valley Project and State Water Project operations (entrainment, impingement, diversion, and increased predation) on all anadromous species. In the Sacramento River tributaries, actions have focused on riparian and shaded riverine aquatic habitat restoration, improved access to available upstream habitat, improvement of instream flows, and reductions in loss of juveniles at diversions, particularly for spring chinook and *O. mykiss*. In the mainstem Sacramento River, actions have focused on flow and temperature control, restoration of spawning habitat, reduction of juvenile losses at diversions, and acquisition of riparian lands to improve spawning and rearing habitat, especially for winter-run chinook salmon. In the San Joaquin River and its tributaries, actions have focused on improvement in instream flows, restoration of river channels, spawning gravels, and riparian cover, and elimination of predator habitat. Most of these actions have been on the tributaries to the San Joaquin River.

Habitat restoration efforts under the Central Valley PIA are generally divided into two categories: anadromous fish habitat restoration measures, and anadromous fish structural measures. Habitat restoration efforts that have been implemented include the acquisition of water for instream flows, channel restoration and enhancement, removal of dams and blockages that interfere with migration, gravel replenishment, acquisition and restoration of riparian habitat, and erosion control to protect spawning gravels. Anadromous fish structural measures include construction or modification of devices to: improve instream habitat (such as the Shasta Dam temperature control device); improve access or reduce mortality during fish migrations (such as fish ladders on dams and screening of diversions); and to supplement fish populations (such as the improvements to Coleman National Fish Hatchery and construction of the Livingston Stone National Fish Hatchery for winter-run chinook salmon). A large number of structural projects have been completed and others are in progress.

Another protective effort in the central valley is the Delta Pumping Plant Fish Protection Agreement (known as the Four Pump Agreement) which was adopted as part of the mitigation package for the State Water Project in 1986. Projects that have been completed or that will be implemented include: screening of unscreened diversions in Suisun Marsh, Butte Creek, and tributaries to the San Joaquin River; enhanced law enforcement efforts to reduce illegal fish harvest; installation of seasonal barriers to guide fish away from undesirable spawning habitat or migration corridors; water exchange projects on Mill and Deer Creek to provide passage flows for adult

and juvenile chinook and steelhead; the design and construction of fish ladders for improved passage on Butte Creek; spawning gravel replacement and maintenance on the Sacramento River and tributaries to the San Joaquin River; and a wide range of other salmonid habitat restoration projects to improve spawning and rearing habitat, eliminate predator habitat, and improve riparian habitat. About a third of the approved funding for salmonid projects specifically target spring run chinook in the upper Sacramento River tributaries; however, many of these projects also provide benefits to *O. mykiss* and other chinook runs.

The Tracy Fish Collection Mitigation Agreement is also a source of funding for habitat restoration and other projects which provide benefits to salmon and *O. mykiss* in the central valley. In 2000, the BOR and the State of California revised this agreement to reduce and offset direct losses of chinook salmon associated with operation of the Tracy Pumping Plant and fish collection facility (part of the Central Valley Project). The agreement provides for improving operations at the fish collection facility, making necessary structural modifications, and annual funding to the State for various mitigation projects. Among the projects funded from this program were the design and permitting phases of the Western Canal Siphon Project on Butte Creek which resulted in the removal of four dams and improved fish passage for chinook and steelhead. The agreement also funded several other engineering and design efforts on tributaries that support spring chinook including Battle Creek, Clear Creek, Butte Creek, and the Yuba River. Additional funding has been recommended to implement further habitat restoration that would benefit spring chinook and/or *O. mykiss* in Butte Creek, the Yuba River, Suisun Marsh, and tributaries on the San Joaquin River.

The Battle Creek Restoration project is a cooperative approach to solving environmental problems through the CALFED ecosystem restoration process. Stream reaches being restored are located in upper Battle Creek where Pacific Gas and Electric operates a series of nine hydroelectric dams and canals affecting 42 miles (67.6 km) of habitat suitable for chinook salmon (winter, spring and fall) and *O. mykiss*. This 42-mile (67.6 km) reach of upper Battle Creek will be fully restored under an agreement between the power company and resource agencies. Of the nine diversion dams, five will be removed and their water rights dedicated to the environment. The remaining dams will have the required minimum instream flows increased to levels substantially above current legal minimums yielding habitat increases of 500 to 800 percent. The structures on the remaining dams will be modified to include optimally designed fish ladders and fish screens. Other activities include a project to restore the meander belt and riparian forest on the lowest 5 miles of the creek and a re-evaluation of Coleman National Fish Hatchery to ensure its operation is integrated with the Battle Creek restoration program.

NMFS is responsible for management of ocean salmon fisheries under the Pacific Coast Ocean Salmon Fishery Management Plan (FMP) and the Magnuson-Stevens Act. As a result of the many salmon and *O. mykiss* ESU listings on the west coast, NMFS has initiated formal ESA section 7 consultations and issued numerous biological opinions which consider the impacts of ocean fishing. In some cases, consultation has determined that existing protections in the FMP will not jeopardize listed ESUs, whereas in other instances reasonable and prudent alternatives have been developed which avoid jeopardizing the listed ESUs. The conservation objectives that NMFS implements for each listed salmon ESU is either contained in the FMP or specified in a biological opinion.

Under the Pacific Coastal Salmon Recovery Program, NMFS provides annual grants to the State of California to assist salmon recovery efforts in coastal watersheds from the Oregon border to southern California. The State integrates these funds with its state salmon restoration funds and issues grants for habitat restoration, watershed planning, salmon enhancement, research and monitoring, and outreach and education in coastal watersheds that support listed salmonids. Funded projects include fish passage barrier removals, stream bank stabilization, fish habitat improvements that increase the frequency of pools, removal of and/or storm-proofing of roads that contribute sediment to streams, stabilizing eroding hill slope area adjacent to stream channels, revegetation of upslope areas and riparian areas, monitoring programs to provide baseline and/or population trend data, and support of local watershed organizations and education projects. The Federal funds provided to the state and California Tribes (*e.g.,* the Yurok, Karuk, and Hoopa Valley Tribes) have been instrumental in furthering conservation efforts in coastal watersheds, especially north of San Francisco and in the Klamath River Basin. These funds have been successfully used to leverage additional State and local salmon recovery funding sources, and have precipitated a substantial increase in overall funding state wide.

Non-Federal Efforts—Several management efforts are currently being implemented to protect listed salmonid ESUs in California. These include: Restrictions on the Klamath River fall chinook harvest rate to protect coastal chinook; restricted exploitation rates on Rogue River/Klamath River hatchery stocks to protect SONCC and central California coho; no retention take prohibitions for coho off California; and seasonal constraints on sport and commercial fisheries south of Point Arena, California, for Central Valley winter run chinook salmon. The fishery constraints designed to protect winter run chinook are thought to also provide protection to central valley spring chinook. NMFS believes that these harvest protective measures being implemented to protect listed salmonid ESUs in California will contribute to achieving long-term recovery of these populations.

The State of California has also listed the Sacramento River winter-run and Central Valley spring-run chinook under the State's California Endangered Species Act, and, therefore, has established specific in-river fishing regulations and no retention prohibitions which are designed to protect these stocks, and also to allow harvest of unlisted fall run chinook. In the case of Sacramento River winter-run chinook, the management measures consist of time and area closures, gear restrictions, and zero bag limits in the Sacramento River. These measures have been in place since 1990 when the winter run chinook ESU was listed by NMFS. For Central Valley spring run chinook, the state has also implemented protective measures, including fishing method and gear restrictions, bait limitations, seasonal closures, and zero bag limits, particularly in several primary tributaries such as Deer Creek, Big Chico Creek, Mill Creek, and Butte Creek which support spring chinook. In addition, CDFG has implemented enhanced enforcement efforts in spring-run chinook tributaries and adult holding areas which have significantly reduced illegal harvest.

Measures to protect listed *O. mykiss* throughout the State of California have been in place since 1998. A wide range of measures have been implemented including 100 percent marking of all hatchery steelhead, zero bag limits for unmarked steelhead, gear restrictions, closures, and size limits designed to protect smolts. NMFS has worked continuously with the State to review

and improve inland fishing regulations through its biennial planning cycle to better protect both anadromous and resident *O. mykiss* populations throughout the State.

A major concern in risk assessments for salmonid ESUs in California has been the lack of comprehensive abundance and trend data for coastal salmonids and for steelhead in the Central Valley. In the past year, the state's habitat restoration grant program funded a major coastal salmonid monitoring program development effort that is being carried out by the CDFG and NMFS. The development of a statewide, coastal monitoring program plan is critical to assessing the viability of listed ESUs and their response to extensive habitat restoration efforts and other conservation efforts. The program is expected to be developed within the next year; however, long-term funding for implementation is uncertain. Recently, the CALFED program funded a similar effort for steelhead in the Central Valley. As with coastal salmonids, the development and implementation of a monitoring and assessment program for Central Valley steelhead is critically important in order to assess population viability and responses to extensive habitat restoration efforts being funded by CALFED and the Central Valley PIA.

An extensive network of Resource Conservation Districts exists within the range of ESA-listed salmonid ESUs along the northern California coast. These Districts represent an important vehicle through which the agricultural community can voluntarily address and correct management practices that impact ESA-listed salmonids and their habitats. Working with individual landowners or through organizations such as the California Farm Bureau, these Resource Conservation Districts can assist landowners in developing and implementing best management practices that are protective of salmonids. Such active participation of the agriculture community is critical to the conservation and recovery of ESA-listed ESUs in California.

In response to a proposed state listing of coho in January 2003 under the California ESA, the State of California convened two recovery teams and tasked them with developing a recovery plan that would identify and address the recovery needs of coho salmon and habitats throughout the State. A draft recovery plan was prepared and released for public review in August 2003. The comprehensive plan includes a broad range of coho range-wide recommendations addressing stream flow, water rights, fish passage, water temperatures, recruitment of large woody debris, riparian vegetation, watershed planning, and gravel mining. In addition, specific watershed recommendations were identified for all watershed units supporting coho throughout the state from the Smith River south to the San Lorenzo River. Because of special water use issues in the Shasta and Scott River watershed and the importance of these watersheds in the Klamath River system, the plan includes a pilot program that has specific recommendations for water management, water augmentation, water use efficiency, and habitat management (*e.g.* fish passage barriers, spawning gravel, riparian vegetation, water temperature, etc.). The final recovery plan was formally approved and adopted by the California Fish and Game Commission on February 5, 2004, and a decision was made to formally list coho salmon under the California ESA. A final decision to move forward with the administrative process leading to a listing of coho under the California ESA is expected in June 2004. The state is in the process of developing an implementation plan that will prioritize recovery actions contained in the plan and estimate implementation costs. The implementation plan will be presented to the Commission at its meeting in June 2004. In the short term, the state is using existing staff and financial resources to implement the plan, but is expected to pursue additional financial resources after the implementation plan is completed. To facilitate implementation, the CDFG has integrated the coho recovery plan with its coastal salmonid habitat restoration grant program by ensuring that high priority recovery plan actions in high priority watersheds receive a greater likelihood of funding. If it is successfully implemented, the State recovery plan will provide substantial benefits to both the Central California Coast and Southern Oregon/Northern California Coast coho ESUs. However, the long-term prospects for plan funding and implementation are uncertain.

The North Coast Regional Water Quality Control Board is in the process of updating its north coast basin plan which will establish water quality standards for all of the northern California rivers and streams. These plans will also incorporate newly developed Total Maximum Daily Load (TMDL) standards that are being developed for those water bodies that are listed as 303d impaired under section 303(d) of the Clean Water Act. Most of the major rivers in northern California are listed as TMDL impaired, primarily for sediment and temperature. It is anticipated that by 2008, all TMDL-listed streams in northern California will have TMDL plans, which likely will help to reduce human impacts to the aquatic environments and thus protect ESA listed salmonids.

The Rangeland Management Advisory Committee has developed a management plan for inclusion in the state's Non-point Source Management Plan. Its purpose is to maintain and improve the quality and associated beneficial uses of surface water as it passes through and out of rangeland resources in the state. The programmatic emphasis is on a voluntary, cooperative approach to water quality management. This includes appropriate technical assistance, planning mechanisms, program incentives, and regulatory authorities. This Plan has been favorably received by the State Water Resources Control Board, the Environmental Protection Agency, and the California State Board of Forestry.

Long-term sustained gravel mining plans have been, or are being, developed by three northern California counties (Del Norte, Humboldt, and Mendocino), which comprise a substantial portion of the range of several listed ESUs. The intent is for the impacts of all gravel extraction projects to be evaluated at the watershed scale. Approved projects (by the USACE) will require annual monitoring reports on gravel recruitment, river geomorphology, and fisheries impacts. Humboldt County currently has an approved plan in place, and Del Norte and Mendocino Counties are in the process of obtaining plan approval. NMFS will be working with the counties and the USACE to ensure that any approved plans for gravel mining are sufficiently protective of coho salmon.

NMFS has developed a Memorandum of Understanding with five northern California counties (Siskiyou, Trinity, Del Norte, Humboldt, and Mendocino) to develop a standardized county routine road maintenance manual to assist in the protection of ESA listed species and their habitat. This manual includes best management practices for reducing impacts to listed species and the aquatic environment, a five-county inventorying and prioritization of all fish passage barriers associated with county roads, annual training of road crews and county planners, and a monitoring framework for adaptive management. NOAA has also provided nearly $750,000 in grants to support this program over the past 3 years and has worked with the counties in developing a prioritization process for inventorying and ranking all fish barriers in

anadromous waters associated with county roads. NMFS is working with the counties to make their routine road maintenance manuals approvable under the limits described in NMFS' ESA 4(d) protective regulations (67 FR 1116, January 9, 2002; 50 CFR 223.203(b)(14) through (b)(22)).

A voluntary certification program has been developed by the Sotoyome Resource Conservation District for grape growers in Sonoma and Mendocino counties who implement land management practices that decrease soil erosion and sediment delivery to streams. The development of the Fish Friendly Farming Program was a 2-year effort which involved grape growers, representatives from government agencies, and environmental groups. The result of this effort was the creation of a workbook of Beneficial Management Practices with a farm plan template. The workbook is designed to assist grape growers to inventory and assess the natural features of their farms, as well as their current management practices and implement improved practices. The growers participate in a series of workshops to develop and finalize a farm plan that is presented to a certification team comprised of NMFS, CDFG, and the Regional Water Quality Control Board.

FishNet 4C is a regional, multi-county group comprised of representatives from Mendocino, Sonoma, Marin, San Mateo and Santa Cruz counties, in addition to individuals from planning and public works staff, local, state and federal agencies, and other key entities such as water agencies, Resource Conservation Districts, and watershed groups. The program has been active for 5 years, coordinating county efforts such as road maintenance, fish barrier assessment and removal, riparian and grading ordinances, erosion control, implementation of bioengineering projects and the development of guidelines that enhance or protect salmonid habitat for public works departments. FishNet 4C is developing Road Maintenance Guidelines similar to that of the Five County Roads Program (above).

The Sonoma County Water Agency is currently constructing vortex weirs on the West Branch Russian River. This passage project provides passage at a flashboard dam site that has been down-cut over the last 40 years, creating a barrier to anadromous salmonids. This project will provide passage for chinook salmon and steelhead to an additional 15 to 20 miles (24.1–32.2 km) of spawning and rearing habitat in the upper Russian River watershed.

Local watershed councils and other groups throughout the state have successfully developed restoration plans and have worked to implement habitat restoration projects that are expected to contribute to the conservation of listed salmonid ESUs. In northern California, these groups include: The Scott River Watershed Committee and French Creek Watershed Advisory Group in the Scott River watershed; the Shasta River CRMP Project (Shasta River watershed); the South Fork Trinity River Restoration council (South Fork Trinity River); Salmon River Learning and Understanding Group; the Humboldt Bay Watershed Advisory Committee for Humboldt Bay watersheds; the Eel River Watershed Improvement Group that focuses on the lower Eel River; the Van Duzen River and South Fork Eel River; the Mainstem Eel River Group; the Yager/Van Duzen Environmental Stewards; the Eel River Salmon Restoration Project; and the Mattole Restoration Council and Group (Mattole River). In the central coast area there are additional watershed groups addressing Tomales Bay, Lagunitas Creek and the Russian River.

In 2003, the Santa Clara Valley Water District initiated the Fisheries Aquatic Habitat Collaborative Effort for Coyote Creek, Stevens Creek, and the Guadalupe River in Santa Clara County. The program will provide for improved stream flows and temperatures below District reservoirs, remediation of fish passage barriers, and habitat restoration. The program is among the most comprehensive, well funded, long-term protective efforts in California.

In cooperation with the CDFG and the Alameda Creek Fisheries Restoration Workgroup, NMFS is working towards re-establishing steelhead in Alameda Creek on the eastern side of south San Francisco Bay. Alameda Creek is the largest drainage in south San Francisco Bay and provides water supplies to several municipalities. San Francisco has also begun discussions with NMFS regarding the development of an HCP that will address water operations at their two reservoirs in the watershed. High quality spawning and rearing habitat for steelhead exists in upper Alameda Creek, Niles Canyon and its tributaries, and the Arroyo Mocho. Genetic testing strongly suggests that viable resident trout populations in these creeks are descended from native steelhead.

Many other sub-watershed groups, landowners, environmental groups and non-profit organizations are conducting habitat restoration and planning efforts in several watersheds that may also contribute to the conservation of listed salmonids. These efforts include, but are not limited to, Trout Unlimited, landowners such as Mendocino Redwood Company and Hawthorne Campbell Timberlands, Ten Mile Forest Landowners Association, Noyo Watershed Alliance, Garcia Watershed Council, Redwood Creek Landowners Association, Sonoma Ecology Center, Occidental Arts and Ecology Center, West Sonoma County Watershed Group, Salmon River Restoration Council, Mill Valley Streamkeepers, Friends of Corte Madera Creek, Coastal Watershed Council in Gazos Creek, Pescadero Conservation Alliance, Peninsula Open Space District, Committee for Green Foothills in San Mateo County, and the Coastal Watershed Council. Several watershed groups are actively working to improve habitat conditions for chinook and *O. mykiss* in tributary streams to the Sacramento River, including the Deer Creek Watershed Conservancy, Big Chico Creek Watershed Alliance, Butte Creek Watershed Conservancy, and Mill Creek Watershed Conservancy. Activities conducted by the various watershed groups include development and implementation of watershed assessments and management plans, support for and implementation of fish passage projects and water diversion screening projects, acquisition of habitat work to improve fish passage, various types of outreach efforts, and coordination with state and Federal resource agencies.

The Pacific Lumber Company HCP contributes to the conservation of listed salmonid ESUs, including Northern California *O. mykiss,* Southern Oregon/Northern California Coast coho, and California Coastal chinook. This multi-species HCP covers approximately 210,000 acres of industrial timberlands in northern California and includes activities related to timber management, forest road development and maintenance and commercial rock quarrying. The Pacific Lumber HCP is habitat-based with a defined goal of achieving or trending towards properly functioning aquatic habitat conditions, relying heavily on watershed-scale analysis, monitoring, and adaptive management.

NMFS and FWS have held technical and policy discussions with Green Diamond Resource Company (formerly the Simpson Resource Company) regarding the development of an HCP for much of its industrial timber operations in northern California. Currently, NMFS and FWS are considering approval of an ESA section 10(a)(1)(B) permit to authorize incidental take pursuant to the plan.

The Services expect issuance of the Permits by summer 2004.

The Humboldt Bay Municipal Water District (which supplies water to both domestic and industrial users in the greater Humboldt Bay area) HCP provides for maintenance of river flows that exceed historical summer low-flows. In no case will the District allow the river to dry up due to their operations.

Protective Efforts in Oregon

Federal Efforts—In the last 2 years, NMFS has completed hundreds of ESA section 7 consultations with Federal agencies on proposed projects within the range of listed ESUs in the state of Oregon. These consultations have improved or successfully minimized impacts to salmonids and their habitats. Specifically, NMFS' interim biological opinion and Federal Energy Regulatory Commission (FERC) relicensing biological opinion for several Clackamas River hydroelectric projects under the authority of FERC and Portland General Electric will provide protective benefits to the Lower Columbia River chinook and coho, and Upper Willamette River chinook and *O. mykiss* ESUs. The biological opinion establishes improvements for upstream passage of adults, downstream passage of juveniles, temperature management, spawning habitats, and the maintenance of in-stream flows. NMFS will continue to work with these and other agencies to facilitate projects that promote the conservation of listed ESUs.

Although not existing protective efforts, the removal of the Marmot and Little Sandy dams, scheduled for 2007, will restore free fish passage in the Sandy River and open currently inaccessible spawning and rearing habitats for the Lower Columbia River chinook, *O. mykiss,* and coho ESUs. The removal of the Powerdale dam on the Hood River by 2010, including interim measures to improve passage and in-stream flows, will provide survival benefits to the Lower Columbia River chinook and *O. mykiss* ESUs in the short term, and will allow improved access to spawning and rearing habitats in the longer term.

The USACE has undertaken feasibility studies and constructed over 25 projects within the Willamette Basin and lower Columbia River to improve habitat for salmonids. Over the last 2 years the USFS has completed eight aquatic habitat restoration projects to improve salmonid habitat within the range of the Upper Willamette River ESUs and 17 projects within the range of the Lower Columbia River ESUs. The FWS, through their Partners for Fish and Wildlife Program, over the last two years has funded eight restoration projects that have restored many acres of stream habitats, adjacent wetlands, and riparian habitats in the Upper Willamette and Lower Columbia River chinook and *O. mykiss* ESUs.

