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50 CFR Parts 226 and 227

Endangered and Threatened Species: Proposed Threatened Status and Designated Critical Habitat for Hood Canal Summer-Run Chum Salmon and Columbia River Chum Salmon; Proposed Rule

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Parts 226 and 227

[Docket No. 980219043–8043–01; I.D. No. 011498B]

RIN 0648–AK53

Endangered and Threatened Species; Proposed Threatened Status and Designated Critical Habitat for Hood Canal Summer-Run Chum Salmon and Columbia River Chum Salmon

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

ACTION: Proposed rule; request for comments.

SUMMARY: NMFS has completed a comprehensive status review of chum salmon (*Oncorhynchus keta*) populations in Washington, Oregon, and California and has identified four Evolutionarily Significant Units (ESUs) within this range. NMFS is now issuing a proposed rule to list two ESUs as threatened under the Endangered Species Act (ESA): the Hood Canal summer-run chum salmon ESU, which spawns in tributaries to Hood Canal, Discovery Bay, and Sequim Bay, Washington and the Columbia River chum salmon ESU, which spawns in tributaries to the lower Columbia River in Washington and Oregon. NMFS has also determined that listing is not warranted for two additional chum salmon ESUs (Puget Sound/Strait of Georgia and Pacific Coast ESUs).

In both ESUs identified as threatened, only naturally spawned chum salmon are being proposed for listing. Critical habitat for each ESU is being proposed as the species' current freshwater and estuarine range and includes all waterways, substrate, and adjacent riparian zones below longstanding, naturally impassable barriers.

NMFS is requesting public comments and input on the issues pertaining to this proposed rule. NMFS is also soliciting suggestions and comments on integrated local/state/Federal conservation measures that might best achieve the purposes of the ESA relative to recovering the health of chum salmon populations and the ecosystems upon which they depend. Should the proposed listings be made final, protective regulations under the ESA would be put into effect and a recovery plan would be adopted and implemented.

DATES: Comments must be received on or before June 8, 1998. The dates and locations of public hearings regarding this proposal will be published in a subsequent **Federal Register** notice.

ADDRESSES: Comments should be sent to Chief, Protected Resources Division, NMFS, 525 NE Oregon St., Suite 500, Portland, OR 97232–2737.

FOR FURTHER INFORMATION CONTACT: Garth Griffin at (503) 231–2005, or Joe Blum at (301) 713–1401.

SUPPLEMENTARY INFORMATION:

Petition Background

On March 14, 1994, NMFS was petitioned by the Professional Resources Organization-Salmon (PRO-Salmon) to list Washington's Hood Canal, Discovery Bay, and Sequim Bay summer-run chum salmon (*Oncorhynchus keta*) as threatened or endangered species under the ESA (PRO-Salmon, 1994). A second petition, received April 4, 1994, from the Save Allison Springs Citizens Committee (Save Allison Springs Citizens Committee, 1994), requested listing of fall chum salmon found in the following southern Puget Sound streams or bays: Allison Springs, McLane Creek, tributaries of McLane Creek (Swift Creek and Beatty Creek), Perry Creek, and the southern section of Mud Bay/Eld Inlet. A third petition, received by NMFS on May 20, 1994, was submitted by Trout Unlimited (Trout Unlimited, 1994). This petition requested listing for summer chum salmon that spawn in 12 tributaries of Hood Canal.

In response to these petitions and to the more general concerns about the status of Pacific salmon throughout the region, NMFS published on September 12, 1994, a notice in the **Federal Register** (59 FR 46808) announcing that the petitions presented substantial scientific information indicating that a listing may be warranted and that the agency would initiate ESA status reviews for chum and other species of anadromous salmonids in the Pacific Northwest. These comprehensive reviews considered all populations in the States of Washington, Idaho, Oregon, and California. Hence, the status review for chum salmon encompasses, but is not restricted to, the populations identified in the petitions described. This **Federal Register** notice will focus on populations in the contiguous United States; however, information from Asia, Alaska, and British Columbia was also considered to provide a broader context for interpreting status review results.

During the coastwide chum salmon status review, NMFS assessed the best available scientific and commercial data, including technical information from Pacific Salmon Biological Technical Committees (PSBTCs) and other interested parties. The PSBTCs consisted primarily of scientists (from Federal, state, and local resource agencies, Indian tribes, industries, universities, professional societies, and public interest groups) possessing technical expertise relevant to chum salmon and their habitats. The NMFS Biological Review Team (BRT), composed of staff from NMFS' Northwest Fisheries Science Center, reviewed and evaluated scientific information provided by the PSBTCs and other sources and completed a coastwide status review for chum salmon (NMFS, 1996a) which was subsequently augmented with additional information regarding Hood Canal summer-run chum salmon, also considered by NMFS in this proposed designation (NMFS, 1996b). Copies of these documents are available upon request (see **ADDRESSES**). A complete status review of west coast chum salmon will be published in a forthcoming NMFS technical memorandum. Early drafts of the BRT review were distributed to state and tribal fisheries managers and peer reviewers who are experts in the field to ensure that NMFS' evaluation was accurate and complete. The review, summarized below, identifies four ESUs of chum salmon in Washington, Oregon, and California, and describes the basis for the BRT's conclusions regarding the proposed ESA status of each ESU.

Use of the term ''essential habitat'' within this document refers to critical habitat as defined by the ESA and should not be confused with the requirement to describe and identify Essential Fish Habitat (EFH) pursuant to the Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. 1801 *et seq.*

Chum Salmon Life History

Chum salmon belong to the family Salmonidae and are one of eight species of Pacific salmonids in the genus *Oncorhynchus*. Chum salmon are semelparous (spawn only once then die), spawn primarily in fresh water, and apparently exhibit obligatory anadromy, as there are no recorded landlocked or naturalized freshwater populations (Randall *et al.*, 1987). The species is best known for the enormous canine-like fangs and striking body color (a calico pattern, with the anterior two-thirds of the flank marked by a bold, jagged, reddish line and the posterior third by a jagged black line) of spawning males. Females are less

flamboyantly colored and lack the extreme dentition of the males.

The species has the widest natural geographic and spawning distribution of any Pacific salmonid, primarily because its range extends farther along the shores of the Arctic Ocean than that of the other salmonids (Groot and Margolis, 1991). Chum salmon have been documented to spawn from Korea and the Japanese island of Honshu, east, around the rim of the North Pacific Ocean, to Monterey Bay in southern California. The species' range in the Arctic Ocean extends from the Laptev Sea in Russia to the Mackenzie River in Canada (Bakkala, 1970; Fredin *et al.*, 1977). Historically, chum salmon were distributed throughout the coastal regions of western Canada and the United States, as far south as Monterey, California. Presently, major spawning populations are found only as far south as Tillamook Bay on the northern Oregon coast.

Chum salmon may historically have been the most abundant of all salmonids. Neave (1961) estimated that, prior to the 1940s, chum salmon contributed almost 50 percent of the total biomass of all salmonids in the Pacific Ocean. Chum salmon also grow to be among the largest of Pacific salmon, second only to chinook salmon in adult size, with individuals reported up to 108.9 cm in length and 20.8 kg in weight (Pacific Fisherman, 1928). Average size for the species is around 3.6 to 6.8 kg (Salo, 1991).

Chum salmon usually spawn in coastal areas, and juveniles outmigrate 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, steelhead, 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 that survival and growth in juvenile chum salmon depend less on freshwater conditions (unlike stream-type salmonids which depend heavily on freshwater habitats) than on favorable estuarine and marine conditions. Another behavioral difference between chum salmon and most species that rear extensively in fresh water is that chum salmon form schools, presumably to reduce predation (Pitcher, 1986), especially if their movements are synchronized to swamp predators (Miller and Brannon, 1982).

Age at maturity appears to follow a latitudinal trend in which a greater number of older fish occur in the northern portion of the species' range. Age at maturity has been investigated in many studies, and in both Asia and North America, it appears that most chum salmon (95 percent) mature between 3 and 5 years of age, with 60 to 90 percent of the fish maturing at 4 years of age. However, a higher proportion of 5-year-old fish occurs in the north, and a higher proportion of 3-year-old fish occurs in the south (southern British Columbia, Washington, Oregon) (Gilbert, 1922; Marr, 1943; Pritchard, 1943; Kobayashi, 1961; Oakley, 1966; Sano, 1966). Helle (1979) has shown that the average age at maturity in Alaska is negatively correlated with growth during the second year of marine life, but not with growth in the first year, and that age at maturity is negatively correlated with year-class strength. A few populations of chum salmon also show an alternation of dominance between 3 to 4 year-old fish, usually in the presence of dominant year classes of pink salmon (Gallagher, 1979).

Chum salmon usually spawn in the lower reaches of rivers typically within 100 km of the ocean. Redds are usually dug in the mainstem or in side channels of rivers. In some areas (particularly in Alaska and northern Asia), they typically spawn where upwelled groundwater percolates through the redds (Bakkala, 1970; Salo, 1991).

Chum salmon are believed to spawn primarily in the lower reaches of rivers because they usually show little persistence in surmounting river blockages and falls. However, in some systems, such as the Skagit River, Washington, chum salmon routinely migrate over long distances upstream (at least 170 km in the Skagit River) (Hendrick, 1996). In two other rivers, the species swims a much greater distance. In the Yukon River, Alaska, and the Amur River, between China and Russia, chum salmon migrate more than 2,500 km inland. Although these distances are impressive, both rivers have low gradients and are without extensive falls or other blockages to migration. In the Columbia River Basin, there are reports that chum salmon may historically have spawned in the Umatilla and Walla Walla Rivers, more than 500 km from the sea (Nehlsen *et al.*, 1991). However, these fish would have had to pass Celilo Falls, a web of rapids and cascades, which presumably were passable by chum salmon only at high water flows.

During the spawning migration, adult chum salmon enter natal river systems from June to March, depending on characteristics of the population or geographic location. Groups of fish entering a river system at particular times or seasons are often called ''runs'', and run timing has long been used by the fishing community to distinguish anadromous populations of salmon, steelhead, and sea-run cutthroat trout. Run timing designations (e.g., summer versus fall or early-fall versus late-fall) are important in this status review because two of the ESA petitions for chum salmon (PRO-Salmon, 1994; Trout Unlimited, 1994) used run timing as evidence supporting population distinction. In Washington, a variety of seasonal runs are recognized, including summer, fall, and winter populations. Fall-run fish predominate, but summer runs are found in Hood Canal, the Strait of Juan de Fuca, and in southern Puget Sound (Washington Department of Fisheries (WDF) *et al.*, 1993). Only two rivers have fish returning so late in the season that the fish are designated as winter-run fish, and both of these are in southern Puget Sound.

Consideration as a ''Species'' Under the ESA

To qualify for listing as a threatened or endangered species, the identified populations of chum salmon must be considered ''species'' 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.'' On November 20, 1991, NMFS published a policy describing how the agency will apply the ESA definition of ''species'' to anadromous salmonid species (56 FR 58612). This policy provides that a salmonid population will be considered distinct, and hence a species under the ESA, if it represents an evolutionarily significant unit (ESU) of the biological species. A population must satisfy two criteria to be considered an ESU: (1) It must be reproductively isolated from other conspecific population units, 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 be strong enough to permit evolutionarily important differences to accrue 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 Species

Act: Application to Pacific Salmon,'' which are available upon request (see **ADDRESSES**).

ESU Determinations

The proposed ESU determinations described here represent a synthesis of a large amount of diverse information. In general, the proposed geographic boundaries for each ESU (i.e., the watersheds within which the members of the ESU are typically found) are supported by several lines of evidence that show similar patterns. However, the diverse data sets are not always entirely congruent (nor would they be expected to be), and the proposed boundaries are not necessarily the only ones possible. In some cases environmental changes occur over a transition zone rather than abruptly. In addition, as ESU boundaries are based on biological and environmental information, they do not necessarily conform to state or national boundaries, such as the U.S./Canada border.

Major types of information evaluated by the NMFS BRT include the following: (1) Physical features, such as physiography, geology, hydrology, and oceanic and climatic conditions; (2) biological features, including vegetation, zoogeography, and ''ecoregions'' identified by the U.S. Environmental Protection Agency (Omernik and Gallant, 1986; Omernik, 1987); (3) life history information such as patterns and timing of spawning and migration (adult and juvenile), fecundity and egg size, and growth and age characteristics; and (4) genetic evidence for reproductive isolation between populations or groups of populations. Genetic data (from protein electrophoresis and DNA markers) were the primary evidence considered for reproductive isolation criterion. This evidence was supplemented by inferences about barriers to migration created by natural geographic features. Data considered important in evaluations of ecological/genetic diversity included distributions, migrational and spawning timing, life history, ichthyogeography, hydrology, and other environmental features of the habitat.

Based on a review of the best available scientific and commercial information pertaining to chum salmon, the BRT identified four ESUs for the species in the Pacific Northwest. Each of the ESUs include multiple spawning populations of chum salmon, and most ESUs also extend over a considerable geographic area. This result is consistent with NMFS species definition policy, which states that, in general, ''ESUs should correspond to more comprehensive units unless there is clear evidence that evolutionarily important differences exist between smaller population segments'' (Waples, 1991). However, considerable diversity in genetic or life-history traits or habitat features may exist within a single complex ESU. The descriptions below briefly summarize the proposed chum salmon ESUs and some of the notable types of diversity within each ESU:

(1) Puget Sound/Strait of Georgia ESU

The Puget Sound/Strait of Georgia ESU includes most U.S. populations of chum salmon outside Alaska and includes all chum salmon populations from Puget Sound and the Strait of Juan de Fuca as far west as the Elwha River, with the exception of summer-run populations in Hood Canal and along the eastern Strait of Juan de Fuca. The BRT concluded that this ESU also includes Canadian populations from streams draining into the Strait of Georgia. A northern boundary for this ESU was tentatively identified as Johnstone Strait, but this determination was hampered by a lack of information on populations in the central and northern regions of the Strait of Georgia, British Columbia. Chum salmon from the west coast of Vancouver Island are not considered part of this ESU, in part because available genetic information suggests these fish are distinct from Puget Sound or Strait of Georgia fish.

