DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 227

[Docket No. 950407093–6298–03; I.D. 012595A]

Endangered and Threatened Species; Threatened Status for Central California Coast Coho Salmon Evolutionarily Significant Unit (ESU)

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

ACTION: Final rule.

SUMMARY: NMFS is issuing a final determination that the Central California coast coho salmon ESU (*Oncorhynchus kisutch*) is a ''species'' under the Endangered Species Act (ESA) of 1973, as amended, and that it will be listed as a threatened species.

In the 1940s, estimated abundance of coho salmon in this ESU ranged from 50,000 to 125,000 native coho salmon. Today, it is estimated that there are probably less than 6,000 naturally-reproducing coho salmon. The threats to naturally-reproducing coho salmon are numerous and varied. In the Central California coast ESU, the present depressed condition is the result of several human caused factors (e.g., habitat degradation, harvest, water diversions, and artificial propagation) that exacerbate the adverse effects of natural environmental variability from drought and poor ocean conditions. Existing regulatory mechanisms are either not adequate or not being adequately implemented to provide for the conservation of the Central California coast coho ESU.

The taking of this species is prohibited, pursuant to section 4(d) and section 9 of the ESA. Certain exceptions to this taking prohibition pursuant to section 10 are provided. The taking prohibitions go into effect as provided in § 227.21.

EFFECTIVE DATE: December 2, 1996.

ADDRESSES: Craig Wingert, NMFS, Southwest Region, Protected Species Management Division, 501 W. Ocean Blvd., Suite 4200, Long Beach, CA 90802–4213, telephone (310/980–4021); or Marta Nammack, NMFS, Office of Protected Resources, 1315 East-West Highway, Silver Spring, MD 20910, telephone (301/713–1401).

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SUPPLEMENTARY INFORMATION:

Background

The coho salmon (*Oncorhynchus kisutch*) is an anadromous salmonid species that was historically distributed throughout the North Pacific Ocean from central California to Point Hope, AK, through the Aleutian Islands, and from the Anadyr River, Russia, south to Hokkaido, Japan. Historically, this species probably inhabited most coastal streams in Washington, Oregon, and northern and central California. Some populations, now considered extinct, and believed to have migrated hundreds of miles inland to spawn in tributaries of the upper Columbia River in Washington, and the Snake River in Idaho.

In contrast to the life history patterns of other anadromous salmonids, coho salmon on the west coast of North America generally exhibit a relatively simple 3-year life cycle. Adults typically begin their freshwater spawning migration in the late summer and fall, spawn by mid-winter, and then die. Run and spawn timing of adult coho salmon vary between and within coastal and Columbia River Basin populations. Depending on river temperatures, eggs incubate in ''redds'' (gravel nests excavated by spawning females) for 1.5 to 4 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, or ''fry,'' and begin actively feeding. Juveniles rear in fresh water for up to 15 months, then migrate to the ocean as ''smolts'' in the spring. Coho salmon typically spend two growing seasons in the ocean before returning to their natal streams to spawn as 3 year-olds. Some precocious males, called ''jacks,'' return to spawn after only 6 months at sea.

During this century, indigenous, naturally-reproducing populations of coho salmon are believed to have been eliminated in nearly all Columbia River tributaries and to be in decline in numerous coastal streams in Washington, Oregon, and California. Coho in at least 33 stream/river systems have been identified by agencies and conservation groups as being at moderate or high risk of extinction. In general, there is a geographic trend in the status of west coast coho salmon stocks, with the southernmost and easternmost stocks in the worst condition.

Consideration as a ''Species'' Under the ESA

The ESA defines a ''species'' to include any ''distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature.'' NMFS published a policy describing how it would apply the ESA definitin of a ''species'' to anandronous salmonid species (56 FR 58612, November 20, 1991). More recently, NMFS and the U.S. Fish and Wildlife Service (FWS) published a joint policy, consistent with NMFS' policy, regarding the definition of distinct population segments (61 FR 4722, February 7, 1996). The earlier policy is more detailed and applies specifically to Pacific salmonids and, therefore, was used for this determination. This policy indicates that one or more naturally reproducing salmonid populations will be considered distinct, and hence species under the ESA, if they represent an ESU of the biological species. To be considered an ESU, a population must satisfy two criteria: (1) It must be reproductively isolated from other population units of the same species, and (2) 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 have been strong enough to permit evolutionarily important differences to occur in different population units. The second criterion is met if the population contributes substantially to the ecological/genetic diversity of the species as a whole. Guidance on the application of this policy is contained in a scientific paper ''Pacific Salmon (*Oncorhynchus* spp.) and the Definition of 'Species' Under the Endangered Species Act'' and a NOAA Technical Memorandum ''Definition of 'Species' under the Endangered Spcies Act: Application to Pacific Salmon.'' NMFS' proposed listing determination and rule (60 FR 38011, July 25, 1995) for west coast coho salmon and the west coast coho salmon status review (Weitkamp et al., 1995) describe the genetic, ecological, and life history characteristics, as well as human-caused genetic changes, that NMFS assessed to determine the number and geographic extent of coho salmon ESUs.

Previous Federal ESA Actions Related to Coho Salmon Listing

The history of petitions received regarding coho salmon is summarized in the proposed rule published on July 25, 1995 (60 FR 38011). The most comprehensive petition received was from the Pacific Rivers Council and 22 co-petitioners on October 20, 1993. In response to that petition, NMFS assessed the best available scientific and commercial data, including technical information from Pacific Salmon

Biological and Technical Committees (PSBTCs) in Washington, Oregon, and California. The PSBTCs consisted of scientists (from Federal, state, and local resource agencies, Indian tribes, industries, professional societies, and public interest groups) with technical expertise relevant to coho salmon.

NMFS established a Biological Review Team (BRT), comprised of staff from its Northwest Fisheries Science Center and Southwest Regional Office, and completed a coastwide status review for coho salmon (NOAA Technical Memorandum, September 1995, entitled: ''Status Review of Coho Salmon from Washington, Oregon, and California'' [Weitkamp et al., 1995]).

Based on the results of the BRT report, and after consideration of other information and a review of existing conservation measures, NMFS published a proposed listing determination (60 FR 38011, July 25, 1995) which identified six ESUs of coho salmon ranging from southern British Columbia to central California. The Olympic Peninsula ESU was found to not warrant listing; the Puget Sound/Strait of Georgia ESU and the lower Columbia River/southwest Washington coast ESU were identified as candidates for listing; and the Oregon Coast ESU, Southern Oregon/Northern California ESU, and Central California coast ESU were proposed for listing as threatened species.

Pursuant to section 4(b)(6)(B)(i), NMFS may make a finding ''that there is a substantial disagreement regarding the sufficiency or accuracy of the available data relevant to the determination'' and, on that basis, may extend the 1-year period for up to 6 months to solicit and analyze additional data. NMFS has concluded that a 6-month extension is warranted for the Oregon Coast and Southern Oregon/Northern California ESUs. For NMFS' determination on the 6-month extension, see the Notices section of this Federal Register.

Summary of Comments Regarding the Central California Coast Coho ESUs

NMFS held two public hearings in California (Rohnert Park and Eureka) to solicit comments on the proposed listing determination for west coast coho salmon. Forty-seven individuals presented testimony at the hearings. During the 90-day public comment period, NMFS received 17 written comments on the proposed rule from state, Federal, and local government agencies, Indian tribes, non-government organizations, the scientific community, and other individuals. Of the comments received, 35 supported the listing and 5 opposed the listing. The majority of comments (44) addressed factors for the decline of coho salmon. Twenty-two commenters stated that existing regulatory mechanisms, including enforcement, were inadequate to protect coho salmon and their habitats. A summary of major comments received during the public comment period and public hearings, grouped by major issue categories, is presented below.

Issue 1: Sufficiency of Scientific Information

Many commenters urged NMFS to use the best available scientific information in reaching a final determination regarding the risk of extinction faced by coho ESUs in California. All but one commenter supported the scientific conclusions reached by NMFS. This commenter specifically questioned the data used to determine the risk of extinction of coho salmon in the Russian River Basin.