The FWS, through their Greenspaces Program, is funding various habitat enhancement programs. The City of Portland's Watershed Revegetation Program, the City of Gresham, and the community are using these funds to enhance at least 20 contiguous riparian and upland acres of the site by removing and reducing invasive non-native species including Himalayan blackberry (*Rubus discolor*), reed canarygrass (*Phalaris arundinaceae*), and non-native pasture grasses. The Three Rivers Land Conservancy is using these funds to create a strategy to identify how, why and where they should protect land, with a focus on fish and wildlife habitat priorities that will supplement and complement regional and local acquisition and natural resource protection efforts. The City of Sherwood and local partners are using these funds to continue the Raindrops to Refuge Program to ensure the preservation of natural areas within the City of Sherwood and surrounding areas for the benefit of fish, wildlife and the community by developing an overall strategy to guide and coordinate natural resource conservation, habitat restoration, environmental education and community outreach efforts. The John Inskeep Environmental Learning Center is using these funds to coordinate activities of students and professors from three universities in their efforts to conduct a watershed assessment, and develop a management and restoration strategy for the Newell Creek watershed. The Nature Conservancy with these funds is continuing a multi-year project involving the removal of invasive, non-native species in Multnomah and Clackamas counties in the Sandy River Gorge and its tributaries, and in the Willamette Narrows (including Little Rock Island in the Willamette River and Camassia preserve). Portland Metro will use these funds to conduct upland and riparian habitat assessments along 50 stream sites and aquatic macroinvertebrate sampling on properties primarily owned and managed by local park providers in Clackamas, Multnomah and Washington Counties in Oregon to establish a Benthic Index of Biological Integrity (B-IBI). The City of Wilsonville is using these funds to implement a project to enhance 4.5 acres (1.8 ha) of upland and riparian areas on a parcel of public property adjacent to Boeckman Creek, a tributary to the Willamette River. Clackamas County Water Environment Services and ODFW will use these funds to: (1) Evaluate the abundance and distribution of fish species in urban streams within two Clackamas County special districts; (2) conduct surveys to evaluate the effects of several previous habitat restoration projects; and (3) conduct aquatic habitat surveys within Clackamas County tributaries of the Tualatin River. Clackamas County Water Environment Services is conducting a macroinvertebrate survey and analysis to supplement water chemistry data that have been collected since 1993. The biological data will provide more insight about the biological conditions of the streams under their jurisdiction. The Tualatin Riverkeepers is coordinating a salmon carcass placement project to restore marine-derived nutrients to 3 to 6 miles (4.8–9.6 km) of salmonid spawning reaches on the main stem of the Tualatin River and two of its tributaries, Dairy Creek and Gales Creek. Nutrient enrichment is also expected to enhance the overall ecology of the upper Tualatin by increasing fish and wildlife productivity. Funds will be used by aquatic science students of Portland's Central Catholic High School to support habitat restoration work along Johnson Creek near Powell Butte in southeast Portland, collecting water, vegetation and soil condition data to monitor the effects of habitat enhancement activities. Gresham's Alpha High School students will use funds to engage in a comprehensive habitat restoration effort on a 3-acre (1.2 ha) section along Johnson Creek known as Gresham Woods.

Within the range of the Lower Columbia and Upper Willamette River ESUs, FWS funded 8 projects during FY 2001–2002 through the Jobs in the Woods Program. These projects will accomplish the following: 48 fish passage barriers will be removed to allow fish access to over 70 miles (112.6 km) on habitat; 2.5 miles (4.0 km) of instream habitat will be restored; 23 acres (9.3 ha) of riparian habitat will be restored; and 33 miles (53.1 km) of forest roads will be decommissioned and improved to reduce erosion and sedimentation. During FY 2003, projects were funded through the program that will remove six fish passage barriers to allow fish access to over 30 miles of habitat.

FWS manages three estuarine national wildlife refuges (Siletz Bay, Nestucca Bay, Bandon Marsh) within the range of the Oregon Coast coho ESU. With

coastal wetland loss in the U.S. exceeding 20,000 acres (8,093 ha) per year, these refuges preserve estuarine habitat important to a variety of species, including Oregon Coast coho salmon. Though largely limited to stocks inhabiting the local watersheds, benefits to coho salmon include preservation of important migratory and rearing habitat.

The EPA has funded a restoration project in Portland to restore vegetation to the Smith and Bybee Lakes complex, that will provide flood refugia to anadromous salmonids. The EPA has also funded three habitat projects in the Lower Columbia River (Scappoose Bay watershed, Roster Rock State Park wetlands and Deep River in Washington) to improve salmonid habitat.

The USACE has undertaken the Tillamook Bay & Estuary Feasibility Study to identify and evaluate the problems and opportunities associated with flood damage reduction and ecosystem restoration in Tillamook Bay. Implementation of ecosystem restoration based on this study is not assured and is highly reliant on the allocation of adequate funding and the cooperation of private land owners.

The USACE's regulatory program strives to provide protection of the aquatic environment, including wetlands. This program issues permits under the Clean Water Act and the Rivers and Harbors Act for projects within its jurisdiction, including many beneficial restoration actions. The USACE's jurisdiction has recently been redefined to exclude isolated wetlands. This change may have deleterious effects on water quality and quantity in area streams and rivers with hyporheic flow.

Since 1997, the PFMC has developed and implemented a management plan for listed Oregon Coast coho salmon, and the plan has been approved by NMFS through a section 7 consultation with itself. Under this management plan harvest rates have decreased from 60 to 80 percent during the 1970s and 1980s to less than 15 percent at present. Fisheries are reviewed annually to ensure that harvest impacts are within the specified limits. A comprehensive review of the harvest management plan occurred in 2000, which included some important refinements to the plan based on new information and analyses.

Non-Federal Efforts—The Conservation Reserve Enhancement Program (CREP) is an effort, jointly funded by the U.S. Department of Agriculture and the State of Oregon, designed to improve riparian conditions on agricultural lands. Under the CREP, agricultural landowners can enroll eligible riparian lands into a 10–15-year CREP contract and receive annual conservation payments for the contract period, for up to 75 percent of the eligible costs of restoration practices, in addition to other financial incentives. Initiated in 1998, the Oregon CREP program continues to encourage greater participation.

The City of Portland has undertaken an effort to delineate fish habitat within the lower Willamette River to determine usage by salmonids, in an effort to better assess potential impacts to salmonids from City activities and to identify important areas to protect and restore. The City has also been working to develop an HCP for the City's water supply in the Bull Run River. The emphasis of the HCP is on adequate flows in the Bull Run River and restoring salmonid habitat in the Sandy River Basin, to mitigate for lost habitat resulting from installation in the early 1900's of the two dams that currently supply the City of Portland with potable water.

The Oregon Department of Transportation over the last 2 years has undertaken several projects to restore fish passage above barriers. The projects have opened over 11 miles (17.7 km) of salmonid habitat, and improved passage for over 25 miles (40.2 km) within the range of the Upper Willamette and Lower Columbia River chinook and *O. mykiss* ESUs.

The City of Portland Office of Transportation submitted its Routine Road Maintenance Program (RMP) to NMFS for approval under 4(d) Limit 10 on March 21, 2003. A 30-day public notice of availability of the program for comments was published on May 5, 2003 (68 FR 23696). Marion County, Department of Public Works, submitted its RMP to NMFS for approval under Limit 10 of the 4(d) protective regulations (65 FR 42422, July 10, 2000; 50 CFR 223.203(b)(1) through (b)(13)) on November 6, 2003. A 30-day public notice of availability of the program for comments was published on March 28, 2003 (68 FR 15153). Prior to final approval or disapproval of the program, NMFS must complete the NEPA review of the program and the ESA section 7 consultation. The RMP guides routine road activities that might affect ESUs of threatened salmon and *O. mykiss*. The RMP is designed to be protective of salmonids and their habitat through the implementation of Best Management Practices (BMPs) developed to protect water quality and habitat. For example, BMPs minimize the movement of soil into streams and restrict other activities based on their proximity to streams and wetlands. The program is already being implemented and improved. The RMP provides a small contribution toward salmon conservation; the activities are limited to the City of Portland transportation and Marion County jurisdiction. The program will contribute to overall conservation but, as with many protective efforts under consideration, it cannot be evaluated how much the program will contribute to salmon abundance, productivity, spatial structure or diversity.

South Slough National Estuarine Research Reserve in Charleston, OR is the only designated marine protected area (MPA) within the range of the Oregon Coast coho ESU. Managed by a commission appointed by the governor, with the administrative support of the Division of State Lands (DSL), activities in the reserve are regulated, including the prohibition of commercial bait gathering, discharge of chemicals or other pollutants, road-building, dredging or filling, and commercial timber harvest. Commercial oystering is the only commercial activity permitted within the reserve. The reserve provides protection of valuable estuarine habitat to coho salmon during migration, as well as rearing. Research in South Slough has documented juvenile salmon presence during periods commonly considered outside the migration period.

The City of Cannon Beach (City) has been working for more than a year to develop a plan under Limit 12 of the ESA 4(d) protective regulations (municipal, residential, commercial, industrial). So far, they have described their environmental baseline and examined the ways that City practices and City land use have affected and/or continue to affect fish and aquatic habitat. Protection of riparian habitat, water quality (water treatment issues) and water supply issues have been identified as areas that need the most work. The City is currently working with a consultant and its residents to develop and implement solutions to these problems.

The Oregon Plan—The Oregon Plan for Salmon and Watersheds (Oregon Plan or Plan, below) is a ''framework of state laws, rules, and executive orders designed to enhance and protect watershed health, at-risk species, and water quality by governing forest and agricultural practices, water diversions, wetlands, water quality, and fish and wildlife protections'' (Oregon Watershed Enhancement Board, OWEB, 2002). The mission of the Plan is ''to restore the watersheds of Oregon and recover the fish and wildlife populations of those watersheds to productive and sustainable levels in a

manner that provides substantial environmental, cultural, and economic benefits'' (IMST, 2002). The Oregon Plan seeks to address factors for decline related to habitat loss and degradation by focusing on human infrastructure and activities that can adversely affect watersheds and salmonid fishes, *e.g.*, fisheries management, hatchery practices, fish passage barriers, forestry, agriculture, livestock grazing, water diversions and effectiveness of fish screens, urbanization, permitted pollutant discharges, removal and fill permits.

The Oregon Plan encourages efforts to improve habitat conditions for salmon through non-regulatory means, including significant efforts by local watershed councils and private landowners. Since the Oregon Coast coho ESU was listed in 1998, OWEB has implemented over 1000 habitat improvement projects to increase and improve habitat for anadromous fish in Oregon rivers and tributaries. State regulatory agencies also actively contribute to the Oregon Plan and its implementation. For example, ODFW has revised fisheries management and hatchery practices, and implemented a comprehensive monitoring program for salmon and *O. mykiss* populations in Oregon.

The Oregon Plan includes several pre-existing activities and programs, as well as additional coordination, compliance, investment, monitoring, and voluntary involvement that are provided under the umbrella of the Plan. Included under this umbrella is the Oregon Agricultural Water Quality Management Act, passed as Senate Bill 1010 in 1993 by the Oregon State Legislature. Under this Act the Oregon Department of Agriculture provides landowners technical assistance to develop watershed-based plans to prevent and control water pollution resulting from agricultural activities. The Agricultural Water Quality Management Act promotes coordinated watershed planning, while maintaining needed flexibility for landowners to address site-specific water quality issues.

The IMST, the entity that provides scientific oversight for the Oregon Plan, has reviewed the adequacy of various elements of the Plan in conserving salmon and *O. mykiss* populations at the state-wide scale (*e.g.*, IMST 1998; 1999; 2002a; 2002b). A comprehensive ESU-scale analysis of the effectiveness of actions and measures under the Oregon Plan, specifically in conserving the Oregon Coast Coho ESU, is being conducted, but is not yet complete. In a coordinated effort through the Oregon Governor's Office, including all state natural resource agencies and several Federal partners, the State of Oregon has undertaken a comprehensive analysis of the adequacy of actions under the Plan, specifically in the context of conserving and recovering the Oregon Coast coho ESU. As this substantial effort is currently underway and not scheduled to be completed until later in 2004, the proposed listing determination for the Oregon Coast coho ESU described in this notice has not been informed by this ESU-scale analysis. If information is made available to NMFS suggesting that the Oregon Plan and/or other conservation efforts substantially mitigate ESU extinction risk, NMFS will take such opportunity to re-initiate a status review for the Oregon Coast coho ESU to consider the best and most recent scientific and commercial information available.

The ODFW has developed several fishery management plans that have been approved by NMFS for listed salmon and *O. mykiss* ESUs in Oregon. ODFW has developed a comprehensive harvest plan for the Oregon Coast coho ESU that was included in the Oregon Plan. This fishery management plan was subsequently adopted by the PFMC (described above). A Fisheries Management Evaluation Plan (FMEP) was developed by ODFW for a coho salmon fishery in Siltcoos and Tahkenitch Lakes on the Oregon Coast. This FMEP was approved by NMFS in 2001 under Limit 4 of the ESA 4(d) rule (65 FR 42422; July 10, 2000) and remains in effect. ODFW has developed two FMEPs under limit 4 of the 4(d) rule for listed spring chinook and winter steelhead in the Willamette River Basin, as well as an additional 4 FMEPs for listed chinook, *O. mykiss*, coho and chum in the Lower Columbia River. Under these FMEPs, only adipose-fin clipped fish can be harvested, and all wild fish must be released unharmed. This management change has resulted in a 75-percent decrease in harvest impacts to spring chinook returning to the Willamette Basin. For listed Willamette River winter *O. mykiss*, harvest rates have been reduced to 1–2 percent. Although these six FMEPs have yet to be approved by NMFS, they have resulted in a reduction of overall fisheries impacts in the Lower Columbia River of over 50 percent.

Protective Efforts in Washington State

Federal Efforts—Since 2000, NMFS has consulted on over 1,000 Federal actions, and private actions requiring Federal authorization, that potentially affected listed ESUs in Washington State. These consultations covered a broad range of activities including water withdrawals, dock construction, road construction, the full suite of forest management activities, and stream channel restoration. Federal agencies were able to effectively minimize the potential adverse impacts of activities through the consultation process. For example, consultations have led to substantial improvements to stream flows in three streams occupied by the Upper Columbia River ESUs, and to improved design standards for new docks in the Columbia River. Another significant outcome of the consultation process has been the marked improvement in the quality of the proposals submitted for consultation. Federal agencies are including more effective minimization measures in their proposed actions before requesting consultation. The installation of spill deflectors as part of the Chief Joseph Dam gas abatement project will likely increase juvenile survival for the Upper Columbia River chinook and *O. mykiss* ESUs, and to a lesser extent the Middle Columbia River *O. mykiss* ESU. A settlement agreement with the FERC will restore fish passage above Pacificorp's Cowlitz Dam and improve in-stream flows. Pacificorp has also committed to the removal of Condit Dam on the White Salmon River, or to otherwise establish fish passage to currently blocked spawning and rearing habitat for Lower Columbia River chinook and Middle Columbia *O. mykiss* ESUs.

Over the past 2½ years, the majority of NMFS' ESA section 7 consultations have concerned ongoing and proposed activities in Puget Sound. Completed section 7(a)(2) consultations cover a wide range of management activities with 26 Federal action agencies, including Federal land management, USACE permits for shoreline modifications, and habitat restoration projects. Each action that NMFS found would not jeopardize Puget Sound chinook included sufficient conservation measures to avoid or minimize substantial adverse effects, and many actions included restorative elements. For example, as integral parts of several major infrastructure projects, over the past decade or so and with greater emphasis since chinook were ESA-listed in Puget Sound, the Port of Seattle has constructed 3.7 acres of aquatic habitat restoration and enhancement areas and made other environmental improvements. The Port also improved light penetration in shallow water areas, removed barriers to migrating juvenile fish, reshaped shoreline to improve aquatic habitat, replaced several thousand creosote-

treated wooden pilings that had contaminated fish habitats with fewer concrete and steel pilings, restored and enhanced habitat, and cleaned up contaminated sediments.

Over the past 2½ years, NMFS has consulted on hundreds of ongoing and proposed activities that may affect salmonid habitats within the Washington area of the Lower Columbia River domain. Completed ESA section 7(a)(2) consultations cover a wide range of management activities with at least 11 Federal action agencies, including Federal land management, USACE permits for shoreline modifications, and habitat restoration projects. Each action that NMFS found would not jeopardize the listed Lower Columbia ESUs included sufficient conservation measures to avoid or minimize substantial adverse effects, and many actions included restorative elements. For example, separate, state-wide Programmatic Consultations with the USACE and FWS provide technical guidance for restoring fish passage and other habitat restoration projects that receive a variety of Federal funds.

As previously mentioned, the NPCC–FWP has invested BPA funds in passage and flow improvements within Columbia River Basin. More recently, the BOR, as part of its responsibilities under the FCRPS Biological Opinion, has deployed staff within the Basin to begin addressing passage and flow problems. Presently, the BOR lacks authority to fund projects, and has instead been providing technical assistance and engineering support to irrigators. The BOR anticipates soon having authority to fund construction and purchase water. In spite of present limitations, the BOR is involved in designing two projects that could meaningfully resolve instream flow problems in two significant tributaries.

BPA, Mitchell Act, and Pacific Coastal Salmon Recovery Funds have also been used to screen irrigation withdrawals throughout the Columbia Basin. The vast majority (in terms of the volume of water diverted) of water withdrawals in the Basin are screened. However, a number of these screens do not meet current criteria. All screens require periodic inspection and maintenance. ESA-compliant screens of gravity water diversions are in place on two of the six sites routinely inspected by the WDFW. There are an unknown number of other screens on gravity diversions that are not inspected by WDFW.

Over 80 percent of the land within the Methow, Entiat, and Wenatchee Subbasins is publicly owned, but private ownership is concentrated along the valley bottoms and represents a disproportionate share of the habitats occupied by the Upper Columbia River *O. mykiss* and spring chinook ESUs. In the Okanogan Basin, nearly all of the habitat currently available to *O. mykiss* is in private or Tribal ownership. Several lesser independent Columbia River tributaries drain lands managed by the Department of the Army or the BOR.

The Department of the Army has significantly improved range management conditions on its lands, to the betterment of fish habitat. Serious water quality problems persist in streams receiving agricultural return flows from BOR facilities. National Forest lands within the range of the Upper Columbia ESUs are managed according to Northwest Forest Plan or PACFISH standards. Continued adherence to these standards is expected to result in conditions on Federal land consistent with salmon and *O. mykiss* recovery. An ongoing concern is that most of the National Forest lands outside of designated wilderness areas contain very high road densities. These roads are a major source of sediment to chinook and *O. mykiss* spawning streams, and many road crossings impede fish passage. The USFS improves roads and stream crossings as it can, but present budgets are inadequate to remedy these problems in the near term.

The upper reaches of several major streams lie in wilderness, but wilderness areas are generally upstream of Upper Columbia *O. mykiss* and spring chinook production areas. Wilderness areas and the non-wilderness portions of the National Forest attract substantial recreational activity. Most of the Forest Lands within the ranges of the Upper Columbia River ESUs are within a few hours' drive of the major population centers of western Washington. Throughout the summer, thousands of recreational users crowd the banks of major *O. mykiss* and chinook production areas, destroying riparian vegetation and harassing listed fish during summer low flows. Again, the USFS has endeavored to minimize these impacts by relocating and closing some camping areas, but budgets have been inadequate to control the problem. The recently enacted program of charging fees for using many sites in the Forest and using those receipts to improve recreational facilities will likely help to lessen recreational impacts. Many of the National Forest lands within the ranges of the Upper Columbia River ESUs are grazed. Although NMFS consults on grazing leases, there is ongoing concern about compliance with lease requirements.

Non-Federal Efforts—NMFS has recently approved a Routine Road Maintenance under Limit 10 of the ESA 4(d) rule for approximately thirty cities and counties across the State. This approval will ensure that routine road maintenance activities, done according to specified conditions, will avoid and minimize possible ''take'' of threatened salmon and *O. mykiss*.

The Lower Columbia Fish Recovery Board has identified over 260 salmonid habitat improvement projects in the last 12 years that were completed by various private and local government entities within the range of the Lower Columbia River ESUs.

HCPs with the Chelan and Douglas County public utility districts for the Wells, Rocky Reach, and Rock Island dams will: increase the survival of juveniles migrating through the projects; improve spawning and rearing habitat in the Okanogan, Methow, and Entiat basins; and ensure that related hatchery programs are operated in a manner consistent with the overall objective of rebuilding natural populations. NMFS is working with two agricultural irrigation districts in the Methow Basin to develop HCPs. The HCPs are likely to be narrowly focused on water use and the maintenance of minimum instream flows. Another large irrigation district has also expressed interest in developing an HCP to cover the full suite of its management activities. A county government within the range of the Upper Columbia River ESUs has also expressed an interest in an HCP that would enable any county resident willing to comply with the terms of the HCP to thereby achieve compliance with the ESA under a section 10 permit held by the county. An Upper Columbia River watershed group has expressed a similar interest, but has not been able to identify a suitable permit holder. At present, it is uncertain whether any of these efforts will lead to the issuance of a section 10 permit.

Approximately 1.1 million acres (445,146 ha) of forest lands and two municipal watersheds are covered by HCPs within the Puget Sound domain (ESUs include Puget Sound chinook, Hood Canal summer-run chum, and Ozette Lake sockeye); NMFS has determined that these HCPs comply with ESA section 10(a)(2)(B). The HCPs are West Fork Timber, Plum Creek Timber (Central Cascades), Port Blakely Tree Farms, WA Department of Natural Resources (WA DNR, discussed in more detail below), Green Diamond Resource Company (formerly, Simpson Timber)—Shelton Timberlands, City of Seattle Cedar River Watershed, and City of Tacoma Green River Water Supply. All

of the forestry HCPs address long-term salmonid survival on industrial forest lands and are designed to provide properly functioning habitat conditions—thereby ensuring healthy watersheds and riparian areas. They also give landowners long-term management clarity and certainty. Specific HCP conservation measures focus on attaining mature forest conditions in riparian areas, minimizing sediment input to streams, protecting and recovering floodplain functions, and protecting water quality during timber management and associated road operations. Of the seven HCPs in Western Washington State, two include protection of instream flows for anadromous salmonids (Cedar and Green rivers). Instream flows are also provided, through agreements negotiated with the FERC, on the Skagit, Sultan, Snoqualmie (ramping rates only) and Nisqually rivers. Recently installed screens on gravity water diversions at five sites on the Dungeness River are consistent with current standards for fish passage. The number of additional gravity water diversions in other sub-basins, and whether any are compliant with fish passage, are unknown. Two long-standing hydroelectric dams on the Elwha River are slated for removal starting in 2007. Congress has authorized funds for current phases of the complex effort that requires construction of several new water supplies. Dam removal will restore about 70 miles (112.6 km) of mainstem and tributary habitat. Fish passage is also being restored to 17 miles (27.4 km) of mainstem and tributary habitats on the Cedar River as part of the City of Seattle's HCP, 7 miles (11.2 km) on Goldsborough Creek, as well as many other small streams.

The WA DNR HCP is the largest of the HCPs, providing conservation benefits to multiple species including ESA-listed and currently unlisted anadromous salmonids. The WA DNR will use riparian management zone (RMZ) buffers on both sides of fish bearing streams to address riparian functions that influence the quality of salmonid freshwater habitat. The RMZ consists of an inner riparian buffer (minimum 100 ft (30.5 m), or on-site tree height, whichever is greater), and an outer wind buffer (between 50–100 ft (15.2–30.5 m), depending on stream size) where needed to protect the inner buffer. No harvest will be allowed in the first 25 ft (7.6 m) of buffer, ''minimal harvest'' will be allowed in the next 75 ft (22.9 m), and ''low harvest'' will be allowed in the remaining buffer more than 100 ft (30.5 m) from the active channel margin. It has been demonstrated that errors in stream classifications are quite common, and that incorrectly classifying streams as non-fish-bearing waters could have significant adverse effects on salmonid habitat. In order to avoid such effects, a 100-ft (30.5 m) wide riparian buffer was applied on both sides of perennial streams believed to be non-fish-bearing. Additionally, stream typing will be examined or verified in the field before harvest.