Genetic, ecological, and life-history information were the primary factors used to identify this ESU. Environmental characteristics that may be important to chum salmon (e.g., water temperature, and amount and timing of precipitation) generally show a strong north-south trend, but no important differences were identified between Washington and British Columbia populations. An east-west gradient separating Olympic Peninsula populations from those to the east was considered to be more important for evaluating chum salmon populations.

Chum salmon populations within this ESU exhibit considerable diversity in life-history features. For example, although the majority of populations in this ESU are considered to be fall-run stocks (spawning from October to January), four summer-run (spawning from September to November) and two winter-run (spawning from January to March) stocks are recognized by state and tribal biologists in southern Puget Sound. Summer chum salmon in southern Puget Sound are genetically much more similar to Puget Sound fall chum salmon than to any other summer-run populations in Hood Canal and in the Strait of Juan de Fuca. These data suggest relatively weak isolation between summer- and fall-run chum salmon in southern Puget Sound and/or a relatively recent divergence of the two forms. Reproductive isolation of the Nisqually River and Chambers Creek winter-run populations, which are the only populations in the ESU whose spawning continues past January, may be somewhat stronger.

The Nisqually and Puyallup Rivers are also unique in southern Puget Sound because their headwaters are fed by glaciers on Mount Rainier, giving the rivers different characteristics than other regional river systems. The Nisqually population is also one of the more genetically distinctive chum salmon populations in Puget Sound. However, the genetic differences are not large in an absolute sense, and the majority of the BRT felt that the distinctiveness of the winter-run populations was not sufficient to designate these populations a separate ESU. Rather, the team concluded that these populations, along with the summer-run populations in southern Puget Sound, reflect patterns of diversity within a relatively large and complex ESU.

(2) Hood Canal Summer-Run ESU

This ESU includes summer-run chum salmon populations in Hood Canal in Puget Sound and in Discovery and Sequim Bays on the Strait of Juan de Fuca. It may also include summer-run fish in the Dungeness River, but the existence of that run is uncertain. Distinctive life-history and genetic traits were the most important factors in identifying this ESU.

Hood Canal summer-run chum salmon are defined in the Salmon and Steelhead Stock Inventory or ''SASSI'' (WDF *et al.*, 1993) as fish that spawn from mid-September to mid-October. Fall-run chum salmon are defined as fish that spawn from November through December or January. Run timing data from as early as 1913 indicated temporal separation between summer and fall chum salmon in Hood Canal, and recent spawning surveys show that this temporal separation still exists. Genetic data indicate strong and long-standing reproductive isolation between chum salmon in this ESU and other chum salmon populations in the United States and British Columbia. Hood Canal is also geographically separated from other areas of Puget Sound, the Strait of Georgia, and the Pacific Coast.

In general, summer-run chum salmon are most abundant in the northern part of the species' range, where they spawn in the mainstems of rivers. Farther south, water temperatures and stream flows during late summer and early fall

become unfavorable for salmonids. These conditions do not improve until the arrival of fall rains in late October/November. Presumably for these reasons, few summer chum populations are recognized south of northern British Columbia. Ecologically, summer-run chum salmon populations from Washington must return to fresh water and spawn during periods of peak high water temperature, suggesting an adaptation to specialized environmental conditions that allow this life-history strategy to persist in an otherwise inhospitable environment. The BRT concluded, therefore, that these populations contribute substantially to the ecological/genetic diversity of the species as a whole.

Some chum salmon populations in the Puget Sound/Strait of Georgia ESU, which has four recognized summer-run populations and two recognized winter-run populations, also exhibit unusual run timing. However, allozyme data indicate that these populations are genetically closely linked to nearby fall-run populations. Therefore, variation in run timing has presumably evolved more than once in the southern part of the species' range. Genetic data indicate that summer-run populations from Hood Canal and the Strait of Juan de Fuca are part of a much more ancient lineage than summer-run chum salmon in southern Puget Sound.

(3) Pacific Coast ESU

This ESU includes all natural chum salmon populations from the Pacific coasts of Washington and Oregon, as well as populations in the Strait of Juan de Fuca west of the Elwha River. This ESU is defined primarily on the basis of life-history and genetic information. Allozyme data show that coastal populations form a coherent group that show consistent differences between other fall-run populations in Washington and British Columbia. Geographically, populations in this ESU are also isolated from most populations in the Puget Sound/Strait of Georgia and Columbia River ESUs.

Ecologically, the western Olympic Peninsula and coastal areas inhabited by chum salmon from this ESU experience a more severe drought in late summer and are far wetter during the winter than areas in the Puget Sound/Strait of Georgia region. All chum salmon populations in this ESU are considered to include fall-run fish. Some Oregon populations are the only known locations to which 2-year-old adult fall chum salmon consistently return with any appreciable frequency.

Chum salmon from this ESU cover a large and diverse geographic area (from the Strait of Juan de Fuca to at least southern Oregon), and the historical ESU may have extended to the recorded extreme limit of the species' distribution near Monterey, California. Many BRT members thought that multiple ESUs of chum salmon may exist in this area, but a more detailed evaluation was hampered by a scarcity of biological information of all types. It is possible that many reports of chum salmon in California and southern Oregon do not represent permanent spawning populations, but rather episodic colonization from northern populations. Even if this is the case, however, it is not clear where the southern limit for permanent natural populations occurs.

There was considerable discussion by the BRT regarding the boundary between this ESU and the Puget Sound/Strait of Georgia ESU, particularly with respect to fall chum salmon in the Dungeness and Elwha Rivers. Genetic data for these two populations are ambiguous (Elwha—because of hatchery stocking) or nonexistent (Dungeness), and run timing is also largely uninformative regarding the affinities of these two populations. Although coastal populations generally return and spawn slightly earlier than those in Puget Sound, there is little difference in run timing between Puget Sound and Strait of Juan de Fuca populations. The Washington Department of Fish and Wildlife (WDFW) (Phelps *et al.*, 1995) considers the Dungeness and Elwha River populations to be affiliated with Strait of Juan de Fuca populations to the west, primarily because of their geographic separation from inner Puget Sound fall-run populations. However, the transition to the wetter, coastal climate occurs west of the Elwha and Dungeness Rivers on the Olympic Peninsula. After careful consideration of these factors, the BRT concluded that, based on available information, fall chum salmon from the Dungeness and Elwha Rivers should be considered part of the Puget Sound/Strait of Georgia ESU.

(4) Columbia River ESU

The BRT concluded that, historically, at least one ESU of chum salmon occurred in the Columbia River. Ecologically, Columbia River tributaries differ in several respects from most coastal drainages. Genetic data are available only for two small Columbia River populations, which differ substantially from each other as well as from all other samples examined to date.

Historically, chum salmon were abundant in the lower reaches of the Columbia River and may have spawned as far upstream as the Walla Walla River (over 500 km inland). Today only remnant chum salmon populations exist, all in the lower Columbia River. They are few in number, low in abundance, and of uncertain stocking history.

The question of the extent of the Columbia River ESU along the Washington and Oregon coasts prompted considerable debate within the BRT. The BRT concluded that, based upon the genetic and ecological data available, chum salmon in the Columbia River were different enough from other populations in nearby coastal river systems (e.g., Willapa Bay, Grays Harbor, Nehalem River, and Tillamook River) that the Columbia River ESU should extend only to the mouth of the river.

Status of Chum Salmon ESUs

The ESA defines the term ''endangered species'' as ''any species which is in danger of extinction throughout all or a significant portion of its range.'' The term ''threatened species'' is defined as ''any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.'' NMFS considers a variety of information in evaluating the level of risk faced by an ESU. Important considerations include the following: (1) Absolute numbers of fish and their spatial and temporal distributions; (2) current abundance in relation to historical abundance and carrying capacity of the habitat; (3) trends in abundance, based on indices such as dam or redd counts or on estimates of spawner-recruit ratios; (4) natural and human-influenced factors that cause variability in survival and abundance; (5) possible threats to genetic integrity (e.g., selective fisheries and interactions between hatchery and natural fish); and (6) recent events (e.g., a drought or a change in management) that have predictable short-term consequences for abundance of the ESU. Additional risk factors, such as disease prevalence or changes in life-history traits, may also be considered in evaluating risk to populations. Aspects of several of these risk considerations are common to all four chum salmon ESUs and described in greater detail in NMFS' status review. After evaluating patterns of abundance and other risk factors for chum salmon from these four ESUs, the BRT reached the following conclusions:

(1) Puget Sound/Strait of Georgia ESU

The Puget Sound/Strait of Georgia ESU of chum salmon encompasses

much diversity in life history and includes summer, fall, and winter runs of chum salmon. WDF *et al.* (1993) identified 38 stocks with sufficient data to calculate trends in escapement within the area encompassed by this ESU: 10 had negative trends and 23 had positive trends. All of the statistically significant trends ($P < 0.05$) were positive, and the slopes of many negative trends were close to zero. The sum of the recent 5-year geometric means of these escapement trends, which are not exhaustive, indicate a recent average escapement of more than 300,000 natural spawners for the ESU as a whole.

Commercial harvest of chum salmon has been increasing since the early 1970s throughout the State of Washington, and the majority of this harvest has been from the Puget Sound/Strait of Georgia ESU. The recent average chum salmon harvest from Puget Sound (1988–1992) was 1.185 million fish (WDFW, 1995). This suggests a total abundance of about 1.5 million adult chum salmon. This increasing harvest, coupled with generally increasing trends in spawning escapement, provides compelling evidence that chum salmon are abundant and have been increasing in abundance in recent years within this ESU.

While most populations in this ESU appear to be healthy and increasing in abundance, there appears to be a potential for loss of genetic diversity within this ESU, especially in populations that display the most unique life histories. For example, four summer-run stocks were identified by WDF *et al.* (1993). Of these four, one was classified as extinct, two were of mixed production, and all were relatively small. Of the three extant stocks, Blackjack Creek has a 5-year geometric mean spawning escapement of 524; Case Inlet has 4,570; and Hammersley Inlet has 7,728, with about 40,000 total summer chum salmon spawners in southern Puget Sound estimated in 1994. The latter two stocks had hatchery supplementation programs that were major contributors to the runs until they were discontinued in 1992 (WDF *et al.*, 1993). The last brood year produced by these hatchery programs (1991 brood year) returned as adults at age 4 in 1995 and age 5 in 1996. While all three populations appear to be stable or increasing, they represent a small fraction of the ESU. The winter-run life history is represented by only two stocks. The Chambers Creek stock is increasing in abundance, and the Nisqually River stock is a relatively large run with a 5-year geometric mean escapement of more than 16,000 spawners. Both stocks are classified as wild production.

The BRT concluded that this ESU is not presently at risk of extinction nor is likely to become endangered in the foreseeable future throughout all or a significant portion of its range. Current abundance is at or near historical levels, with a total run size averaging more than one million fish annually in the past 5 years. The majority of populations within this ESU have stable or increasing population trends, and all populations with statistically significant trends are increasing. However, the BRT expressed concern that the summer-run populations in this ESU spawn in relatively small, localized areas and, therefore, are intrinsically vulnerable to habitat degradation and demographic or environmental fluctuations. Concern was also expressed about effects on natural populations of the high level of hatchery production of fall chum salmon in the southern part of Puget Sound and Hood Canal and about the high representation of non-native stocks in the ancestry of hatchery stocks throughout this ESU. The BRT was also concerned that, although the Nisqually River winter-run population is fairly large and apparently stable, the Chambers Creek population is much smaller and spawns in a restricted area. Conservation of populations with all three recognized run timing characteristics is important to maintaining diversity within this ESU.

(2) Hood Canal Summer-Run ESU

Analysis of biological information for the Hood Canal summer-run chum salmon ESU was more extensive than that for other ESUs. This extended analysis reflects the deliberations of the BRT in considering the dynamic changes in summer-run chum salmon abundance that have occurred in this ESU over the past several years.

Although summer-run chum salmon in this ESU have experienced a steady decline over the past 30 years, escapement in 1995–96 increased dramatically in some streams. Spawning escapement of summer-run chum salmon in Hood Canal (excluding the Union River) numbered over 40,000 fish in 1968, but was reduced to only 173 fish in 1989 (WDF *et al.*, 1993). In 1991, only 7 of 12 streams that historically contained spawning runs of summer chum salmon still had escapements (Cook-Tabor, 1994; WDFW, 1996). Then in 1995–96, escapement increased to more than 21,000 fish in northern Hood Canal, the largest return in more than 20 years (WDFW, 1996). These increases in escapement were observed primarily in rivers on the west side of Hood Canal, with the largest increase occurring in the Big Quilcene River where the U.S. Fish and Wildlife Service (USFWS) has been conducting an enhancement program starting with the 1992 brood year. Streams on the east side of Hood Canal continued to have either no returning adults (Big Beef Creek, Anderson Creek, and the Dewatto River) or no increases in escapement (Tahuya and Union Rivers).

Summer runs of chum salmon in the Strait of Juan de Fuca (Snow and Salmon Creeks in Discovery Bay and Jimmycomelately Creek in Sequim Bay) are also part of this ESU. While these populations did not demonstrate the marked declining trend that has characterized the summer-run populations in Hood Canal in recent years, they are at very low population levels. Further, though escapement of summer-run chum salmon to Salmon Creek increased in 1996, the other two populations in the Strait of Juan de Fuca did not show similar increases, and the overall trend in the Strait populations was one of continued decline. WDF *et al.* (1993) considered the Discovery Bay population to be critical and the Sequim Bay population to be depressed.

In 1994, when petitions were filed with NMFS to list summer chum salmon in Hood Canal, of 12 streams in Hood Canal identified by the petitioners as recently supporting spawning populations of summer chum salmon, 5 may already have become extinct, 6 of the remaining 7 showed strong downward trends in abundance, and all were at low levels of abundance. The populations in Discovery Bay and Sequim Bay were also at low levels of abundance, with declining trends. Threats to the continued existence of these populations include degradation of spawning habitat, low water flows, and incidental harvest in salmon fisheries in the Strait of Juan de Fuca and coho salmon fisheries in Hood Canal.

