NATIONAL MARINE FISHERIES SERVICE POLICY DIRECTIVE 02-304 ***July 2005***
Protected Resources Management
POLICY ON THE CONSIDERATION OF HATCHERY-ORIGIN FISH IN ENDANGERED SPECIES ACT LISTING DETERMINTINATIONS FOR PACIFIC SALMON AND STEELHEAD
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OPR: F/PR (M. Nammack) **Certified by:** F/PR3 (A. Somma) **Type of Issuance:** Renewed July 2014
SUMMARY OF REVISIONS:

Species [1]		Where listed	Citation(s) for listing determination(s)	Citation for critical habitat designation
Common name	Scientific name			
Upper Columbia spring-run Chinook.	*Oncorhynchus tshawytscha*.	U.S.A., WA, including all naturally spawned populations of Chinook salmon in all river reaches accessible to Chinook salmon in Columbia River tributaries upstream of the Rock Island Dam and downstream of Chief Joseph Dam in Washington (excluding the Okanogan River), the Columbia River from a straight line connecting the west end of the Clatsop jetty (south jetty, Oregon side) and the west end of the Peacock jetty (north jetty, Washington side) upstream to Chief Joseph Dam in Washington, as well as six artificial propagation programs: the Twisp River, Chewuch River, Methow Composite, Winthrop NFH, Chiwawa River, and White River spring-run Chinook hatchery programs.	64 FR 14308, Mar. 24, 1999. June 28, 2005.	NA. [vacated 9/29/03; 68 FR 55900].
Central California Coast coho.	*Oncorhynchus kisutch* ...	U.S.A., CA, including all naturally spawned populations of coho salmon from Punta Gorda in northern California south to and including the San Lorenzo River in central California, as well as populations in tributaries to San Francisco Bay, excluding the Sacramento-San Joaquin River system, as well four artificial propagation programs: the Don Clausen Fish Hatchery Captive Broodstock Program, Scott Creek/King Fisher Flats Conservation Program, Scott Creek Captive Broodstock Program, and the Noyo River Fish Station egg-take Program coho hatchery programs.	61 FR 56138, Oct. 31, 1996. June 28, 2005.	64 FR 24049, May 5, 1999.
Southern California Steelhead.	*Oncorhynchus mykiss*	U.S.A., CA, including all naturally spawned populations of steelhead (and their progeny), in streams from the Santa Maria River, San Luis Obispo County, California, (inclusive) to the United States—Mexico Border.	62 FR 43937, Aug. 18, 1997. 67 FR 21586, May 1, 2002.	NA. [vacated 9/29/03; 68 FR 55900].
Upper Columbia River Steelhead.	*Oncorhynchus mykiss*	U.S.A., WA, including the Wells Hatchery stock all naturally spawned populations of steelhead (and their progeny) in streams in the Columbia River Basin upstream from the Yakima River, Washington, to the United States-Canada border.	62 FR 43937, Aug. 18, 1997.	NA. [vacated 9/29/03, 68 FR 55900].

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

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[FR Doc. 05–12351 Filed 6–27–05; 8:45 am]

BILLING CODE 3510–22–P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Parts 223 and 224

[Docket No. 040511148–5151–02; I.D. 050304B]

Policy on the Consideration of Hatchery-Origin Fish in Endangered Species Act Listing Determinations for Pacific Salmon and Steelhead

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

ACTION: Final policy.

SUMMARY: We, the National Marine Fisheries Service (NMFS), announce a final policy addressing the role of artificially propagated (hatchery produced) Pacific salmon (*Oncorhynchus gorbuscha*, *O. keta*, *O. kisutch*, *O. nerka*, *O. tshawytscha*) and steelhead (*O. mykiss*) in listing determinations under the Endangered Species Act of 1973 (ESA), as amended. This final policy supersedes the Interim Policy on Artificial Propagation of Pacific Salmon under the Endangered

Species Act, published in the **Federal Register** on April 5, 1993. The Interim Policy is being revised in light of a 2001 United States District Court ruling that NMFS improperly listed only the naturally spawning component of Oregon Coast coho salmon under the ESA, excluding hatchery stocks that the agency had determined were part of the same ''distinct population segment'' (DPS) as the listed natural populations. The Court's ruling invalidated the practice described in the Interim Policy of generally excluding hatchery stocks in a DPS from listing unless it was determined that they contained a substantial proportion of the DPS's remaining genetic diversity and were ''essential for recovery.'' Under this new policy, hatchery stocks determined to be part of a DPS will be considered in determining whether a DPS is threatened or endangered under the ESA, and will be included in any listing of the DPS. This policy applies only to Pacific salmon and steelhead and only in the context of making ESA listing determinations.