The WA DNR's Road Management Strategy will be implemented to: (1) Minimize further road-related degradation of riparian, aquatic, and identified species habitat; (2) plan, design, construct, use, and maintain a road system that serves the DNR's management needs; and (3) remove unnecessary road segments from the road network. Comprehensive road maintenance plans will include annual inventories of road conditions; aggressive maintenance, stabilization, and access control to minimize management and environmental problems; and limits on road network expansion. The standards for new road construction and appropriate placement will be consistently applied and updated. The DNR will initially focus on improving roads in the more sensitive areas of a landscape giving priority to locations on steep slopes with unstable soils and high precipitation, and locations within 100 feet of fish-bearing streams and wetlands. In order to keep new roads to a minimum, log yarding will be allowed through the harvest zone in the RMZ. Specific measures for this yarding (and any other management in the RMZs) will be developed by DNR and reviewed by NMFS/FWS. Such management would be based on detailed, site-specific conservation objectives, and sufficient monitoring would be included to ensure that the RMZs will continue to adequately provide the desired riparian functions.

Protections of seasonal non-fish-bearing streams include: (1) Those streams crossing unstable slopes will be protected (no timber harvest) to minimize potential for landslides and other mass-wasting activities; (2) those streams crossing stable ground will be protected where necessary to maintain important elements of the aquatic ecosystem; and (3) an aggressive, 10-year research program will study the effects on aquatic resources of forest management along such streams. At the end of 10 years, a long-term conservation strategy for forest management along seasonal non-fish-bearing streams will be developed and incorporated into the HCP. Potential sediment introductions to streams will be minimized by placing harvest restrictions near those streams flowing on unstable slopes and in areas with a high risk of mass wasting. Also, a comprehensive landscape-based road network will be developed to identify fish blockages caused by stream crossings and prioritize their retrofitting or removal. Adverse effects on salmonid habitat caused by rain-on-snow floods will be minimized by maintaining two-thirds of DNR-managed forest lands within each sub-basin in a forest condition that is hydrologically mature with respect to rain-on-snow events. In addition, improved road management will decrease adverse effects on natural hydrologic function.

The DNR will monitor the WA DNR HCP to determine whether its conservation strategies are implemented as written and whether that implementation results in anticipated habitat conditions. Implementation monitoring will document the types, amounts, and locations of forest management activities carried out on DNR-managed lands in the five westside and Olympic area planning units. Research monitoring in riparian habitats will focus on determining how to design wind buffers, evaluating forest practices along seasonal non-fish-bearing waters not associated with unstable slopes, designing timber harvest in riparian buffers and mass wasting areas, and developing basic information on the relationship among forest practices, riparian ecosystems, and basin hydrology. Implementation of these measures will likely lead to properly functioning conditions on commercial state-owned timberlands.

The CREP is an effort, jointly funded by the U.S. Department of Agriculture and Washington State, designed to improve riparian conditions on agricultural lands. Under the program, farmers are paid to plant and maintain, for a period of up to 15 years, streamside buffers. In spite of the availability of more than $200 million, participation in CREP within Washington State has been very low. The State and the Department of Agriculture are in the process of modifying the Washington State program to allow smaller buffers, to encourage greater participation. The current program requires that buffer widths vary according to local geomorphic features, while the proposed changes would allow the application of fairly narrow static-width buffers, independent of a site's geomorphic context. It is unclear whether lowering the minimum standards will encourage greater

participation, and in turn lead to improved riparian conditions.

The Washington State Salmon Recovery Funding Board (SRFB) is intended to fund efforts to protect and restore salmonid habitat. The SRFB is supported by a combination of state general fund and Federal Coastal Salmon Recovery dollars. The scope of SRFB projects is essentially the same as NPCC habitat projects, and often, funds from both sources are pooled on individual projects. In the Columbia Basin, the state is attempting to harmonize SRFB efforts with the NPCC program and has granted funding to local groups in support of subbasin planning. Working in concert, these two programs will form a powerful vehicle for habitat protection and restoration within the range of the ESU.

State and private forest practices are subject to new Washington State Forest and Fish Report regulations, which will reduce forest practices impacts relative to those rules in effect when the species in Washington were listed. These regulations are among the most restrictive in the country and require the retention of substantial riparian zones and the remediation of forest road problems.

Although forest practices on private lands are not now compliant with ESA regulations, the Washington State Forest Practice Rules were changed in 2000. Those rules are now being developed into an HCP (68 FR 12676; March 17, 2003). Effective July 2001, these new rules covered a wide variety of forest practices and include: a new, more functional classification of rivers and streams on non-Federal forest land; improved plans for properly designing, maintaining, and upgrading existing and new forest roads; additional protections for unstable slopes; greater protections for riparian areas intended to maintain properly functioning conditions; and a process for adaptive management.

The State of Washington has established a water rights acquisition program intended to secure water rights for the purpose of improving stream flows for fish. The program is endowed with $5.5 million in State and Federal funds, which are to be used only in 16 priority subbasins. Two of these subbasins are within the range of the Upper Columbia River ESUs. Unlike the BOR program under FCRPS Biological Opinion's Action 149, the state's effort has established guidelines for prioritizing how the funds are spent. Portions of the program's funds have been used to lease water in the Okanogan River Basin as part of a cooperative effort between a local irrigation district, the Colville Tribes, and non-profit organization. That effort put flows in lower Salmon Creek in early 2003, allowing anadromous *O. mykiss* to spawn there for the first time in nearly a century.

WDFW's Yakima Screen shop has installed and maintained numerous screens within the ranges of salmon and *O. mykiss* ESUs, using a combination of BPA, Mitchell Act, and state funds. Their progress in fabricating and installing screens has been impeded by insufficient funding and staff. The status of the state's budget is such that it is uncertain if the State will continue to fund screen construction in the future.

The Washington State Department of Ecology (DOE) is responsible for ensuring that water quality meets the standards required by the Clean Water Act (CWA). However, every subbasin within the ranges of the Upper Columbia River ESUs contains streams or stream reaches that do not meet CWA standards, and water quality remains a significant limiting factor. There are 109 streams or stream segments listed under CWA 303(d) as impaired with respect to water quality. Nineteen of these are listed as impaired for lack of instream flows, and a number of others are listed for temperature problems that occur as indirect effect of water withdrawals. Water withdrawals for irrigated agriculture are the most significant sources of water quality degradation within the Upper Columbia River. TMDLs are the most effective tools for addressing these non-point source pollution problems. Presently, the only TMDL effort underway in the Upper Columbia River is in the Wenatchee Subbasin, although there are a number of TMDL efforts underway across the state outside of the Columbia Basin. Lack of staff resources at DOE is a major impediment to the development of additional TMDLs. During its 2003 session, the Washington State Legislature acted to limit DOE's authority to regulate water withdrawals for the protection of in-stream flows. While DOE had not exercised this authority until 2002, its first attempt to do so resulted in the subject legislation. It is now doubtful that the CWA, implemented by DOE, will be used to resolve in-stream flow problems in Washington State.

Recovery planning for listed salmonids in Puget Sound is being conducted through a voluntary, collaborative process called the Puget Sound Shared Strategy. Federal agencies, tribal governments, state and local governments, private businesses, and environmental organizations are working together through the Shared Strategy to complete a recovery plan for listed Puget Sound chinook by 2005. This effort is focused on the development of local watershed recovery plans, each of which will describe specific actions within a given watershed necessary to recover the local listed salmon populations. In addition to the individual watershed recovery plans, an inter-disciplinary group of planners, scientists, and government agency staffs are preparing a plan for the recovery of nearshore and estuarine habitats in Puget Sound. Drafts of these plans will be completed by June 2004. The plans will be included, to the maximum extent practicable, as part of the Puget Sound chinook ESU recovery plan to be completed by the summer of 2005.

In the Lower Columbia River, WDFW has developed an FMEP for listed chinook salmon, listed *O. mykiss*, and listed chum salmon under Limit 4 of the 4(d) rule. The FMEP was approved by NMFS in December 2003. Under the FMEP only adipose fin-clipped chinook, *O. mykiss*, chum and coho salmon may be harvested. All unmarked wild fish must be released unharmed. Changes in trout fishing regulations reduce harvest rates on juvenile steelhead to less than 2 percent.

Protective Efforts in Idaho

Federal Efforts—The USFS is currently in the process of revising its Land and Resource Management Plans (LRMPs) across the Snake River Basin. This LRMP revision will be used by the USFS to replace the existing protective efforts of PACFISH, INFISH, and the related LRMP biological opinions, providing comparable protection for ESA-listed fish species but at a site-specific scale. LRMPs have recently been revised for the Boise, Payette, and Sawtooth National Forests (Southwest Idaho Ecogroup), and will soon be revised on the Clearwater, Wallowa-Whitman, and Salmon-Challis National Forests. Direction provided by these LRMPs will guide all management activities across applicable National Forest lands for the next 10 to 15 years. As in the revision for the Southwest Idaho Ecogroup, each of these LRMPs will likely include some form of an Aquatic Conservation Strategy (ACS), a strategy designed to ensure that future management activities work to maintain and restore proper functioning fish habitat conditions.

To accomplish this goal, LRMPs will provide guidelines for timber harvest, road maintenance, and other activities. They will include but not be limited to: (1) Placing restrictions on the types and magnitude of management activities across the forest or within individual

watersheds; (2) placing restrictions on the location and extent of ground-disturbing activities in a watershed (including road network development); (3) allocating important watersheds to listed fish species for restoration emphasis versus commodity production; (4) identifying watershed restoration needs and priorities; (5) establishing a process for riparian reserve network delineation; and (6) incorporating an adaptive management process to ensure that restoration priorities remain current.

Success of habitat restoration efforts on Federal lands will depend upon adequate funding. NMFS believes that implementation of the LRMPs for National Forest lands in the Snake River Basin will continue to provide substantial benefits to Snake River *O. mykiss* and chinook salmon. While the LRMP covers a very large area, the overall effectiveness of efforts on Federal lands in conserving Snake River *O. mykiss* and chinook salmon is somewhat limited by the extent of Federal lands and the fact that Federal land ownership is not uniformly distributed in watersheds within the ranges of affected ESUs. Therefore, long-term habitat protection within the range of this ESU continues to depend on improvement in non-Federal land management, particularly those lands used for timber harvest and agriculture.

To date, three HCPs are under development within the range of Snake River *O. mykiss*, fall and spring/summer chinook and sockeye, one by Plum Creek Timber Company and the other two by the Upper Salmon River and Lemhi River Irrigators. However, only the Plum Creek HCP has been formally submitted to NMFS. The success of HCPs depends on funding and implementation of restoration activities basinwide.

The Idaho Screen Shop in Salmon, Idaho, is very active in screening diversions throughout the Salmon River basin. The screen shop is run by Idaho Department of Fish and Game, with funding from BPA and NMFS under the Mitchell Act. The BOR provides technical assistance in design. This program has been effective in reducing fish losses to irrigation systems.

The BOR is responsible for addressing flow, passage and screening problems on non-public land pursuant to the 2000 FCRPS Biological Opinion. In 2002, BOR facilitated the completion of ten projects in the Lemhi River, and two projects in the East Fork Salmon River to replace headgates, consolidate diversions, and install screens in an effort to eliminate fish passage barriers. In 2003, BOR began work in the upper Salmon River, and as a result completed two projects on Upper and Lower Beaver Creek. Additionally, BOR has contacted landowners in other subbasins to locate and remove fish passage barriers. BOR is currently designing several projects to remove fish passage barriers in the upper Salmon River subbasin. The objective of BOR's action is to restore flows needed to avoid jeopardy to listed species, screen all diversions, and resolve all passage obstructions within each of 16 priority subbasins. Water acquisition will occur through water purchase or lease. This program may be highly successful in opening additional spawning and rearing habitat and increasing flows for out-migrating anadromous fish. Success depends upon sufficient funding, identification of problem areas and adequate design and implementation. BOR has in the past and will continue to consult with NMFS and the FWS when designing projects to eliminate fish passage barriers.

Non-Federal Efforts—Demands for Idaho's groundwater resources have caused groundwater levels to drop and reduced flow in springs for which there are senior water rights. The Idaho Department of Water Resources is continuing studies and has promulgated rules that address water right conflicts and demands on a limited resource. The studies have identified aquifer recharge as a mitigation measure with the potential to affect the quantity of water in certain streams, particularly those essential to listed species. Idaho continues to address the potential to improve flows for fish passage through state programs. Idaho water law has been changed to allow water rentals and the retention of instream flows for fish in the Lemhi River. Idaho and local irrigators have negotiated short-term agreements to ensure minimum in-stream flows through 2003 and have committed to developing a long-term HCP with NMFS for the Lemhi River. However, Idaho has not yet augmented flows to any significant extent in subbasins other than the Lemhi. Efforts to recover listed salmon are likely to be impeded until Idaho begins to explore opportunities to address the limitations of state water law to increase flows in other subbasins.

In 2001, the Idaho state legislature extended for one year BOR's authority to rent water from Idaho's water rental pools, for delivery to BOR's flow augmentation program. In recent years, BOR rented up to about 250,000 acre-feet from these rental pools of the total 427,000 acre-feet delivered for salmon flow augmentation. While this legislation allowed such rentals to continue during 2001, a severe drought occurred in 2001 and very little water was available for rental. In 2001–2003 water was rented in the Lemhi River.

The Idaho Department of Environmental Quality continues to establish court-required TMDLs in the Snake River Basin, a program regarded as having positive water quality effects. TMDLs were completed in 2001 in the following subbasins: South Fork Clearwater River, Mid-Salmon Panther (completed and approved), Mid-Salmon Chamberlain (approval pending), and South Fork Salmon (approval pending). TMDLs were completed in 2002 in the following subbasins: Pahsimeroi (1 sediment, 1 temperature), Mid-Salmon Chamberlain [(Crooked Creek) (1 segment temperature) (EPA requested changes; resubmitted September 2002)], and South Fork Salmon (assessment complete; no new TMDLs; existing 1991 TMDL on mainstem remains in effect). Additionally the following work is underway: South Fork Clearwater (Subbasin assessment/TMDL loading analysis underway), Snake River-Hells Canyon (submittal pending; TMDLs for temperature, sediment loads at mouths of tributaries, nutrients, dissolved oxygen, total dissolved gas), Potlatch (starting assessment) and small tributaries of the Clearwater on Nez Perce Reservation (developing work plans). An agreement establishing a schedule for completion of TMDLs in Idaho was reached in 2002. Corrective actions to meet TMDL targets will need to be identified, funded, and implemented.

Summary of Protective Efforts Addressing Habitat, Harvest, and Passage Issues

In summary, the ESA listings of salmon and *O. mykiss* ESUs have provided the incentive for numerous protective efforts. While many causes of decline in salmon and *O. mykiss* ESUs are being addressed (*e.g.*, providing fish passage above artificial barriers), habitat degradation and destruction has been slowed but not prevented. The protective efforts described above are directed toward addressing the numerous factors that limit recovery of threatened and endangered ESUs—water quality and quantity, safe migration, riparian vegetation, food, predation dynamics and complex stream channels, and floodplain connectivity. These actions all will aid in improving these factors within the area of each project. Cumulative effects of these and other protective efforts, and any additional measures necessary to address the ESUs' factors for decline

and extinction risk, are being evaluated through recovery planning.

Proposed Listing Determinations

The ESA defines a species as including any subspecies, or any distinct population segment of a vertebrate species, which interbreeds when mature. The ESA further defines an endangered species as any species in danger of extinction throughout all or a significant portion of its range, and a threatened species as any species likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Section 4(b)(1) of the ESA requires that the listing determination be based solely on the best scientific and commercial data available, after conducting a review of the status of the species and taking into account those efforts, if any, being made to protect such species.

The proposed listing determinations are described below for each of the 27 ESUs of West Coast salmon and *O. mykiss* under review, as defined in the section *''Determinations of ''Species'' Under the ESA.''* Informed by the BRT's findings (NMFS, 2003b), NMFS' assessment of the effects of artificial propagation programs on ESU viability (NMFS, 2004b), the Artificial Propagation Evaluation Workshop conclusions regarding the extinction risk of ESUs in-total (NMFS, 2004c), and after considering the efforts being made to protect these ESUs, NMFS has determined that four ESUs warrant listing as endangered species, and 23 ESUs warrant listing as threatened species. Collectively, these ESUs include 162 artificial propagation programs. Informed by the *Alsea* ruling and consistent with the proposed Hatchery Listing Policy published elsewhere in this issue of the **Federal Register**, any artificial propagation programs considered to be part of an ESU will be included in the listing if it is determined that the ESU in-total is threatened or endangered. Table 3 at the end of this section provides a summary of the proposed listing determinations.

In many of these ESUs, adult returns have been significantly higher in the last 1 to 3 years than has been observed in the past decade or more. These recent improvements, principally in ESU abundance and productivity, are encouraging and represent a relative reduction in extinction risk. However, the favorable responses observed in recent years are often uneven across populations within these ESUs. Additionally, the causes for the recent increases in abundance and productivity are not well understood, and in many (perhaps most) cases may be primarily due to unusually favorable conditions in the marine environment rather than more permanent reductions in the factors that have led to the widespread declines in salmonid abundance over the past century (See NMFS, 2003b for further discussion). For ESUs limited by factors affecting their spatial structure, improvements in fish passage and other issues are difficult to obtain and are slow to show a biological response. Reform of harmful hatchery practices has alleviated threats to the diversity of many ESUs, but it is uncertain the degree to which past harmful effects are reversible.

Snake River Sockeye ESU

The BRT unanimously concluded that the Snake River sockeye ESU is ''in danger of extinction.'' Although the Redfish Lake captive broodstock program was instrumental in rescuing the ESU from extinction, it does not substantially mitigate the BRT's assessment of risk. Actions under the 2000 FCRPS Biological opinion, as well as other protective efforts in the region and the State of Idaho, have improved habitat conditions for the ESU. Nonetheless, risks to the ESU's abundance, productivity, spatial structure, and diversity remain extremely high. NMFS' assessment of the effects of artificial propagation on the ESU's extinction risk concluded that the Redfish Lake captive broodstock program does not substantially reduce the extinction risk of the ESU in-total (NMFS, 2004c). Protective efforts, as evaluated pursuant to the PECE, do not provide sufficient certainty of implementation and effectiveness to alter the BRT's and the Artificial Propagation Evaluation Workshop's assessments that the ESU is ''in danger of extinction.'' NMFS concludes that the ESU in-total is in danger of extinction throughout all or a significant portion of its range, and proposes that the Snake River sockeye ESU remain listed under the ESA as an endangered species.

Ozette Lake Sockeye ESU

The BRT concluded that the naturally spawned component of the Ozette Lake sockeye ESU is ''likely to become endangered within the foreseeable future.'' The Makah Tribe's artificial propagation program has improved the ESU's overall abundance and spatial structure, but these efforts likely have not mitigated the risks faced by the beach spawning sockeye aggregations. Uncertainties and biases in the available data continue to confound evaluations of abundance and productivity trends in the ESU. NMFS' assessment of the effects of artificial propagation on the ESU's extinction risk concluded that the within-ESU hatchery programs do not substantially reduce the extinction risk of the ESU in-total (NMFS, 2004c). Protective efforts, as evaluated pursuant to the PECE, do not provide sufficient certainty of implementation and effectiveness to alter the BRT's and the Artificial Propagation Evaluation Workshop's assessments that the ESU is ''likely to become endangered within the foreseeable future.'' Although the WA DNR HCP, Washington State Forest Practice Rules, and other protective efforts are encouraging signs, these efforts have yet to demonstrate substantive improvements to Ozette Lake habitat conditions. NMFS concludes that the ESU in-total is likely to become endangered within the foreseeable future throughout all or a significant portion of its range, and proposes that the Ozette Lake sockeye ESU remain listed under the ESA as a threatened species.

Sacramento River Winter-Run Chinook ESU

The BRT concluded that the naturally spawned component of the Sacramento winter-run chinook ESU is ''in danger of extinction.'' Informed by the BRT's findings (NMFS, 2003b) and the assessment of artificial propagation programs on the viability of the ESU (NMFS, 2004b), the Artificial Propagation Evaluation Workshop concluded that the Sacramento River winter-run chinook ESU in-total is presently ''in danger of extinction'' (NMFS 2004c). Major efforts have been undertaken by NMFS and others over the past decade to: Assess the viability of, and conduct research on, the winter run chinook population; implement freshwater and ocean harvest management conservation efforts; and implement a wide range of habitat conservation measures. The State of California has listed winter-run chinook under the California Endangered Species Act, implemented freshwater harvest management conservation measures, and increased monitoring and evaluation efforts in support of conserving this ESU. Harvest and habitat conservation efforts have substantially benefited the ESU's abundance and productivity over the past decade. These efforts include: Changes in Central Valley Project and State Water Project operations and other actions undertaken pursuant to implementation of the Central Valley Project biological opinion that have increased freshwater survival; changes in salmon ocean harvest pursuant to the ocean harvest biological opinion that have increased ocean survival and adult

escapement; implementation of habitat restoration efforts throughout the central valley as a result of the CALFED program and other central valley habitat restoration projects. A key concern of the BRT was the lack of diversity within this ESU and the fact that it is represented by a single extant population at present. However, significant efforts are underway through the CALFED ecosystem restoration program to restore habitat and anadromous fish access to Battle Creek which would provide an opportunity for this ESU to establish a second population. The two artificial propagation programs that are part of this ESU also provide benefits to the ESU's viability by contributing to abundance and by preserving the genetic diversity of the ESU through careful use of spawning protocols and other tools that maximize genetic diversity of propagated fish and minimize impacts on naturally spawning fish. The Livingston Stone NFH program also safeguarded the natural population during a period of critically low abundance in the early 1990s, and preserved the genetic and behavioral characteristics of the extant natural population. NMFS believes that the protective efforts being implemented for this ESU, as evaluated pursuant to the PECE, provide sufficient certainty of implementation and effectiveness to alter the BRT's and Artificial Propagation Workshop's assessments that the ESU is ''in danger of extinction.'' NMFS concludes that the ESU in-total is not in danger of extinction, but is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Accordingly, NMFS proposes that the Sacramento River winter-run chinook ESU, presently listed as an endangered species, be listed as a threatened species under the ESA.

Central Valley Spring-run Chinook ESU

The BRT concluded that the Central Valley Spring-run chinook ESU is ''likely to become endangered within the foreseeable future'' (NMFS, 2003b). There are no artificial propagation programs producing spring chinook that are considered to be part of the ESU, and therefore, the Artificial Propagation Evaluation Workshop did not consider this ESU. The BRT was particularly concerned about the loss of the ESU's diversity caused by extirpation of populations in most portions of the Central Valley, as well as the geographic proximity of the relatively small populations that remain. NMFS believes that the various habitat restoration efforts in the Central Valley have contributed substantially to improving the viability of the remaining spring chinook populations. Current efforts in Battle Creek and elsewhere are likely to provide additional habitat for spring chinook. In addition, the State of California has listed spring run chinook under the California Endangered Species Act and has implemented freshwater harvest management measures, as well as increased its monitoring and evaluation of naturally spawning populations. However, the blockage of historical spawning habitat, the limited distribution of natural production areas, and the risks posed by the non-ESU Feather River hatchery program remain to be addressed. Protective efforts, as evaluated pursuant to the PECE, do not provide sufficient certainty of implementation and effectiveness to alter the BRT's assessment that the ESU is ''likely to become endangered within the foreseeable future.'' NMFS concludes that the ESU in-total is likely to become endangered within the foreseeable future throughout all or a significant portion of its range, and therefore, proposes that the Central Valley spring-run chinook ESU remain listed as threatened under the ESA.