In 1995 and 1996, new information was supplied by the WDFW (1996) and by USFWS (1996) that demonstrated substantial increases of returning summer chum to some streams. Several factors may have contributed to the dramatic increase in abundance. These include hatchery supplementation, reduction in harvest rate, increase in marine survival, and improvements in freshwater habitat. Information relevant to these factors were critically reviewed by the BRT and are discussed in detail in the status review.

A hatchery program initiated in 1992 at the Quilcene National Fish Hatchery was at least partially responsible for

adult returns to the Quilcene River system, but it appears that 1996 spawners returning to other streams in Hood Canal were primarily (and perhaps entirely) the result of natural production. These streams (e.g., the Duckabush, Hamma Hamma, and Dosewallips) have thus demonstrated considerable resilience in rebounding dramatically from very depressed levels of abundance in recent years.

The rapid increase of summer-run populations in northern Hood Canal following the reduction in incidental harvest in 1991 and 1992 is considerably more encouraging than the lack of response of Columbia River and Tillamook Bay populations even though directed fisheries were eliminated in those areas many years ago.

Concerns remain, however, about the overall health of this ESU. First, the population increases were limited in geographic extent, occurring only in streams on the west side of Hood Canal. Several streams on the eastern side of Hood Canal continue to have no spawners at all, and even returns to the Union River were down in 1996. Union River, located at the southeastern end of the Canal, was classified as a healthy stock by WDFW in the SASSI report. In the Strait of Juan de Fuca portion of this ESU, only one of three creeks that have recently contained summer chum salmon runs showed an increase in adult returns in 1996.

Second, the strong returns to the west-side streams were the result of a single strong year class (1992), which returned as 3-year-old fish in 1995 and as 4-year-old fish in 1996. In contrast, the declines in most of these populations have been severe and have spanned two decades. Coastwide, many chum salmon populations had unusually large returns in 1995 and 1996, but there is no indication from the historical record to suggest that such high productivity can be sustained. In addition, in this ESU, summer chum salmon populations have shown a great deal of variability in productivity and run size in recent years, and this extreme variability can itself be a significant risk factor.

Third, greatly reduced incidental harvest rates in recent years probably contributed to the increased abundance in west-side Hood Canal streams. However, these reductions have been implemented because of greatly reduced abundances of the target species (coho salmon), rather than as a conservation measure for summer chum salmon. If coho salmon in the area rebound and fishery management policies are not implemented to protect summer-run chum salmon, these populations would again face high levels of incidental harvest.

Although the BRT agreed that the 1995–96 data on summer chum salmon from this ESU provide a more encouraging picture than was the case in 1994, most members thought that this ESU was still at significant risk of extinction. A major factor in this conclusion was that, in spite of strong returns to some streams, summer chum salmon were either extinct or at very low abundance in more than half of the streams in this ESU that historically supported summer-run populations. A minority of the BRT thought that the new data indicated somewhat less risk of extinction but that the ESU was still likely to become endangered in the foreseeable future. Only one member thought that the large returns to some Hood Canal streams indicated that this ESU as a whole was not at significant extinction risk.

Subsequent to the BRT's assessment, WDFW submitted additional escapement data for this ESU. Although the BRT was unable to formally evaluate this information, NMFS did consider it an important factor in discerning the level of risk faced by this ESU. These data indicate that 1997 returns of Hood Canal summer-run chum salmon numbered approximately 9,500 fish and that pre-season estimates for 1998 could be even greater (WDFW, 1997). While this information is preliminary, it indicates that some populations in this ESU have seen a significant and continued rebound from historic lows while others (notably streams from eastern Hood Canal) remain seriously depressed or extinct.

(3) Pacific Coast ESU

The Pacific Coast ESU of chum salmon includes a broad geographic range over the coastal regions of three states, and data on chum salmon in the ESU have been collected from several tribal, state, and Federal agencies. Consequently, the types of data collected vary considerably. On the Strait of Juan de Fuca, spawning escapement estimates are available only for Deep Creek and the Pysht River. Tribal harvest data are the only data available for coastal rivers on the Olympic Peninsula. Tribal harvests of chum salmon on the coast of the Olympic Peninsula generally declined prior to the mid-1960s and have been relatively stable at lower levels since then. On the Quinault River, these estimates of tribal chum salmon harvest have been converted to run size and escapement, using information from the hatchery coho salmon fishery on the Quinault River. Escapement estimates in Grays Harbor and Willapa Bay are available for individual stocks. The spawning escapements for these populations show no strong recent trends in the more abundant populations but generally appear to be increasing. These trend data are far from exhaustive, but indicate about 35,000 spawners as a lower bound on the escapement of chum salmon on the Washington coast. The harvest of chum salmon from coastal fisheries combined has averaged 96,000 fish per year from 1988 to 1992 (WDFW, 1995). This suggests an abundance level that is an order of magnitude smaller for the Washington coastal portion of this ESU than it is for the Puget Sound/Strait of Georgia ESU, but is still on the order of 150,000 adults.

Few data are available on chum salmon south of the Columbia River. Tillamook Bay is the southernmost location that supported substantial chum salmon harvests in recent times. Intermittent historical landing data are available for Oregon rivers farther south. In response to declines of the runs in Tillamook Bay, Oregon closed the commercial fishery for chum salmon in 1962. Though the connection between estimates of abundance from spawner surveys and actual spawner abundance is somewhat tenuous, there has been no substantial increase in the number of spawners in stream surveys since the halt of commercial fishing. Spawner surveys in the Tillamook District show substantial year-to-year variability with little correspondence of the variability among individual spawner surveys. Estimates of total escapement to the Tillamook Bay have been relatively stable since the end of the commercial fishery in 1962, with a geometric mean of 12,500 spawners for the period from 1987 to 1991. Whiskey Creek in Netarts Bay also shows no clear trend in spawner counts, although this population is supplemented with hatchery fish.

The BRT concluded that this ESU is not presently at risk of extinction nor is likely to become endangered in the foreseeable future throughout all or a significant portion of its range. An important factor in this conclusion was the abundance of natural populations in Grays Harbor and Willapa Bay, which presently have escapements of tens of thousands of adults per year. Elsewhere on the Olympic Peninsula, available data suggest that populations are depressed from historic levels but relatively stable. Populations in the Tillamook District, the major chum salmon-producing area on the Oregon coast, are also at much lower abundance than they were historically, with no

apparent trends in abundance. The primary cause of the depressed status of Oregon coastal populations appears to be habitat degradation.

Although there has been considerable hatchery enhancement in some areas and some transfer of stocks within this ESU, overall hatchery production has been relatively minor compared with natural production, and hatchery programs have primarily used fish from local populations. On the Oregon coast, both public and private chum salmon hatcheries were phased out by 1990, and all current chum salmon production in this area is natural.

The BRT identified some areas of concern for the status of this ESU. Neither the historical nor the present southern limit of distribution and spawning of chum salmon is known with certainty. Thus, it is unclear whether the geographic range has been reduced. Tillamook Bay populations appear to be stable at low abundance. The Oregon Department of Fish and Wildlife (ODFW) has recently increased monitoring efforts for chum salmon on the remainder of the Oregon coast, but at present the time series is too short to provide much insight into trends in abundance. Although populations from the northern Washington coast and the Strait of Juan de Fuca do not appear to be at critically low levels, their generally depressed status is also a concern and should be monitored. Finally, more definitive information about the relationship between hatchery and natural fish in Willapa Bay and Grays Harbor tributaries would allow a more comprehensive evaluation of the viability of natural populations in these areas.

(4) Columbia River ESU

The Columbia River historically contained large runs of chum salmon that supported a substantial commercial fishery in the first half of this century. These landings represented a harvest of more than 500,000 chum salmon in some years. There are presently neither recreational nor directed commercial fisheries for chum salmon in the Columbia River, although some chum salmon are taken incidentally in the gill-net fisheries for coho and chinook salmon, and there has been minor recreational harvest in some tributaries (WDF *et al.*, 1993). WDF *et al.* (1993) monitored returns of chum salmon to three streams in the Columbia River and suggested that there may be a few thousand, perhaps up to 10,000, chum salmon spawning annually in the Columbia River basin. Kostow (1995) identified 23 spawning populations on the Oregon side of the Columbia River but provided no estimates of the number of spawners in these populations.

An estimate of the minimal run size for chum salmon returning to both the Oregon and Washington sides of the Columbia River has been calculated by summing harvest, spawner surveys, Bonneville Dam counts, and returns to the Sea Resources Hatchery on the Chinook River in Washington (ODFW and WDFW, 1995). This suggests that the chum salmon run size in the Columbia River has been relatively stable since the run collapsed in the mid-1950s. The minimal run size in 1995 was 1,500 adult fish.

The BRT concluded that the Columbia River ESU was presently at significant risk, but team members were divided in their opinions of the severity of that risk. Historically, the Columbia River contained chum salmon populations that supported annual harvests of hundreds of thousands of fish. Current abundance is probably less than 1 percent of historical levels, and the ESU has undoubtedly lost some (perhaps much) of its original genetic diversity. Presently, only three chum salmon populations, all relatively small and all in Washington, are recognized and monitored in the Columbia River (Grays River, Hardy and Hamilton Creeks). Each of these populations may have been influenced by hatchery programs and/or by introduced stocks, but information on hatchery-wild interactions is unavailable.

Although current abundance is only a small fraction of historical levels, and much of the original inter-populational diversity has presumably been lost, the total spawning run of chum salmon to the Columbia River has been relatively stable since the mid 1950s, and total natural escapement for the ESU is probably at least several thousand fish per year. Taking all of these factors into consideration, about half of the BRT members concluded that this ESU was at significant risk of extinction; the remainder concluded that the short-term extinction risk was not as high, but that the ESU was at risk of becoming endangered.

Existing Protective Efforts

Under section 4(b)(1)(A) of the ESA, the Secretary of Commerce is required to make listing determinations solely on the basis of the best scientific and commercial data available and after taking into account efforts being made to protect a species. Under section 4(a)(1)(D) of the ESA, the Secretary must also evaluate, among other things, existing regulatory mechanisms. During the status review for west coast chum salmon and for other salmonids, NMFS reviewed protective efforts ranging in scope from regional strategies to local watershed initiatives. NMFS has summarized some of the major efforts in a document entitled ''Steelhead Conservation Efforts: A Supplement to the Notice of Determination for West Coast Steelhead under the Endangered Species Act.'' Many of these efforts also have significant potential for promoting the conservation of west coast chum salmon. This document is available upon request (see ADDRESSES). Some of the principal efforts within the range of ESUs considered ''at risk'' by the NMFS BRT (i.e., Hood Canal summer-run and Columbia River ESUs) are described briefly below.

Northwest Forest Plan—The Northwest Forest Plan (NFP) is a Federal interagency cooperative program, documented in the Record of Decision for Amendments to U.S. Forest Service (USFS) and Bureau of Land Management (BLM) Planning Documents Within the Range of the Spotted Owl, which was signed and implemented in April 1994. The NFP represents a coordinated ecosystem management strategy for Federal lands administered by the USFS and BLM within the range of the Northern spotted owl (which overlaps considerably with the range of chum salmon). The NFP region-wide management direction either amended or was incorporated into approximately 26 land and resource management plans (LRMPs) and two regional guides.

The most significant element of the NFP for anadromous fish is its Aquatic Conservation Strategy (ACS), 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 ACS components collectively ensure that Federal land management actions achieve a set of nine ACS objectives that strive 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. In recognition of over 300 ''at-risk'' Pacific salmonid stocks within the NFP area (Nehlsen *et al.*, 1991), the ACS was developed by aquatic scientists, with NMFS participation, to restore and maintain the ecological health of watersheds and aquatic ecosystems on public lands. The approach seeks to

prevent further degradation and to restore habitat on Federal lands over broad landscapes.

The NFP identifies five key watersheds within the range of the Hood Canal summer-run ESU. These key watersheds have been identified as both ''Tier 1'' (identified as critical for conservation of at-risk salmonids and other fishes) and ''Tier 2'' (selected principally for their importance as sources for high quality water) watersheds and are located principally on the west side of Hood Canal on lands managed by the Olympic National Forest. Principal chum salmon streams within the range of these key watersheds include the Quilcene, Dosewallips, and Duckabush Rivers. Management actions on Federal lands within key watersheds must comply with special standards and guidelines designed to preserve their refugia functions for at-risk salmonids (i.e., watershed analysis must be completed prior to timber harvests and other management actions, road miles should be reduced, no new roads can be built in roadless areas, and restoration activities are prioritized).

Washington Wild Stock Restoration Initiative—In 1991, the Washington treaty tribes, Washington Department of Fisheries, and Washington Department of Wildlife created this initiative to address wild stock status and recovery. The first step in this initiative was to develop an inventory of the status of all salmon and steelhead stocks which was completed in 1993 with publication of the SASSI report. Based on this report, the state and tribes have identified several salmon stocks in ''critical'' condition (including populations in the Hood Canal summer-run ESU) and have prioritized the development of recovery and management plans for them. The final stage of implementing the policy will be plans to monitor and evaluate the success of individual recovery efforts.

Washington Wild Salmonid Policy—The Washington State Legislature passed a bill in June of 1993, (ESHB 1309) which required WDFW to develop wild salmonid policies that ''ensure that department actions and programs are consistent with the goals of rebuilding wild stock populations to levels that permit commercial and recreational fishing opportunities.'' The policy will provide broad management principles and guidelines for habitat protection, escapement objectives, harvest management, genetic conservation, and other management issues related to both anadromous and resident salmonids. The policy will be used as the basis to review and modify current management goals, objectives, and strategies related to wild stocks. A final Environmental Impact Statement, which analyzes the environmental effects of the proposed policy, has been developed, and the Washington Fish and Wildlife Commission is scheduled to consider action on the policy in the near future. Once the policy is adopted, full reviews of hatchery and harvest programs are planned to ensure consistency with the policy.