NMFS is required under section 4(b) of the ESA to use only the best scientific and commercial data available in making a determination. However, the available information regarding the historic and present abundance of coho salmon throughout the Central California coast coho salmon ESU is limited. NMFS' 1995 west coast salmon status review (Weitkamp et al., 1995), together with recent information collected by NMFS scientists and information provided to NMFS by other sources since the proposed listing determination was published, represent the best scientific information presently available for coho salmon populations in the Central California coast ESU. This information indicates that coho salmon in the southern portion of the ESU (south of San Francisco Bay) are severely depressed, though most of the coho production within this ESU originated from coastal watersheds north of San Francisco Bay (CDFG, 1991). Nehlsen et al. (1991) provided no information on individual coho salmon in central California but identified coho in streams and rivers north of San Francisco as being at moderate risk of extinction and those south of San Francisco as being at high risk of extinction. Higgins et al. (1992) considered only drainages from the Russian River north and identified four coho salmon stocks within the central California coast ESU as being at risk (three of special concern and one, the Gualala River, as being at a high risk of extinction). The most comprehensive review of coho salmon in California was conducted by Brown and Moyle (1991) and summarized by Brown et al. (1994). They reported that coho in California have declined or disappeared from all streams in which they were historically recorded.

Issue 2: Status of the Central California Coast Coho ESU

Forty comments received by NMFS addressed the status of California coho salmon populations. The vast majority of the comments (91 percent) stated that the Central California coast ESU should be listed as endangered based on the scientific information available and presented in the state and federal status reviews. The remaining commenters stated coho salmon in central California should be listed as threatened, primarily based on conservation efforts currently being implemented.

In determining the status of the Central California coast coho ESU under the ESA, NMFS considers both the scientific information on the status and risk faced by the ESU. In assessing the risk of extinction faced by a species, NMFS considers ''those efforts, if any, being made by any State or foreign nation, or any political subdivision of a State or foreign nation, to protect such species'' (16 U.S.C. 1533(b)(1)(A); 50 CFR 424.11(f)).

Based on a review of the status of coho south of San Francisco (Anderson, 1995), the California Fish and Game Commission decided to list coho south of San Francisco as endangered under the California ESA (CESA), effective January 1, 1996. The California Department of Forestry (CDF) and the California Department of Fish and Game (CDFG) have implemented protective measures for coho salmon stocks and their habitats south of San Francisco Bay which represent an improvement over the existing forest rules and practices.

NMFS thinks that the State's efforts to protect coho south of San Francisco may prove to be effective in mitigating adverse impacts, but it is premature to conclude that they reduce the risk facing the species to such an extent that the determination would be different. In the remainder of the ESU, NMFS has collected information indicating that coho are present in streams in which they were not previously reported historically and from which they had been reported to have been extirpated (Adams, 1996; August 27, 1996, Memorandum A. MacCall to H. Diaz-Soltero). In addition, a number of water-shed groups are involved in restoration projects within this ESU, and steps have been taken by the Pacific Fishery Management Council (PFMC) and NMFS to curtail the adverse effects of ocean fishing. Therefore, NMFS has determined that, even though the

absolute numbers of fish in this ESU are low, the ESU is not in imminent danger of extinction, and it is appropriately designated as threatened.

Issue 3: Factors Contributing to the Decline of Coho Salmon in California

Forty-four comments addressed factors regarding the decline of coho salmon and the damage or loss of their habitats. Thirty-eight individuals commented on the degraded, blocked, fragmented, and generally poor quality of coho salmon habitat; 24 cited the adverse effects of logging, and 11 discussed adverse effects of agricultural activities on coho salmon and their habitats; 21 commented that poor water quality conditions, primarily excessive warm water temperatures, were outside the preferred range for salmonids during the summer; 19 indicated that point and non-point source pollution including sedimentation, municipal and industrial effluent, and herbicides/pesticides, have contributed to the decline of the species; 8 commented that hatchery practices, primarily excessive out-of-basin plantings, disease, and competition with natural fish for food and space, have contributed to the decline of the species; 7 commented that excessive fishing had occurred; 6 commented that past and present mining activities have contributed to the decline of the species; 6 commented that urbanization activities have contributed to the decline of the species; 5 commented that there has been increased predation on coho salmon from pinniped, fish, and avian predators; and two commented on the effects that drought (e.g., 1976–77 and 1986–92) has had on coho salmon populations in California.

NMFS agrees with the commenters that many factors, past and present, have contributed to the decline of coho salmon. New information provided by commenters and responses to this information have been incorporated in the Summary of Factors Affecting Coho Salmon.

Issue 4: Existing Regulatory Mechanisms

Two commenters acknowledged that past timber and mining activities contributed to the decline of coho salmon but maintained that existing regulatory mechanisms (e.g., the California Forest Practices Act (CFPA), Clean Water Act (CWA), mining regulations) and review processes are sufficient for the protection of coho salmon and their habitats. Twenty-two commented that existing regulatory mechanisms (e.g., CFPA and CWA), including enforcement, and inadequate to protect coho salmon and their habitats.

Several commenters stated that current logging practices have dramatically improved over those of the past, decreasing the impact of present-day logging on habitat. Present-day logging practices have improved over those of the past; however, timber harvest is still a major land use in the Central California coast ESU, and fish habitat is still recovering from past logging practices. In addition, the incremental impacts of present-day land management practices, when added to impacts of past land management practices and other risk factors, continue to pose a serious threat to Central California coast coho.

Although several commenters describe the CFPA as being capable of protecting coho salmon and their ecosystems, little evidence has been provided to support these claims. While the CFPA attempts to achieve fish habitat protection by establishing ''Water and Lake Protection Zones,'' there is no substantive body of evidence to demonstrate that the level of protection is sufficient to conserve the anadromous fish habitat and ecosystems upon which coho salmon in the Central California coast coho salmon ESU depend. Neither has the CWA been used to its full potential. Seventeen water bodies in central and northern California have been designated as impaired under section 303(d) of the CWA, and the Environmental Protection Agency has been sued for failure to develop Total Maximum Daily Load (TMDL) standards for these waterbodies.

Comments Received After the Close of the Comment Period

On September 27, 1996, the California Resources Agency requested NMFS to reopen the comment period and extend its decision date for 6 months because (1) there was substantial disagreement between scientists as to the sufficiency and accuracy of the data upon which NMFS was relying to make a determination; (2) during the 1996 field season, fisheries biologists obtained significant new information which, once complied, may influence NMFS' decision; (3) NMFS has not had an opportunity to evaluate the cumulative effects of the variety of efforts by landowners in California to complete multi-species Habitat Conservation Plans (HCPs) and sustainable yield plans (SYPs) under the California Forest Practice Rules (CFPRs); and (4) NMFS has not thoroughly evaluated the protections for coho salmon provided under the CFPRs and other existing State protective programs.

The California Resources Agency cites Oregon's recent submission to NMFS on the role of ocean survival in judging coho population viability as a basis for disagreement in California. While the results of these modeling exercises and additional population viability analysis relative to Oregon may be broadly applicable to California, California does not have available the underlying information of stock abundance that Oregon has to support its claim. Information in California, over which there is no scientific debate, indicates that coho are severely depressed and that they have been eliminated from nearly half of the streams in which they occurred historically.

The California Resources Agency claims that data being developed since the close of the comment period calls into question the accuracy and sufficiency of the information currently in the administrative record. Since the close of the comment period, NMFS has collected additional information indicating that coho are present in streams in which Brown and Moyle (1991) found none, and NMFS has received new information from landowners indicating that new coho sites have been identified. NMFS has incorporated most of the information provided in the State's letter in its deliberations on this rule. This new information did not substantially alter this final determination or the reasons upon which it is based.

The California Resources Agency also suggests that NMFS would benefit from waiting to evaluate the results of HCPs and SYPs that are being developed by large timber landowners. While NMFS is encouraged by these activities and intends to pursue these HCPs, NMFS cannot defer a listing based on the prospect of future development of conservation measures. NMFS' determination must be based on the best available information after consideration of state and other efforts to protect the species. These HCPs and other planned conservation efforts are still in the developmental phase and, therefore, cannot be considered to reduce the risks facing the species at this time. Neither does the promise of a plan constitute a scientific disagreement, thus, despite NMFS' support of these plans, they do not constitute a basis for delay.

Lastly, the California Resources Agency claims that NMFS has not evaluated the CFPRs. NMFS has reviewed these rules and determined that they are not being adequately implemented. While the CDFG commented during the comment period in support of the proposed rule, the CDF did not. Further, the Board of Forestry rejected efforts of the CDFG to designate

coho as a sensitive species and develop special protective measures for coho habitat. Nonetheless, NMFS is involved in discussions with the CDF to determine how to improve implementation of the CFPRs. While the CFPRs contain measures protective of watercourse and lake protection zones, they allow activities in those zones that are harmful to coho habitat. The CFPRs also contain exceptions that allow salvage without environmental review or monitoring. However, as with the HCPs under development, disagreement over the effectiveness of the State program does not constitute a scientific disagreement and is likewise not a reason for delay.