California Coastal Chinook ESU

The BRT concluded that the naturally spawned component of the California Coastal chinook ESU is ''likely to become endangered within the foreseeable future.'' Informed by the BRT's findings (NMFS, 2003b) and the assessment of artificial propagation programs on the viability of the ESU (NMFS, 2004b), the Artificial Propagation Evaluation Workshop concluded that the California Coastal Chinook ESU in-total is ''likely to become endangered within the foreseeable future'' (NMFS, 2004c). Some coastal habitat protective efforts have provided benefits to the ESU, most notably: the State's habitat restoration grant program, which is funded in large part by the Pacific Coast Salmon Restoration Fund; the multi-county conservation planning and implementation efforts which have focused on fixing migration barriers and improving road maintenance programs; and implementation of the Pacific Lumber Company HCP, which is expected to contribute to achieving properly functioning habitat conditions in some watersheds occupied by this ESU. Collectively, however, these programs do not substantially reduce risks to the ESU. Implementation of the Potter Valley hydroelectric project biological opinion by FERC and completion of the Russian River consultation addressing water project operations in the Russian River are expected to benefit this ESU in the future. Similarly, ongoing efforts by NMFS and CDFG to develop a coastal salmon and steelhead monitoring program are expected to substantially improve the amount and quality of available information on the abundance and spatial distribution of naturally spawning populations in the future, thereby allowing improved long-term assessment of population viability and trends. Protective efforts, as evaluated pursuant to the PECE, do not provide sufficient certainty of implementation and effectiveness to alter the BRT's and the Artificial Propagation Evaluation Workshop's assessments that the ESU is ''likely to become endangered within the foreseeable future.'' NMFS concludes that the ESU in-total is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. NMFS proposes that the California Coastal chinook ESU remain listed as a threatened species under the ESA.

Upper Willamette River Chinook ESU

The BRT concluded that the naturally spawned component of the Upper Willamette River chinook ESU is ''likely to become endangered within the foreseeable future.'' NMFS' assessment of the effects of artificial propagation on the ESU's extinction risk concluded that the within-ESU hatchery programs do not substantially reduce the extinction risk of the ESU in-total (NMFS, 2004c). Protective efforts, as evaluated pursuant to the PECE, do not provide sufficient certainty of implementation and effectiveness to alter the BRT's and the Artificial Propagation Evaluation Workshop's assessments that the ESU is ''likely to become endangered within the foreseeable future.'' Efforts under FWS' Greenspaces Program, the Oregon Plan, hatchery reform efforts, and other protective efforts are encouraging signs. However, restoration efforts in the ESU are very local in scale, and have yet to provide benefits at the scale of watersheds or at the larger spatial scale of the ESU. The blockage of historical spawning habitat and the restriction of natural production areas remain to be addressed. NMFS concludes that the ESU in-total is likely to become endangered within the foreseeable future throughout all or a significant portion of its range, and proposes that the Upper Willamette River chinook ESU remain listed under the ESA as a threatened species.

Lower Columbia River Chinook ESU

The BRT concluded that the naturally spawned component of the Lower Columbia River chinook ESU is ''likely to become endangered within the foreseeable future.'' NMFS' assessment of the effects of artificial propagation on the ESU's extinction risk concluded that the within-ESU hatchery programs do not substantially reduce the extinction risk of the ESU in-total (NMFS, 2004c). Protective efforts, as evaluated pursuant to the PECE, do not provide sufficient certainty of implementation and effectiveness to alter the BRT's and the Artificial Propagation Evaluation Workshop's assessments that the ESU is ''likely to become endangered within the foreseeable future.'' Planned dam removals on the Sandy River, federally funded habitat restoration efforts, the WA DNR HCP, and other protective efforts are encouraging signs in addressing the ESU's factors for decline, but they do not as yet substantially reduce threats to the ESU. NMFS concludes that the ESU in-total is likely to become endangered within the foreseeable future throughout all or a significant portion of its range, and proposes that the Lower Columbia River chinook ESU remain listed under the ESA as a threatened species.

Upper Columbia River Spring-run Chinook ESU

The BRT was divided on the extinction risk faced by the naturally spawned component of the Upper Columbia River spring-run chinook ESU between ''in danger of extinction'' and ''likely to become endangered within the foreseeable future,'' with a slight majority finding that the ESU is ''in danger of extinction.'' NMFS' assessment of the effects of artificial propagation on the ESU's extinction risk concluded that the within-ESU hatchery programs do not substantially reduce the extinction risk of the ESU in-total (NMFS, 2004c). Protective efforts, as evaluated pursuant to the PECE, do not provide sufficient certainty of implementation and effectiveness to alter the BRT's and the Artificial Propagation Evaluation Workshop's assessments that the ESU is in danger of extinction or likely to become so in the foreseeable future. Actions under the 2000 FCRPS biological opinion, federally funded habitat restoration efforts, and other protective efforts are encouraging signs in addressing the ESU's factors for decline, but they do not as yet substantially reduce the ESU's extinction risk.

NMFS is concerned that artificial propagation practices within the geographic range of the ESU are not fully supporting the conservation and recovery of Upper Columbia River spring-run chinook. In particular, NMFS is concerned that the non-ESU Entiat NFH has compromised the genetic integrity of the native natural population of spring-run chinook in the Entiat basin. NMFS concludes that the Upper Columbia River spring-run chinook ESU in-total is in danger of extinction throughout all or a significant portion of its range. NMFS proposes that the Upper Columbia River spring-run chinook ESU remain listed under the ESA as an endangered species.

Puget Sound Chinook ESU

The BRT concluded that the naturally spawned component of the Puget Sound chinook ESU is ''likely to become endangered within the foreseeable future.'' NMFS' assessment of the effects of artificial propagation on the ESU's extinction risk concluded that the within-ESU hatchery programs do not substantially reduce the extinction risk of the ESU in-total (NMFS 2004c). In particular, NMFS is concerned that the pervasive use of the Green River derived hatchery stocks throughout the range of the ESU in proximity to locally adapted naturally spawning populations continues to erode the ESU's spatial structure and diversity. Protective efforts, as evaluated pursuant to the PECE, do not provide sufficient certainty of implementation and effectiveness to alter the BRT's and the Artificial Propagation Evaluation Workshop's assessments that the ESU is ''likely to become endangered within the foreseeable future.'' There have been significant and positive actions to address factors limiting the viability of Puget Sound chinook including: implementation of the Forest and Fish agreement for timber practices; DOT's Routine Road Maintenance 4(d) limit and its implementation by local governments; changes to harvest management; hatchery reform; and habitat restoration and conservation actions by local governments and voluntary organizations. However, the degradation and loss of estuarine, riparian, and freshwater habitats through past and present urbanization, agricultural activities, man-made impassible barriers, and forest practices remain significant limiting factors in this ESU. NMFS is encouraged by the parties working in the Shared Strategy process and will consider the results of this process provided they: address the limiting factors caused by past actions; address future losses from human population growth; and contain sufficient commitments over necessary time frames to evaluate the certainty of implementation. Without the necessary commitments to address the ESU's limiting factors, NMFS concludes that the ESU in-total is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. NMFS proposes that the Puget Sound chinook ESU remain listed under the ESA as a threatened species.

Snake River Fall-run Chinook ESU

The BRT concluded that the Snake River fall-run chinook ESU is ''likely to become endangered within the foreseeable future.'' The within-ESU propagated stocks derived from the Lyons Ferry Hatchery stock have contributed to some encouraging increases in total ESU abundance in recent years; however, NMFS' assessment of the effects of artificial propagation on the ESU's extinction risk concluded that the within-ESU hatchery programs do not substantially reduce the extinction risk of the ESU in-total (NMFS, 2004c). Protective efforts, as evaluated pursuant to the PECE, do not provide sufficient certainty of implementation and effectiveness to alter the BRT's and the Artificial Propagation Evaluation Workshop's assessments that the ESU is ''likely to become endangered within the foreseeable future.'' Nonetheless, actions under the 2000 FCRPS biological opinion and improvements in hatchery practices have provided some encouraging signs in addressing the ESU's factors for decline. Other protective efforts, such as measures associated with the FERC relicensing of the Idaho Power Company's Hells Canyon Complex, are under development or ongoing. NMFS concludes that the ESU in-total is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. NMFS proposes that the Snake River fall-run chinook ESU remain listed under the ESA as a threatened species.

Snake River Spring/Summer Chinook ESU

The BRT concluded that the Snake River spring/summer-run chinook ESU is ''likely to become endangered within the foreseeable future.'' NMFS' assessment of the effects of artificial propagation on the ESU's extinction risk concluded that the within-ESU hatchery programs do not substantially reduce the extinction risk of the ESU in-total (NMFS, 2004c). Protective efforts, as evaluated pursuant to the PECE, do not provide sufficient certainty of implementation and effectiveness to

alter the BRT's and the Artificial Propagation Evaluation Workshop's assessments that the ESU is ''likely to become endangered within the foreseeable future.'' Nonetheless, actions under the 2000 FCRPS biological opinion, and improvements in hatchery practices have provided some encouraging signs in addressing the ESU's factors for decline. NMFS concludes that the ESU in-total is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. NMFS proposes that the Snake River spring/summer-run chinook ESU remain listed under the ESA as a threatened species.

Central California Coast Coho ESU

The BRT concluded that the naturally spawned component of the Central California Coast coho ESU is ''in danger of extinction.'' Informed by the BRT findings (NMFS, 2003b) and the assessment of artificial propagation programs on the viability of the ESU (NMFS, 2004b), the Artificial Propagation Evaluation Workshop concluded that the Central California Coast coho ESU in-total is ''in danger of extinction.'' The State of California has initiated the process for listing coho salmon under the California ESA and is expected to make a final listing decision in June 2004. In conjunction with this California ESA listing process the State has also developed a comprehensive, state-wide coho salmon recovery strategy and plan. This recovery strategy and plan was developed by the CDFG in 2003 and approved by the California Fish and Game Commission in February 2004. The plan is comprehensive in scope, addresses a wide range of factors responsible for the decline of coho throughout the State, and was developed by a broad range of stakeholders who will be responsible for the plan's implementation. The CDFG is in the process of developing an implementation plan that will prioritize recovery actions and estimate implementation costs. In the short-term, CDFG is using existing staff and financial resources to implement the plan, but is expected to pursue additional financial resources after the implementation plan is completed. In addition, CDFG has integrated the coho recovery plan with its coastal habitat restoration grant program by ensuring that high priority recovery plan actions in high priority watersheds receive a greater likelihood of funding.

Although NMFS believes the plan will provide substantial benefits to this ESU over the long-term if it is implemented, the long-term prospects for plan funding and implementation are uncertain. Both freshwater and ocean harvest impacts to coho salmon have also been reduced, which has contributed to reducing extinction risk for the ESU. Other protective efforts that have provided benefits to this ESU include: Implementation of numerous freshwater habitat restoration projects funded through the State's habitat restoration grant program; efforts by multi-county conservation planning groups to inventory, prioritize, and fix salmonid migration barriers and to modify road maintenance activities throughout the range of the ESU; and the completion of numerous ESA section 7 consultations for gravel mining and other habitat impacting actions. Several future projects are expected to provide benefits to this ESU, including completion and implementation of the Russian River consultation addressing water project operations in the Russian River, and completion and approval of the Green Diamond Resource Company and Mendocino Redwoods timber harvest HCPs. Ongoing efforts by NMFS and CDFG to develop a coastal salmon and steelhead monitoring program are also expected to substantially improve the amount and quality of available information on the abundance and spatial distribution of naturally spawning populations in the future, thereby allowing much improved long-term assessment of population viability and trends. Although the artificial propagation programs that are part of this ESU were not found to substantially affect the viability of the ESU in-total, implementation of these programs in conjunction with the other protective efforts that are addressing habitat related factors for decline are expected to provide benefits to the ESU in the long term. Nonetheless, NMFS believes that protective efforts, as evaluated pursuant to the PECE, do not provide sufficient certainty of implementation and effectiveness to alter the BRT's and the Artificial Propagation Evaluation Workshop's assessments that the ESU is ''in danger of extinction.'' NMFS concludes, therefore, that the ESU in-total is in danger of extinction throughout all or a significant portion of its range. Accordingly, NMFS proposes that the Central California Coast coho salmon ESU, presently listed as a threatened species, be listed as an endangered species under the ESA.

Southern Oregon/Northern California Coast Coho ESU

The BRT concluded that the naturally spawned component of the Southern Oregon/Northern California Coast coho ESU is ''likely to become endangered within the foreseeable future.'' Informed by the BRT findings (NMFS, 2003b) and the assessment of artificial propagation programs on the viability of the ESU (NMFS, 2004b), the Artificial Propagation Evaluation Workshop concluded that the Southern Oregon/Northern California Coast coho ESU is ''likely to become endangered within the foreseeable future'' (NMFS, 2004c). The State of California has initiated the process for listing coho salmon within this ESU under the California ESA and is expected to make a final listing decision in June 2004. The State also developed a comprehensive, state-wide coho salmon recovery strategy and plan that was approved by the California Fish and Game Commission in February 2004. NMFS believes the plan will provide substantial benefits to the California portion of this ESU over the long-term if it is successfully implemented, but the long term prospects for plan funding and implementation are uncertain. In both Oregon and California, changes to freshwater and ocean harvest management have reduced impacts to coho salmon, which have contributed to reducing extinction risk for the ESU. Other protective efforts that have provided benefits to this ESU include: implementation of numerous freshwater habitat restoration projects in California through the state's habitat restoration grant program; efforts by the Five County conservation planning group to inventory, prioritize, and fix salmonid migration barriers and to modify road maintenance activities throughout the California portion of the ESU; implementation of the Oregon Plan in the Oregon portion of the ESU; implementation of the long-term Klamath Project biological opinion; and implementation of the Pacific Lumber Company HCP.

NMFS and the State of California are developing a coastal salmon and steelhead monitoring program, which if implemented is expected to substantially improve the amount and quality of available information on the abundance and spatial distribution of naturally spawning populations in California, which would enhance the long-term assessment of population viability and trends. Although a wide range of important protective efforts have been implemented in both Oregon and California, these protective efforts, as yet, do not reduce threats sufficiently to the ESU. Protective efforts, as evaluated pursuant to the PECE, do not provide sufficient certainty of implementation and effectiveness to alter the BRT's and the Artificial

Propagation Evaluation Workshop's assessments that the ESU is ''likely to become endangered within the foreseeable future.'' NMFS concludes that the ESU in-total is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. NMFS proposes that the Southern Oregon/Northern California Coast coho ESU remain listed under the ESA as a threatened species.

Oregon Coast Coho ESU

The BRT concluded that the naturally spawned component of the Oregon Coast coho ESU is ''likely to become endangered within the foreseeable future.'' Following recruitment failure for the 1994–1996 brood years (returning in 1997–1999, respectively), the ESU has seen near record recruitment for the 1997–1999 brood years (returning in 2000–2002, respectively). These recent returns are extremely encouraging; however, these increases need to be sustained through additional brood years to resolve remaining uncertainties regarding the ESU's viability. Additional data demonstrating that the freshwater habitat can support high abundances of natural spawners and sustain recent abundance levels would help resolve uncertainties regarding the ESU's resilience under less favorable ocean conditions.

The artificial propagation programs producing coho populations considered to be part of the ESU have undergone substantial changes in the last 10 years to limit adverse effects to natural Oregon Coast coho populations. However, they are not managed to contribute to the ESU's abundance, productivity, spatial structure, or diversity. NMFS' assessment of the effects of artificial propagation on the ESU's extinction risk concluded that the within-ESU hatchery programs do not substantially reduce the extinction risk of the ESU in-total (NMFS, 2004c). The severe reduction of harvest levels for Oregon Coast coho populations since 1998 has contributed to the increased abundance of natural spawners. Hatchery reform and the reduction of harvest represent effective management tools that can quickly yield results. However, once implemented, there is limited management flexibility to respond to future declines in the ESU's productivity if caused by deteriorating ocean or freshwater conditions.

The Oregon Plan has made or encouraged significant contributions toward conserving salmon and steelhead populations in the state of Oregon. As noted in the *Protective Efforts in Oregon* section, an ESU-scale analysis of the effectiveness of measures under the Oregon Plan in conserving the Oregon Coast Coho ESU is underway but not yet completed. In the absence of this analysis, the information available as evaluated pursuant to the PECE does not provide sufficient certainty of implementation and effectiveness to alter the BRT's and the Artificial Propagation Evaluation Workshop's assessments that the ESU is ''likely to become endangered within the foreseeable future.'' Based upon the information currently available, which does not include the findings from Oregon's analysis of the Oregon Plan with respect to this ESU, NMFS concludes that the ESU in-total is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. NMFS, therefore, proposes that the Oregon Coast coho ESU be listed under the ESA as a threatened species. If, upon completion of the analysis, information is made available to the agency showing that the Oregon Plan and/or other conservation efforts substantially mitigate ESU extinction risk, NMFS will re-initiate a status review for Oregon Coast coho to consider the best and most recent scientific and commercial information available.

Lower Columbia River Coho ESU

The BRT concluded that the naturally spawned component of the Lower Columbia River coho ESU is ''in danger of extinction.'' The BRT observed that although the scale of artificial propagation poses genetic and ecological threats to the two extant natural populations in the ESU, the within-ESU hatchery programs represent a substantial proportion of the genetic resources remaining in the ESU. However, the manner in which the majority of these hatchery fish are being produced does not adhere to best management practices, and may be compromising the integrity of these genetic resources. NMFS' assessment of the effects of artificial propagation on the ESU's extinction risk concluded that hatchery programs collectively mitigate the immediacy of extinction risk for the Lower Columbia River coho ESU in-total in the short term, but that these programs do not substantially reduce the extinction risk of the ESU in the foreseeable future (NMFS, 2004c). Protective efforts, as evaluated pursuant to the PECE, do not provide sufficient certainty of implementation and effectiveness to alter the Artificial Propagation Evaluation Workshop's assessment that the ESU is ''likely to become endangered within the foreseeable future.'' However, several conservation measures represent encouraging signs in addressing the ESU's factors for decline. The expected dam removals on the Sandy River, once accomplished, would restore fish passage and open up currently inaccessible spawning and rearing habitats. Federal, state, and locally funded projects have improved fish passage, river flow management, and instream and riparian habitat conditions at many locations. The WA DNR HCP will benefit riparian zone habitats, improve road and forest management practices, and encourage improved monitoring efforts.

NMFS recognizes that the genetic resources that reside in the ESU's hatchery programs may play a vital role in the future in expanding the distribution of naturally spawning coho populations in the Lower Columbia River. The manner in which these genetic resources are being managed, however, poses significant risks to the sustainability of these programs in the foreseeable future, as well as the ESU in-total. NMFS strongly encourages the reform of existing hatchery practices to provide better stewardship over the ESU's remaining diversity. Potentially effective improvements in hatchery practices by the Oregon and Washington Departments of Fish and Wildlife include: (1) Ending the transfer of eggs among basins; (2) use of broodstock that reflects what was historically present in a given basin, (3) development of Hatchery and Genetic Management Plans that reflect the natural escapement goals for each basin, and that identify how the hatchery programs will incorporate natural-origin fish into their broodstock; (4) commitments to continue 100 percent marking of released hatchery fish; (5) commitments to continue monitoring of natural production and the proportion of hatchery-origin fish on spawning grounds; and (6) development of a program to evaluate the reproductive success of naturally spawning hatchery coho and their contribution to the productivity of the natural populations.

NMFS concludes that the ESU in-total is likely to become endangered within the foreseeable future over all or a significant portion of its range, and proposes that Lower Columbia River coho ESU be listed under the ESA as a threatened species.

Columbia River Chum ESU

The BRT concluded that the Columbia River chum ESU is ''likely to become endangered within the foreseeable future.'' NMFS' assessment of the effects of artificial propagation on the ESU's extinction risk concluded that the

within-ESU hatchery programs do not substantially reduce the extinction risk of the ESU in-total (NMFS, 2004c). Protective efforts, as evaluated pursuant to the PECE, do not provide sufficient certainty of implementation and effectiveness to alter the BRT's and the Artificial Propagation Evaluation Workshop's assessments that the ESU is ''likely to become endangered within the foreseeable future.'' However, flow management under the 2000 FCRPS biological opinion, federally funded habitat restoration efforts, the WA DNR HCP, and other protective efforts are encouraging signs in addressing the ESU's factors for decline. NMFS concludes that the ESU in-total is likely to become endangered within the foreseeable future throughout all or a significant portion of its range, and proposes that the Columbia River chum ESU remain listed under the ESA as a threatened species.

Hood Canal Summer Chum ESU

The BRT concluded that the naturally spawned component of the Hood Canal summer-run chum ESU is ''likely to become endangered within the foreseeable future.'' NMFS' assessment of the effects of artificial propagation on the ESU's extinction risk concluded that the within-ESU hatchery programs do not substantially reduce the extinction risk of the ESU in-total (NMFS, 2004c). Protective efforts, as evaluated pursuant to the PECE, do not provide sufficient certainty of implementation and effectiveness to alter the BRT's and the Artificial Propagation Evaluation Workshop's assessments that the ESU is ''likely to become endangered within the foreseeable future.'' Habitat improvements, HCPs, and other protective efforts are nonetheless encouraging signs in addressing the ESU's factors for decline. NMFS concludes that the ESU in-total is likely to become endangered within the foreseeable future throughout all or a significant portion of its range, and proposes that the Hood Canal summer chum ESU remain listed under the ESA as a threatened species.

Southern California *O. mykiss* ESU

The BRT concluded that the Southern California *O. mykiss* ESU is ''in danger of extinction'' (NMFS, 2003b). For some BRT members, the presence of relatively numerous resident fish reduces risks to the ESU's abundance, but provides an uncertain contribution to the ESU's productivity, spatial structure, and diversity. There are no artificial propagation programs producing hatchery *O. mykiss* populations within the geographic range of the ESU, and therefore, the Artificial Propagation Evaluation Workshop did not evaluate this ESU. The most important protective efforts in this ESU have resulted from ESA section 7 consultations and habitat restoration projects funded by the State of California. Habitat restoration efforts in the Lower Santa Ynez River and new fish passage facilities at the Robles Diversion Dam on the Ventura River are recent efforts that are expected to provide benefits to *O. mykiss.* Other conservation efforts such as the Matilija and Rindge Dam removal projects have long-term potential to benefit the ESU, but their implementation is uncertain. Other habitat restoration or protective efforts are very local in scale, and so they do not provide benefits at the scale of large watersheds or the ESU in-total. Blockage of historical spawning and rearing habitat in both large and small watersheds and instream flow conditions remain to be addressed on a broad scale in this ESU. Information on the abundance and distribution of steelhead and resident *O. mykiss* remains limited and is a major concern since there are not comprehensive monitoring efforts being implemented. Efforts are underway by NMFS and the State, however, to develop a coastal salmonid monitoring program that, if implemented for this ESU, will likely allow improved long-term assessment of spatial distribution and abundance trends. Protective efforts, as evaluated pursuant to the PECE, do not provide sufficient certainty of implementation and effectiveness to alter the BRT's assessment that the ESU is ''in danger of extinction.'' NMFS, therefore, concludes that the ESU in-total is in danger of extinction throughout all or a significant portion of its range. NMFS proposes that the Southern California *O. mykiss* ESU remain listed under the ESA as an endangered species.