Hood Canal/Strait of Juan de Fuca Chum Salmon Conservation Plan—Notable among the recent efforts is a draft plan by WDFW entitled ''Hood Canal and Strait of Juan de Fuca Summer Chum Conservation Plan for Interim and Long Term Stock Rehabilitation, Management, and Production'' (WDFW, 1997). The plan describes an adaptive approach for rebuilding summer chum salmon populations with the stated goal to ''protect and restore run sizes of Hood Canal and Strait of Juan de Fuca summer chum salmon to levels that will perpetuate genetically viable populations and allow for harvest opportunities.'' NMFS has reviewed a working draft of this plan and provided comments on ways to improve the state's efforts. NMFS is encouraged by the substantial progress made toward addressing the problems of the Hood Canal summer-run chum ESU; however, the draft plan in its current form requires further development before it can be expected to affect significantly the recovery of Hood Canal summer chum. Concerns identified by NMFS includes the following: (1) Uncertainty regarding substantive changes in habitat quality and quantity that will result from eventual implementation of measures that might be developed under the Plan, (2) lack of a conservation/protection strategy for critical ''core'' river reaches or watersheds, (3) uncertainty that fishery management actions as effective as those that have been employed in recent years will continue in the future (particularly in the event coho and/or chinook stocks rebound to levels that support increased fisheries in Hood Canal), and (4) uncertainty that requisite funding will be available, both for the substantive measures and the monitoring program.

NMFS recognizes that the ultimate stability of chum salmon populations will depend significantly on the initiative taken at state, tribal, local, and private levels involved in preparing and implementing this plan and will continue to encourage and support this initiative.

Hatchery Supplementation and Reintroduction Efforts—Due to the critical status of Hood Canal summer chum salmon populations, supplementation programs were recently implemented by WDFW, western Washington tribes, volunteer groups, and USFWS on several rivers within the range of this ESU. Also, experimental reintroduction projects have begun on Big Beef and Chimacum Creeks. These efforts are part of the Hood Canal/Strait of Juan de Fuca Chum Salmon Conservation Plan described above. The supplementation programs, now underway at Quilcene National Fish Hatchery and facilities on Lilliwaup and Salmon Creeks, have undoubtedly contributed to the recent dramatic increases in escapement observed in some streams during the past 3 years. While NMFS remains concerned about the potential negative impacts from artificial propagation on natural chum salmon populations, the agency recognizes that these and future supplementation and reintroduction efforts could play a key role in the recovery of this ESU.

Harvest Restrictions—Exploitation rates on summer-run chum salmon in Hood Canal have been greatly reduced since 1991 as a result of closures of the coho salmon fishery and of efforts to reduce the harvest of summer chum salmon (WDFW, 1996). Between 1991 and 1996, harvests removed an average of 2.5 percent of the summer-run chum salmon returning to Hood Canal, compared with an average of 71 percent in the period from 1980 to 1989. The harvest restrictions have included an array of specific measures endorsed by both state and tribal fisheries managers, including area closures, restrictions in the duration and timing of chinook and coho salmon fisheries, mesh size restrictions and live-release requirements in net fisheries, catch and release requirements for recreational fisheries, and selective gear fisheries that should minimize impacts to summer chum salmon. These restrictions are significant, and NMFS will encourage their continued implementation to alleviate a serious risk factor facing the Hood Canal summer-run ESU.

As noted previously, neither recreational nor directed commercial fisheries are allowed for chum salmon in the Columbia River ESU.

Other Efforts—Restoration plans for steelhead in the lower Columbia River are being developed by the States of Washington (Lower Columbia Steelhead Conservation Initiative, or LCSCI) and Oregon (Oregon Steelhead Restoration Plan, or OSRP). Development and implementation of the LCSCI will be closely tied to guidance provided by the

Washington Wild Salmonid Policy, which itself is still under development. The OSRP, an outgrowth of the Oregon Coastal Salmon Restoration Initiative (OCSRI, 1997), is expected to complement the Washington effort. While focussed on steelhead, NMFS recognizes there is a considerable potential for these plans to also promote the conservation of chum salmon and other salmonids. Both efforts are in the formative stage at this time and will require more development and NMFS review before they can be judged for their benefits to steelhead, chum salmon, or to other species.

In addition to monitoring escapement in several Washington tributaries to the Columbia River, WDFW and USFWS have undertaken several habitat enhancement projects aimed at restoring Washington populations of chum salmon (e.g., populations in Hamilton and Hardy Creeks). In contrast, there appears to be little or no effort (aside from harvest restrictions) focussed on protecting remaining chum salmon in Oregon tributaries of the Columbia River. According to the ODFW biennial report on the status of wild fish, Oregon has placed all chum salmon populations on the state's list of Sensitive Fish Species (Kostow, 1995). However, this designation does not provide substantial protection for the species nor does the ODFW report identify any specific actions underway to benefit Columbia River chum salmon (although reference is made to efforts for coastal chum salmon populations). Furthermore, NMFS has recently received comments from ODFW (ODFW, 1997) suggesting that the state may attempt to reclassify Columbia River populations of this species as ''extirpated.''

While NMFS recognizes that many of the ongoing protective efforts are likely to promote the conservation of chum salmon and other salmonids, some are very recent and few address chum salmon conservation at a scale that is adequate to protect and conserve entire ESUs. NMFS believes that most existing efforts lack some of the critical elements needed to provide a high degree of certainty that the efforts will be successful. These elements include (1) identification of specific factors for decline, (2) immediate measures required to protect the best remaining populations and habitats and priorities for restoration activities, (3) explicit and quantifiable objectives and timelines, and (4) monitoring programs to determine the effectiveness of actions, including methods to measure whether recovery objectives are being met.

NMFS concludes that existing protective efforts are inadequate to preclude a proposed listing determination for the ESUs considered ''at-risk'' by the NMFS BRT. However, NMFS will continue to solicit information regarding protective efforts (see Public Comments Solicited) and will work with Federal, state, and tribal fisheries managers to evaluate, promote, and improve efforts to conserve chum salmon populations.

Summary of Factors Affecting the Species

Section 2(a) of the ESA states that various species of fish, wildlife, and plants in the United States have been rendered extinct as a consequence of economic growth and development untempered by adequate concern and conservation. Section 4(a)(1) of the ESA and the listing regulations (50 CFR part 424) set forth procedures for listing species. NMFS 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 education purposes; (3) disease or predation; (4) inadequacy of existing regulatory mechanisms; or (5) other natural or human-made factors affecting its continued existence.

The factors threatening naturally reproducing chum salmon throughout its range are numerous and varied. The present depressed condition of many populations is the result of several long-standing, human-induced factors (*e.g.*, habitat degradation, water diversions, harvest, and artificial propagation) that serve to exacerbate the adverse effects of natural factors (*e.g.*, competition and predation) or environmental variability from such factors as drought and poor ocean conditions. The following sections provide a general treatment of threats facing chum salmon, with emphasis on factors known to affect chum salmon ESUs considered ''at risk'' by the NMFS BRT.

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

Chum salmon may depend less on freshwater habitats than some other Pacific salmonids, but their spawning areas still extend up to 80 km upstream in many rivers, and their requirements for successful spawning and rearing, such as cold, clean water and relatively sediment-free spawning gravel, are similar to other Pacific salmon.

Alterations and loss of freshwater habitat for salmonids have been extensively documented in many regions, especially in urban areas or habitat associated with construction of large dams. In the last 25 years, a major issue in ''stream restoration'' has been the role that large woody debris (LWD) plays in creating and maintaining Pacific salmon spawning and rearing habitat. Descriptions of pre-development conditions of rivers in Washington and Oregon that had abundant salmonid populations suggest that even big rivers had large amounts of instream LWD, which not only completely blocked most rivers to navigation but also contributed significantly to trapping sediments and nutrients, impounding water, and creating many side channels and sloughs (Sedell and Luchessa, 1982; Sedell and Froggatt, 1984). Many streams consisted of a network of sloughs, islands, and beaver ponds with no main channel. For example, portions of the Willamette River reportedly flowed in five separate channels, and many coastal Oregon rivers were so filled with log jams and snags they could not be ascended by early explorers. Most rivers in coastal Washington and Puget Sound were similarly blocked by LWD, snags, and instream vegetation. Sedell and Luchessa (1982) compiled a partial list of major rivers that were impassable for navigation in the mid-1800s because of large (100–1500 m-long) log jams; this list included 11 rivers in Oregon and 16 in Washington. However, until recently, up to 90 percent of the funds for fish-habitat enhancement went for removal of wood debris in streams (Sedell and Luchessa, 1982).

Besides clearing rivers for navigation, extensive stream improvements were accomplished to facilitate log drives. Simenstad *et al*. (1982) reported that historically some of the more adverse impacts on the estuarine and freshwater habitats used by chum salmon resulted from stream improvements in the 1800s and early 1900s, when logs were transported down streams and stored in mainstems of rivers, lakes and estuaries. These activities included blocking off sloughs and swamps to keep logs in the mainstream and clearing boulders, trees, logs, and snags from the main channel. Smaller streams required the building of splash dams to provide sufficient water to carry logs. Scouring, widening, and unloading of main-channel gravel during the log drive may have caused as much damage as the initial stream cleaning. In tributaries to Grays Harbor and Willapa Bay, over 120 logging dams were identified by Wendler and Deschamps (1955). Stream cleaning

continued through the mid-1970s in many areas not only for flood control and navigation, but also as a fisheries enhancement tool. Debris in streams was viewed as something that would either impede or block fish passage and as a source of channel destruction by scour during storm-induced log jam failures.

The past destruction, modification, and curtailment of freshwater habitat for steelhead was reviewed in the ''Factors for Decline'' document published as a supplement to the notice of determination for West Coast Steelhead under the ESA (NMFS, 1996). Although chum salmon, in general, spawn lower in river systems than do steelhead and rear primarily in estuarine areas, this document still serves as a catalog of past habitat modification within the range of chum salmon. Among habitat losses documented by NMFS (1996), the following are those with the most impact on chum salmon: (1) Water withdrawal, conveyance, storage, and flood control (resulting in insufficient flows, stranding, juvenile entrainment, and instream temperature increases); (2) logging and agriculture (loss of LWD, sedimentation, loss of riparian vegetation, habitat simplification); (3) mining (especially gravel removal, dredging, pollution); and (4) urbanization (stream channelization, increased runoff, pollution, habitat simplification). Hydropower development was considered a major factor in habitat loss for steelhead (NMFS, 1996), but is probably less significant for chum salmon (due to chum salmon's use of lower river areas for spawning). However, many spill dams and other small hydropower facilities were constructed in lower river areas, and Bonneville Dam presumably continues to impede recovery of upriver populations. Substantial habitat loss in the Columbia River estuary and associated areas presumably was an important factor in the decline and also represents a significant continuing risk for this ESU. Lichatowich (1989) also identified habitat loss as a significant contributor to the decline of Pacific salmon in Oregon's coastal streams.

A number of authors have attempted to quantify overall anadromous fish habitat losses in areas within the range of chum salmon. Gregory and Bisson (1997) stated that habitat degradation has been associated with greater than 90 percent of documented extinctions or declines of Pacific salmon populations. It has been reported that up to 75 percent and 96 percent of the original coastal temperate rainforest in Washington and Oregon, respectively, has been logged (Kellogg, 1992) and that only 10 to 17 percent of old-growth forests in Douglas-fir regions of Washington and Oregon remain (Norse, 1990; Speis and Franklin, 1988). Approximately 80 to 90 percent of the original riparian habitat in most western states has been eliminated (NMFS, 1996). For example, Edwards *et al.* (1992) reported that 55 percent of the 43,000 stream kilometers in Oregon were moderately or severely affected by non-point source pollution.

Specific quantitative assessment of habitat degradation or attempts to evaluate the response of fish populations to specific changes in habitat are rare (Reeves *et al.*, 1991). For coho salmon, Beechie *et al.* (1994) estimated a 24-percent and 34-percent loss since European settlement in the capacity for smolt production in summer and winter rearing habitats, respectively, in the Skagit River. Beechie *et al.* (1994) identified the three major causes for these habitat losses, in order of importance, as hydromodification, blocking culverts, and forest practices. Similarly, McHenry (1996) estimated that, since European settlement, Chimacum Creek, Washington (northwest Puget Sound) had lost 12 percent, 94 percent, and 97 percent of its spawning, summer rearing, and winter rearing habitats for coho salmon, respectively. McHenry (1996) stated that these habitat losses were due to logging, agricultural clearing, channelization, drainage ditching, groundwater withdrawal, and lack of woody debris.

Chum salmon generally spend only a short time relative to other salmonids in streams and rivers before migrating downstream to estuarine and nearshore marine habitats. Because of this, the survival of early life history stages depends more on the health and ecological integrity of estuaries and nearshore environments than it does for most other Pacific salmon. Habitat loss in the estuarine or nearshore marine environment is difficult to quantify since there are few historical studies that include baseline information and since these studies encompass a variety of classification methods and several time intervals to measure change (Levings and Thom, 1994). One of the first attempts to inventory estuarine areas in the Puget Sound region was a U.S. Department of Agriculture survey by Nesbit (1885). He surveyed 267 km^2 of tidal marshes and swamps in nine counties bordering Puget Sound and reported nearly 320 km of dikes enclosing 4.1 km^2 of marsh. In Skagit and Stilliguamish River areas, Nesbit found that tidelands covered 520 km^2 and extended 20 km inland from the present shoreline. Across the Puget Sound region in the 1880s, Nesbit found that the areas covered by tidal marshes greatly exceeded those covered by tidal flats and that the extents of non-tidal freshwater marshes were three to four times larger than tidal marshes. In contrast, by the 1980s, Boule *et al.* (1983) estimated that Puget Sound had only 54.6 km^2 of intertidal marine or vegetated habitat in the entire basin and that this represented 58 percent of the state's total estuarine wetlands.