NMFS concludes that it would not be prudent to delay listing and risk further population declines or habitat degradation in any part of the Central California coast ESU. Moreover, the ESA requires that a listing determination be made based ''* * * solely on the basis of the best scientific information available after conducting a review of the status of the species and after taking into account those efforts, if any, being made by a state or foreign nation or any political subdivision of any state or foreign nation to protect such species * * *'' (16 USC 1533(b)(1); 50 CFR 424.11(b)). Such a determination must be made in accordance with the timeframes set forth in the ESA. Therefore, NMFS finds it appropriate to make a final listing determination at this time.

Summary of Factors Affecting the Species

Section 4(a)(1) of the ESA and NMFS listing regulations (50 CFR part 424) set forth procedures for listing species. The Secretary of Commerce must determine, through the regulatory process, if a species is endangered or threatened based upon 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.

In the 1940s, estimated abundance of coho salmon in this ESU ranged from 50,000 to 125,000 natural spawning adults. Today, it is estimated that there are probably less than 6,000 naturally-reproducing coho salmon, and the vast majority of these fish are considered to be of non-native origin (either hatchery fish or from streams stocked with hatchery fish).

The factors threatening naturally-reproducing coho salmon throughout its range are numerous and varied. For coho salmon populations in the Central California coast ESU, the present depressed condition is the result of several long-standing, human-induced factors (e.g., habitat degradation, harvest, water diversions, and artificial propagation) that serve to exacerbate the adverse effects of natural environmental variability from such factors as drought and poor ocean conditions.

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

Logging, agricultural and mining activities, urbanization, stream channelization, dams, wetland loss, and water withdrawals and unscreened diversions for irrigation have contributed to the decline of the Central California coast coho ESU. The following discussion provides an overview of the types of activities and conditions that adversely affect coho salmon in central California coast watersheds.

Depletion and storage of natural flows have drastically altered natural hydrological cycles in many central California rivers and streams. Alteration of streamflows has increased juvenile salmonid mortality for a variety of reasons: migration delay resulting from insufficient flows or habitat blockages; loss of usable habitat due to dewatering and blockage; stranding of fish resulting from rapid flow fluctuations; entrainment of juveniles into unscreened or poorly screened diversions; and increased juvenile mortality resulting from increased water temperatures (California Advisory Committee on Salmon and Steelhead Trout, 1988; CDFG, 1991; CBFWA, 1991a; Bergren and Filardo, 1991; Palmisano et al., 1993; Reynolds et al., 1993; Chapman et al., 1994; Cramer et al., 1995; Botkin et al., 1995). In addition, reduced flows degrade or diminish fish habitats via increased deposition of fine sediments in spawning gravels, decreased recruitment of new spawning gravels, and encroachment of riparian and non-endemic vegetation into spawning and rearing areas.

Sufficient quantities of good quality water are essential for coho survival, growth, reproduction, and migration. Important elements of water quality include water temperatures within the range that corresponds with migration, rearing and emergence needs of fish and the aquatic organisms upon which they depend (Sweeney and Vannote, 1978; Quinn and Tallman, 1987). Desired conditions for coho salmon include an abundance of cool (generally in the range of 53.3 °F to 58.3 °F (11.8 °C to 14.6 °C) Reiser and Bjornn, 1979), well oxygenated water that is present year-round, free of excessive suspended sediments and other pollutants that could limit primary production and benthic invertebrate abundance and diversity (Cordone and Kelley, 1961; Lloyd et al., 1987).

Numerous studies have demonstrated that land use activities associated with logging, road construction, urban development, mining, agriculture, and recreation have significantly altered coho salmon habitat quantity and quality. Impacts of concern associated with these activities include the following: alteration of streambank and channel morphology, alteration of ambient stream water temperatures, elimination of spawning and rearing habitat, fragmentation of available habitats, elimination of downstream recruitment of spawning gravels and large woody debris, removal of riparian vegetation resulting in increased stream bank erosion, and degradation of water quality (CDFG, 1965; Bottom et al., 1985; California Advisory Committee on Salmon and Steelhead Trout, 1988; CDFG, 1991; Nehlsen et al., 1991; California State Lands Commission, 1993; Wilderness Society, 1993; Bryant, 1994; CDFG, 1994; Brown et al., 1994; Botkin et al., 1995; McEwan and Jackson, 1996). Of particular concern is the increased sediment input into spawning and rearing areas that results from the loss of channel complexity, pool habitat, suitable gravel substrate, and large woody debris (Bottom et al., 1985; Higgins et al., 1992; FEMAT, 1993; USFS and BLM, 1994b; Botkin et al., 1995).

Further, historical practices, such as the use of splash dams, and widespread removal of beaver dams, log jams and snags from river channels, have adversely modified fish habitat (Bottom et al., 1985).

Agricultural practices have also contributed to the degradation of salmonid habitat on the West Coast through irrigation diversions, overgrazing in riparian areas, and compaction of soils in upland areas from livestock (Palmisano et al., 1993; Botkin et al., 1995). The vigor, composition and diversity of natural vegetation can be altered by livestock grazing in and around riparian areas. This in turn can affect the site's ability to control erosion, provide stability to stream banks, and provide shade, cover, and nutrients to the stream. Mechanical compaction can reduce the productivity of the soils appreciably and cause bank

slough and erosion. Mechanical bank damage often leads to channel widening, lateral stream migration, and excess sedimentation.

Urbanization has degraded coho salmon habitat through stream channelization, floodplain drainage, and riparian damage (Botkin et al., 1995). When watersheds are urbanized, problems may result simply because structures are placed in the path of natural runoff processes, or because the urbanization itself has induced changes in the hydrologic regime. In almost every point that urbanization activity touches the watershed, point source and nonpoint pollution occurs. Water infiltration is reduced due to extensive ground covering. As a result, runoff from the watershed is flashier, with increased flood hazard (Leopold, 1968). Flood control and land drainage schemes may concentrate runoff, resulting in increased bank erosion which causes a loss of riparian vegetation and undercut banks and eventually causes widening and down-cutting of the stream channel. Sediments washed from the urban areas contain trace metals such as copper, cadmium, zinc, and lead (CSLC, 1993). These, together with pesticides, herbicides, fertilizers, gasoline, and other petroleum products, contaminate drainage waters and harm aquatic life necessary for coho salmon survival. The California State Water Resources Control Board (1991) reported that nonpoint source pollution is the cause of 50 to 80 percent of impairment to water bodies in California.

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

Marine harvest of coho salmon occurs primarily in nearshore waters off British Columbia, Washington, Oregon, and California. Recreational fishing for coho salmon is pursued in numerous streams throughout the central California coast when adults return on their fall spawning migration. There are few good historical accounts of the abundance of coho salmon harvested along the California coast (Jensen and Startzell, 1967). Consequently, those early records did not contain quantitative data by species until the early 1950s.

Tody, coho salmon stocks are managed by NMFS in conjunction with the PFMC, the states, and certain tribes. The central California coast falls within the Federal salmon fishery management zone that stretches from Horse Mountain, just north of Fort Bragg, CA, to the Mexico border (PFMC Salmon Fishery Management Plan). Coho ocean harvest is managed by setting escapement goals for Oregon Coastal Natural coho salmon. This stock aggregate constitutes the largest portion of naturally produced coho salmon caught in ocean salmon fisheries off California and Oregon (PFMC, 1993). Using this index may have resulted in pre-1994 exploitation rates higher than central California populations could sustain. The confounding effects of habitat deterioration, drought, and poor ocean conditions on coho salmon survival make it difficult to assess the degree to which recreational and commercial harvest have contributed to the overall decline of coho salmon in West Coast rivers.

Collection for scientific research and educational programs has had little or no impact on California coho salmon populations. In California, most of the scientific collection permits are issued to environmental consultants, Federal resource agencies, and universities by the CDFG. Regulation of take is controlled by conditioning individual permits. The CDFG requires reporting of any coho salmon taken incidental to other monitoring activities; however, no comprehensive total or estimate of coho salmon mortalities related to scientific sampling are kept for any watershed in the State (F. Reynolds, pers. comm.). The CDFG does not believe that indirect mortalities associated with scientific use are detrimental to coho salmon in California (F. Reynolds, pers. comm.).