South-Central California Coast *O. mykiss* ESU

The BRT concluded that the naturally spawned component of the South-Central California Coast *O. mykiss* ESU is ''likely to become endangered within the foreseeable future'' (NMFS, 2003b). For some BRT members, presence of relatively numerous resident fish reduces risks to the ESU's abundance, but provides an uncertain contribution to the ESU's productivity, spatial structure, and diversity. No artificial propagation programs are considered to be part of this ESU, and therefore, the Artificial Propagation Evaluation Workshop did not evaluate this ESU. Protective efforts in the Carmel watershed appear to have contributed, at least in part, to a substantial increase in the steelhead escapement to the Carmel River since the mid-1990s. Recreational harvest of *O. mykiss* has been reduced by the State in recent years and the outplanting of hatchery fish from the Monterey Bay Salmon and Trout Project into this ESU has been halted. Both of these protective efforts have provided benefits to the ESU. Other restoration efforts and protective efforts, such as ESA section 7 consultations and habitat restoration projects funded by the State have provided benefits on a local scale, but have not reduced extinction risk at the scale of the ESU. The BRT expressed particular concern about the degraded habitat conditions in the Pajaro and Salinas river basins. No significant protective efforts are currently being implemented in either watershed. Protective efforts, as evaluated pursuant to the PECE, do not provide sufficient certainty of implementation and effectiveness to alter the BRT's assessment that the ESU is ''likely to become endangered within the foreseeable future.'' NMFS concludes that the ESU in-total is likely to become endangered in the foreseeable future throughout all or a significant portion of its range. NMFS proposes that the South-Central Coast *O. mykiss* ESU remain listed under the ESA as a threatened species.

Central California Coast *O. mykiss* ESU

The BRT concluded that the naturally spawned component of the Central California Coast *O. mykiss* ESU is ''likely to become endangered within the foreseeable future.'' For some BRT members, the presence of resident fish reduces risks to the ESU's natural abundance, but provides an uncertain contribution to the ESU's productivity, spatial structure, and diversity. Informed by the BRT's findings (NMFS, 2003b) and the assessment of artificial propagation programs on the viability of the ESU (NMFS, 2004b), the Artificial Propagation Evaluation Workshop concluded that the Central California Coast *O. mykiss* ESU is ''likely to become endangered within the foreseeable future'' (NMFS, 2004c). There are two artificial propagation programs that are considered to be part of the ESU. These two programs likely provide some limited benefits to the ESU's viability by contributing to local population abundance, but do not substantially reduce the ESU's extinction risk. Resident *O. mykiss* populations above Dam 1 on Alameda Creek are genetically similar to below-dam populations that are part of the ESU, and therefore, are considered to be part of the ESU. Although these above-

dam resident populations are considered part of the ESU, it is unclear how and to what extent these resident populations contribute to the viability of the ESU in-total. Protective efforts that have provided benefits to this ESU include implementation of numerous habitat restoration projects as part of the state's habitat restoration grant program as well as ESA section 7 consultations for gravel mining and other habitat impacting activities. Protective efforts that are expected to have benefits to this ESU include completion and implementation of the Russian River water project operations consultation with the USACE, and ongoing local county planning and restoration efforts that are addressing migration barriers and routine road maintenance activities. Although some of the habitat protective efforts have provided benefits to the ESU, most notably the state's habitat restoration grant program and the multi-county restoration efforts, they do no reduce the ESU's extinction risk. Changes in the management of recreational angling on the north coast since the late 1990's have reduced impacts to naturally spawning *O. mykiss* and likely contributed to reducing the ESU's extinction risk. In addition, the cessation of *O. mykiss* planting from the Monterey Bay Salmon and Trout Project into the adjacent South-Central Coast ESU is a positive development. Protective efforts, as evaluated pursuant to the PECE, do not provide sufficient certainty of implementation and effectiveness to alter the BRT's and the Artificial Propagation Evaluation Workshop's assessments that the ESU is ''likely to become endangered within the foreseeable future.'' NMFS therefore concludes that the ESU in-total is ''likely to become endangered in the foreseeable future throughout all or a significant portion of its range, and therefore, proposes that the Central California Coast *O. mykiss* ESU remain listed as a threatened species under the ESA.

California Central Valley *O. mykiss* ESU

The BRT concluded that the California Central Valley *O. mykiss* ESU is ''in danger of extinction.'' For some BRT members, the presence of resident fish reduces risks to the ESU's abundance somewhat, but provides an uncertain contribution to the ESU's productivity, spatial structure, and diversity. Informed by the BRT's findings (NMFS, 2003b) and the assessment of artificial propagation programs on the viability of the ESU (NMFS, 2004b), the Artificial Propagation Evaluation Workshop concluded that the California Central Valley *O. mykiss* ESU is ''in danger of extinction'' (NMFS, 2004c). The two artificial propagation programs considered to be part of the ESU provide some limited benefits to the ESU's abundance, but they do not substantially reduce the ESU's extinction risk. The BRT was concerned that two out-of-ESU hatchery programs may pose ecological and diversity risks to the natural *O. mykiss* populations in this ESU. All out-of-ESU hatchery production, however, is marked and releases occur in relatively close proximity to the hatchery facilities. These measures likely minimize straying and genetic introgression from the out-of-ESU hatchery stocks. In addition, in-river harvest of hatchery steelhead is encouraged by complete marking of all hatchery production, and State fishing regulations which allow retention of marked fish only. Nonetheless, it is uncertain the degree to which these out-of-ESU hatchery programs are an ecological risk and compromise the ESU's diversity. The loss of most historical spawning and rearing habitat above impassable dams throughout the California Central Valley, the restriction of natural production areas, the apparent continuing decline in *O. mykiss* abundance, and the lack of any monitoring efforts designed to assess *O. mykiss* abundance and trends remain major concerns for this ESU. A positive development is that CALFED has recently approved funding to develop a monitoring program for *O. mykiss* in the Central Valley. Development of this program and its subsequent implementation is a critically important action needed to assess the response of *O. mykiss* to habitat restoration efforts in the Central Valley. Major efforts have been undertaken over the past decade by Federal and state agencies to improve habitat conditions in the Central Valley and the major tributaries supporting spring chinook salmon. These efforts have also provided benefits to *O. mykiss* as well. These efforts include projects implemented as part of the CALFED program and the Central Valley Project Improvement Act. Restoration efforts have been implemented and are ongoing in Battle Creek, Butte Creek, Little Chico Creek, Clear Creek, and the Yuba River. In addition, local watershed groups are working in many of these watersheds to improve habitat conditions that provide benefits to both spring chinook and *O. mykiss.* NMFS has worked closely with the state over the past several years to ensure that in-river harvest impacts on natural *O. mykiss* are minimized and efforts are continuing to develop a fishing management and evaluation plan for *O. mykiss* in the central valley. NMFS believes that the protective efforts being implemented for this ESU, as evaluated pursuant to the PECE, provide sufficient certainty of implementation and effectiveness to alter the BRT's and the Artificial Propagation Evaluation Workshop's assessments that the ESU is ''in danger of extinction.'' NMFS concludes that the ESU in-total is not in danger of extinction, but is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Accordingly, NMFS proposes that the California Central Valley *O. mykiss* ESU remain listed as a threatened species under the ESA.

Northern California *O. mykiss* ESU

The BRT concluded that the naturally spawned component of the Northern California *O. mykiss* ESU is ''likely to become endangered within the foreseeable future.'' The BRT did not consider resident fish to reduce risks to the ESU's abundance, and their contribution to the ESU's productivity, spatial structure, and diversity is uncertain. Informed by the BRT's findings (NMFS, 2003b) and the assessment of artificial propagation programs on the viability of the ESU (NMFS, 2004b), the Artificial Propagation Evaluation Workshop concluded that the Northern California *O. mykiss* ESU is ''likely to become endangered within the foreseeable future'' (NMFS, 2004c). The two artificial propagation programs considered to be part of the ESU may provide some benefit to the abundance of local populations, but they affect only a small portion of the ESU in-total and do not substantially reduce the ESU's extinction risk. Although some protective efforts aimed at reducing threats to habitat and harvest impacts have benefited this ESU, most notably the State's habitat restoration grant program and multi-county conservation planning efforts aimed primarily at fixing migration barriers and improving road maintenance activities, these and other programs collectively do not substantially reduce the ESU's extinction risk. These protective efforts, as evaluated pursuant to the PECE, do not provide sufficient certainty of implementation and effectiveness to alter the BRT's and the Artificial Propagation Evaluation Workshop's assessments that the ESU is ''likely to become endangered within the foreseeable future.'' NMFS concludes that the ESU in-total is likely to become endangered within the foreseeable

future throughout all or a significant portion of its range. NMFS proposes that the Northern California *O. mykiss* ESU remain listed as a threatened species under the ESA.

Upper Willamette River *O. mykiss* ESU

The BRT concluded that the Upper Willamette River *O. mykiss* ESU is ''likely to become endangered within the foreseeable future.'' The BRT did not consider resident fish to reduce risks to the ESU's abundance, and their contribution to the ESU's productivity, spatial structure, and diversity is uncertain. There are no artificial propagation programs producing hatchery *O. mykiss* populations that are considered to be part of the ESU. Protective efforts under FWS' Greenspaces Program, the Oregon Plan, and other efforts are encouraging signs. However, restoration efforts in the ESU are very local in scale, and have yet to provide benefits at the scale of watersheds or the larger spatial scale of the ESU. The blockage of historical spawning habitat and the restriction of natural production areas remain to be addressed. Protective efforts, as evaluated pursuant to the PECE, do not provide sufficient certainty of implementation and effectiveness to alter the BRT's assessment that the ESU is ''likely to become endangered within the foreseeable future.'' NMFS concludes that the ESU in-total is likely to become endangered within the foreseeable future throughout all or a significant portion of its range, and proposes that the Upper Willamette River *O. mykiss* ESU remain listed under the ESA as a threatened species.

Lower Columbia River *O. mykiss* ESU

The BRT concluded that the naturally spawned component of the Lower Columbia River *O. mykiss* ESU is ''likely to become endangered within the foreseeable future.'' The BRT did not consider resident fish to reduce risks to the ESU's abundance, and their contribution to the ESU's productivity, spatial structure, and diversity is uncertain. NMFS' assessment of the effects of artificial propagation on the ESU's extinction risk concluded that the within-ESU hatchery programs do not substantially reduce the extinction risk of the ESU in-total (NMFS, 2004c). Protective efforts, as evaluated pursuant to the PECE, do not provide sufficient certainty of implementation and effectiveness to alter the BRT's and the Artificial Propagation Evaluation Workshop's assessments that the ESU is ''likely to become endangered within the foreseeable future.'' Nonetheless, the expected dam removals on the Sandy River, federally funded habitat restoration efforts, and the WA DNR HCP are encouraging signs in addressing the ESU's factors for decline. NMFS concludes that the ESU in-total is likely to become endangered within the foreseeable future throughout all or a significant portion of its range, and proposes that the Lower Columbia River *O. mykiss* ESU remain listed under the ESA as a threatened species.

Middle Columbia River *O. mykiss* ESU

The BRT was closely divided on the extinction risk faced by the naturally spawned component of the Middle Columbia River *O. mykiss* ESU between ''likely to become endangered within the foreseeable future'' and ''not in danger of extinction or likely to become endangered within the foreseeable future.'' The BRT concluded that the relatively abundant and widely distributed resident fish in the ESU reduce risks to overall ESU abundance, but provide an uncertain contribution to the ESU's productivity, spatial structure, and diversity. The improved viability of the ESU is attributable, in part, to recent improvements in ocean and freshwater conditions. The principal improvements in viability over the last 5 years include: Dramatic increases in abundance throughout the ESU; and positive short-term productivity in all production areas. However, there is insufficient certainty that these encouraging trends will continue into the future. Despite recent increases, the natural populations in the Yakima, Klickitat, and Touchet Rivers remain well below their interim recovery target abundance levels, and long-term trends for 11 of 12 production areas in the ESU remain negative. Although adult returns in the Deschutes River have increased, the presence of substantial numbers of out-of-basin hatchery strays may pose risks to the productivity and diversity of this population.

NMFS' assessment of the effects of artificial propagation on the ESU's extinction risk concluded that the within-ESU hatchery programs do not substantially reduce the extinction risk of the ESU in-total (NMFS, 2004c). Protective efforts, as evaluated pursuant to the PECE, do not provide sufficient certainty of implementation and effectiveness to alter the BRT's and the Artificial Propagation Evaluation Workshop's assessments that the ESU is ''likely to become endangered within the foreseeable future.'' Ongoing actions under the 2000 FCRPS biological opinion, federally funded habitat restoration efforts, and other protective efforts continue to benefit the ESU, but do not as yet substantially reduce threats to the ESU.

Continued and additional conservation efforts are needed to address threats to the ESU to the point that the protections afforded under the ESA are no longer necessary. Conservative harvest and hatchery management, continued riparian zone and habitat restoration efforts, improvements in fish passage and the management of instream flows, and adherence to best management practices for grazing, forestry, artificial propagation, mining, and recreational activities are all critical to the recovery of the Middle Columbia River *O. mykiss* ESU. NMFS concludes that the ESU is likely to become endangered within the foreseeable future throughout all or a significant portion of its range, and proposes that the Middle Columbia River *O. mykiss* ESU remain listed as a threatened species.

Although NMFS believes that the Middle Columbia River *O. mykiss* ESU at present still warrants listing under the ESA, the risk assessments by the BRT and the Artificial Propagation Evaluation Workshop were almost evenly divided on whether the ESU is likely to become endangered in the foreseeable future. NMFS recognizes that the decision to propose retaining the threatened listing was a close one. NMFS views the improved viability of the Middle Columbia River *O. mykiss* ESU as an exceptional opportunity to secure specific conservation measures that would help ensure the ESU's viability over the long term, and likely bring the ESU to the point where the protections of the ESA are no longer necessary. NMFS is interested in assuring that certain major threats are addressed through firm commitments, plans, and funding. In addition to continued habitat protections, the following specific actions are likely to have the greatest influence on the viability of this ESU: (1) Continued funding by the Bonneville Power Administration of ESU-wide riparian zone and instream habitat restoration efforts, consistent with its Fish and Wildlife Program's portion of the subbasin and recovery plans being developed; (2) adherence of the BLM to best management practices for grazing, mining, and recreational activities ESU-wide; (3) adherence of the USFS to best management practices for grazing, forestry, and mining activities ESU-wide; (4) continued conservative fisheries management by the Washington Department of Fish and Wildlife within the range of this ESU, and its development and implementation of a long-term approach

that balances natural and hatchery production across the ESU; (5) continued conservative fisheries management by ODFW in this ESU (particularly in the John Day River subbasin), its development and implementation of management approaches to reduce the straying of out-of-basin stocks into Deschutes and John Day spawning areas, and its development and implementation of a long-term approach that balances natural and hatchery production across the ESU; (6) improved passage and flow management by the BOR in the Yakima River and the Umatilla River subbasins, including the establishment of fish passage into significant tributaries; (7) establishment of passage in the Deschutes River subbasin above the Pelton/Rounde Butte complex, the restoration of the downstream water temperature regime to historical levels, and the restoration and enhancement of upstream/downstream habitats by the FERC; (8) improvements in fish passage, screening and flow management in the Walla Walla River subbasin by the USACE, as well as altering the flood operating rule for Mill Creek or alternatively screening the diversion into Bennington Lake; (9) continued conservative hatchery and harvest management and adherence to best land management practices by the Yakama Nation; (10) continued conservative hatchery and harvest management by the Confederated Tribes of the Umatilla Reservation; and (11) continued adherence to best land management practices by the Confederated Tribes of the Warm Springs Reservation in the Deschutes River subbasin.

In the event that such actions are undertaken to address these factors prior to making our final listing determination, and adequate commitments are made that they will be continued, NMFS will take such opportunity to re-initiate a status review for the Middle Columbia River *O. mykiss* ESU. If such actions were taken following a final determination to list this ESU, NMFS may similarly reinitiate a status review to consider the best and most recent scientific and commercial information available.

Upper Columbia River *O. mykiss* ESU

The BRT was divided on the extinction risk faced by the naturally spawned component of the Upper Columbia River *O. mykiss* ESU between ''in danger of extinction'' and ''likely to become endangered within the foreseeable future,'' with a majority finding that the ESU is ''in danger of extinction.'' For many BRT members, the presence of relatively numerous resident fish reduces risks to the ESU's abundance, but provides an uncertain contribution to the ESU's productivity, spatial structure, and diversity. NMFS' assessment of the effects of artificial propagation on the ESU's extinction risk concluded that hatchery programs collectively mitigate the immediacy of extinction risk for the Upper Columbia River *O. mykiss* ESU in-total in the short term, but that the contribution of these programs in the foreseeable future is uncertain (NMFS, 2004c). Protective efforts, as evaluated pursuant to the PECE, do not provide sufficient certainty of implementation and effectiveness to alter the Artificial Propagation Evaluation Workshop's assessments that the ESU is ''likely to become endangered within the foreseeable future.'' Actions under the 2000 FCRPS biological opinion, federally funded habitat restoration efforts, and other protective efforts are encouraging signs in addressing the ESU's factors for decline, but do not as yet substantially reduce the ESU's extinction risk. NMFS concludes that the ESU in-total is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. NMFS proposes that the Upper Columbia River *O. mykiss* ESU, presently listed as an endangered species, be listed under the ESA as a threatened species.

Snake River Basin *O. mykiss* ESU

The BRT concluded that the naturally spawned component of the Snake River Basin *O. mykiss* ESU is ''likely to become endangered within the foreseeable future.'' For many BRT members, the presence of relatively numerous resident fish reduces risks to the ESU's abundance, but provides an uncertain contribution to the ESU's productivity, spatial structure, and diversity. Native resident *O. mykiss* populations above Dworshak Dam on the North Fork Clearwater River are genetically similar to below-dam populations that are part of the ESU, and, therefore, are considered to be part of the ESU. Although these above-dam resident populations are considered part of the ESU, it is unclear how and to what extent these resident populations contribute to the viability of the ESU in-total. NMFS' assessment of the effects of artificial propagation on the ESU's extinction risk concluded that the within-ESU hatchery programs do not substantially reduce the extinction risk of the ESU in-total (NMFS, 2004c). Protective efforts, as evaluated pursuant to the PECE, do not provide sufficient certainty of implementation and effectiveness to alter the BRT's and the Artificial Propagation Evaluation Workshop's assessments that the ESU is ''likely to become endangered within the foreseeable future.'' Nonetheless, actions under the 2000 FCRPS biological opinion and improvements in hatchery practices have provided some encouraging signs in addressing the ESU's factors for decline. NMFS concludes that the ESU in-total is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. NMFS proposes that the Snake River Basin *O. mykiss* ESU remain listed under the ESA as a threatened species.

Evolutionarily significant unit (ESU)	Current Endangered Species Act (ESA) status	Proposed listing determination	Number of artificial propagation programs included in the ESU
Snake River sockeye ESU	Endangered	Endangered	1
Ozette Lake sockeye ESU	Threatened	Threatened	2
Sacramento River winter-run chinook ESU	Endangered	Threatened	2
Central Valley spring-run chinook ESU	Threatened	Threatened	0
California Coastal chinook ESU	Threatened	Threatened	7
Upper Willamette River chinook ESU	Threatened	Threatened	7
Lower Columbia River chinook ESU	Threatened	Threatened	17
Upper Columbia River spring-run chinook ESU	Endangered	Endangered	6
Puget Sound chinook ESU	Threatened	Threatened	22
Snake River fall-run chinook ESU	Threatened	Threatened	4
Snake River spring/summer-run chinook ESU	Threatened	Threatened	15

Evolutionarily significant unit (ESU)	Current Endangered Species Act (ESA) status	Proposed listing determination	Number of artificial propagation programs included in the ESU
Central California Coast coho ESU	Threatened	Endangered	4
Southern Oregon/Northern California Coast coho ESU	Threatened	Threatened	3
Oregon Coast coho ESU	Threatened *	Threatened	5
Lower Columbia River coho ESU	Candidate	Threatened	21
Columbia River chum ESU	Threatened	Threatened	3
Hood Canal summer-run chum ESU	Threatened	Threatened	8
Southern California *O. mykiss* ESU	Endangered	Endangered	0
South-Central California Coast *O. mykiss* ESU	Threatened	Threatened	0
Central California Coast *O. mykiss* ESU	Threatened	Threatened	2
California Central Valley *O. mykiss* ESU	Threatened	Threatened	2
Northern California *O. mykiss* ESU	Threatened	Threatened	2
Upper Willamette River *O. mykiss* ESU	Threatened	Threatened	0
Lower Columbia River *O. mykiss* ESU	Threatened	Threatened	10
Middle Columbia River *O. mykiss* ESU	Threatened	Threatened	7
Upper Columbia River *O. mykiss* ESU	Endangered	Threatened	6
Snake River Basin *O. mykiss* ESU	Threatened	Threatened	6

* But see *Alsea Valley Alliance* v. *Evans,* 358 F.3d 1181 (9th Cir. Feb. 24, 2004).

Findings on Delisting Petitions

With regard to the six petitions (detailed above in the ''*Summary of Petitions*'' section) seeking to delist a total of 15 salmon and *O. mykiss* ESUs, NMFS finds on the basis of the best available scientific and commercial information that the petitioned actions are not warranted. NMFS finds that listing is warranted for all of the 15 petitioned ESUs: six chinook ESUs (the Snake River spring/summer-run, Snake River fall-run, Puget Sound, Lower Columbia River, Upper Willamette River, and Upper Columbia River spring-run chinook ESUs); two coho ESUs (the Central California Coast and Southern Oregon/Northern California Coast coho ESUs); two chum ESUs (the Hood Canal summer-run and Columbia River chum ESUs); and five *O. mykiss* ESUs (the Upper Columbia River, Snake River Basin, Middle Columbia River, Lower Columbia River, and Upper Willamette River *O. mykiss* ESUs).