More recently, Bortelson *et al.* (1980), Simenstad *et al.* (1982), Hutchinson (1988), and Levings and Thom (1994) have attempted to quantify changes in some Northwest estuaries. Bortelson *et al.* estimated historical changes in natural habitats in eleven major estuaries. They found on average, a decrease in the estimated (km^2) size of subaerial wetland of 64 percent (Standard Deviation 35 percent) with losses in the Puyallup of 100 percent, the Duwamish of 99 percent, and the Samish of 96 percent. Only in the Nooksack had wetland area increased, and that was only by 0.2 percent. Simenstad *et al.* (1982) used similar methods to calculate losses of wetlands in Grays Harbor and found a decrease of 30.3 percent. They also reported that, as part of maintenance dredging operations, the U.S. Army Corps of Engineers removed 2.3 million m^3 of sediments annually from estuaries in Washington State, nearly half of this in Grays Harbor. Hutchinson (1988) estimated change in the area of intertidal marshes around the Strait of Georgia and Puget Sound at the time of European settlement to the present. He found overall losses to 18 percent around the Strait of Georgia and 58 percent around Puget Sound. Dahl *et al.* (1990) reported that over 33 percent of total (freshwater and estuarine) wetland area in Washington and Oregon have been lost and that much of the remaining habitat is degraded.

Levings and Thom (1994) also estimated changes in extent of habitat coverage in Puget Sound for the following habitat types: Marshes/riparian, sandflats, mudflats, rock-gravel habitats, unvegetated subtidal, kelp beds, intertidal algae, and eelgrass. They were able to quantify change only in the marshes/riparian and kelp bed habitats. For all other areas, they could estimate change only as a loss or as an increase. However, for the marshes and riparian areas in the 11 major river deltas in Puget Sound, they estimated a loss of at least 76 percent (from 732 km^2 prior to the mid-1800s to 176.1 km^2 in the early 1990s), based upon the reports of Nesbit (1885), Boule *et al.* (1983), and others.

Levings and Thom (1994) were also able to quantify a change in extent of kelp beds. They found that the locations of kelp beds have been relatively well documented as navigational aids, for marking the location of shallow rocky bottom areas, and as sources of kelp for potash. Based upon several comprehensive surveys (one dating back to the Wilkes expedition in 1841 (Thom and Hallum, 1990)), they estimated that the length of shore with kelp beds in Puget Sound has increased from 1912 to the present by as much as 53 percent (from 205.5 km^2 to 313.8 km^2). The significance of kelp beds to chum salmon is undocumented, but presumably they would supply a refuge from waves, currents, and perhaps predators.

Most regulatory reviews and environmental analysis of estuarine modification have been focused on major estuaries and at river mouths near high-intensity industrial and urban development, but this development affects only 2 percent of the approximately 3,620 km of Puget Sound shoreline (Canning, 1997). Perhaps a better estimate of overall historical changes in intertidal and nearshore habitats is the inventories of shoreline armoring (e.g., construction of rock, concrete, and timber bulkheads or retaining walls) as these habitat modifications occur primarily with residential development in relatively rural areas (Shipman, 1997). Armoring has a cumulative environmental impact that eventually results in loss of riparian vegetation, burial of the upper beach areas, altered wave interaction with the shoreline, and obstruction of sediment movement (Shipman, 1997). Morrison *et al.* (1993) inventoried armoring in Thurston County, Washington, and compared this to 1977 studies. They found a more than 100 percent increase in the length of armoring from 1977 to 1993. Kathey (1993) inventoried armoring along Bainbridge Island in Puget Sound and found that between 42 and 67 percent of the entire shoreline was armored.

Although not all of the chum salmon stocks identified by WDF *et al.* (1993) had habitat factors listed for them; numerous habitat-or land-use practices were identified as having a detrimental impact on chum salmon. The northern portion of the Puget Sound/Strait of Georgia ESU was reported to incur its greatest impact from agricultural (diking) and logging practices (sedimentation). Habitat impacts in the southern portion of this ESU (excluding Hood Canal) were listed as loss of freshwater and estuarine wetlands due to diking and armoring (e.g., construction of bulkheads, piers, and docks), urbanization, degradation of water quality, and loss of spawning habitats. Habitat factors in Hood Canal were primarily identified for the Hood Canal summer-run chum salmon ESU and included gravel aggradation (due to logging in some areas), channel shifting, and diking. No chum salmon habitat factors were identified in the Washington portion of the Coastal ESU, but the greatest impacts to other species were reported to be from forest and agricultural practices. In the Lower Columbia River ESU, habitat ''limiters'' associated with chum salmon included gravel quality and stability, availability to good quality nearshore mainstem freshwater and marine habitat, road building, timber harvest, diking, and industrialization (WDF *et al.*, 1993).

Overutilization for Commercial, Recreational, Scientific, or Education Purposes

Chum salmon have been targeted for commercial and recreational fisheries throughout their range. In Washington, commercial harvest has been increasing since the early 1970s with the majority of this harvest taken from the Puget Sound/Strait of Georgia ESU. While Washington chum salmon fisheries occur in several Puget Sound rivers, most chum salmon are harvested in salt water, as fish return to different spawning areas. The relative run size in terminal areas and genetic mixed-stock analysis (MSA) indicate that various stocks are included in these mixed-stock fisheries (Graves, 1989).

As described previously, the NMFS BRT considered incidental harvest in salmon fisheries in the Strait of Juan de Fuca and coho salmon fisheries in Hood Canal to be a significant threat for the Hood Canal summer-run ESU. Historically, summer chum salmon have not been a primary fishery target in Hood Canal, as harvests have focused on chinook, coho, and fall chum salmon. Summer chum salmon have a run timing that overlaps with those of chinook and coho salmon, and they have been incidentally harvested in fisheries directed at those species (Tynan, 1992). Prior to the Boldt decision in 1974, Hood Canal was designated a commercial salmon fishing preserve, with the only net fisheries in Hood Canal occurring on the Skokomish Reservation (WDF *et al.*, 1973). In 1974, commercial fisheries were opened in Hood Canal, and incidental harvest rates on summer chum salmon began to increase rapidly. By the late 1970s, incidental harvest rates had increased to 50 to 80 percent in most of Hood Canal and exceeded 90 percent in Area 12A during the 1980s. In 1991, coho salmon fishing in the main part of Hood Canal was closed to protect depressed natural coho salmon runs. Commercial fisheries, targeting hatchery-produced coho salmon, continued in Quilcene Bay. Beginning in 1992, fishing practices in this fishery, including changes in gear, seasons, and fishing locations, were modified to protect summer chum salmon (WDFW, 1996). Since then, the tribal and nontribal harvests of coho salmon during the summer chum migration have been by beach seine with the requirement that summer chum salmon be released or surrendered to the USFWS for broodstock in the interagency enhancement program at Quilcene National Fish Hatchery.

Exploitation rates on summer-run chum salmon in Hood Canal have been greatly reduced since 1991 as a result of closures of the coho salmon fishery and of efforts to reduce the harvest of summer chum salmon (WDFW, 1996). Between 1991 and 1996, harvests removed an average of 2.5 percent of the summer-run chum salmon returning to Hood Canal, compared with an average of 71 percent in the period from 1980 to 1989. These harvest rates and the reconstructed run sizes on which they are based are imprecise and are probably overestimated in recent years, when summer-run chum salmon abundance has been depressed.

Summer-run chum salmon are still harvested incidentally in British Columbia in pink and sockeye salmon fisheries in the Strait of Juan de Fuca (Area 20) and Johnstone and Georgia Straits (LeClair 1995, 1996; Pacific States Marine Fisheries Commission (PSMFC) data 1995; Tynan, 1996a). Summer-run chum salmon are also taken in troll fisheries off the west coast of Vancouver Island (PSMFC data 1995). Net and troll fisheries in these areas target Fraser River sockeye and coho salmon but incidentally harvest chum salmon. Bycatch of chum salmon in Canadian Area 20 in the period from 1968 to 1995 has been estimated at 2,803 fish (Tynan, 1996b). These harvests have traditionally been allocated between U.S. and British Columbia populations using the proportions determined from genetic MSA estimates in samples of fall chum salmon caught in later fisheries that were directed at chum salmon (Pacific Salmon Commission (PSC), Joint Chum Technical Committee, 1995).

Recently, fishery managers have begun to suspect that Hood Canal and Strait of Juan de Fuca summer-run chum salmon may be the majority of chum salmon migrating through Area 20

in August and early September when Area 20 fisheries for sockeye and pink salmon occur (WDFW, 1996). Genetic MSA was used to estimate the proportion of Hood Canal summer chum salmon in the Area 20 catch (LeClair 1995, 1996). Estimates indicated that Hood Canal and Strait of Juan de Fuca summer-run chum salmon accounted for 31 percent of the Area 20 catch in 1995 and 68 percent of the catch in 1996 (WDFW, 1996). This corresponded to estimated harvest rates on Hood Canal fish of approximately 3 percent in 1995 and approximately 1.5 percent in 1996 and, on Strait of Juan de Fuca fish of approximately 17 percent in 1995 and approximately 2 percent in 1996.

The Columbia River historically contained large runs of chum salmon that supported a substantial commercial fishery in the first half of this century. These landings represented a harvest of more than 500,000 chum salmon in some years. There are presently neither recreational nor directed commercial fisheries for chum salmon in the Columbia River, although some chum salmon are taken incidentally in the gill-net fisheries for coho and chinook salmon and there has been minor recreational harvest in some tributaries (WDF *et al.*, 1993).

Disease or Predation

There is no clear evidence that diseases pose a risk factor for chum salmon in Washington and Oregon. However, predation has been identified as a risk factor for this species. Predation by juvenile coho salmon was the primary cause of mortality to chum salmon in all the freshwater studies reviewed by the NMFS BRT. In Big Beef Creek on Hood Canal, size selection of chum salmon juveniles by coho salmon was identified by Beall (1972), but, in a later study (Fresh and Schroder, 1987), size selection by coho salmon and rainbow trout was not observed.

Mortality of chum salmon juveniles, especially those from natural populations, is difficult to estimate in estuaries. In studies on fluorescently marked juvenile chum salmon released from the Enetai Hatchery in Hood Canal, Bax (1983a, b) estimated average daily mortalities between 31 and 46 percent over a 2- and 4-day period. In a study on releases of equal numbers of fish of two different sizes, Whitmus (1985) estimated that small fish suffered higher mortalities than did large fish. About 58 percent of the small fish died over 2 days, and of the fish remaining after 10 days only 26 percent were small fish. This mortality appeared to be due to predation by cutthroat trout and marine birds, but predator selectivity on fish size may have been due to the distribution of the differently sized fish rather than to selective behavior (i.e., large fish avoided predation in the study area by emigrating out of the area sooner than small fish). Ames (1980) hypothesized that competition for food and predation between pink and chum salmon juveniles in estuary and nearshore marine habitats may cause distinct odd- and even-year cycles in natural chum salmon populations in Puget Sound. Estuarine predation on natural and hatchery pink and chum salmon by larger, piscivorous salmon, such as coho and chinook salmon smolts, may have caused declines in some Puget Sound pink and chum salmon populations (Johnson, 1973; Simenstad *et al.*, 1982).

Adult chum salmon (more so than most other salmonids in Washington State) concentrate in large numbers in estuaries and off the mouths of small streams to such an extent that their dorsal fins break the water's surface. The cause of milling is unclear, but the behavior does make adults particularly vulnerable to fisheries and natural predation. For example, Evenson and Calambokidis (1993) found that the number of harbor seals at Dosewallips State Park in Hood Canal, Washington, was highest when adult chum salmon were present.

Inadequacy of Existing Regulatory Mechanisms

Under the ESA, a determination to propose a species for listing as threatened or endangered requires considering the biological status of the species, as well as efforts being made to protect the species (see Existing Protective Efforts). Typically, regulatory mechanisms established by Federal, state, tribal, and local governments provide the most effective means to prevent a species from facing the peril of extinction. Unfortunately, the continued widespread decline of naturally spawning chum salmon and other salmonids in numerous West Coast streams suggests that existing regulations may not provide adequate protection for this species. Because many existing protective efforts are new or have uncertain regulatory mechanisms, it is not possible to determine if they will be adequate to reverse the declining trend in chum salmon abundance. During the period between this proposed rule and a final rule, NMFS will continue to evaluate the efficacy of existing efforts to protect and restore chum salmon populations (see Public Comments Solicited).

Other Natural or Human-Made Factors

Climatic and Ocean Factors

Climatic conditions are known to have changed recently in the Pacific Northwest. Most Pacific salmonids south of British Columbia have been affected by changes in ocean production that occurred during the 1970s (Pearcy, 1992; Lawson, 1993). Changes in productivity in the nearshore marine environment have been implicated in declines in chinook and coho salmon abundance and productivity. Chum salmon tend to migrate farther offshore than chinook and coho salmon and are thought to have been less affected by changes in the nearshore environment. However, the chum salmon populations considered in the NMFS status review are from the southern end of the range of the species, and their migration patterns are poorly understood. Much of the Pacific coast has also been experiencing drought conditions in recent years, which may depress freshwater production, even of species such as chum salmon that spend only a brief time in fresh water. At this time, we do not know whether these climatic conditions represent a long-term shift in conditions that will continue to affect salmonids into the future or short-term environmental fluctuations that can be expected to be reversed in the near future.

Artificial Propagation

For almost 100 years, hatcheries in the U.S. Pacific Northwest have produced chum salmon for the purpose of increasing harvest and rebuilding depleted runs. Potential problems associated with hatchery programs include genetic impacts on indigenous, naturally reproducing populations, 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 continued annual introduction of hatchery fish (Waples, 1991; Hindar *et al.*, 1991; Stewart and Bjornn, 1990). All things being equal, the more hatchery fish that are released, the more likely natural populations are to be impacted by hatchery fish. Similarly, the more genetically similar hatchery fish are to natural populations they spawn with, the less change there will be in the genetic makeup of future generations in the natural population. The substantial influence of artificial propagation on genetic/ecological integrity of natural salmon and steelhead populations is discussed in

considerable detail in the NMFS status review.