C. Disease or Predation

Relative to effects of fishing, habitat degradation, and hatchery practices, disease and predation are not believed to be major factors contributing to the decline of West Coast coho salmon populations. However, disease and predation may have substantial impacts in local areas.

Coho salmon are exposed to numerous bacterial, protozoan, viral, and parasitic organisms in fresh water and marine environments. Specific diseases such as bacterial kidney disease (BKD), ceratomyxosis, columnaris, furunculosis, infectious hematopoietic necrosis, redmouth and black spot disease, Erythrocytic Inclusion Body Syndrome, whirling disease, and others are present and known to affect salmon and steelhead (Rucker et al., 1953; Wood, 1979; Leek, 1987, Cox, 1992; Foott et al., 1994; Gould and Wedemeyer, undated). Very little current or historical information exists to quantify changes in infection levels and mortality rates attributable to these diseases for coho salmon. However, studies have shown that native fish tend to be less susceptible to these pathogens than hatchery-reared fish (Buchanon et al., 1983; Sanders et al., 1992).

Infectious disease is one of many factors that can influence adult and juvenile survival (Buchanan et al., 1983). Disease may be contracted through waterborne pathogens or by interbreeding with infected hatchery fish (Fryer and Sanders, 1981; Evelyn et al., 1984 and 1986). Salmonids typically are infected with several pathogens during their life cycle; however, a high intensity of infection (number of organisms per host) and stressful conditions must usually occur before the host/parasite balance favors the parasite (pathogen) and a disease state occurs in the fish.

Many natural and hatchery coho populations throughout California's coast have tested positive for the bacterium, *Renibacterium salmoninarum*, the causative agent of BKD (Cox, 1992; Foott, 1992). The overall incidence of BKD measured by direct fluorescent antibody technique among Scott Creek coho salmon was 100 percent (13/13 fish) and 95.5 percent (21/22 fish) among San Lorenzo River coho (Cox, 1992). Waddell Creek coho salmon are also suspected of having near 100 percent infection (D. Streig, pers. comm.). The CDFG recently initiated a treatment protocol to attempt to control BKD outbreaks in hatchery fish released into the Russian River and Scott Creek (Cox, 1992). The impacts of this disease are subtle. Juvenile salmonids may survive well in their journey downstream but may be unable to make appropriate changes in kidney function for a successful transition to sea water (Foott, 1992). Stress during migration may also cause this disease to come out of remission (Schreck, 1987). Water quantity and quality during late summer is a critical factor in controlling disease epidemics. As water quantity and quality diminishes, stress may trigger the onset of these diseases in fish that are carrying the disease (Holt et al., 1975; Wood, 1979; Matthews et al., 1986; Maule et al., 1988).

Freshwater predation by other salmonids is not believed to be a major factor contributing to the decline of central California coho salmon. Avian predators have been shown to impact some juvenile salmonids in fresh water and near shore environments. Ruggerone (1986) estimated that ring-billed gulls (*Larus delawarensis*) consumed 2 percent of the salmon and steelhead trout passing Wanapum Dam, in the Columbia River, during the spring smolt outmigration in 1982. Wood (1987) estimated that the common merganser (*Mergus merganser*), a known freshwater predator of juvenile

salmonids, were able to consume 24 to 65 percent of coho salmon production in coastal British Columbia streams. Known avian predators in the nearshore marine environment include herons, cormorants, and alcids (Allen, 1974). Cooper and Johnson (1992) and Botkin et al. (1995) reported that marine mammal and avian predation may occur on some local salmonid populations; however, they believed that it was a minor factor in the decline of coastwide salmonid populations. With the decrease in quality riverine and estuarine habitats, increased predation by freshwater, avian, and marine predators will occur. With the decrease in avoidance habitat (e.g., deep pools and estuaries, and undercut banks) and adequate migration and rearing flows, predation may play a small role in the reduction of some localized coho salmon stocks.

Harbor seal and California sea lion numbers have increased along the Pacific Coast. At the mouth of the Russian River, Hanson (1993) reported that the foraging behavior of California sea lions and harbor seals with respect to anadromous salmonids was minimal. Hanson (1993) also stated that predation on salmonids appeared to be coincidental with the salmonid migrations rather than dependent upon them.

Salmonids appear to be a minor component of the diet of marine mammals (Scheffer and Sperry, 1931; Jameson and Kenyon, 1977; Graybill, 1981; Brown and Mate, 1983; Roffe and Mate, 1984; Hanson, 1993). Principal food sources are small pelagic schooling fish, juvenile rockfish, lampreys (Jameson and Kenyon, 1977; Roffe and Mate, 1984), benthic and epibenthic species (Brown and Mate, 1983) and flatfish (Scheffer and Sperry, 1931; Graybill, 1981).

Predation may significantly influence salmonid abundance in some local populations when other prey are absent and physical conditions lead to the concentration of adults and juveniles (Cooper and Johnson, 1992). Low flow conditions in streams can also enhance predation opportunities, particularly in central California streams, where adult coho may congregate at the mouths of streams waiting for high flows for access (CDFG, 1995).

Several studies have indicated that piscivorous predators may control the abundance and survival of salmonids. Holtby et al. (1990) hypothesized that temperature-mediated arrival and predation by Pacific hake may be an important source of mortality for coho salmon off the west coast of Vancouver Island. Beamish et al. (1992) documented predation of hatchery-reared chinook and coho salmon by spiny dogfish (*Squalus acanthias*). Pearcy (1992) reviewed several studies of salmonids off the Pacific Northwest coastline and concluded that salmonid survival was influenced by the factional responses of the predators to salmonids and alternative prey.

The relative impacts of marine predation on anadromous salmonids are not well understood, but most investigators believe that marine predation is a minor factor in coho salmon declines. Predators play an important role in the ecosystem, culling out unfit individuals, thereby strengthening the species as a whole. The increased impact of certain predators has been to a large degree the result of ecosystem modification. Therefore, it would seem more likely that increased predation is but a symptom of a much larger problem, namely, habitat modification and a decrease in water quantity and quality.

D. Inadequacy of Existing Regulatory Mechanisms

A variety of state and Federal regulatory mechanisms exist to protect coho habitat and address the decline of coho salmon in the Central California coast ESU, but they have not been adequately implemented.

The State of California has listed coho as endangered in streams south of San Francisco pursuant to the State ESA, initiated a recovery planning effort, and implemented a biological opinion and incidental take statement to improve the implementation of CFPRs in the range of the listed streams. In CDFG's comment letter (October 23, 1995), CDFG relayed the determination of its Ad-hoc Coho Salmon Advisory Committee that coho south of Punta Gorda qualify for state listing and acknowledged that, while state listing (subsequently implemented by the Fish and Game Commission) did not encompass the entire ESU, it is essential to manage the ESU as a population unit. While the CDFG may intend to expand its recovery planning effort to the entire ESU, it cannot provide the protective measures of the State ESA unless it expands the current listing to encompass the remainder of the ESU.

The Northwest Forest Plan and its Aquatic Conservation Strategy provide a mechanism to ensure protection of functional salmonid habitat on Federal lands. This is accomplished through a set of guidelines and processes for watershed assessment to determine what forest practices are acceptable within certain riparian buffer zones. Federal lands comprise only about 5 percent of the Central California coast coho salmon ESU, a proportion too small to secure recovery even with the strictest of Federal forest management practices.

The CFPRs contain provisions that are protective if fully implemented. For example, provisions for sensitive species designation allow the Board to adopt special management practices for sensitive species and their habitat. The Board did not adopt CDFG's proposal to designate coho salmon as a sensitive species. The current process for approving Timber Harvest Plans receives inadequate environmental review, and monitoring of impacts of timber harvest operations is insufficient to determine whether a particular operation damaged habitat and, if so, how it might be mitigated. There are also exceptions to the rules that allow timber harvest to occur without any requirement for environmental review or monitoring.

The CWA provides for the protection of beneficial uses, including the protection of fishery resources. However, implementation of this statute has not been adequate to protect coho habitat. Seven streams or rivers in central California have been designated as impaired waterbodies pursuant to Section 303(d). The State Water Quality Control Board is required to develop and implement water quality standards for these waterbodies, and, if they do not, the Environmental Protection Agency (EPA) is required to do so. EPA is currently involved in litigation for its failure to designate water quality criteria for these water bodies.