Prohibitions and Protective Regulations

ESA section 9(a) take prohibitions (16 U.S.C. 1538(a)(1)(B)) apply to all species listed as endangered. Hatchery stocks determined to be part of endangered ESUs are afforded the full protections of the ESA. In the case of threatened species, ESA section 4(d) leaves it to the Secretary's discretion whether and to what extent to extend the statutory 9(a) ''take'' prohibitions, and directs the agency to issue regulations it considers necessary and advisable for the conservation of the species. NMFS has flexibility under section 4(d) to tailor protective regulations based on the contributions of available conservation measures. The 4(d) protective regulations may prohibit, with respect to threatened species, some or all of the acts which section 9(a) of the ESA prohibits with respect to endangered species. These 9(a) prohibitions and 4(d) regulations apply to all individuals, organizations, and agencies subject to U.S. jurisdiction.

Even though existing protective efforts and plans, including certain artificial propagation programs and their associated hatchery stocks, are not sufficient to preclude the need for listing the subject ESUs at this time, they are nevertheless valuable for improving watershed health and restoring fishery resources. In those cases where regulations or conservation programs are in place, which will adequately protect threatened ESUs, NMFS may choose to limit the application of the take prohibitions for those ESUs. NMFS has already adopted ESA 4(d) rules that exempt a range of activities from the take prohibitions for threatened salmon and *O. mykiss* ESUs (62 FR 38479, July 18, 1997; 65 FR 42422, July 10, 2000; 65 FR 42485, July 10, 2000; 67 FR 1116, January 9, 2002; see description of the current 4(d) protective regulations for threatened salmonids in the following section).

NMFS intends to use the flexibility of the ESA to respond appropriately to the biological condition of each ESU and to the strength of regulations and conservation programs to protect them. The Court ruled in the *Alsea* case that NMFS may not list only a portion of an ESU when making its ESA listing determinations. Informed by the Court's ruling, hatchery stocks considered to be part of an ESU will be listed if it is determined that the ESU in-total is threatened or endangered. This approach, however, presents some challenges to hatchery and fisheries management. While the ESA requires NMFS to list all populations within a threatened or endangered ESU, it does not require NMFS to implement protective regulations equally among populations within threatened ESUs. NMFS has discretion under the ESA to allow for the take of hatchery fish, considered to be part of a threatened ESU, provided that such take is not inconsistent with the recovery of the ESU.

Current ESA 4(d) Protective Regulations for Threatened Salmonids

Currently there are a total of 29 ''limits'' to ESA Section 9(a) ''take'' prohibitions for threatened salmonid ESUs. Comprehensive descriptions of each 4(d) limit are contained in ''A Citizen's Guide to the 4(d) Rule'(available on the Internet at *http://www.nwr.noaa.gov/1salmon/salmesa/final4d.htm),* and in previously published **Federal Register** notices (62 FR 38479, July 18, 1997; 65 FR 42422, July 10, 2000; 65 FR 42485, July 10, 2000; 67 FR 1116, January 9, 2002).

The first six of these limits promulgated (50 CFR 223.204(b)(1) through (b)(6)) were published as an interim rule in 1997 for the Southern Oregon/Northern California Coast coho ESU (62 FR 38479, July 18, 1997). These six limits allow for the take of coho salmon in Oregon and California, under certain circumstances, if the take is: part of approved fisheries management plans; part of an approved hatchery program; part of approved fisheries research and monitoring activities; or part of approved habitat restoration activities.

In 2000, NMFS promulgated 13 limits affecting, in total, 14 ESUs in California, Oregon, and Washington (65 FR 42422, July 10, 2000; 50 CFR 223.203(b)(1) through (b)(13)). These ''limits'' include: paragraph (b)(1) activities conducted in accordance with ESA section 10 incidental take authorization; paragraph (b)(2) scientific or artificial propagation activities with pending applications at the time of rulemaking; paragraph (b)(3) emergency actions related to injured, stranded, or dead salmonids; paragraph (b)(4) fishery management activities; paragraph (b)(5) hatchery and genetic management programs; paragraph (b)(6) activities in compliance with joint tribal/state plans developed within *United States (U.S.)* v. *Washington* or *U.S.* v. *Oregon;* paragraph (b)(7) scientific research activities permitted or conducted by the states; paragraph (b)(8) state, local, and private habitat restoration activities; paragraph (b)(9) properly screened water diversion devices; paragraph (b)(10) routine road maintenance activities; paragraph (b)(11) certain park pest management activities in Portland, Oregon; paragraph (b)(12) certain municipal, residential, commercial, and industrial development and redevelopment activities; and paragraph (b)(13) forest management activities on state and private lands within the State of Washington. The Southern Oregon/Northern California Coasts coho ESU was included under two of these 13 limits (limits 50 CFR 223.203(b)(1) and (b)(3)). The limits published in 2000 that addressed fishery and harvest management, scientific research, and habitat restoration activities did not supersede the 6 limits for the Southern Oregon/Northern California Coast coho ESU promulgated in the 1997 interim rule, despite addressing the same types of activities (although for different ESUs). Also in 2000, NMFS issued a limit for all threatened ESUs exempting activities undertaken consistent with an approved tribal resource management plan (65 FR 42485, July 10, 2000; 50 CFR 223.209).

In 2002, NMFS added an additional nine limits (67 FR 1116, January 9, 2002; 50 CFR 223.203(b)(14) through (b)(22)) addressing four salmonid ESUs in California: the Central Valley spring-run chinook, California Coastal chinook, Central California Coast coho, and Northern California *O. mykiss* ESUs. These limits are essentially identical to limits previously promulgated in 2000. These additional nine limits similarly address emergency actions, fishery management activities, artificial propagation programs, scientific research, habitat restoration activities; properly screened water diversions, routine road maintenance activities, and development and redevelopment activities. Rather than including the four California ESUs under the limits promulgated in 2000, these ESUs were treated under separate limits.

Proposed Amendment to 4(d) Protective Regulations for Threatened Salmonid ESUs

NMFS proposes to amend existing 4(d) regulations to provide the necessary flexibility to ensure that fisheries and artificial propagation programs are managed consistently with the conservation needs of ESA-listed ESUs. NMFS proposes to apply section 4(d) protections to unmarked anadromous fish with an intact adipose fin. (The clipping of adipose fins in hatchery fish just prior to release into the natural environment is a commonly employed method for the marking of hatchery production). Hatchery fish that are surplus to the recovery needs of an ESU, and that are otherwise distinguishable from naturally spawned fish in the ESU (*e.g.*, by run timing or location) may be exempted from the section 4(d) protections under limits (b)(4) and (b)(6) under 50 CFR 223.203 for fishery management plans, as well as under 50 CFR 223.209 for tribal resource management plans. NMFS believes this approach provides needed flexibility to appropriately manage artificial propagation and direct take of threatened salmon and *O. mykiss* for the conservation and recovery of these ESUs. Not all hatchery stocks considered to be part of listed ESUs are of equal value for use in conservation and recovery. Certain ESU hatchery stocks may comprise a substantial portion of the genetic diversity remaining in a threatened ESU, and thus are essential assets for ongoing and future recovery efforts. If released with adipose fins intact, hatchery fish in these populations would be afforded protections under 4(d). NMFS, however, may need to allow take of listed hatchery stocks to manage the number of hatchery fish allowed to spawn naturally to limit potential adverse effects to spawning natural-origin fish. Other hatchery stocks, although considered to be part of a threatened ESU, may be of limited or uncertain conservation value. Artificial propagation programs producing within-ESU hatchery populations could release adipose-fin-clipped fish, such that protections under 4(d) would not apply, and these populations could fulfill other purposes (*e.g.*, fulfilling Federal trust and tribal treaty obligations) while preserving all future recovery options. It may be determined through ongoing recovery planning efforts that these hatchery stocks are essential for recovery.

Simplification of Existing 4(d) Protective Regulations for Threatened Salmonids

Although the ESA section 4(d) regulations for threatened salmonids have proven effective at appropriately protecting threatened salmonid ESUs and permitting certain activities, several of the limits described therein are redundant, outdated, or are located disjunctly in the Code of Federal Regulations (CFR). The resulting complexity of the existing 4(d) regulations unnecessarily increases the administrative and regulatory burden of managing protective regulations for threatened ESUs, and does not effectively convey to the public the specific ESUs for which certain activities may be exempted from the take prohibitions under 4(d). As part of this proposed rulemaking, NMFS proposes to clarify the existing section 4(d) regulations for threatened salmonids so that they can be more efficiently and effectively accessed and interpreted by all affected parties.

NMFS proposes simplifying the ESA 4(d) regulations by making the following clarifying changes: (1) NMFS proposes to apply the same set of limits to all threatened ESUs by bringing the Snake River fall-run chinook, Snake River spring/summer-run chinook, Southern Oregon/Northern California Coast coho, Central Valley spring-run chinook, California Coastal chinook, Central California Coast coho, Lower Columbia River coho, and Northern California *O. mykiss* ESUs under the 13 limits promulgated in 2000; (2) for those ESUs currently listed as endangered but being proposed for threatened status (the Sacramento River winter-run chinook, Upper Columbia River spring-run chinook, and Upper Columbia River *O. mykiss* ESUs), NMFS also proposes to apply the 4(d) protections and 13 limits promulgated in 2000; (3) NMFS proposes to amend an expired limit (50 CFR 223.203(b)(2)) to apply to the Lower Columbia River coho ESU; and (4) NMFS proposes moving the limit for Tribal Resource Management Plans (50 CFR 223.209) so that it appears in the CFR next to the 4(d) rule. These four clarifying changes are described in further detail below.

NMFS believes that the clarity and consistency of the existing ESA 4(d) regulations would be improved by including all threatened salmonid ESUs under the same set of limits, rather than maintaining separate and partially

redundant sets of limits for different ESUs. As noted in the previous section, the limits added in 2002 are essentially identical to limits promulgated in 2000. Removing the nine limits promulgated in 2002 (67 FR 1116, January 9, 2002; limits 50 CFR 223.203 (b)(14) through (b)(22)) and consolidating them under the limits promulgated in 2000 will simplify and clarify the existing 4(d) regulations, reduce their regulatory and administrative impact, while remaining equally protective of the affected ESUs: the Central Valley spring-run chinook, California Coastal chinook, Central California Coast coho, and Northern California *O. mykiss* ESUs.

NMFS also proposes to apply the limits promulgated in 2000 to the Snake River fall-run and spring/summer-run chinook ESUs. Currently, these ESUs are afforded the section 9(a) take prohibitions and the limit exempting activities with ESA section 10 incidental take authorization (50 CFR 223.203(b)(1)). However, the remaining 12 limits promulgated in 2000 do not apply (50 CFR 223.203 (b)(2) through (b)(13)). At the time of the 2000 rulemaking, NMFS stated that the 4(d) protective regulations for the two Snake River chinook ESUs provided the necessary flexibility to support research, monitoring, and conservation activities. However, the take limits provided by the 2000 rulemaking have proved extremely useful in managing other threatened ESUs, including the Snake River Basin *O. mykiss* ESU, which has an overlapping geographic range with the two Snake River chinook ESUs. NMFS proposes including these two ESUs under limits 50 CFR 223.203(b)(3) through (b)(13) to provide consistency with other threatened ESUs and to encourage regulations and conservation programs that are consistent with their conservation and recovery.

Section 4(d) of the ESA states that whenever any species is listed as a threatened species, ''the Secretary shall issue such regulations as he deems necessary and advisable to provide for the conservation of the species.'' NMFS proposes to apply the 4(d) protections and 13 limits promulgated in 2000 to the Lower Columbia River coho ESU, being proposed for threatened status. These protections are necessary to promote the conservation of the remaining natural populations in the ESU (*i.e.*, the Sandy and Clackamas River populations). However, extending the 4(d) protective regulations to the Lower Columbia River coho ESU will not represent an additional administrative or regulatory burden. The ESU has an overlapping geographic range with four threatened ESUs that are currently subject to the 2000 4(d) protective regulations (*i.e.*, the Columbia River chum, Lower Columbia River chinook, Upper Willamette River chinook, and Lower Columbia River *O. mykiss* ESUs). The 21 hatchery programs included in the ESU all employ 100 percent marking by adipose-fin clip. Extending the 4(d) protective regulations to the Lower Columbia River ESU is necessary to provide the needed flexibility to appropriately manage artificial propagation and direct take consistent with the conservation and recovery of the ESU.

NMFS proposes to remove the six limits of the 1997 interim rule for the Southern Oregon/Northern California Coast coho ESU (62 FR 38479, July 18, 1997; 50 CFR 223.204), and to bring the ESU under the limits promulgated in 2000 (65 FR 42422; July 10, 2000; limits 50 CFR 223.203 (b)(1) through (b)(13)). The 1997 interim rule was the first ''limited'' ESA 4(d) regulation promulgated by NMFS for a salmonid ESU. The limits promulgated in 2000 addressed the same types of activities addressed in the 1997 interim rule, as additional activities determined to be consistent with the conservation and recovery of threatened salmonid ESUs.

Including the Southern Oregon/Northern California Coasts coho ESU under the 2000 ESA 4(d) limits will result in two substantive changes in the take prohibitions afforded. The first change concerns the use of electrofishing in research and monitoring activities. In lieu of agency technical guidance on how to minimize the adverse effects of electrofishing on salmonids, the 1997 interim rule specifically prohibits the use of electrofishing (50 CFR 223.204(a)(5)). In 2000, NMFS released its ''Guidelines for Electrofishing Waters Containing Salmonids Listed Under the Endangered Species Act'' (Electrofishing Guidelines; NMFS, 2000b; available online at *http://www.nwr.noaa.gov/1salmon/salmesa/4ddocs/final4d/electro2000.pdf),* based on NMFS' research expertise, as well as input from fishery researchers and specialists in electrofishing technology. NMFS believes that exempting the use of electrofishing in research and monitoring activities for the Southern Oregon/Northern California Coast coho ESU, consistent with the Electrofishing Guidelines, will adequately protect fish in the ESU. Additionally, this action will provide consistency by permitting similar activities for the Southern Oregon/Northern California Coast coho ESU as are permitted for other ESUs within the same geographical range that are covered under the limits promulgated in 2000.

The second substantive change in the protective regulations for the Southern Oregon/Northern California Coast coho ESU concerns certain scientific research activities. Under the 1997 interim ESA 4(d) rule for this ESU (50 CFR 223.204(a)(4)) take of the listed species associated with certain fisheries research and monitoring activities conducted by ODFW and CDFG personnel are not prohibited, pending NMFS' review and approval. This limit is not extended beyond ODFW and CDFG, such that take for all other research (*e.g.*, research conducted by academic researchers, contractors, and consultants) can only be exempted under section 10(a)(1). However, a limit promulgated in 2000 (specifically 50 CFR 223.203 (b)(7)) provides for a take limitation to any party conducting research under a state permit. NMFS has determined that the impact on listed species is the same whether take is afforded under section 4(d) or section 10. However, requiring parties to seek take exemptions under section 10 increases the regulatory and administrative burden without providing additional protections or safeguards for listed fish. Accordingly, this proposed change will streamline the permitting processes for research activities, while remaining equally protective of the Southern Oregon/Northern California Coasts coho ESU.

Limit 50 CFR 223.203(b)(2) exempts scientific or artificial propagation activities with pending applications at the time of 2000 rulemaking (65 FR 42422, July 10, 2000; 67 FR 1116, January 9, 2002). The deadline associated with this exemption has expired. The proposed amendment of this expired limit will not impact in any way the protective regulations for the threatened ESUs addressed in the 2000 rulemaking. NMFS proposes to amend limit § 223.203(b)(2) to apply to the Lower Columbia River coho ESU, which is presently not a listed species but is being proposed for threatened status. NMFS proposes to amend limit § 223.203(b)(2) to allow for research on Lower Columbia River coho to continue for 6 months, provided the researcher submits an application within 30 days of the effective date of the final ESA 4(d) rule.

The limit for certain tribal resource management plans (50 CFR 223.209) is separated by several sections in the CFR from the other limits (50 CFR 223.203). Although this does not diminish the applicability of the limit to certain activities under tribal plans, its appearance in the CFR as a disjunct

section does not clearly convey to tribal governments the opportunities associated with these plans. NMFS proposes to move the limit for tribal plans, so that it appears in the CFR next to the 13 ESA 4(d) limits. This reorganization will improve the clarity of the ESA 4(d) regulations, but will not modify the limit for tribal plans in any way.

NMFS believes that the ESA section 9(a) take prohibitions, which are applicable for endangered species, are to some extent necessary and advisable for the conservation of the Sacramento winter-run chinook, Lower Columbia River coho, and Upper Columbia River *O. mykiss* ESUs, which are being proposed for threatened status. However, the take of listed fish in these ESUs need not be prohibited when it results from activities which are in accordance with adequate regulations and conservation programs. NMFS therefore proposes to apply ESA section 9(a) prohibitions to these three ESUs, and to apply the 13 limits promulgated in 2000. No change is needed in 50 CFR 223.209 to include these three ESUs under the limit for Tribal Resource Management Plans. Limit 50 CFR 223.209(a) applies the limit for tribal plans to all threatened species listed in 50 CFR 223.203(a).

Certain ESA 4(d) limits are regional in scope and are not necessarily applicable to those ESUs outside the area of coverage. These limits are for: activities in compliance with joint tribal/state plans developed within *United States* (U.S.) v. *Washington* or *U.S.* v. *Oregon* (50 CFR 223.203(b)(6)); certain park pest management activities in Portland, Oregon (50 CFR 223.203(b)(11); and forest management activities on state and private lands within the State of Washington (50 CFR 223.203(b)(13)).

NMFS emphasizes that these take limits are not prescriptive regulations. The fact that an activity is not conducted within the specified criteria for a take limit does not automatically mean that the activity violates the ESA or the proposed regulation. Many activities do not affect the threatened ESUs covered by this proposed rule, and, therefore, need not necessarily be conducted within a given limit to avoid section 9 take violations. Nevertheless, there is greater certainty that an activity or program is not at risk of violating the section 9 take prohibitions, and at risk of enforcement actions, if it is conducted in accordance with these take limits.

Jurisdictions, entities, and individuals are encouraged to evaluate their practices and activities to determine the likelihood of whether take is occurring. NMFS can provide ESA coverage through ESA section 4(d) rules, section 10 research, enhancement, and incidental take permits, or through section 7 consultation with Federal agencies. If take is likely to occur, then the jurisdiction, entity or individual should modify its practices to avoid the take of these threatened salmonid ESUs, or seek protection from potential ESA liability through section 7, section 10, or section 4(d) procedures.

Jurisdictions, entities, and individuals are not required to seek coverage under an ESA 4(d) limit from NMFS. In order to reduce its liability, a jurisdiction, entity, or individual may also informally comply with a limit by choosing to modify its programs to be consistent with the evaluation considerations described in the individual limits. Finally, a jurisdiction, entity, or individual may seek to qualify its plans or ordinances for inclusion under a take limit by obtaining a 4(d) take limit authorization from NMFS.

NMFS will continue to work collaboratively with all affected governmental entities to recognize existing management programs that conserve and meet the biological requirements of listed salmonids, and to strengthen other programs toward the conservation of listed ESUs. Any final rule resulting from this proposal may be amended (through proposed rule making and public comment) to add new limits on the take prohibitions, or to amend or delete adopted take limits as circumstances warrant.

Other Protective Regulations

Section 7(a)(4) of the ESA requires that Federal agencies confer with NMFS on any actions likely to jeopardize the continued existence of a species proposed for listing and on actions likely to result in the destruction or adverse modification of proposed critical habitat. For listed species, section 7(a)(2) requires Federal agencies to ensure that activities they authorize, fund, or conduct are not likely to jeopardize the continued existence of a listed species or to destroy or adversely modify its critical habitat. If a proposed Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into consultation with NMFS. Examples of Federal actions likely to affect salmon and O. mykiss include authorized land management activities of the USFS and the BLM, as well as operation of hydroelectric and storage projects of the BOR and the USACE. Such activities include timber sales and harvest, permitting livestock grazing, hydroelectric power generation, and flood control. Federal actions, including the USACE section 404 permitting activities under the Clean Water Act, USACE permitting activities under the River and Harbors Act, FERC licenses for non-Federal development and operation of hydropower, and Federal salmon hatcheries, may also require consultation.

Sections 10(a)(1)(A) and 10(a)(1)(B) of the ESA provide NMFS with authority to grant exceptions to the ESA's ''take'' prohibitions. Section 10(a)(1)(A) scientific research and enhancement permits may be issued to entities (Federal and non-Federal) conducting research that involves a directed take of listed species. A directed take refers to the intentional take of listed species. NMFS has issued section 10(a)(1)(A) research/enhancement permits for currently listed salmon and *O. mykiss* ESUs for a number of activities, including trapping and tagging, electroshocking to determine population presence and abundance, removal of fish from irrigation ditches, and collection of adult fish for artificial propagation programs. Section 10(a)(1)(B) incidental take permits may be issued to non-Federal entities performing activities which may incidentally take listed species. The types of activities potentially requiring a section 10(a)(1)(B) incidental take permit include the operation and release of artificially propagated fish by state or privately operated and funded hatcheries, state or academic research not receiving Federal authorization or funding, the implementation of state fishing regulations, logging, road building, grazing, and diverting water into private lands.

NMFS Policies on Endangered and Threatened Fish and Wildlife

On July 1, 1994, NMFS, jointly with FWS, published a series of policies regarding listings under the ESA, including a policy for peer review of scientific data (59 FR 34270) and a policy to identify, to the maximum extent possible, those activities that would or would not constitute a violation of section 9 of the ESA (59 FR 34272).

Role of Peer Review

The intent of the peer review policy is to ensure that listings are based on the best scientific and commercial data available. Prior to a final listing, NMFS will solicit the expert opinions of at least three qualified specialists, concurrent with the public comment period. Independent peer reviewers will be selected from the academic and scientific community, Native American

tribal groups, federal and state agencies, and the private sector.

Identification of Those Activities That Would Constitute a Violation of Section 9 of the ESA

NMFS and the FWS published in the **Federal Register** on July 1, 1994 (59 FR 34272), a policy that NMFS shall identify, to the maximum extent practicable at the time a species is listed, those activities that would or would not constitute a violation of section 9 of the ESA. The intent of this policy is to increase public awareness of the effect of this listing on proposed and ongoing activities within the species' range. At the time of the final rule, NMFS will identify to the extent known specific activities that will not be considered likely to result in violation of section 9, as well as activities that will be considered likely to result in violation. NMFS believes that, based on the best available information, the following actions will not result in a violation of section 9:

1. Possession of salmon or *O. mykiss* from any ESU listed as threatened which are acquired lawfully by permit issued by NMFS pursuant to section 10 of the ESA, or by the terms of an incidental take statement pursuant to section 7 of the ESA; or

2. Federally funded or approved projects that involve activities such as silviculture, grazing, mining, road construction, dam construction and operation, discharge of fill material, stream channelization or diversion for which section 7 consultation has been completed, and when activities are conducted in accordance with any terms and conditions provided by NMFS in an incidental take statement accompanying a biological opinion.