Although past hatchery practices may have substantially influenced some isolated chum salmon populations, the relatively small magnitude of most current hatchery programs and the predominant use of local broodstock argue that hatchery practices are unlikely to threaten the genetic integrity of most chum salmon populations considered in the NMFS status review. Large programs take place in Hood Canal and southern Puget Sound, and genetic concerns in these areas are proportionally greater. Small population effects (such as genetic drift, mutation, and introgression) are likely to influence summer-run chum in Hood Canal and populations spawning from the Columbia River south.

Proposed Determination

The ESA 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 after taking into account those efforts, if any, being made to protect such species.

Based on results from its coastwide status review, NMFS has identified four ESUs of chum salmon on the west coast of the United States which constitute ''species'' under the ESA. NMFS has determined that listing is not warranted for two chum salmon ESUs (Puget Sound/Strait of Georgia and Pacific Coast ESUs) and that two ESUs are currently threatened (Hood Canal summer-run and Columbia River ESUs) and proposes to list them as such at this time. The geographic boundaries for the ESUs proposed for listing are described under ''ESU Determinations'' and critical habitat is described below under ''Critical Habitat of Chum Salmon ESUs Proposed for Listing.'' The best available scientific information, coupled with an assessment of existing protective efforts, supports a proposed listing of these two chum salmon ESUs under the ESA.

While the majority of the BRT considered the Hood Canal summer-run ESU to meet the definition for an endangered species under the ESA, NMFS is proposing it as threatened due to continued improvements in spawning escapement (including very recent data not available for review by the BRT) and to the ongoing and expanding protective efforts being made throughout the range of the ESU. Due to uncertainties regarding the severity of risks facing Columbia River chum salmon populations, NMFS believes that it is appropriate to propose a threatened designation for this ESU. If new information indicates a substantial change in the biological status of either ESU or if protective efforts are judged to be inadequate, NMFS will alter this listing proposal.

In both ESUs, only naturally spawned chum salmon are being proposed for listing. Prior to the final listing determination, NMFS will examine the relationship between hatchery and natural populations of chum salmon in these ESUs and assess whether any hatchery populations are essential for their recovery. This may result in the inclusion of specific hatchery populations as part of a listed ESU in NMFS' final determination.

Prohibitions and Protective Regulations

Section 4(d) of the ESA requires NMFS to issue protective regulations that it finds necessary and advisable to provide for the conservation of a threatened species. Section 9(a) of the ESA prohibits violations of protective regulations for threatened species promulgated under section 4(d). The 4(d) protective regulations may prohibit, with respect to the 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. NMFS intends to have final 4(d) protective regulations in effect at the time of a final listing determination on the chum salmon ESUs proposed as threatened in the present notice. The process for completing the 4(d) rule will provide the opportunity for public comment on the proposed protective regulations.

In the case of threatened species, NMFS also has flexibility under section 4(d) to tailor the protective regulations based on the contents of available conservation measures. Even though existing conservation efforts and plans are not sufficient to preclude the need for listings at this time, they are nevertheless valuable for improving watershed health and restoring fishery resources. In those cases where well-developed and reliable conservation plans exist, NMFS may choose to incorporate them into the recovery planning process, starting with the protective regulations. NMFS has already adopted 4(d) protective regulations that exempt a limited range of activities from section 9 take prohibitions. For example, the interim 4(d) rule for Southern Oregon/Northern California coho salmon (62 FR 38479, July 18, 1997) exempts habitat restoration activities conducted in accordance with approved plans and fisheries conducted in accordance with an approved state management plan. In the future, 4(d) rules may contain limited take prohibitions applicable to activities such as forestry, agriculture, and road construction when such activities are conducted in accordance with approved conservation plans.

These are all examples where NMFS may apply modified section 9 prohibitions in light of the protections provided in a strong conservation plan. There may be other circumstances as well in which NMFS would use the flexibility of section 4(d). For example, in some cases there may be a healthy population of salmon or steelhead within an overall ESU that is listed. In such a case, it may not be necessary to apply the full range of prohibitions available in section 9. NMFS intends to use the flexibility of the ESA to respond appropriately to the biological condition of each ESU and to the strength of efforts to protect them.

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) 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 (see Activities That May Affect Chum Salmon or Critical Habitat).

Sections 10(a)(1)(A) and 10(a)(1)(B) of the ESA provide NMFS with authority to grant exceptions to 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 a directed take of listed species.

NMFS has issued section 10(a)(1)(A) research or enhancement permits for other listed species (e.g., Snake River chinook salmon and Sacramento River winter-run chinook salmon) 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. NMFS is aware of several sampling efforts for chum salmon in the proposed ESUs, including efforts by Federal and state fishery management agencies. These and other research efforts could provide critical information regarding chum salmon distribution and population abundance.

Section 10(a)(1)(B) incidental take permits may be issued to non-Federal entities performing activities that 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 university research on species other than chum salmon, not receiving Federal authorization or funding, the implementation of state fishing regulations, and timber harvest activities on non-Federal lands.

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, tribal, and local agencies, private organizations, and individuals.

Several conservation efforts are underway that may reverse the decline of west coast chum salmon and other salmonids (see Existing Protective Efforts). NMFS is encouraged by these significant efforts, which could provide all stakeholders with an approach to achieving the purposes of the ESA—protecting and restoring native fish populations and the ecosystems upon which they depend—that is less regulatory. NMFS will continue to encourage and support these initiatives as important components of recovery planning for chum salmon and other salmonids. Based on information presented in this proposed rule, general conservation measures that could be implemented to help conserve the species are listed below. This list does not constitute NMFS' interpretation of a recovery plan under section 4(f) of the ESA.

1. Measures could be taken to promote land management practices that protect and restore chum salmon habitat. Land management practices affecting chum salmon habitat include timber harvest, road building, agriculture, livestock grazing, and urban development.

2. Evaluation of existing harvest regulations could identify any changes necessary to protect chum salmon populations.

3. Artificial propagation programs could be modified to minimize impacts upon native populations of chum salmon.

4. Water diversions could have adequate headgate and staff gauge structures installed to control and monitor water usage accurately. Water rights could be enforced to prevent irrigators from exceeding the amount of water to which they are legally entitled.

5. Irrigation diversions affecting chum salmon could be screened. A thorough review of the impact of irrigation diversions on the species could be conducted.

NMFS recognizes that, to be successful, protective regulations and recovery programs for chum salmon will need to be developed in the context of conserving aquatic ecosystem health. NMFS intends that Federal lands and Federal activities play a primary role in preserving listed populations and the ecosystems upon which they depend. However, throughout the range of the ESUs proposed for listing, chum salmon habitat occurs and can be affected by activities on state, tribal or private land. Agricultural, timber, and urban management activities on nonfederal land could and should be conducted in a manner that avoids adverse effects to chum salmon habitat.

NMFS encourages nonfederal landowners to assess the impacts of their actions on potentially threatened or endangered salmonids. In particular, NMFS encourages the formulation of watershed partnerships to promote conservation in accordance with ecosystem principles. These partnerships will be successful only if state, tribal, and local governments, landowner representatives, and Federal and nonfederal biologists all participate and share the goal of restoring salmon to the watersheds.

Definition of Critical Habitat

Critical habitat is defined in section 3(5)(A) of the ESA as

> (i) the specific areas within the geographical area occupied by the species * * * 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 * * * upon a determination by the Secretary that such areas are essential for the conservation of the species.

The term ''conservation,'' as defined in section 3(3) of the ESA, means ''* * * to use and the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary.''

In designating critical habitat, NMFS considers the following requirements of the species: (1) Space for individual and population growth, and for normal behavior; (2) food, water, air, light, minerals, or other nutritional or physiological requirements; (3) cover or shelter; (4) sites for breeding, reproduction, or rearing of offspring; and, generally, (5) habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of this species (see 50 CFR 424.12(b)). In addition to these factors, NMFS also focuses on the known physical and biological features (primary constituent elements) within the designated area that are essential to the conservation of the species and may require special management considerations or protection. These essential features may include, but are not limited to, spawning sites, food resources, water quality and quantity, and riparian vegetation (see 50 CFR 424.12(b)).

Consideration of Economic and Other Factors

The economic and other impacts of a critical habitat designation have been considered and evaluated in this proposed rulemaking. NMFS identified present and anticipated activities that may adversely modify the area(s) being considered or be affected by a designation. An area may be excluded from a critical habitat designation if NMFS determines that the overall benefits of exclusion outweigh the benefits of designation, unless the exclusion will result in the extinction of the species (see 16 U.S.C. 1533(b)(2)).

The impacts considered in this analysis are only those incremental impacts specifically resulting from a critical habitat designation, above the economic and other impacts attributable to listing the species or resulting from other authorities. Since listing a species under the ESA provides significant protection to a species' habitat, in many cases, the economic and other impacts resulting from the critical habitat designation, over and above the impacts of the listing itself, are minimal (see Significance of Designating Critical Habitat). In general, the designation of critical habitat highlights geographical

areas of concern and reinforces the substantive protection resulting from the listing itself.

Impacts attributable to listing include those resulting from the take prohibitions contained in section 9 of the ESA and associated regulations. ''Take'', as defined in the ESA means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct (see 16 U.S.C. 1532(19)). Harm can occur through destruction or modification of habitat (whether or not designated as critical habitat) that significantly impairs essential behaviors, including breeding, feeding, rearing or migration.

Significance of Designating Critical Habitat

The designation of critical habitat does not, in and of itself, restrict human activities within an area or mandate any specific management or recovery actions. A critical habitat designation contributes to species conservation primarily by identifying important areas and by describing the features within those areas that are essential to the species, thus alerting public and private entities to the area's importance. Under the ESA, the only regulatory impact of a critical habitat designation is through the provisions of section 7 of the ESA. Section 7 applies only to actions with Federal involvement (e.g., authorized, funded, or conducted by a Federal agency) and does not affect exclusively state or private activities.

Under the section 7 provisions, a designation of critical habitat would require Federal agencies to ensure that any action they authorize, fund, or carry out is not likely to destroy or adversely modify designated critical habitat. Activities that destroy or adversely modify critical habitat are defined as those actions that ''appreciably diminish the value of critical habitat for both the survival and recovery'' of the species (see 50 CFR 402.02). Regardless of a critical habitat designation, Federal agencies must ensure that their actions are not likely to jeopardize the continued existence of the listed species. Activities that jeopardize a species are defined as those actions that ''reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery'' of the species (see 50 CFR 402.02). Using these definitions, activities that would destroy or adversely modify critical habitat would also be likely to jeopardize the species. Therefore, the protection provided by a critical habitat designation generally duplicates the protection provided under the section 7 jeopardy provision. Critical habitat may provide additional benefits to a species in cases where areas outside the species' current range have been designated. When actions may affect these areas, Federal agencies are required to consult with NMFS under section 7 (see 50 CFR 402.14(a)), which may not have been recognized but for the critical habitat designation.

A designation of critical habitat provides a clear indication to Federal agencies as to when section 7 consultation is required, particularly in cases where the action would not result in immediate mortality, injury, or harm to individuals of a listed species (e.g., an action occurring within the critical area when a migratory species is not present). The critical habitat designation, describing the essential features of the habitat, also assists in determining which activities conducted outside the designated area are subject to section 7 (i.e., activities that may affect essential features of the designated area).

A critical habitat designation will also assist Federal agencies in planning future actions, since the designation establishes, in advance, those habitats that will be given special consideration in section 7 consultations. With a designation of critical habitat, potential conflicts between Federal actions and endangered or threatened species can be identified and possibly avoided early in the agency's planning process.

Another indirect benefit of a critical habitat designation is that it helps focus Federal, tribal, state, and private conservation and management efforts in such areas. Management efforts may address special considerations needed in critical habitat areas, including conservation regulations to restrict private as well as Federal activities. The economic and other impacts of these actions would be considered at the time of those proposed regulations and, therefore, are not considered in the critical habitat designation process. Other Federal, tribal, state, and local management programs, such as zoning or wetlands and riparian lands protection, may also provide special protection for critical habitat areas.

Process for Designating Critical Habitat

Developing a proposed critical habitat designation involves three main considerations. First, the biological needs of the species are evaluated, and essential habitat areas and features are identified. If alternative areas exist that would provide for the conservation of the species, such alternatives are also identified. Second, the need for special management considerations or protection of the area(s) or features are evaluated. Finally, the probable economic and other impacts of designating these essential areas as critical habitat are evaluated. After considering the requirements of the species, the need for special management, and the impacts of the designation, the proposed critical habitat is published in the **Federal Register** for comment. The final critical habitat designation, considering comments on the proposal and impacts assessment, is typically published within 1 year of the proposed rule. Final critical habitat designations may be revised, using the same process, as new information becomes available.

A description of the essential habitat, need for special management, impacts of designating critical habitat, and the proposed action are described in the following sections.

Critical Habitat of Chum Salmon ESUs Proposed for Listing

The following is a brief overview of distribution and habitat utilization information for chum salmon in the Pacific Northwest; more detailed information can be found in the previous section of this **Federal Register** proposed rule on ''Chum Salmon Life History'' and species reviews by NMFS (1996a and 1996b), Pauley *et al.* (1988), Salo (1991), and Pearcy (1992). The current geographic range of chum salmon from the Pacific Northwest includes vast areas of the North Pacific ocean, nearshore marine zone, and extensive estuarine and riverine areas. Historically, chum salmon were distributed throughout the coastal regions of western Canada and the United States, as far south as Monterey, California. Presently, major spawning populations are found only as far south as Tillamook Bay on the northern Oregon coast. Any attempt to describe the current distribution of chum salmon must take into account the fact that extant populations and densities are a small fraction of historical levels. Hence, some populations that are considered extinct could in fact exist but are represented by only a few individuals that could escape detection during surveys.