While ocean fishing is regulated to reduce impacts on coho, state sport fishing regulations continue to allow fishing for coho in inland waters. The contribution of coho salmon to the in-river sport catch is unknown, and losses due to injury and mortality from incidental capture in other authorized fisheries, principally steelhead, are also unknown. Current funding and personnel are not available to implement monitoring programs to evaluate these impacts.

E. Other Natural or Human-made Factors Affecting Its Continued Existence

Natural Factors

Long-term trends in rainfall and marine productivity associated with atmospheric conditions in the North Pacific Ocean may have a major influence on coho salmon production.

a. Drought

Much of the Pacific coast has experienced drought conditions during the past 8 years, a situation which has undoubtedly contributed to the decline of many salmonid populations. Drought conditions reduce the amount of water available, resulting in reductions (or elimination) of flows needed for adult coho salmon passage, egg incubation, and juvenile rearing and migration. There are indications in tree ring records that droughts more severe than the 6-year drought that California recently experienced occurred in the past (Stine, 1994). The key to survival in this type of variable and rapidly changing environment is the evolution of behaviors and life history traits that allow coho salmon to cope with a variety of environmental conditions.

Populations that are fragmented or reduced in size and range are more vulnerable to extinction by natural events. Whether recent climatic conditions represent a long-term change that will continue to affect salmonid stocks in the future or whether these changes are short-term environmental fluctuations that can be expected to reverse in the near future remains unclear. Many of the coho salmon population declines began prior to these recent drought conditions.

b. Floods

With high inherent erosion risk, urban encroachment, and intensive timber management, flood events can cause major soil loss (Hagans et al., Nawa et al., 1991; Higgins et al., 1992). As previously mentioned, sedimentation of stream beds has been implicated as a principal cause of declining salmonid populations throughout their range. Floods can result in mass wasting of erodible hillslopes and failure of roads on unstable slopes causing catastrophic erosion. In addition, flooding can cause scour and redeposition of spawning gravels in typically inaccessible areas.

During flood events, land disturbances resulting from logging, road construction, mining, urbanization, livestock grazing, agriculture, fire, and other uses may contribute sediment directly to streams or exacerbate sedimentation from natural erosive processes (California Advisory Committee on Salmon and Steelhead Trout, 1988; CSLC, 1993; FEMAT, 1993). Judsen and Ritter (1964), the California Department of Water Resources (CDWR, 1982b), and the California State Lands Commission (1993) have stated that northwestern and central coastal California have some of the most erodible terrain in the world. Several studies have indicated that, in this region, catastrophic erosion and subsequent stream sedimentation (such as during the 1955 and 1964 floods) resulted from areas which had been clearcut or which had roads constructed on unstable soils (Janda et al., 1975; Wahrhaftig, 1976; Kelsey, 1980; Lisle, 1982; Hagans et al., 1986).

As streams and pools fill in with sediment, flood flow capacity is reduced. Such changes cause decreased stream stability and increased bank erosion, and subsequently exacerbate existing sedimentation problems (Lisle, 1982), including sedimentation of spawning gravels and filling of pools and estuaries. Channel widening and loss of pool-riffle sequence due to sedimentation has damaged spawning and rearing habitat of all salmonids. By 1980, the pool-riffle sequence and pool quality in some California streams still had not fully recovered from the 1964 regional flood. In fact, Lisle (1982) and Weaver and Hagans (1996) found that many Pacific coast streams continue to show signs of harboring debris flow. Such streams have remained shallow, wide, warm, and unstable since these floods.

c. Ocean Conditions

Large fluctuations in Pacific salmon catch have occurred during the past century. Annual world harvest of Pacific salmon has varied from 347 million lb (772 million kg) in the 1930s to about 184 million lb (409 million kg) in 1977 and back to 368 million lb (818 million kg) by 1989 (Hare and Francis, 1993). Mechanisms linking atmospheric and oceanic physics and fish populations have been suggested for Pacific salmon (Rogers, 1984; Nickelson, 1986; Johnson, 1988; Brodeur and Ware, 1992; Francis et al., 1992; Francis, 1993; Hare and Francis, 1993; Ward, 1993). Many studies have tried to correlate the production or marine survival of salmon with environmental factors (Pearcy, 1992; Neeley 1994). Vernon (1958), Holtby and Scrivener (1989), and Holtby et al. (1990) have reported associations between salmon survival and sea surface temperature and salinity, especially during the first few months that slamonids are at sea. Francis and Sibley (1991), Rogers (1984), and Cooney et al. (1993) also found relationships between salmon production and sea surface temperature. Some studies have tried to link salmon production to oceanic and atmospheric climate change. For example, Beamish and Bouillon (1993) and Ward (1993) found that trends in Pacific salmon catches were similar to trends in winter atmospheric circulation in the North Pacific.

Francis and Sibley (1991) and Francis et al. (1992) have developed a model linking decadal-scale atmospheric variability and salmon production that incorporates hypotheses developed by Hollowed and Wooster (1991) and Wockett (1967), as well as evidence presented in many other studies. The model developed by Francis et al. (1992) describes a time series of biological and physical variables from the Northeast Pacific that appear to share decadal-scale patterns. Biological and physical variables that appear to have undergone shifts during the late 1970s include the following: abundance of salmon (Rogers, 1984, 1987; Hare and Francis, 1993) and other pelagic fish, cephalopods, and zooplankton (Broadeur and Ware, 1992); oceanographic properties such as current transport (Royer, 1989), sea surface temperature and upwelling (Holowed and Wooster, 1991); and atmospheric phenomena such as atmospheric circulation patterns, sea-surface pressure patterns, and sea-surface wind-stress (Trenberth, 1990; Trenberth et al., 1993).

Finally, Scarnecchia (1981) reported that near-shore conditions during the spring and summer months along the California coast may dramatically affect year-class strength of salmonids. Bottom et al. (1986) believed that coho salmon along the Oregon and California coasts may be especially sensitive to upwelling patterns because these regions lack extensive bays, straits, and estuaries, such as those found along the Washington, British Columbia, and Alaskan coasts, which could buffer adverse oceanographic effects. The paucity of high quality near-shore habitat, coupled with variable ocean conditions, makes freshwater rearing habitat more crucial for the survival and persistence of many coho salmon populations.

El Niño

An environmental condition often cited as a cause for the decline of west coast salmonids is the condition known as ''El Niño.'' El Niño is a warming of the Pacific Ocean off South America and is caused by atmospheric changes in the tropical Pacific Ocean (Southern Oscillation-ENSO). During an El Niño event, a plume of warm sea water flows from west to east toward South America, eventually reaching the coast where it is reflected south and north along the continents.

El Niño ocean conditions are characterized by anomalously warm sea surface temperature and changes in thermal structure, coastal currents, and

upwelling. Principal ecosystem alterations include decreases in primary and secondary productivity and changes in prey and predator species distributions. Several El Niño events have been recorded during the last several decades, including those of 1940–41, 1957–58, 1982–83, 1986–87, 1991–92, and 1993–94. The degree to which adverse ocean conditions can influence coho salmon production was demonstrated during the El Niño event of 1982–83, which resulted in a 24 to 27 percent reduction in fecundity and a 58 percent reduction (based on pre-return predictions) in survival of adult coho salmon stocks originating from the Oregon Production Index area (Johnson, 1988).

b. Manmade Factors

Artificial Propagation

Non-native coho salmon stocks have been introduced as broodstock in hatcheries and widely transplanted in many coastal rivers and streams in central California (Bryant, 1994; Weitkamp et al., 1995). Potential problems associated with hatchery programs include genetic impacts on indigenous, naturally-reproducing populations (see Waples, 1991), disease transmission, predation of wild fish, difficulty in determining wild stock status due to incomplete marking of hatchery fish, depletion of wild stock to increase brood stock, and replacement rather than supplementation of wild stocks through competition and continuted annual introduction of hatchery fish (Waples, 1991; Hindar et al., 1991; and Stewart and Bjornn, 1990).

While non-native fish have been introduced in the Central California coast ESU, most hatchery programs are currently being conducted without inter-ESU import of broodstock. Hatchery fish releases are conducted based on a determination that the hatchery stocks are considered similar to the native run. Efforts are made to return hatchery fish to their natal streams, and they are held for an acclimation period to increase the probability of imprinting. However, there are inadequate resources to tag enough (perhaps all) hatchery coho to monitor return rates and rates of straying (CDFG memorandum dated October 23, 1995).

