

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

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

The homing fidelity of salmon and steelhead has created a meta-population structure with discrete populations distributed among watersheds (McElhany *et al.*, 2000). Low levels of straying result in regular genetic exchange among populations, creating genetic similarities among populations in adjacent watersheds. Maintenance of the meta-population structure requires a distribution of populations among watersheds where environmental risks (e.g., from landslides or floods) are likely to vary. It also requires migratory connections among the watersheds to allow for periodic genetic exchange and alternate spawning sites in the case that

natal streams are inaccessible due to natural events such as a drought or landslide.

Areas Occupied by the Species at the Time of Listing

As described in ESA section 3(5)(A)(i), the agency will assemble the best available information to identify those "specific areas within the geographical area occupied by the species at the time it is listed . . . on which are found those physical or biological features . . . (I) essential to the conservation of the species and (II) which may require special management considerations or protection."

The ESA specifies that critical habitat is that habitat occupied by the species "at the time it is listed" (ESA section 3(5)(A)(i)). Due to their anadromous, highly migratory life cycle and the presence of multiple year classes or "cohorts," fish from a particular ESU are widely distributed at the time of listing. For example, at the time an ESU is listed the eggs from one cohort may be incubating in stream gravel while older cohorts are rearing in an estuary and still others are foraging in the North Pacific Ocean. Thus, the geographic area occupied is a vast and diverse array of habitats occupied simultaneously by various cohorts and life stages. NMFS' ESA regulations relevant to describing a "geographical area" and "specific areas" state that "each critical habitat will be defined by specific limits using reference points and lines as found on standard topographic maps of the area" (50 CFR 424.12). These regulations require that NMFS also identify the state(s), county(ies), or other local governmental units within which all or part of the critical habitat is located. However, the regulations note that such political units typically would not constitute the boundaries of critical habitat. In addition, the regulations state that ephemeral reference points (e.g., trees, sand bars) shall not be used in defining critical habitat. Distribution information for Pacific salmon and steelhead is available in three general formats: (1) maps and databases identifying specific river segments (i.e., data mapped as line segments); (2) maps and databases identifying entire watersheds (i.e., data mapped as polygons); and (3) textual descriptions. During the information-gathering phase, NMFS is seeking information in all available formats.

NMFS will seek the best scientific information available to make the designations as precise as practicable. Most of the data sources that NMFS has reviewed to date indicate that fish distribution can be mapped for most

watersheds at a scale of 1 to 100,000 or greater (*see StreamNet, 2003*). At this coarse scale, numerous streams and stream reaches that may contain physical and biological features essential to conservation do not appear (Roni *et al.*, 1997; *StreamNet, 2003*). Also, fish distribution maps are often based on a mix of empirical data (i.e., fish observations) and best professional judgement, and may not reflect the species' actual distribution in many stream reaches that have never been or have only occasionally been surveyed. During the information-gathering phase, NMFS is seeking information that will allow it to map specific river reaches, using reference points and lines as found on standard topographic maps, that (1) are currently occupied by the species and (2) contain essential physical and biological features. NMFS will seek input as to the accuracy and suitability of this approach, and the applicability of other approaches.

NMFS has not designated marine areas in previous critical habitat designations for salmon, except in the case of Puget Sound chinook salmon and Hood Canal summer-run chum salmon. This exclusion was due to the lack of identifiable special management considerations affecting marine habitat features (65 FR 7764, 7771, February 16, 2000). However, in the February 2000 rulemaking the agency noted that it would be re-evaluating this issue, especially in light of the recent marine area designations of EFH for Pacific salmon (Pacific Coast Salmon Fishery Management Plan, 2000). This notice seeks information on habitat in marine as well as freshwater areas.

Physical and Biological Features Essential for Conservation

Joint NMFS/FWS regulations for listing endangered and threatened species and designating critical habitat at section 50 CFR 424.12(b) state that the agency "shall consider those physical and biological features that are essential to the conservation of a given species and that may require special management considerations or protection (hereafter also referred to as "Essential Features"). Pursuant to the regulations, such requirements include, but are not limited to the following: (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, rearing of offspring, germination, or seed dispersal; and generally; (5) Habitats that are protected from disturbance or are representative of the historic