Activities that NMFS believes could potentially ''harm'' salmon or *O. mykiss* (see ESA 3(19) and 50 CFR 222.102 [harm]) in any of the proposed ESUs, and result in a violation of the section 9 take prohibition include, but are not limited to:

1. Land-use activities that adversely affect salmon or *O. mykiss* habitats in any proposed ESU (*e.g.*, logging, grazing, farming, urban development, road construction in riparian areas and areas susceptible to mass wasting and surface erosion);

2. Destruction/alteration of the salmon or *O. mykiss* habitats in any proposed ESU, such as removal of large woody debris and "'sinker logs'" or riparian shade canopy, dredging, discharge of fill material, draining, ditching, diverting, blocking, or altering stream channels or surface or ground water flow;

3. Discharges or dumping of toxic chemicals or other pollutants (*e.g.*, sewage, oil, gasoline) into waters or riparian areas supporting the salmon or *O. mykiss* in any proposed ESU;

4. Violation of discharge permits;

5. Pesticide applications;

6. Interstate and foreign commerce of salmon or *O. mykiss* from any of the proposed ESUs and import/export of salmon or *O. mykiss* from any ESU without a threatened or endangered species permit;

7. Collecting or handling of salmon or *O. mykiss* from any of the proposed ESUs. Permits to conduct these activities are available for purposes of scientific research or to enhance the propagation or survival of the species; or

8. Introduction of non-native species likely to prey on salmon or *O. mykiss* in any proposed ESU or displace them from their habitat.

These lists are not exhaustive. They are intended to provide some examples of the types of activities that might or might not be considered by NMFS as constituting a take of salmon or *O. mykiss* in any of the proposed ESUs under the ESA and its regulations. Questions regarding whether specific activities will constitute a violation of the section 9 take prohibition, and general inquiries regarding prohibitions and permits, should be directed to NMFS (see **ADDRESSES**).

Critical Habitat

Section 4(b)(2) of the ESA 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, the impact on national security, and any other relevant impact, of specifying any particular area as critical habitat.'' This section grants the Secretary [of Commerce] discretion to exclude any area from critical habitat if he determines ''the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat.'' The Secretary's discretion is limited, as he may not exclude areas if it ''will result in the extinction of the species.'' In addition, the Secretary may not designate as critical habitat any lands or other geographical areas owned or controlled by the Department of Defense, or designated for its use, that are subject to an integrated natural resources management plan under Section 101 of the Sikes Act (16 U.S.C. 670a), if the Secretary determines in writing that such plan provides a benefit to the species for which critical habitat is proposed for designation (see section 318(a)(3) of the National Defense Authorization Act, Pub. L. 108–136).

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

''(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, section 7 of the ESA requires Federal agencies to ensure 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 other principal section 7 requirement that Federal agencies ensure their actions do not jeopardize the continued existence of listed species.

On February 16, 2000, NMFS published a final rule designating critical habitat for 19 ESUs of west coast salmon and *O. mykiss* (65 FR 7764). The designations included more than 150 river subbasins in WA, OR, ID, and CA. Within each occupied subbasin, NMFS designated as critical habitat those lakes and river reaches accessible to listed fish along with the associated riparian zone, except for reaches on Indian land. Areas considered inaccessible included areas above long-standing natural impassable barriers and areas above impassable dams, but not areas above ephemeral barriers such as failed culverts.

In considering the economic impact, NMFS determined that the critical habitat designations would impose very little or no additional costs beyond those already imposed by the listing of the species themselves. NMFS reasoned that since it was designating only occupied habitat, there would be few or no actions that adversely modified critical habitat that also did not jeopardize the continued existence of the species. Therefore, there would be no economic impact as a result of the designations (65 FR 7764, 7765; February 16, 2000).

The National Association of Homebuilders (NAHB) challenged the designations in District Court in Washington, DC, as having inadequately considered the economic impacts of the critical habitat designations (*National Association of Homebuilders* v. *Evans*,

2002 WL 1205743 No. 00–CV–2799 (D.D.C.). NAHB also challenged NMFS' designation of Essential Fish Habitat (EFH) (Pacific Coast Salmon Fishery Management Plan, 2000). While the NAHB litigation was pending, the Court of Appeals for the 10th Circuit issued its decision in *New Mexico Cattlegrowers' Association* v. *U.S. Fish and Wildlife Service*, 248 F.3d 1277 (10th Cir. 2001) (*NMCA*). In that case, the Court rejected the FWS' approach to economic analysis, which was similar to the approach taken by NMFS in the final rule designating critical habitat for 19 ESUs of west coast salmon and *O. mykiss*. The Court ruled that ''Congress intended that the FWS conduct a full analysis of all of the economic impacts of a critical habitat designation, regardless of whether those impacts are attributable co-extensively to other causes.'' Subsequent to the 10th Circuit decision, NMFS entered into and sought judicial approval of a consent decree resolving the NAHB litigation. That decree provided for the withdrawal of critical habitat designations for the 19 salmon and *O. mykiss* ESUs and dismissed NAHB's challenge to the EFH designations. The District Court approved the consent decree and vacated the critical habitat designations by Court order on April 30, 2002 (*National Association of Homebuilders* v. *Evans*, 2002 WL 1205743 (D.D.C. 2002).

As a result of the Court's decision, NMFS removed critical habitat designations for the following 19 ESUs of salmon and *O. mykiss:* One sockeye ESU (the Ozette Lake sockeye ESU); six chinook ESUs (the Puget Sound, Lower Columbia River, Upper Willamette River, Upper Columbia River, California Central Valley spring-run, and California coastal chinook ESUs); one coho ESU (the Oregon Coast coho ESU); two chum ESUs (the Hood Canal summer-run and Columbia River chum ESUs; and nine *O. mykiss* ESUs (the Southern California, South-Central California Coast, Central California Coast, California Central Valley, Upper Columbia River, Snake River Basin, Lower Columbia River, Upper Willamette River, and Middle Columbia River *O. mykiss* ESUs) (68 FR 55900; September 29, 2003). NMFS is currently compiling information to prepare critical habitat proposals for the 19 ESUs vacated by the Court in April 2002, as well as for the Northern California *O. mykiss* ESU listed as threatened on February 12, 2001 (66 FR 9808). If new information warrants, the agency also may later revise, subject to appropriate regulatory procedures, existing critical habitat designations for six ESUs (the Snake River sockeye, Sacramento River winter-run chinook, Central California Coast coho, Southern Oregon/Northern California Coast coho, Snake River spring/summer-run chinook, and Snake River fall-run chinook ESUs) that were not subject to the Court's decision in *National Association of Homebuilders* v. *Evans*. *See* 68 FR 55926 (September 29, 2003) for further detail on NMFS' efforts in designating critical habitat for West Coast salmon and *O. mykiss*.

Public Comments Solicited

To ensure that the final action resulting from this proposed rule will be as accurate and effective as possible, and informed by the best available scientific and commercial information, NMFS is soliciting information, comments, and suggestions from the public, other governmental agencies, the scientific community, industry, and any other interested parties. Public hearings will be held in several locations in the range of the proposed ESUs; details regarding the locations, dates and times will be published in a forthcoming **Federal Register** document.

NMFS recognizes that in several instances there are serious limits to the quantity and quality of available information, and accordingly NMFS has exercised its best professional judgment in developing this proposed rule. NMFS will appreciate any additional information regarding: (1) The relatedness of specific hatchery stocks to the 27 subject ESUs; (2) biological or other relevant data concerning the viability and/or threats to Pacific salmon and *O. mykiss* ESUs, including the abundance, productivity, spatial structure, and diversity of the subject ESUs; (3) current or planned activities in the subject areas and their possible impact on these species; (4) the relationship, range, distribution, and habitat-use patterns of anadromous and resident *O. mykiss* populations; (5) genetic or other relevant data indicating the amount of exchange and the degree of relatedness between anadromous and resident *O. mykiss* life-history forms; (6) the existence of natural and artificial barriers to anadromous *O. mykiss* populations, and the relationship of resident fish located above natural and manmade impassible barriers to anadromous and resident populations below such barriers; (7) efforts being made to protect salmonid populations in California, Oregon, Washington, and Idaho; and (8) suggestions for specific regulations under section 4(d) of the ESA to apply to threatened salmon and *O. mykiss* ESUs, including the description of ''limits'' or activities that should not be subject to the take prohibitions for these threatened species. Additionally, NMFS seeks comment on: (a) The divergence threshold used for determining whether hatchery stocks should be considered part of a salmonid ESU (*i.e.*, excluding from ESUs those hatchery stocks that exhibit substantial genetic divergence from the natural population(s)); (b) NMFS' BRT assessment of the viability and extinction risk of the naturally spawned component of the subject ESUs; (c) NMFS' consideration of artificial propagation and hatchery stocks in evaluating the extinction risk of ESUs in-total; (d) NMFS' assessment of the benefits and risks provided by artificial propagation programs and hatchery stocks; (e) NMFS' overall assessments of ESU-level extinction risk and ESA listing status for the subject ESUs; and (f) NMFS' proposed approach for managing protective regulations under section 4(d) of the ESA for threatened species.

NMFS invites and will consider all pertinent information and comment. NMFS requests that information and comments be organized and identified as relating to issues (1)–(8) and (a)–(f) listed above to ensure that it is most effectively and efficiently considered in the development of the final rule. It is further requested that data, information, and comments be accompanied by: Supporting documentation such as maps, logbooks, bibliographic references, personal notes, and/or reprints of pertinent publications; and the name of the person submitting the data, the address, and any association, institution, or business that the person represents.

Public Hearings

Joint Commerce—Interior ESA implementing regulations state that the Secretary shall promptly hold at least one public hearing if any person who requests within 45 days of publication of a proposed regulation to list a species or to designate critical habitat (see 50 CFR 424.16(c)(3)). In a forthcoming **Federal Register** document, NMFS will announce the dates and locations of public meetings to provide the opportunity for the interested individuals and parties to give comments, exchange information and opinions, and engage in a constructive dialogue concerning this proposed rule. NMFS encourages the public's involvement in such ESA matters.

References

A complete list of the references used in this proposed rule is available upon

request (see **ADDRESSES**) or via the Internet at *http://www.nwr.noaa.gov/ProposedListings/References.html*.

Classification

National Environmental Policy Act

Proposed ESA listing decisions are exempt from the requirement to prepare an environmental assessment or environmental impact statement under the NEPA. See NOAA Administrative Order 216–6.03(e)(1) and *Pacific Legal Foundation* v. *Andrus*, 675 F. 2d 825 (6th Cir. 1981). Thus, NMFS has determined that the proposed listing determinations for 27 ESUs of Pacific salmonids described in this notice are exempt from the requirements of the NEPA of 1969. NMFS has conducted an Environmental Assessment (EA) under the NEPA analyzing the proposed amendments to the 4(d) protective regulations for Pacific salmonids. Copies of the EA are available from NMFS upon request (*see* **FOR FURTHER INFORMATION CONTACT** and **ADDRESSES**, above).

Regulatory Flexibility Act

The Chief Counsel for Regulation of the Department of Commerce certified to the Chief Counsel for Advocacy of the Small Business Administration that the proposed rule issued under authority of ESA section 4, if adopted, would not have a significant economic impact on a substantial number of small entities. As a result, no regulatory flexibility analysis for the proposed listing determinations contained in this rule has been prepared.

Basis and Purpose of the Proposed Rule

Under section 4(d) of the ESA, NMFS is required to adopt such regulations as it deems necessary and advisable for the conservation of species listed as threatened, including prohibiting ''take'' of the listed species. With respect to the listing determination itself, economic impacts cannot be considered, as noted in the Conference Report on the 1982 amendments to the ESA. Therefore, the economic analysis requirements of the Regulatory Flexibility Act (RFA) are not applicable to the listing process. Adoption of regulations under ESA section 4(d), in contrast, contains elements of discretion and, therefore, it is appropriate to consider its impacts on small entities.

NMFS has previously adopted ESA 4(d) rules prohibiting take, except in certain circumstances, of all salmon and steelhead (salmonid) species listed as threatened under the ESA. Pursuant to a court order, NMFS is now proposing to list all hatchery fish considered part of the listed species. In most cases, it is not necessary or advisable for the conservation of the listed species to prohibit the take of hatchery fish. Moreover, if NMFS does not amend the current rules, take of hatchery fish will be prohibited once they are listed. West coast commercial and recreational fisheries primarily harvest hatchery salmonids.

NMFS is proposing to revise the current ESA section 4(d) rule so that take is prohibited only of fish with an intact adipose fin. Hatchery managers typically mark fish intended for harvest by removing the small fin near the tail on the fish's back. This visible mark allows harvesters to distinguish and release naturally spawned fish while retaining clipped fish.

NMFS is also proposing to amend the rule to protect two species that were previously listed as endangered but are now proposed for threatened status; to protect one species newly proposed for listing; and to consolidate certain provisions of the existing rules that provide exceptions to the take prohibition in certain circumstances.

Description and Estimate of the Number of Small Entities to Which the Rule Applies

The proposed rule applies to Non-tribal commercial salmon fisheries including ocean troll, Puget Sound seine and gillnet, Washington coastal bays gillnet, and lower Columbia non-Indian gillnet. Most of the entities involved in these fisheries are small entities. In Washington, California and Oregon combined, there were 2,840 troll licenses as of 2003; in the Columbia River there were 588 gillnet licenses as of 2003; and in Washington there were 1,274 purse seine and gillnet licenses as of 2000. Not all of these licenses are actively fished. In 2003 the total number of vessels reporting landings in all ocean fisheries was 1120. In 2003, the value of commercial landings of west coast salmon in all fisheries was $33 million. Ocean harvest accounted for $19 million of that total, with $12 million in the troll fishery. The average ex-vessel value of landings per vessel was $17,567.

Recreational salmon fisheries include ocean, inland marine and freshwater as far inland as Idaho. The entities that service the recreational fisheries include bait and tackle suppliers, guides, outfitters, charter boat operators, and lodging and related service providers. These entities range in size from multi-national corporations and chain stores to small local family businesses. Except for the multi-national corporations and chain stores, most of these entities are small businesses. According to the Northwest Sportfishing Industry Association, salmon and steelhead anglers spend over $600 million per year in the Northwest. (Other sources provide lower and higher estimates.)

Tribal salmon fisheries are conducted by over 30 west coast Indian tribes with treaty and other rights to fish. Tribes range in size from a few hundred to several thousand individuals. Tribal members rely on salmon fisheries for ceremonial and subsistence needs as well as for economic benefit. The value of ceremonial and subsistence fisheries is incalculable. The value of salmon harvest for commercial sale is included in the figures available for commercial fisheries generally.

Economic Impacts

The revisions NMFS is proposing will largely preserve the existing regulatory regime. Currently, hatchery fish are not listed, so their take is not prohibited. The proposed revisions will allow hatchery fish to continue to be available for harvest by not prohibiting their take. Currently, for the two species listed as endangered, all take is prohibited by section 9(a) of the ESA. The proposed revisions will maintain take prohibitions but with the greater flexibility allowed by a section 4(d) rule. Currently, the species listed as threatened are covered under a mix of 4(d) rules with varying degrees of flexibility. The proposed revisions will consolidate all of the species under one rule and apply the set of prohibitions and exceptions NMFS has found most flexible. For one species, Columbia River Coho, the proposed revisions will impose take prohibitions where none previously existed. NMFS has concluded that this revision will not have significant impacts on small entities. Since take of hatchery fish will not be prohibited, fisheries will be largely unaffected. Landowners will not be affected because the range of the newly listed coho ESU overlaps that of already-listed species whose take is already prohibited.

Conclusion

NMFS concludes that the proposed rule will not have a significant impact on a substantial number of small entities because it largely leaves intact the existing regulatory scheme. Moreover, failure to adopt the revisions would have a large adverse impact on small businesses by prohibiting take of newly-listed hatchery fish.

If you believe that this proposed rule will impact your economic activity, please comment on whether there is a preferable alternative that would meet

the statutory requirements of ESA section 4(d) (*see* **ADDRESSES**). Please describe the impact that alternative would have on your economic activity and why the alternative is preferable.

Paperwork Reduction Act (PRA)

Notwithstanding any other provision of the law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with, a collection of information subject to the requirements of the PRA, unless that collection of information displays a currently valid Office of Management and Budget (OMB) Control Number.

This proposed rule does not contain a collection-of-information requirement for purposes of the PRA of 1980.

Executive Order (E.O.) 12866

The proposed listing determinations and amendments to the ESA 4(d) protective regulations addressed in this rule have been determined to be significant for the purposes of E.O. 12866. NMFS has prepared a Regulatory Impact Review which was provided to the OMB.

E.O. 13084—Consultation and Coordination With Indian Tribal Governments

E.O. 13084 requires that if NMFS issues a regulation that significantly or uniquely affects the communities of Indian tribal governments and imposes substantial direct compliance costs on those communities, NMFS must consult with those governments or the Federal government must provide the funds necessary to pay the direct compliance costs incurred by the tribal governments. This proposed rule does not impose substantial direct compliance costs on the communities of Indian tribal governments. Accordingly, the requirements of section 3(b) of E.O. 13084 do not apply to this proposed rule. Nonetheless, NMFS intends to inform potentially affected tribal governments and to solicit their input on the proposed rule. NMFS will continue to give careful consideration to all written and oral comments received on the proposed rule and will continue its coordination and discussions with interested tribes as the agency moves forward toward a final rule.

E.O. 13132—Federalism

E.O. 13132 requires agencies to take into account any federalism impacts of regulations under development. It includes specific consultation directives for situations where a regulation will preempt state law, or impose substantial direct compliance costs on state and local governments (unless required by statute). Neither of those circumstances is applicable to this proposed rule. In fact, this notice proposes mechanisms by which NMFS, in the form of 4(d) limits to take prohibitions, may defer to state and local governments where they proved necessary protections for threatened salmonids.

List of Subjects

50 CFR Part 223

Enumeration of threatened marine and anadromous species, Restrictions applicable to threatened marine and anadromous species.

50 CFR Part 224

Enumeration of endangered marine and anadromous species.

Authority: 16 U.S.C. 1531 *et seq.*

Dated: May 28, 2004.

William T. Hogarth,

Assistant Administrator for Fisheries, National Marine Fisheries Service.

For the reasons set out in the preamble, 50 CFR parts 223 and 224 are proposed to be amended as follows:

PART 223—THREATENED MARINE AND ANADROMOUS SPECIES

1. The authority citation for part 223 continues to read as follows:

Authority: 16 U.S.C. 1531–1543; subpart B, § 223.12 also issued under 16 U.S.C. 1361 *et seq.*

2. In § 223.102, paragraph (a) is revised to read as follows:

§ 223.102 Enumeration of threatened marine and anadromous species.

* * * * *

(a) *Marine and anadromous fish.*

The following table lists the common and scientific names of threatened species, the locations where they are listed, and the citations for the listings and critical habitat designations.

Species [1]		Where listed	Citation(s) for listing determinations	Citation(s) for critical habitat designations
Common name	Scientific name			
(1)Gulf sturgeon	*Acipenser oxyrinchus desotoi.*	Everywhere	56 FR 49653, Sep. 30, 1991.	68 FR 13370, Mar. 19, 2003.
(2) Ozette Lake sockeye	*Oncorhynchus nerka*	U.S.A., WA, including all naturally spawned populations of sockeye salmon in Ozette Lake and streams and tributaries flowing into Ozette Lake, Washington, as well as two artificial propagation programs: The Umbrella Creek and Big River sockeye hatchery programs.	64 FR 14528, Mar. 25, 1999, [FR CITATION WHEN PUBLISHED AS A FINAL RULE].	NA [vacated 9/29/03; 68 FR 55900].
(3) Sacramento winter-run chinook.	*Oncorhynchus tshawytscha.*	U.S.A., CA, including all naturally spawned populations of winter-run chinook salmon in the Sacramento River and its tributaries in California, as well as two artificial propagation programs: Winter-run chinook from the Livingston Stone National Fish Hatchery (NFH), and winter run chinook in a captive broodstock program maintained at Livingston Stone NFH and the University of California Bodega Marine Laboratory.	[FR CITATION WHEN PUBLISHED AS A FINAL RULE]..	58 FR 33212, June 16, 1993.
(4) Central Valley spring-run chinook.	*Oncorhynchus tshawytscha.*	U.S.A., CA, including all naturally spawned populations of spring-run chinook salmon in the Sacramento River and its tributaries in California.	64 FR 50394, Sep. 16, 1999, [FR CITATION WHEN PUBLISHED AS A FINAL RULE].	NA [vacated 9/29/03; 68 FR 55900].

Species [1]		Where listed	Citation(s) for listing determinations	Citation(s) for critical habitat designations
Common name	Scientific name			
(5) California Coastal chinook.	*Oncorhynchus tshawytscha.*	U.S.A., CA, including all naturally spawned populations of chinook salmon from rivers and streams south of the Kalmath River to the Russian River, California, as well as sever artificial propagation programs: The Humboldt Fish Action Council (Freshwater Creek), Yager Creek, Redwood Creek, Hollow Tree, Van Arsdale Fish Station, Mattole Salmon Group, and Mad River Hatchery fall-run chinook hatchery programs.	64 FR 50394, Sep. 16, 1999, [FR CITATION WHEN PUBLISHED AS A FINAL RULE].	NA [vacated 9/29/03; 68 FR 55900].
(6) Upper Willamette River chinook.	*Oncorhynchus tshawytscha.*	U.S.A., OR, including all naturally spawned populations of spring-run chinook salmon in the Clackamas River and in the Willamette River, and its tributaries, above Willamette Falls, Oregon, as well as seven artificial propagation programs: The McKenzie River Hatchery (Oregon Department of Fish and Wildlife (ODFW) stock # 24), Marion Forks/North Fork Santiam River (ODFW Stock # 21), South Santiam Hatchery (ODFW stock # 23) in the South Fork Santiam River, South Santiam Hatchery in the Calapooia River, South Santiam Hatchery in the Mollala River, Willamette Hatchery (ODFW stock # 22), and Clackamas hatchery (ODFW stock # 19) spring-run chinook hatchery programs.	64 FR 14308, Mar. 24, 1999, [FR CITATION WHEN PUBLISHED AS A FINAL RULE].	NA [vacated 9/29/03; 68 FR 55900].
(7) Lower Columbia River chinook.	*Oncorhynchus tshawytscha.*	U.S.A., OR, WA, including all naturally spawned populations of chinook salmon from the Columbia River and its tributaries from its mouth at the Pacific Ocean upstream to a transitional point between Washington and Oregon east of the Hood River and the White Salmon River, and includes the Willamette River to Willamette Falls, Oregon, exclusive of spring-run chinook salmon in the Clackamas River, as well as seventeen artificial propagation programs: The Sea Resources Tule chinook Program, Big Creek Tule chinook Program, Astoria High School (STEP) Tule chinook Program, Warrenton High School (STEP) Tule chinook Program, Elochoman River Tule chinook Program, Spring Creek NFH Tule chinook Program, Cowlitz Tule Chinook Program, North Fork Toutle Tule chinook Program, Kalama Tule chinook Program, Washougal River Tule chinook Program, Spring Creek NFH Tule Chinook Program, Cowlitz spring chinook Program in the Upper Cowlitz River and the Cispus River, Friends of the Cowlitz spring chinook Program, Kalama River spring chinook Program, Lewis River spring chinook Program, Fish First spring chinook Program, and the Sandy River Hatchery (ODFW stock #11) chinook hatchery programs.	64 FR 14308, Mar. 24, 1999, [FR CITATION WHEN PUBLISHED AS A FINAL RULE].	NA [vacated 9/29/03; 68 FR 55900].
(8) Puget Sound chinook ...	*Oncorhynchus tshawytscha.*	U.S.A., WA including all naturally spawned populations of chinook salmon from rivers and streams flowing into Puget Sound including the Straits of Juan De Fuca from the Elwha River, eastward, including rivers and streams flowing into Hood Canal, South Sound, North Sound and the Strait of Georgia in Washington, as well as twenty-two artificial propagation programs: The Kendal Creek Hatchery, Marblemount Hatchery (fall, spring yearlings, spring subyearlings, and summer run), Harvey Creek Hatchery, Whitehorse Springs Pond, Wallace River Hatchery (yearlings and subyearlings), Tualip Bay, Soos Creek Hatchery, Icy Creek Hatchery, Keta Creek Hatchery, White River Hatchery, White Acclimation Pond, Hupp Springs Hatchery, Voights Creek Hatchery, Diru Creek, Clear Creek, Kalama Creek, Dungeness/Hurd Creek Hatchery, Elwha Channel Hatchery Chinook Hatchery program.	64 FR 14308, Mar. 24, 1999, [FR CITATION WHEN PUBLISHED AS A FINAL RULE].	NA [vacated 9/29/03; 68 FR 55900].