Listing Determination

The listing determination is based on the best available information provided by the PSBTCs which were formed for the purpose of collecting information from diverse and remote repositories, information provided by co-manager agencies and tribes, information provided in response to the solicitation for comments, new information collected by NMFS and other scientists subsequent to the publication of the proposed rule, and the results of two BRT meetings (September 2, 1994, memorandum from Michael Schiewe to William Stelle, Jr., and October 15, 1996 memorandum from Michael Schiewe to William Stelle, Jr. and Hilda Diaz-Soltero).

The rationale for the delineation of the Central California coast coho salmon ESU is contained in the Status Review of coho salmon for Washington, Oregon, and California (Weitkamp et al., 1995) and summarized in the proposed rule (60 FR 38011, July 25, 1995). There was no disagreement over the designation of the boundaries of the Central California coast coho Eus. Moreover, the CDFG's Ad-hoc Salmon Advisory Committee confirmed that the appropriate unit for consideration is that which NMFS had described (i.e., all coho reproducing in streams between Punta Gorda, Humboldt County, CA and the San Lorenzo River, Santa Cruz County, CA). The second BRT meeting on October 7 and 8, 1996, reaffirmed the boundaries of this ESU.

The BRT also evaluated the status of existing hatchery coho populations in this ESU and concluded, with the exception of Warm Springs Hatchery, that hatchery fish should be included in the definition of this ESU (BRT Memo, October 16, 1996). The hatchery programs in this ESU are relatively small and they are being operated as supplementation hatcheries rather than production hatcheries. They are taking eggs from the rivers in which they operate and returning fish to the river from which they were taken. Release of hatchery fish occurs in streams with stocks similar to the native runs. The Warm Springs Hatchery is a relatively recent mitigation hatchery established in 1980. It was established with brood stock from an adjacent ESU and non-native coho have been imported for brood stock on several occasions. Based on recent and periodic use of non-native brood stock, the BRT recommended that these hatchery fish not be considered part of this ESU. In its comments on the proposed rule, CDFG stated that its coho hatchery programs can be integrated into recovery plans for each ESU within California through re-evaluation of each hatchery's goals and constraints with program modifications where appropriate (CDFG, October 23, 1995). NMFS is deferring its decision on the BRT's recommendation until it has had the opportunity to discuss with the CDFG and its cooperators/permit holders how they would incorporate these hatchery programs into a coho conservation strategy.

The Status Review of Coho Salmon from Washington, Oregon, and California (Weitkamp et al., 1995) and the proposed listing determination for west coast coho salmon (60 FR 38011, July 25, 1995) summarized the best available information regarding the current status of the Central California coast coho ESU. In its proposed listing determination, NMFS concluded that the Central California coho salmon ESU should be proposed for listing as a threatened species, but indicated that additional information would be gathered prior to making a final determination. Specifically, NMFS indicated that it would: (1) Gather additional biological information on the status of coho salmon populations in this ESU; (2) assess the response, if any, of coho salmon populations to recent coho protection measures proposed by the PFMC and implemented by NMFS; (3) review and evaluate any new protective measures implemented as a result of the State of California's decision to list coho salmon south of San Francisco; (4) review and evaluate any additional protective or conservation measures implemented by the State or private landowners; and (5) evaluate the progress made by the Resources Agency in its effort to coordinate the development and implementation of a long-term conservation plan for coho salmon in California.

NMFS scientists have collected new biological information on the presence-absence of coho salmon in the Central California coast ESU since the proposed listing in July 1995, and they have gathered additional information on coho salmon presence for the period of 1994–96 from other sources. Based on this new information, coho salmon show a higher frequency of presence in this ESU than reported by Brown and Moyle (1991) and Brown et al. (1994). Specifically, the new information showed that coho salmon were present in 57 percent of the streams of historical record in the Central California coast ESU compared with the 47 percent reported by Brown and Moyle (1991). Coho salmon were found in an additional 23 streams where there was no historical record of their occurrence. In addition, sampling data recently supplied by several timber landowners suggest similar increases in occurrence of coho in streams on their property. These new data suggest that coho salmon are more widely distributed in the ESU than was previously thought to

be the case, and indicate that additional and more widespread sampling would improve our ability to assess the status of coho in this ESU. The BRT reviewed this new information and concluded that the Central California coast coho salmon ESU should be listed, but they did not reach a consensus on whether the ESU was at risk of extinction or whether it was likely to become at risk of extinction in the near future.

Since 1994, the PFMC has recommended an ocean harvest management regime that prohibits retention of coho and sets incidental ocean harvest impact rate for coho of 12 percent. Recent data from Oregon suggest that the in-river escapement of coho has increased during the last few years due to the reduction in ocean harvest impacts. However, without an adequate in-river sampling program in California to monitor coho escapement levels, NMFS is not able to evaluate the relative benefit of this level of fishing mortality other than to conclude that the harvest impact rate is low compared to harvest rates for healthy stocks, and incidental harvest rates authorized for endangered winter chinook salmon in the Sacramento River and threatened spring/summer chinook salmon in the Columbia River Basin.

The CDFG has implemented a cooperative effort with the CDF and Santa Cruz County to address habitat issues and improve implementation of the State's forest practice rules. The primary administrative vehicle for this effort was a consultation between the CDFG and CDF and the subsequent issuance of a biological opinion and incidental take statement pursuant to section 2090 of California ESA. NMFS is encouraged by the effort shown by the CDF, Board of Forestry, and County of Santa Cruz to provide greater protection for coho salmon habitat. However, these programs need to be evaluated for a period of time to determine whether they are providing the intended habitat protection.

NMFS has also identified and evaluated existing and new conservation measures contributing to the conservation of coho salmon in this ESU. Examples of watersheds where local coho conservation efforts are being implemented are: San Lorenzo River (Santa Cruz County), Lagunitas Creek (Marin County), Russian River and Gualala River (Sonoma County), and the Garcia River and Navarro River (Mendocino County). Specific efforts within these basins vary in scope and complexity. In Santa Cruz County restoration and recovery efforts range from coho trapping at a water diversion facility and movement to rearing facilities, to County sponsored in-stream fish passage and stream restoration projects. In Marin, Sonoma, and Mendocino Counties, Resource Conservation Districts (RCD) are providing the focus for agriculture and local conservation groups to use Federal grants to develop and implement prioritized restoration plans. One of the best examples of a coordinated effort has been the Garcia River Watershed Advisory Group. In 1991 this group developed a restoration and enhancement plan, and to date has completed many of the prioritized actions. In the summer of 1996, this group began to focus on sediment delivery and monitoring plans to evaluate restoration success, identify data gaps, and monitor population trends. A similar, cooperative effort has been initiated in the Russian River between the local RCD and the Sonoma County Water Agency. NMFS encourages agencies and other groups to continue these efforts and believes that successful watershed restoration initiatives may provide an effective and efficient approach to salmonid conservation on non-Federal lands in a manner that may reduce the vulnerability of landowners to potential section 9 ''take'' liabilities through their adoption into a 4(d) rule.

In July 1995, the California Resources Agency initiated the Coastal Salmon Initiative (CSI). The CSI is a community oriented planning effort designed to produce a conservation program based on voluntary measures and incentives to protect fish and wildlife habitat in a manner that would protect the economic interests of communities within the range of coho salmon. The process has been slow to progress and is currently not expected to develop a plan for NMFS review until March 1997. If the plan is gauged likely to be successful, NMFS will consider implementing it via a section 4(d) rule comparable to the FWS's 4(d) rule for gnatcatchers in southern California. Because this effort is only in its early stages of development and little concrete progress has occurred to date, the CSI itself can have only a de minimis effect on this listing decision. However, MNFS encourages the Resources Agency to continue to process as it provides small timber land owners, ranchers, and farmers a mechanism for fulfilling the requirements of the ESA.

Based on its assessment of the available scientific and commercial information on coho salmon in this ESU and the conservation measures which are being implemented, NMFS has determined that the Central California coast coho salmon ESU should be listed as a threatened species. The Central California Coast coho salmon ESU consists of all coho salmon naturally reproduced in streams between Punta Gorda, Humboldt County, CA and the San Lorenzo River, Santa Cruz County, CA. The determination as threatened is appropriate because of the information contained in the original status review and received during the comment period, confirmed by new information, indicating that coho are present in watersheds where they had been reported to be extirpated or not present historically, and because of the conservation efforts being implemented by NMFS and the PFMC regarding the ocean fishing impacts, measures to improve habitat south of San Francisco under the State's 2090 agreement, and local efforts by RCDs to acquire funding and restore coho aquatic habitat elsewhere within the ESU.