In the Hood Canal summer-run ESU, chum salmon are currently present throughout much of their historical range. Spawning populations recognized by WDF *et al.* (1993) include the Quilcene, Dosewallips, Duckabush, Hamma, Dewatto, Tahuya, and Union Rivers and three streams along the Strait of Juan de Fuca (Snow and Salmon Creeks in Discovery Bay and Jimmycomelately Creek in Sequim Bay)

(WDF *et al.*, 1993). Some populations on the east side of Hood Canal (Big Beef Creek, Anderson Creek, and the Dewatto River) are severely depressed and have recently had no returning adults.

In the Columbia River ESU, chum salmon occupy a small remnant of their historic range. Presently, on the Washington side of the lower Columbia River, only three streams are recognized as containing native chum salmon: Hamilton and Hardy Creeks near Bonneville Dam at river km 235 and Grays River (river km 34) (WDF *et al.*, 1993). Oregon currently recognizes 23 ''provisional'' populations in the Columbia River Basin, ranging from the Lewis and Clark River (river km 13) to Milton Creek (river km 144) near St. Helens, Oregon (Kostow, 1995). ODFW considers these populations as provisional because ''very few chum are observed in spawning ground surveys, hatchery rack counts, or as incidental catch in adjacent fisheries'' and further adds that the few fish observed are probably strays from Washington populations (ODFW, 1997). Although it is uncertain whether they would be considered part of the extant ESU, there are reports that some extinct runs of chum salmon may historically have spawned in the Umatilla and Walla Walla Rivers, more than 500 km from the sea (Nehlsen *et al.*, 1991).

Chum salmon typically spawn in the lower reaches of rivers, with redds usually dug in the mainstem or in side channels of rivers from just above tidal influence to nearly 100 km from the sea. Populations in both ESUs proposed for listing appear to spawn within approximately 16 km of the river mouths (WDF *et al.*, 1993). After hatching, juvenile chum salmon spend a very limited amount of time in fresh water and typically migrate to estuarine and marine areas soon after emergence.

Essential features of chum salmon critical habitat include adequate: (1) Substrate; (2) water quality; (3) water quantity; (4) water temperature; (5) water velocity; (6) cover/shelter; (7) food; (8) riparian vegetation; (9) space; and (10) safe passage conditions. Given the vast geographic range occupied by each of these chum salmon ESUs, and the diverse habitat types used by the various life stages, it is not practical to describe specific values or conditions for each of these essential habitat features. However, good summaries of these environmental parameters and freshwater factors that have contributed to the decline of this and other salmonids can be found in reviews by Pauley *et al.* (1988), Bjornn and Reiser (1991), Nehlsen *et al.* (1991), WDF *et al.* (1993), Botkin *et al.* (1995), NMFS (1996) and Spence *et al.* (1996).

NMFS believes that the current freshwater and estuarine range of the species encompasses all essential habitat features and is adequate to ensure the species' conservation. Therefore, designation of habitat areas outside the species' current range is not necessary. For the Hood Canal ESU, these areas include all river reaches accessible to listed chum salmon (including estuarine areas and tributaries) draining into Hood Canal as well as Olympic Peninsula rivers between Hood Canal and Sequim Bay, Washington. Also included is the Hood Canal waterway, from its southern terminus at the Union River north to its confluence with Admiralty Inlet near Port Ludlow, Washington. Critical habitat for the Columbia River ESU encompasses accessible reaches of the Columbia River (including estuarine areas and tributaries) downstream from Bonneville Dam, excluding Oregon tributaries upstream of Milton Creek at river km 144 near the town of St. Helens.

It is important to note that habitat quality in this current range is intrinsically related to the quality of upland areas and upstream areas (including headwater or intermittent streams) which provide key habitat elements (e.g., LWD, gravel, water quality) crucial for chum salmon in downstream reaches. NMFS recognizes that estuarine habitats are critical for chum salmon and has included them in this designation. This definition of estuarine habitat includes the mixing and seawater portions of Hood Canal defined in NOAA's National Estuarine Inventory (NOAA, 1985). Marine habitats (i.e., oceanic or nearshore areas seaward of the mouth of coastal rivers or Hood Canal) are also vital to the species and ocean conditions may have a major influence on chum salmon survival. However, there does not appear to be a need for special management consideration or protection of this habitat. Therefore, NMFS is not proposing to designate critical habitat in marine areas at this time. If additional information becomes available that supports the inclusion of such areas, NMFS may revise this designation.

Based on consideration of the best available information regarding the species' current distribution, NMFS believes that the preferred approach to identifying critical habitat for chum salmon is to designate all areas (and their adjacent riparian zones) accessible to the species within the range of each ESU. NMFS believes that adopting a more inclusive, watershed-based description of critical habitat is appropriate because it: (1) Recognizes the species' use of diverse habitats and underscores the need to account for all of the habitat types supporting the species' freshwater and estuarine life stages; (2) takes into account the natural variability in habitat use; and (3) reinforces the important linkage between aquatic areas and adjacent riparian/upslope areas.

An array of management issues encompasses these habitats and special management considerations will be needed, especially on lands and streams under Federal ownership (see sections below describing Activities that May Affect Critical Habitat and Need for Special Management Considerations or Protection). While marine areas are also a critical link in this cycle, NMFS does not believe that special management considerations are needed to conserve the habitat features in these areas. Hence, only the freshwater and estuarine areas are being proposed for critical habitat at this time.

Need for Special Management Considerations or Protection

In order to assure that the essential areas and features are maintained or restored, special management may be needed. Activities that may require special management considerations for freshwater and estuarine life stages of listed chum salmon include, but are not limited to: (1) Land management; (2) timber harvest; (3) point and non-point water pollution; (4) livestock grazing; (5) habitat restoration; (6) irrigation water withdrawals and returns; (7) mining; (8) road construction; (9) dam operation and maintenance; and (10) dredge and fill activities. Not all of these activities are necessarily of current concern within every watershed; however, they indicate the potential types of activities that will require consultation in the future. No special habitat management considerations have been identified for listed chum salmon while they are residing in the ocean environment.

Activities That May Affect Chum Salmon or Critical Habitat

A wide range of activities may affect the essential habitat requirements of listed chum salmon. These activities include water and land management actions of Federal agencies such as the U.S. Forest Service (USFS), U.S. National Park Service (NPS), U.S. Army Corps of Engineers (COE), Federal Energy Regulatory Commission (FERC), Federal Highways Administration (FHA), and related or similar activities of other Federally-regulated projects and lands including; (1)Timber sales and

harvest conducted by USFS; (2) road building activities authorized by FHA, USFS, and NPS; (3) hydropower sites licensed by FERC; (4) dams built or operated by COE; (5) dredge and fill, mining, and bank stabilization activities authorized or conducted by COE; and (6) mining and road building activities authorized by the states of Washington and Oregon.

This proposed designation will provide clear notification to these agencies, private entities, and the public of critical habitat designated for listed chum salmon and the boundaries of the habitat and protection provided for that habitat by the section 7 consultation process. This proposed designation will also assist these agencies and others in evaluating the potential effects of their activities on listed chum salmon and their critical habitat and in determining when consultation with NMFS is appropriate. Consultation may result in specific conditions designed to achieve the intended purpose of the project and avoid or reduce impacts to chum salmon and its habitat within the range of the listed ESUs.

Expected Economic Impacts of Critical Habitat Designation

The economic impacts to be considered in a critical habitat designation are the incremental effects of critical habitat designation above the economic impacts attributable to listing or attributable to authorities other than the ESA (see Consideration of Economic and Other Factors). Incremental impacts result from special management activities in areas outside the present distribution of the listed species that have been determined to be essential to the conservation of the species. However, NMFS has determined that the species' present freshwater and estuarine range contains sufficient habitat for conservation of the species. Therefore, the economic impacts associated with this critical habitat designation are expected to be minimal.

USFS and NPS manage areas of proposed critical habitat for the listed chum salmon ESUs. COE, FERC, FHA, and other Federal agencies that may be involved with funding or permits for projects in critical habitat areas may also be affected by a designation. Because NMFS believes that virtually all ''adverse modification'' determinations pertaining to critical habitat would also result in ''jeopardy'' conclusions, designation of critical habitat is not expected to result in significant incremental restrictions on Federal agency activities. Critical habitat designation will, therefore, result in few if any additional economic effects beyond those that may have been caused by listing and by other statutes.

NMFS Policies on Endangered and Threatened Fish and Wildlife

On July 1, 1994, NMFS, jointly with USFWS, published a series of new 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 § 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 three qualified specialists. Independent peer reviewers will be selected from the academic and scientific community, tribal and other native American groups, Federal and state agencies, and the private sector.

Identification of those activities that would constitute a violation of § 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 will identify, to the extent known at the time of the final rule, specific activities that will not be considered likely to result in violation of § 9, as well as activities that will be considered likely to result in violation. For those activities whose likelihood of violation is uncertain, a contact will be identified in the final listing document to assist the public in determining whether a particular activity would constitute a prohibited act under § 9.

Public Comments Solicited

To ensure that the final action resulting from this proposal will be as accurate and effective as possible, NMFS is soliciting 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 Oregon and Washington in proximity to the range of the proposed ESUs (see Public Hearings). In particular, NMFS is requesting information regarding: (1) Biological or other relevant data concerning any threat to chum salmon; (2) current or planned activities in the subject areas and their possible impact on this species; (3) efforts being made to protect naturally spawned populations of chum salmon in Washington and Oregon; (4) relationship of hatchery chum salmon and naturally-reproducing chum salmon; and (5) suggestions for specific regulations under § 4(d) of the ESA that should apply to threatened chum salmon. Suggested regulations should address activities, plans, or guidelines that, despite their potential to result in the incidental take of listed fish, will ultimately promote the conservation of threatened chum salmon.

NMFS is also requesting quantitative evaluations describing the quality and extent of freshwater, estuarine, and marine habitats for juvenile and adult chum salmon as well as information on areas that may qualify as critical habitat within the range of ESUs proposed for listing. Areas that include the physical and biological features essential to the recovery of the species should be identified. NMFS recognizes that there are areas within the proposed boundaries of these ESUs that historically constituted chum salmon habitat, but may not be currently occupied. NMFS is requesting information about chum salmon in these currently unoccupied areas and whether these habitats should be considered essential to the recovery of the species or excluded from designation. Essential features should include, but are not limited to: (1) Space for individual and population growth, and for normal behavior; (2) food, water, air, light, minerals, or other nutritional or physiological requirements; (3) cover or shelter; (4) sites for reproduction and rearing of offspring; and (5) habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of the species.

For areas potentially qualifying as critical habitat, NMFS is requesting information describing: (1) The activities that affect the area or could be affected by the designation; and (2) the economic costs and benefits of additional requirements of management measures likely to result from the designation.

The economic cost to be considered in the critical habitat designation under the ESA is the probable economic impact ''of the [critical habitat] designation upon proposed or ongoing activities'' (50 CFR 424.19). NMFS must consider the incremental costs specifically resulting from a critical habitat designation that are above the economic effects attributable to listing the species. Economic effects attributable to listing include actions resulting from section 7 consultations under the ESA to avoid jeopardy to the species and from the taking prohibitions under section 9 of the ESA. Comments concerning economic impacts should distinguish the costs of listing from the

incremental costs that can be directly attributed to the designation of specific areas as critical habitat.

NMFS will review all public comments and any additional information regarding the status of the chum salmon ESUs described herein and, as required under the ESA, will complete a final rule within one year of this proposed rule. The availability of new information may cause NMFS to re-assess the status of these ESUs or the geographic extent of critical habitat.

Joint Commerce-Interior ESA implementing regulations state that the Secretary shall promptly hold at least one public hearing if any person so 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** notice, NMFS will announce the dates and locations of public hearings on this proposed rule to provide the opportunity for the public to give comments and to permit an exchange of information and opinion among interested parties. NMFS encourages the public's involvement in such ESA matters.

References

A complete list of all references cited herein is available upon request (see **ADDRESSES**).

Compliance With Existing Statutes

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 the National Environmental Policy Act under NOAA Administrative Order 216–6.

In addition, NMFS has determined that Environmental Assessments and Environmental Impact Statements, as defined under the authority of the National Environmental Policy Act of 1969, need not be prepared for this critical habitat designation made pursuant to the ESA. See *Douglas County* v. *Babbitt*, 48 F.3d 1495 (9th Cir. 1995), cert. denied, 116 S. Ct. 698 (1996).

Classification

The Assistant Administrator for Fisheries, NOAA (AA), has determined that this rule is not significant for purposes of E.O. 12866.

NMFS proposes to designate only the current range of these chum salmon ESUs as critical habitat. Areas excluded from this proposed designation include marine habitats in the Pacific Ocean and any historically-occupied areas above impassable natural barriers (e.g., long-standing, natural waterfalls). NMFS has concluded that currently inhabited areas within the range of each ESU are the minimum habitat necessary to ensure their conservation and recovery.

Since NMFS is designating the current range of the listed species as critical habitat, this designation will not impose any additional requirements or economic effects upon small entities, beyond those which may accrue from section 7 of the ESA. Section 7 requires Federal agencies to insure that any action they carry out, authorize, or fund is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat (ESA § 7(a)(2)). The consultation requirements of § 7 are nondiscretionary and are effective at the time of species' listing. Therefore, Federal agencies must consult with NMFS and ensure their actions do not jeopardize a listed species, regardless of whether critical habitat is designated.

In the future, should NMFS determine that designation of habitat areas outside the species' current range is necessary for conservation and recovery, NMFS will analyze the incremental costs of that action and assess its potential impacts on small entities, as required by the Regulatory Flexibility Act. Until that time, a more detailed analysis would be premature and would not reflect the true economic impacts of the proposed action on local businesses, organizations, and governments.

Accordingly, the Assistant General Counsel for Legislation and Regulation of the Department of Commerce has certified to the Chief Counsel for Advocacy of the Small Business Administration that the proposed rule, if adopted, would not have a significant economic impact of a substantial number of small entities, as described in the Regulatory Flexibility Act.

This rule does not contain a collection-of-information requirement for purposes of the Paperwork Reduction Act.