Species [1]		Where listed	Citation(s) for listing determinations	Citation(s) for critical habitat designations
Common name	Scientific name			
(9) Snake River fall-run chinook.	*Oncorhynchus tshawytscha*.	U.S.A., OR, WA, ID, including all naturally spawned populations of fall-run chinook salmon in the mainstem Snake River and in the Tucannon River, Grande Ronde River, Imnaha River, Salmon River, and Clearwater River, as well as four artificial propagation programs: The Lyons Ferry Hatchery, Fall Chinook Acclimation Ponds Program, Nez Perce Tribal Hatchery, and Oxbow Hatchery fall-run chinook hatchery programs.	57 FR 34639, Apr. 22, 1992; 57 FR 23458, Jun. 3, 1992, [FR CITATION WHEN PUBLISHED AS A FINAL RULE].	58 FR 68543, Dec. 28, 1993.
(10) Snake River spring/summer-run chinook.	*Oncorhynchus tshawytscha*.	U.S.A., OR, WA, ID, including all naturally spawned populations of spring/summer-run chinook salmon in the mainstem Snake River and the Tucannon River, Grande Ronde River, Imnaha River, and Salmon River subbasins, as well as fifteen artificial propagation programs: the Tucannon River conventional Hatchery, Tucannon River Captive Broodstock Program, Lostine River, Catherine Creek, Lookingglass Hatchery, Upper Grande Ronde, Imnaha River, Big Sheep Creek, McCall Hatchery, Johnson Creek Artificial Propagation Enhancement, Lemhi River Captive Rearing Experiment, Pahsimeroi Hatchery, East Fork Captive Rearing Experiment, West Fork Yankee Fork Captive Rearing Experiment, and the Sawtooth Hatchery spring/summer-run chinook hatchery programs.	57 FR 34639, Apr. 22, 1992; 57 FR 23458, Jun. 3, 1992 [FR CITATION WHEN PUBLISHED AS A FINAL RULE].	58 FR 68543, Dec. 28, 1993. 64 FR 57399, Oct. 25, 1999.
(11) Oregon Coast coho	*Oncorhynchus kisutch*	U.S.A., OR, including all naturally spawned populations of coho salmon in Oregon coastal streams south of the Columbia River and north of Cape Blanco, as well as five artificial propagation programs: the North Umpqua River (ODFW stock #18), Cow Creek (ODFW stock #37), Coos Basin (ODFW stock #37), Coquille River (ODFW stock #44), and North Fork Nehalem River (ODFW stock #32) coho hatchery programs.	63 FR 42587, Aug. 10, 1998 [FR CITATION WHEN PUBLISHED AS A FINAL RULE].	NA [vacated 9/29/03; 68 FR 55900].
(12) Southern Oregon/Northern California Coast coho.	*Oncorhynchus kisutch*	U.S.A., CA, OR, including all naturally spawned populations of coho salmon in coastal streams between Cape Blanco, Oregon, and Punta Gorda, California, as well three artificial propagation programs: the Cole Rivers Hatchery (ODFW stock #52), Trinity River Hatchery, and Iron Gate Hatchery coho hatchery programs.	62 FR 24588, May 6, 1997 [FR CITATION WHEN PUBLISHED AS A FINAL RULE].	64 FR 24049, May 5, 1999.
(13) Lower Columbia River coho.	*Oncorhynchus kisutch*	U.S.A., OR, WA, including all naturally spawned populations of coho salmon in the Columbia River and its tributaries in Washington and Oregon, from the mouth of the Columbia up to and including the Big White Salmon and Hood Rivers, as well as twenty-one artificial propagation programs; the Grays River, Sea Resources Hatchery, Peterson Coho Project, Big Creek Hatchery, Astoria High School (STEP) Coho Program, Warrenton High School (STEP) Coho Program, Elochoman Type-S Coho Program, Elochoman Type-N Coho Program, Cathlamet High School FFA Type-N Coho Program, Cowlitz Type-N Coho Program in the Upper and Lower Cowlitz Rivers, Cowlitz Game and Anglers Coho Program, Friends of the Cowlitz Coho Program, North Fork Toutle River Hatchery, Lewis River Type-N Coho Program, Lewis River Type-S Coho Program, Fish First Wild Coho Program, Fish First Type-N Coho Program, Syverson Project Type-N Coho Program, Sandy Hatchery, and the Bonneville/Cascade/Oxbow complex coho hatchery programs.	[FR CITATION WHEN PUBLISHED AS A FINAL RULE].	NA.
(14) Columbia River chum	*Oncorhynchus keta*	U.S.A., OR, WA, including all naturally spawned populations of chum salmon in the Columbia River and its tributaries in Washington and Oregon, as well as three artificial propagation programs: the Chinook River (Sea Resources Hatchery), Grays River, and Washougal River/Duncan Creek chum hatchery programs.	64 FR 14508, Mar. 25, 1999 [FR CITATION WHEN PUBLISHED AS A FINAL RULE].	NA [vacated 9/29/03; 68 FR 55900].

Species [1]		Where listed	Citation(s) for listing determinations	Citation(s) for critical habitat designations
Common name	Scientific name			
(15) Hood Canal summer-run chum.	*Oncorhynchus keta*	U.S.A., WA, including all naturally spawned populations of summer-run chum salmon in Hood Canal and it tributaries as well as populations in Olympic Peninsula rivers between Hood Canal and Dungeness Bay, Washington, as well as eight artificial propagation programs: the Quilcene NFH, Hamma Hamma Fish Hatchery, Lilliwaup Creek Fish Hatchery, Union River/Tahuya, Big Beef Creek Fish Hatchery, Salmon Creek Fish Hatchery, Chimacum Creek Fish Hatchery, and the Jimmycomelately Creek Fish Hatchery summer-run hatchery programs.	64 FR 14508, Mar. 25, 1999 [FR CITATION WHEN PUBLISHED AS A FINAL RULE].	NA [vacated 9/29/03; 68 FR 55900].
(16) South-Central California Coast *Oncorhynchus mykiss*.	*Oncorhynchus mykiss*	U.S.A., CA, including all naturally spawned anadromous *O. mykiss* (steelhead) populations, as well as co-occurring resident *O. mykiss* (rainbow trout) populations, below natural and manmade impassible barriers in streams from the Pajaro River (inclusive) to, but not including the Santa Maria River, California.	64 FR 43937, Aug. 18, 1997 [FR CITATION WHEN PUBLISHED AS A FINAL RULE].	NA [vacated 9/29/03; 68 FR 55900].
(17) Central California Coast *Oncorhynchus mykiss*.	*Oncorhynchus mykiss*	U.S.A., CA, including all naturally spawned anadromous *O. mykiss* (steelhead) populations, as well as co-occurring resident *O. mykiss* (rainbow trout) populations, below natural and manmade impassible barriers in California streams from the Russian River to Aptos Creek, and the drainages of San Francisco and San Pablo Bays eastward to the Napa River (inclusive), excluding the Sacramento-San Joaquin River Basin, as well as two artificial propagation programs: the Dan Clausen Fish Hatchery, and Kingfisher Flat Hatchery/Scott Creek (Monterey Bay Salmon and Trout Project) steelhead hatchery programs. Native resident *O. mykiss* above Rubber Dam 1 on Alameda Creek are also considered part of the ESU.	64 FR 43937, Aug. 18, 1997 [FR CITATION WHEN PUBLISHED AS A FINAL RULE].	NA [vacated 9/29/03; 68 FR 55900].
(18) California Central Valley *Oncorhynchus mykiss*.	*Oncorhynchus mykiss*	U.S.A., CA, including all naturally spawned anadromous *O. mykiss* (steelhead) populations, as well as co-occurring resident *O. mykiss* (rainbow trout) populations, below natural and manmade impassible barriers in the Sacramento and San Joaquin Rivers and their tributaries, excluding steelhead from San Francisco and San Pablo Bays and their tributaries, as well as two artificial propagation programs: the Coleman NFH, and Feather River Hatchery steelhead hatchery programs.	[FR CITATION WHEN PUBLISHED AS A FINAL RULE].	NA [vacated 9/29/03; 68 FR 55900].
(19) Northern California *Oncorhynchus mykiss*.	*Oncorhynchus mykiss*	U.S.A., CA, including all naturally spawned anadromous *O. mykiss* (steelhead) populations, as well as co-occurring resident *O. mykiss* (rainbow trout) populations, below natural and manmade impassible barriers in California coastal river basins from Redwood Creek south to the Gualala River (inclusive), as well as two artificial propagation programs: the Yager Creek Hatchery, and North Fork Gualala River Hatchery (Gualala River Steelhead Project) steelhead hatchery programs.	65 FR 36074, June 7, 2000, [FR CITATION WHEN PUBLISHED AS A FINAL RULE].	NA.
(20) Upper Willamette River *Oncorhynchus mykiss*.	*Oncorhynchus mykiss*	U.S.A., OR, including all naturally spawned anadromous *O. mykiss* (steelhead) populations, as well as co-occurring resident *O. mykiss* (rainbow trout) populations, below natural and manmade impassible barriers in the Willamette River, Oregon, and its tributaries upstream from Willamette falls to the Calapooia River (inclusive).	62 FR 43937, Aug. 18, 1997, [FR CITATION WHEN PUBLISHED AS A FINAL RULE].	NA [vacated 9/29/03; 68 FR 55900].

Species [1]		Where listed	Citation(s) for listing determinations	Citation(s) for critical habitat designations
Common name	Scientific name			
(21) Lower Columbia River *Oncorhynchus mykiss.*	*Oncorhynchus mykiss*	U.S.A., OR, WA, including all naturally spawned anadromous *O. mykiss* (steelhead) populations, as well as co-occurring resident *O. mykiss* (rainbow trout) populations, below natural and manmade impassible barriers in streams and tributaries to the Columbia River between the Cowlitz and Wind Rivers, Washington (inclusive), and the Willamette and Hood Rivers, Oregon (inclusive), as well as ten artificial propagation programs: the Cowlitz Trout Hatchery (in the Cispus, Upper Cowlitz, Lower Cowlitz, and Tilton Rivers), Kalama River Wild (winter- and summer-run), Clackamas Hatchery, Sandy Hatchery, and Hood River (winter- and summer-run) steelhead hatchery programs. Excluded are *O. mykiss* populations in the upper Willamette River Basin above Willamette Falls, Oregon, and from the Little and Big White Salmon Rivers, Washington.	63 FR 13347, Mar. 19, 1998, [FR CITATION WHEN PUBLISHED AS A FINAL RULE].	NA [vacated 9/29/03; 68 FR 55900].
(22) Middle Columbia River *Oncorhynchus mykiss.*	*Oncorhynchus mykiss*	U.S.A., OR, WA, including all naturally spawned anadromous *O. mykiss* (steelhead) populations, as well as co-occurring resident *O. mykiss* (rainbow trout) populations, below natural and manmade impassible barriers in streams from above the Wind River, Washington, and the Hood River, Oregon (exclusive), upstream to, and including, the Yakima River, Washington, excluding *O. mykiss* from the Snake River Basin, as well seven artificial propagation programs: the Touchet River Endemic, Yakima River Kelt Reconditioning Program (in Satus Creek, Toppenish Creek, Naches River, and Upper Yakima River), Umatilla River, and the Deschutes River steelhead hatchery programs..	57 FR 14517, Mar. 25, 1999, [FR CITATION WHEN PUBLISHED AS A FINAL RULE].	NA [vacated 9/29/03; 68 FR 55900].
(23) Upper Columbia River *Oncorhynchus mykiss.*	*Oncorhynchus mykiss*	U.S.A., WA, including all naturally spawned anadromous *O. mykiss* (steelhead) populations, as well as co-occurring resident *O. mykiss* (rainbow trout) populations, below natural a – d manmade impassible barriers in streams in the Columbia River Basin upstream from the Yakima River, Washington, to the U.S.-Canada border, as well six artificial propagation programs: the Wenatchee River, Wells Hatchery (in the Methow and Okanogan Rivers), Winthrop NFH, Omak Creek, and the Ringold steelhead hatchery programs.	62 FR 43937, Aug. 18, 1997, [FR CITATION WHEN PUBLISHED AS A FINAL RULE].	NA [vacated 9/29/03; 68 FR 55900].
(24) Snake River Basin *Oncorhynchus mykiss.*	*Oncorhynchus mykiss*	U.S.A., OR, WA, ID, including all naturally spawned anadromous *O. mykiss* (steelhead) populations, as well as co-occurring resident *O. mykiss* (rainbow trout) populations, below natural and manmade impassible barriers in streams in the Snake River Basin of southeast Washington, northeast Oregon, and Idaho, as well six artificial propagation programs: the Tucannon River, Dworshak NFH, Lolo Creek, North Fork Clearwater, East Fork Salmon River, and the Little Sheep Creek/Imnaha River Hatchery steelhead hatchery progrmas. Native resident *O. mykiss* above Dworshak Dam on the North Fork Clearwater River are also considered part of the ESU.	62 FR 43937, Aug. 18, 1997, [FR CITATION WHEN PUBLISHED AS A FINAL RULE].	NA [vacated 9/29/03; 68 FR 55900].

[1] Species includes taxonomic species, subspecies, distinct population segments (DPSs) (for a policy statement, see 61 FR 4722, February 7, 1996), and evolutionarily significant units (ESUs) (for a policy statement, see 56 FR 58612, November 20, 1991).

3. In § 223.203, paragraphs (a), (b) introductory text, and (b)(2) are revised to read as follows:

§ 223.203 Anadromous fish.

* * * * *

(a) *Prohibitions.* The prohibitions of section 9(a)(1) of the ESA (16 U.S.C. 1538(a)(1) relating to endangered species apply to unmarked anadromous fish with an intact adipose fin that are part of the threatened species of salmonids listed in § 223.102(a)(2) through (a)(24).

(b) *Limits on the prohibitions.* The limits to the prohibitions of paragraph (a) of this section relating to threatened species of salmonids listed in § 223.102(a) are described in subparagraphs (b)(1) through (b)(13) below:

(1) * * *

(2) The prohibitions of paragraph (a) of this section relating to threatened species of salmonids listed in § 223.102(a)(2) through (a)(24) do not apply to activities specified in an application for a permit for scientific purposes or to enhance the conservation

or survival of the species, provided that the application has been received by the Assistant Administrator for Fisheries, NOAA (AA), no later than [date 60 days after the publication of the final rule in the **Federal Register**]. The prohibitions of this section apply to these activities upon the AA's rejection of the application as insufficient, upon issuance or denial of a permit, or [date 6 months after the publication of the final rule in the **Federal Register**], whichever occurs earliest.

* * * * *

4. In § 223.203, paragraphs (b)(1) through (b)(13), and (c), the references in the sections listed in the first column below are amended according to the directions in the second and third columns.

Section	Remove	Add
§ 223.203(b)(1)	§ 223.102(a)(1) through (a)(10), and (a)(12) through (a)(22).	§ 223.102(a)(2) through (a)(24).
§ 223.203(b)(3) introductory text	§ 223.102(a)(4) through (a)(10), and (a)(12) through (a)(19).	§ 223.102(a)(2) through (a)(24).
§ 223.203(b)(4) introductory text	§ 223.102(a)(5) through (a)(10), and (a)(12) through (a)(19).	§ 223.102(a)(2) through (a)(24).
§ 223.203(b)(5) introductory text	§ 223.102(a)(5) through (a)(10), and (a)(12) through (a)(19).	§ 223.102(a)(2) through (a)(24).
§ 223.203(b)(6) introductory text	§ 223.102(a)(7), (a)(8), (a)(10), and (a)(12) through (a)(19).	§ 223.102(a)(2) through (a)(24).
§ 223.203(b)(7) introductory text	§ 223.102(a)(5) through (a)(10), and (a)(12) through (a)(19).	§ 223.102(a)(2) through (a)(24).
§ 223.203(b)(8) introductory text	§ 223.102(a)(5) through (a)(10), and (a)(12) through (a)(19).	§ 223.102(a)(2) through (a)(24).
§ 223.203(b)(9) introductory text	§ 223.102(a)(5) through (a)(10), and (a)(12) through (a)(19).	§ 223.102(a)(2) through (a)(24).
§ 223.203(b)(10) introductory text	§ 223.102(a)(5) through (a)(10), and (a)(12) through (a)(19).	§ 223.102(a)(2) through (a)(24).
§ 223.203(b)(11) introductory text	§ 223.102(a)(5) through (a)(10), and (a)(12) through (a)(19).	§ 223.102(a)(2) through (a)(24).
§ 223.203(b)(12) introductory text	§ 223.102(a)(5) through (a)(10), and (a)(12) through (a)(19).	§ 223.102(a)(2) through (a)(24).
§ 223.203(b)(13) introductory text	§ 223.102(a)(12), (a)(13), (a)(16), (a)(17), and (a)(19).	§ 223.102(a)(2) through (a) (24).
§ 223.203(c)	§ 223.102(a)(3), (a)(5) through (a)(10), and (a)(12) through (a)(22).	§ 223.102(a)(2) through (a)(24).
§ 223.203(c)	§ 223.209(a)	§ 223.204(a).

§ 223.203 [Amended]

5. Remove § 223.203(b)(14) through (b)(22).

§ 223.204 [Removed]

6. Remove § 223.204.

§ 223.209 [Redesignated]

7. Redesignate § 223.209 as § 223.204, and reserve § 223.209.

PART 224—ENDANGERED MARINE AND ANADROMOUS SPECIES

1. The authority citation for part 224 continues to read as follows:

Authority: 16 U.S.C. 1531–1543 and 16 U.S.C. 1361 *et seq.*

2. Revise § 224.101(a) to read as follows:

§ 224.101 Enumeration of endangered marine and anadromous species.

* * * * *

(a) *Marine and anadromous fish.*

The following table lists the common and scientific names of endangered species, the locations where they are listed, and the citations for the listings and critical habitat designations.

Species [1]		Where listed	Citations for listing determination(s)	Critical habitat
Common name	Scientific name			
Shortnose sturgeon	*Acipenser brevirostrum*	Everywhere	32 FR 4001, Mar. 11, 1967.	NA
Smalltooth sawfish	*Pristis pectinata*	U.S.A	68 FR 15674, Apr. 1, 2003	NA
Totoaba	*Cynoscion macdonaldi*	Everywhere	44 FR 29480, May 21, 1979.	NA
Atlantic salmon	*Salmo salar*	U.S.A., ME, Gulf of Maine population, which includes all naturally reproducing populations and those river-specific hatchery populations cultured from them.	65 FR 69459, Nov. 17, 2000.	NA
Snake River sockeye	*Oncorhynchus nerka*	U.S.A., ID, including all anadromous and residual sockeye salmon from the Snake River Basin, Idaho, as well as artificially propagated sockeye salmon from the Redfish Lake captive propagation program.	56 FR 58619, Nov. 20, 1991, [FR CITATION WHEN PUBLISHED AS A FINAL RULE].	58 FR 68543, Dec. 28, 1993.

Species [1]		Where listed	Citations for listing determination(s)	Critical habitat
Common name	Scientific name			
Upper Columbia River Spring-run chinook.	*Oncorhynchus tshawytscha*.	U.S.A., WA, including all naturally spawned populations of chinook salmon in all river reaches accessible to chinook salmon in Columbia River tributaries upstream of the Rock Island Dam and downstream of Chief Joseph Dam in Washington (excluding the Okanogan River), the Columbia River from a straight line connecting the west end of the Clatsop jetty (south jetty, Oregon side) and the west end of the Peacock jetty (north jetty, Washington side) upstream to Chief Joseph Dam in Washington, as well as six artificial propagation programs: the Twisp River, Chewuch River, Methow Composite, Winthrop NFH, Chiwawa River, and White River spring-run chinook hatchery programs.	64 FR 14308, Mar. 24, 1999, [FR CITATION WHEN PUBLISHED AS A FINAL RULE].	NA [vacated 9/29/03; 68 FR 55900].
Central California Coast coho.	*Oncorhynchus kisutch*	U.S.A., CA, including all naturally spawned populations of coho salmon from Punta Gorda in northern California south to and including the San Lorenzo River in central California, as well as populations in tributaries to San Francisco Bay, excluding the Sacramento-San Joaquin River system, as well as four artificial propagation programs: the Don Clausen Fish Hatchery Captive Broodstock Program, Scott Creek/King Fisher Flats Conservation Program, Scott Creek Captive Broodstock Program, and the Noyo River Fish Station egg-take Program coho hatchery programs.	61 FR 56138, Oct. 31, 1996, [FR CITATION WHEN PUBLISHED AS A FINAL RULE].	64 FR 24049, May 5, 1999.
Southern California *Oncorhynchus mykiss*.	*Oncorhynchus mykiss*	U.S.A., CA, including all naturally spawned anadromous *O. mykiss* (steelhead) populations, as well as co-occurring resident *O. mykiss* (rainbow trout) populations, below natural and manmade impassible barriers in streams from the Santa Maria River, San Luis Obispo County, California, (inclusive) to the U.S.-Mexico Border.	62 FR 43937, Aug. 18, 1997, [FR CITATION WHEN PUBLISHED AS A FINAL RULE].	NA [vacated 9/29/03; 68 FR 55900].

[1] Species includes taxonomic species, subspecies, distinct population segments (DPSs) (for a policy statement, see 61 FR 4722, February 7, 1996), and evolutionarily significant units (ESUs) (for a policy statement, see 56 FR 58612, November 20, 1991).

* * * * *

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