Prohibitions and Proposed Protective Measures

Section 9(a) of the ESA contains specific prohibitions that apply to all endangered fish and wildlife species. These prohibitions, in part, make it illegal for any person subject to the jurisdiction of the United States to ''take'' (including harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt any such conduct), import or export, transport in interstate or foreign commerce in the course of commercial activity, or sell or offer for sale in interstate or foreign commerce any listed species. It also is illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that has been taking illegally. These prohibitions apply to all individuals, organizations, and agencies subject to U.S. jurisdiction. Certain exceptions apply to agents of NMFS and State conservation agencies.

Sections 10(a)(1)(A) and 10(a)(1)(B) of the ESA provide NMFS with authority to grant exceptions for the ESA's ''taking'' prohibitions (see regulations at 50 CFR §§ 222.22 through 222.24). Section 10(a)(1)(A) scientific research and enhancement permits may be issued to entities (Federal and non-Federal conducting research that involves intentional take of listed species.

Section 4(d) of the ESA allows the promulgation of regulations ''to provide for the conservation of [threatened] species,'' which may include extending any or all of the prohibitions of section 9 to threatened species. Section 9 also prohibits violations of protective regulations for threatened species promulgated under section 4(d).

In this rulemaking, NMFS is extending, pursuant to section 4(d) of the ESA, the section 9 prohibitions to the threatened Central California coho salmon ESU, with the exceptions provided for under section 10 of the ESA, in order to provide it with maximum and immediate protection. As discussed below, NMFS may develop a regulation pursuant to section 4(d) for the conservation of the species that would be more flexible and more specific than the generic section 9 prohibitions.

NMFS is delaying, for 60 days, the prohibitions of section 9 both with respect to scientific research and enhancement programs to provide time to accept applications and process permits for such programs, and, generally, in order to conclude discussions with CDFG and CDF regarding agreements that will define activities that may occur without taking coho salmon. Thus, the requirements of section 7 will be effective on December 2, 1996, and the section 9 prohibitions on take will be effective on December 30, 1996. This will minimize the disruption of otherwise legal activities within the geographic range of this ESU.

For listed species, section 7(a)(2) of the ESA 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 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 most likely to be affected by listing the Central California coast ESU include Corps of Engineers (COE) section 404 permitting activities under the CWA, COE section 10 permitting activities under the River and Harbors Act and Federal Energy Regulatory Commission licensing and relicensing for non-Federal development and operation of hydropower and EPA promulgation of TMDLs. These actions will likely be subject to ESA section 7 consultation requirements which may result in conditions designed to achieve the intended purpose of the project and avoid or reduce impacts to coho salmon and its habitat within the range of the listed ESU.

There are likely to be Federal actions ongoing in the range of the Central California coast ESU at the time that this listing becomes effective. Therefore, NMFS will review all ongoing actions that may affect the listed species with the Federal agencies, and will complete formal or informal consultations, where requested or necessary, for such actions as appropriate, pursuant to ESA section 7(a)(2).

NMFS has issued section 10(a)(1)(A) research or enhancement permits for other listed species (e.g., Snake River chinook salmon, Sacramento River winter-run chinook salmon) for a number of activities, including trapping and tagging to determine population distribution and abundance, and collection of adult fish for artificial propagation programs. NMFS is aware of several sampling efforts for coho salmon in the Central California coast coho ESU, including efforts by Federal and state fisheries agencies, and private landowners. These and other research efforts could provide critical information regarding coho salmon distribution and population abundance.

Section 10(a)(1)(B) incidental take permits may be issued to non-Federal entities to authorize take of listed species incidental to otherwise lawful activities. The types of activities potentially requiring a section 10(a)(1)(B) incidental take permit include the operation and funding of hatcheries and release of artificially propagated fish by the State, State or university research not receiving Federal authorization or funding, the implementation of state fishing regulations, and timber harvest activities on non-federal lands. Several industrial timber companies with substantial landownership within the boundaries of the Central California coast coho ESU are in the process of developing HCPs and incidental take permit applications for coho salmon. These HCPs are being developed as multi-species plans in conjunction with both NMFS and the FWS.

NMFS and 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. NMFS thinks that, based on the best available information, the following actions will not result in a violation of section 9:

1. Possession of Central California Coast coho salmon 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.

2. Federally 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 consultation has been completed, and when such activity is conducted in accordance with any terms and conditions provided by NMFS in an incidental take statement accompanied by a biological opinion pursuant to Section 7 of the ESA.

3. Incidental catch of coho salmon by recreational anglers in freshwater streams, provided they are fishing legally under California fishing regulations (which must comply with a NMFS incidental take permit) and the coho salmon is returned immediately to the water using handling practices to minimize injury to the fish.

4. Diversion of water, provided a properly designed and functional fish screen (i.e. meets NMFS screen criteria) is in place to prevent entrainment of coho salmon and if resulting instream flow conditions do not adversely affect coho salmon.

5. Ongoing habitat restoration efforts that have been reviewed and approved by NMFS.

Activities that NMFS thinks could potentially harm coho salmon in the Central California Coast ESU and result in ''take'', include, but are not limited to:

1. Land-use activities that adversely affect coho salmon habitat (e.g. logging, grazing, farming, road construction) in riparian areas and areas susceptible to mass wasting and surface erosion.

2. Unauthorized destruction/alteration of the species' habitat, such as removal of large woody debris 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 (i.e., sewage, oil, and gasoline) into waters or riparian areas supporting the species.

4. Violation of discharge permits.

5. Pesticide applications in violation of label restrictions.

6. Interstate and foreign commerce of central California coast coho salmon (commerce across state lines and international boundaries) and import/export of central California coast coho salmon without prior obtainment of a threatened or endangered species permit.

7. Unauthorized collecting or handling of the species. Permits to conduct these activities are available for purposes of scientific research or to

enhance the propagation or survival of the species.

8. Introduction of non-native species likely to prey on salmon or displace them from their habitat.

This list is not exhaustive. It is intended to provide some examples of the types of activities that might be considered by the NMFS as constituting a ''take'' of Central California coast coho salmon under the ESA and its regulations. Questions regarding whether specific activities will constitute a violation of section 9, and general inquiries regarding prohibitions and permits, should be directed to NMFS (see **ADDRESSES**).

Conservation Measures

Conservation measures provided to species listed as endangered or threatened under the ESA include recognition, recovery actions, Federal agency consultation requirements, and prohibitions on taking. Recognition through listing promotes public awareness and conservation actions by Federal, State, and local agencies, private organizations, and individuals.

Several protective and recovery efforts are underway to address problems contributing to the decline of the Central California coast coho salmon ESU. These include the listing of coho salmon south of San Francisco under CESA, the implementation of improved protective measures for timber harvest in watersheds south of San Francisco, and the development of a recovery plan for coho salmon south of San Francisco. Other important future efforts include development of the California Resources Agency's CSI, the development of several HCPs by industrial timber companies, and development of a Memorandum of Understanding (MOU) with Natural Resources Conservation Service (NRCS) and others.

As discussed under the listing determination, NMFS encourages the State to continue its work with the CSI to create a comprehensive conservation plan for coho salmon throughout California. NMFS thinks these cooperative conservation efforts wherein diverse stakeholders achieve both environmental and economic goals are essential components of recovery planning for coho salmon and other salmonids. Even after a final listing of the Central California coho salmon ESU, the CSI process can serve as an important forum to assist NMFS in the development of ESA 4(d) regulations for listed salmonids.

The California Forest Practices Act provides a process to list threatened or endangered species as ''Sensitive Species,'' thereby requiring additional protection measures either throughout the species range or specific to individual watershed basins. This process could be employed to provide substantial conservation benefits for coho salmon in the central California coast ESU, where at present more than 90 percent of the land is in private ownership, and silviculture is a predominant land use activity. In response to the listing of the Central California coast salmon ESU, the CDF, State Water Resources Control Board, and CDFG, in cooperation with Federal agencies, could provide special emphasis to habitat areas containing listed coho salmon to promote their recovery.