The AA has determined that the proposed designation is consistent to the maximum extent practicable with the approved Coastal Zone Management Program of the states of Washington and Oregon. This determination will be submitted for review by the responsible state agencies under section 307 of the Coastal Zone Management Act.

At this time NMFS is not promulgating protective regulations pursuant to ESA section 4(d). In the future, prior to finalizing its 4(d) regulations for these threatened ESUs, NMFS will comply with all relevant NEPA and RFA requirements.

List of Subjects

50 CFR Part 226

Endangered and threatened species.

50 CFR Part 227

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

Dated: February 26, 1998.

Rolland A. Schmitten,

Assistant Administrator for Fisheries, National Marine Fisheries Service.

For the reasons set out in the preamble, 50 CFR parts 226 and 227 are proposed to be amended as follows:

PART 226—DESIGNATED CRITICAL HABITAT

1. The authority citation for part 226 continues to read as follows:

Authority: 16 U.S.C. 1533.

2. Section 226.26 is added to subpart C to read as follows:

§ 226.26 Hood Canal summer-run chum salmon (Oncorhynchus keta), Columbia River chum salmon (Oncorhynchus keta).

Critical habitat consists of the water, substrate, and adjacent riparian zone of estuarine and riverine reaches in hydrologic units and counties identified in Tables 7 and 8 for Hood Canal summer-run chum salmon and Columbia River chum salmon, respectively. Accessible reaches are those within the historical range of the ESUs that can still be occupied by any life stage of chum salmon. Inaccessible reaches are those above longstanding, naturally impassable barriers (i.e., natural waterfalls in existence for at least several hundred years). Adjacent riparian zones are defined as those areas within a slope distance of 300 ft (91.4 m) from the normal line of high water of a stream channel or adjacent off-channel habitats (600 ft or 182.8 m, when both sides of the channel are included). Figures 12 and 13 to part 226 identify the general geographic extent of larger rivers and streams within hydrologic units designated as critical habitat for Hood Canal summer-run chum salmon and Columbia River chum salmon, respectively. Note that Figures 12 and 13 to part 226 do not constitute the definition of critical habitat but, instead, are provided as a general reference to guide Federal agencies and interested parties in locating the boundaries of critical habitat for listed

Hood Canal summer-run chum salmon and Columbia River chum salmon. Hydrologic units are those defined by the Department of the Interior (DOI), U.S. Geological Survey (USGS) publication, ''Hydrologic Unit Maps, Water Supply Paper 2294, 1986, and the following DOI, USGS, 1:500,000 scale hydrologic unit maps: State of Oregon (1974) and State of Washington (1974) which are incorporated by reference. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies of the USGS publication and maps may be obtained from the USGS, Map Sales, Box 25286, Denver, CO 80225. Copies may be inspected at NMFS, Protected Resources Division, 525 NE Oregon St., Suite 500, Portland, OR 97232–2737, or NMFS, Office of Protected Resources, 1315 East-West Highway, Silver Spring, MD 20910, or at the Office of the Federal Register, 800 North Capitol Street, NW., Suite 700, Washington, DC.

(a) *Hood Canal summer-run chum salmon (Oncorhynchus keta) geographic boundaries.* Critical habitat is designated to include all river reaches accessible to listed chum salmon (including estuarine areas and tributaries) draining into Hood Canal as well as Olympic Peninsula rivers between Hood Canal and Sequim Bay, Washington. Also included is the Hood Canal waterway, from its southern terminus at the Union River north to its confluence with Admiralty Inlet near Port Ludlow, Washington.

(b) *Columbia River chum salmon (Oncorhynchus keta) geographic boundaries.* Critical habitat is designated to include all river reaches accessible to listed chum salmon (including estuarine areas and tributaries) in the Columbia River downstream from Bonneville Dam, excluding Oregon tributaries upstream of Milton Creek at river km 144 near the town of St. Helens.

3. Table 7 to part 226 is added to read as follows: Table 7 to Part 226—Hydrologic Units and Counties Containing Critical Habitat for Hood Canal Summer-Run Chum Salmon.

Hydrologic unit name	Hydrologic unit number	Counties contained in hydrologic unit and within range of ESU [1]
Skokomish	17110017	Mason (WA), Jefferson (WA).
Hood Canal	17110018	Mason (WA), Jefferson (WA), Kitsap (WA), Clallam (WA).
Puget Sound	17110019	Jefferson (WA).

[1] Some counties have very limited overlap with estuarine, riverine, or riparian habitats identified as critical habitat for this ESU. Consult USGS hydrologic unit maps (available from USGS) to determine specific county and basin boundaries.

4. Table 8 to part 226 is added to read as follows: Table 8 to Part 226—Hydrologic Units and Counties Containing Critical Habitat for Columbia River Chum Salmon

Hydrologic unit name	Hydrologic unit number	Counties contained in hydrologic unit and within range of ESU [1]
Lower Columbia	17080006	Pacific (WA), Wahkiakum (WA), Lewis (WA), Clatsop (OR).
Lower Cowlitz	17080005	Cowlitz (WA), Lewis (WA), Skamania (WA).
Lower Columbia—Clatskanie	17080003	Wahkiakum (WA), Lewis (WA), Cowlitz (WA), Clark (WA), Skamania (WA), Clatsop (OR), Columbia (OR).
Lewis	17080002	Cowlitz (WA), Clark (WA), Skamania (WA)
Lower Columbia—Sandy	17080001	Clark (WA), Skamania (WA), Multnomah (OR).
Lower Willamette	17090012	Columbia (OR), Multnomah (OR), Washington (OR).

[1] Some counties have very limited overlap with estuarine, riverine, or riparian habitats identified as critical habitat for this ESU. Consult USGS hydrologic unit maps (available from USGS) to determine specific county and basin boundaries.

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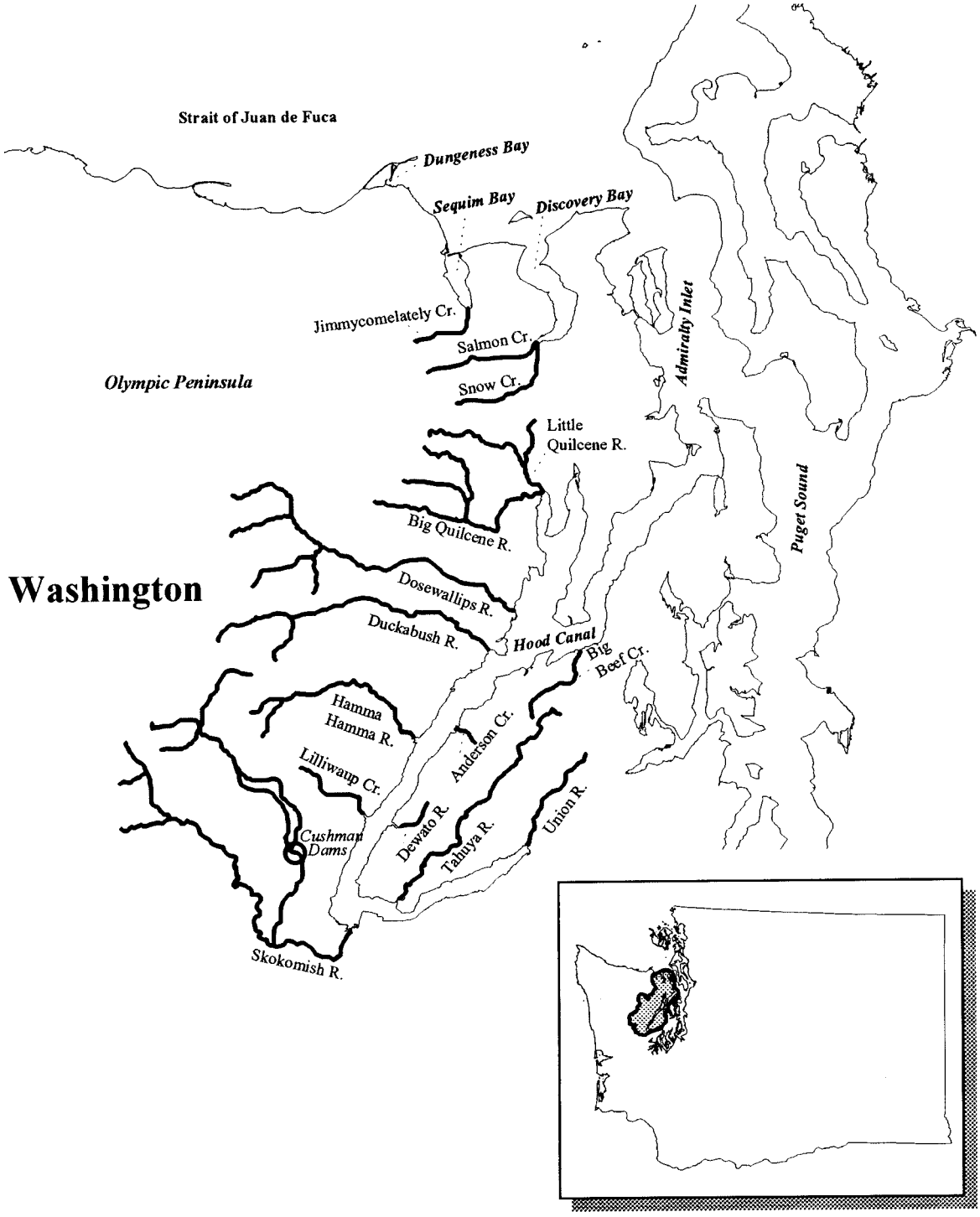
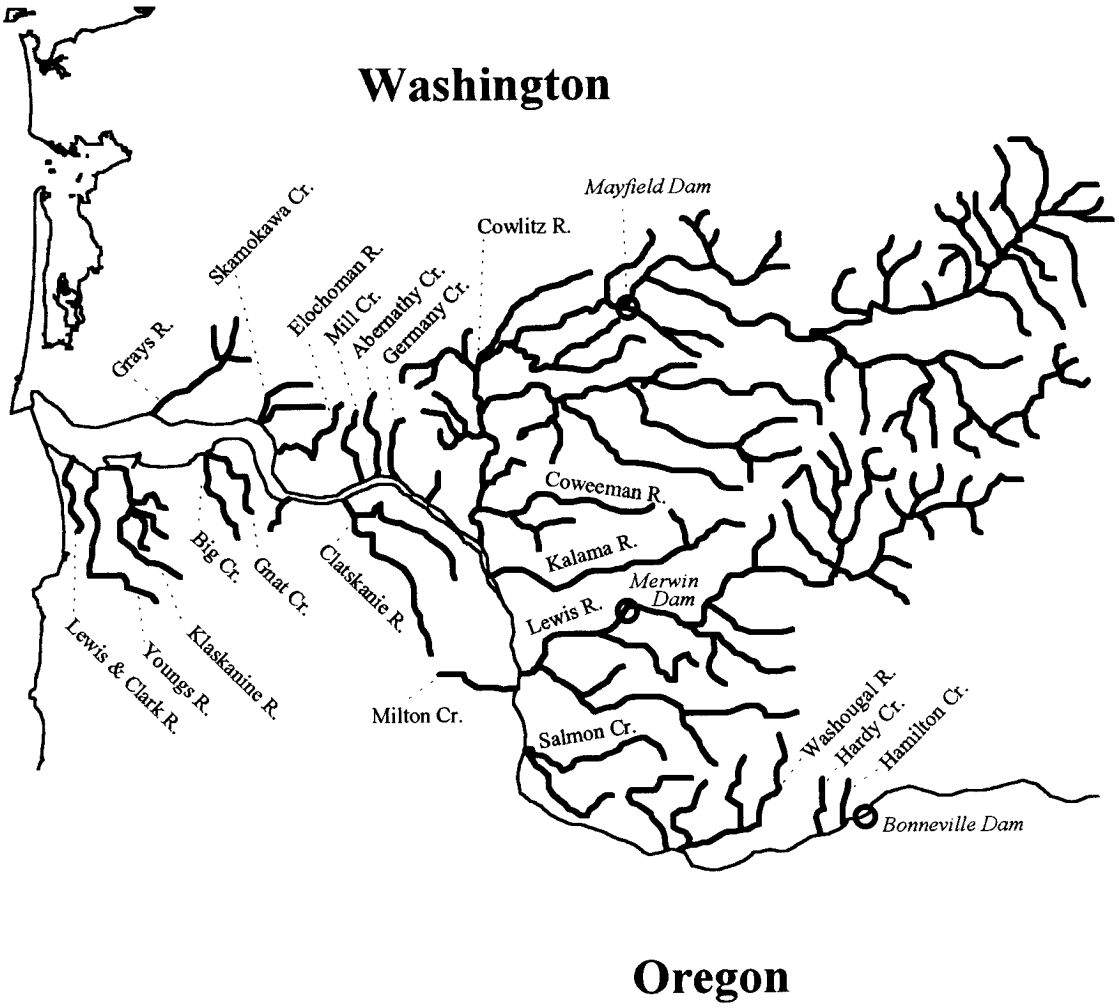
5. Figure 12 to part 226 is added to read as follows:

Figure 12 to Part 226—Critical Habitat for Hood Canal Summer-run Chum Salmon



6. Figure 13 to Part 226 is added to read as follows:

Figure 13 to Part 226—Critical Habitat for Columbia River Chum Salmon



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PART 227—THREATENED FISH AND WILDLIFE

7. The authority citation for part 227 is revised to read as follows:

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

8. In § 227.4, paragraphs (m) and (n) are added to read as follows:

§ 227.4 Enumeration of threatened species.

* * * * *

(m) Hood Canal summer-run chum salmon (*Oncorhynchus keta*). Includes all naturally spawned populations of summer-run chum salmon (and their progeny) in Hood Canal and its tributaries as well as populations in Olympic Peninsula rivers between Hood Canal and Sequim Bay, Washington; and

(n) Columbia River chum salmon (*Oncorhynchus keta*). Includes all naturally spawned populations of chum salmon (and their progeny) in the Columbia River and its tributaries in Washington and Oregon.

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