NMFS will assess new scientific information as it becomes available and will continue to assess the degree to which ongoing Federal, state, and local conservation initiatives reduce the risks faced by coho salmon in the Central California coast coho salmon ESU. If these or future initiatives clearly ameliorate risk factors and demonstrate that the species is recovering, NMFS will reconsider the listing status. Information regarding the efficacy of conservation efforts and any new scientific data regarding the Central California Coast coho salmon ESU should be submitted to NMFS (see **ADDRESSES**).

NMFS intends to move rapidly during the next year to develop and implement a strategy to halt the decline and begin the recovery of coho salmon populations within the Central California coast coho salmon ESU. Because the vast majority of land in this ESU is in private ownership (ca. 90 percent), the key to protecting and recovering coho salmon in this ESU will be the implementation of conservation measures on private lands. Also, because coho salmon in this ESU are being listed as threatened, NMFS intends to take full advantage of section 4(d) of the ESA to define and authorize incidental take of coho salmon and its habitat in association with various land use activities on private lands. Key elements of the coho salmon conservation strategy that NMFS will pursue include:

1. Development of ESA 4(d) Rules—NMFS intends to pursue the development of one or more ESA 4(d) rules that will identify conservation measures and strategies for various non-federal land use sectors (e.g. timber harvest, agriculture, and grazing, etc.) and define acceptable levels of incidental take. NMFS thinks that the California Resources Agency's CSI can serve as a particularly useful forum for developing these conservation strategies, since a broad range of stakeholder groups participate in the CSI process. NMFS, therefore, encourages rapid progress by the participants in the CSI so that its work products can contribute to or be incorporated into a 4(d) rule that may define, with greater specificity, permissible activities and protect landowners from potential section 9 liabilities.

2. Development of Interim/Long-term Protective Strategies for Timber Harvest—NMFS will continue to work aggressively with the California Board of Forestry and CDF to develop guidelines for the development of Timber Harvest plans which do not result in the take of coho salmon, including harm to the species by degradation of its habitat. In addition, NMFS will work with the Bureau of Forestry, CDF, and landowners to develop protection strategies for coho salmon and its habitat throughout the ESU. These strategies may also reduce harm or incidental take of coho salmon as a result of modification to habitat. NMFS is hopeful that this type of protection plan can be incorporated into an ESA 4(d) rule which will address smaller landowners in this ESU.

3. Development of Multi-Species HCPs and ITPs—NMFS will continue to work with large industrial timber landowners within this ESU to develop HCPs which protect and conserve coho salmon and its habitat, while at the same time allowing landowners to conduct their economic activities with long-term certainty. NMFS will continue its commitment to work with the FWS to develop multi-species HCPs and issue multi-species ITPs. These efforts are important because large landowners control and manage a substantial portion of coho salmon habitat within the Central California coast coho salmon ESU.

4. Development and Implementation of an MOU with NRCS and others—NMFS will continue working with the Natural Resource Conservation Service, FWS, EPA, the State, local and private interests (e.g. The California Association of Resource Conservation Districts) to develop and implement a voluntary, watershed-based, locally driven program to assist the agricultural and grazing community in complying with Federal and State endangered species and water quality laws including protecting coho salmon and its habitat. Both technical and financial assistance will be made available to farmers in high-priority watersheds.

5. Ocean Harvest Management—NMFS expects that it will be necessary to continue the restrictions on coho

salmon harvest that have been in place since 1994 to protect listed and proposed coho salmon populations. At this time, NMFS does not think that further restrictions on the ocean chinook fisheries are needed to reduce ocean harvest impacts on coho salmon.

6. State-managed Fisheries and Hatcheries—NMFS intends to work with the State of California to evaluate its current fisheries management regulations and hatchery activities to ensure that impacts to coho salmon from in-river recreational fisheries and State managed hatchery practices are minimized. As necessary, NMFS will work with the State to amend its sportfishing regulations and provide incidental take authorization for recreational fisheries targeting other species of salmon, steelhead and trout. Similarly, NMFS will review and authorize appropriate hatchery practices.

7. Develop and Implement Recovery Plan—NMFS intends to establish a recovery team to develop a recovery plan for coho salmon once the final decisions on coho salmon status coastwide are completed by the agency in the coming months. In the interim, NMFS will continue to work with the State in its efforts to develop a recovery plan for coho salmon populations south of San Francisco where the species has been listed under the CESA.

Critical Habitat

Section 4(a)(3)(A) of the ESA requires that, to the extent prudent and determinable, critical habitat be designated concurrently with the listing of a species. NMFS has completed its analysis of the biological status of the Central California Coast coho salmon ESU, but has not completed the analysis necessary for the designation of critical habitat. NMFS has decided to proceed with the final listing determination now and to proceed with the designation of critical habitat in a separate rulemaking. Section 4(b)(6)(C)(ii) provides that, where critical habitat is not determinable at the time of final listing, NMFS may extend the period for designating critical habitat by not more than one additional year. Congress further stated in the 1982 amendments to the ESA, ''where the biology relating to the status of the species is clear, it should not be denied the protection of the Act because of the inability of the Secretary to complete the work necessary to designate critical habitat.'' H. Rep. No. 567, 97th Cong., 2d Sess. 19 (1982). NMFS believes that this final listing determination is appropriate and necessary to protect the ESU and is consistent with congressional direction.

NMFS further concludes that critical habitat is not determinable at this time because information sufficient to perform the required analysis of the impacts of the designation is lacking. NMFS has solicited information necessary to designate critical habitat in its proposed rule (60 FR 38011, July 25, 1995) and will consider such information in the proposed designation. Specifically, designation requires a determination of those physical and biological features that are essential to the conservation of the species and which may require special management considerations or protection; it further requires the consideration of economic analysis of the impacts of the designation. These analyses have not yet been completed, and, therefore, critical habitat is not determinable at this time.

Classification

The 1982 amendments to the ESA in section 4(b)(1)(A) restrict the information that may be considered when assessing species for listing. Based on this limitation of criteria for a listing decision and the opinion in *Pacific Legal Foundation* v. *Andrus*, 675 F. 2d 825 (6th Cir., 1981), NMFS has categorically excluded all ESA listing actions from the environmental assessment requirements of NEPA (48 FR 4413; February 6, 1984).

As noted in the Conference Report on the 1982 amendments to the ESA, economic considerations have no relevance to determinations regarding the status of the species. Therefore, the economic analysis requirements of the Regulatory Flexibility Act are not applicable to the listing process. Similarly, this final rule is exempt from review under E.O. 12866.

References

The complete citations for the references used in this document can be obtained by contacting Craig Wingert, NMFS (see **ADDRESSES**)

List of Subjects in 50 CFR Part 227

Endangered and threatened species, Exports, Imports, Marine mammals, Transportation.

Dated: October 24, 1996.

Gary Matlock,

Acting Assistant Administrator for Fisheries, National Marine Fisheries Service.

For the reasons set out in the preamble, 50 CFR part 227 is amended as follows:

PART 227—THREATENED FISH AND WILDLIFE

1. The authority citation of part 227 continues to read as follows:

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

2. In § 227.4, paragraph (h) is added to read as follows:

§ 227.4 Enumeration of threatened species.

* * * * *

(h) Central California coast coho salmon (*Oncorhynchus kisutch*).

3. Section 227.21 is revised to read as follows:

§ 227.21 Threatened salmon.

(a) *Prohibitions.* The prohibitions of section 9 of the ESA (16 U.S.C. 1538) relating to endangered species apply to the threatened species of salmon listed in § 227.4 (f), (g), and (h), except as provided in paragraph (b) of this section. These prohibitions shall become effective for the threatened species of salmon listed in § 227.4(h) on December 30, 1996.

(b) *Exceptions.* (1) The exceptions of section 10 of the Act (16 U.S.C. 1539) and other exceptions under the Act relating to endangered species, including regulations implementing such exceptions, also apply to the threatened species of salmon listed in § 227.4 (f), (g), and (h). This section supersedes other restrictions on the applicability of parts 217 and 222 of this chapter, including, but not limited to, the restrictions specified in §§ 217.2 and 222.22(a) of this chapter with respect to the species identified in 227.21(a).

(2) The prohibitions of paragraph (a) of this section relating to threatened species of salmon listed in § 227.4 (h) of this part do not apply to activities specified in an application for a permit for scientific purposes or to enhance the propagation or survival of the species provided that the application has been received by the Assistant Administrator by December 30, 1996. This exception ceases upon the Assistant Administrator's rejection of the application as insufficient, upon issuance or denial of a permit, or on May 31, 1997, whichever occurs earliest.

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