DATES: This policy is effective immediately, June 28, 2005.

ADDRESSES: Chief, NMFS, Protected Resources Division, 1201 NE Lloyd Boulevard, Suite 1100, Portland, OR 97232, Facsimile (503) 230–5441.

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

SUPPLEMENTARY INFORMATION:

Background

Statutory Provisions

NMFS is responsible for determining whether species, subspecies, or DPSs of Pacific salmon and steelhead are threatened or endangered under the Endangered Species Act (ESA) (16 U.S.C. 1531 *et seq.*) Section 3 of the ESA defines (i) an endangered species as ''any species that is in danger of extinction throughout all or a significant portion of its range'' and (ii) a threatened species as one ''which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.'' To be considered for listing as threatened or endangered under the ESA, a group of organisms must constitute a species, which is defined in section 3 of the ESA to include ''any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature.'' Since 1991, we have used the term ''evolutionarily significant unit'' (ESU) to refer to a DPS of Pacific salmon and steelhead, and have defined an ESU as a Pacific salmon or steelhead population or group of populations that (i) is substantially reproductively isolated from other conspecific populations, and (ii) represents an important component in the evolutionary legacy of the biological species (56 FR 58612; November 20, 1991). Section 4(b)(1)(A) of the ESA requires us to make listing determinations based solely on the best scientific and commercial data available, after conducting a review of the status of the species and after taking into account efforts being made to protect the species.

Past Pacific Salmon and Steelhead ESA Listings and the Alsea Decision

Since 1991, we have conducted ESA status reviews of six species of Pacific salmonids in California, Oregon, Washington, and Idaho, identifying 52 ESUs, with 25 ESUs currently listed as threatened or endangered. Hatchery stocks are associated with many ESUs, and the number of hatchery fish often exceeds the abundance of natural-origin fish. The relationship of hatchery stocks to populations of natural-origin fish, and the manner in which within-ESU hatchery stocks are considered in assessing an ESU's level of extinction risk, can significantly affect the scope and outcome of a listing determination.

In past status reviews, we based our extinction risk assessments on whether the natural-origin fish in an ESU are, by themselves, self-sustaining in their natural ecosystem over the long term. We listed as ''endangered'' those ESUs whose natural-origin populations were found to have a present high risk of extinction, and listed as ''threatened'' those ESUs whose natural-origin populations were found likely to become endangered in the foreseeable future. Although we recognized that artificial propagation can be used as a conservation tool and has the potential to help speed recovery of natural populations, we did not explicitly consider the contribution of hatchery fish to the current overall viability of the ESU, or whether the presence of hatchery fish within the ESU might have the potential for reducing the risk of extinction of the ESU or the likelihood that the ESU would become endangered in the foreseeable future. (The listing of Snake River fall Chinook, however, is an exception. See 57 FR 14653; April 22, 1992.) We also recognized that artificial propagation can pose a variety of threats to the long-term persistence of the natural-origin populations within an ESU.

Under a 1993 Interim Policy on the consideration of artificially propagated Pacific salmon and steelhead under the ESA (April 5, 1993; 58 FR 17573), if it was determined that an ESU warranted listing, we then reviewed the associated hatchery stocks to determine if they were part of the ESU. We did not include hatchery stocks in an ESU if: (1) information indicated that the hatchery stock was of a different genetic lineage than the listed natural populations; (2) information indicated that hatchery practices had produced appreciable changes in the ecological and life-history characteristics of the hatchery stock and these traits were believed to have a genetic basis; or (3) there was substantial uncertainty regarding the relationship between hatchery fish and the existing natural population(s). The Interim Policy provided that hatchery salmon and steelhead found to be part of an ESU would not be listed under the ESA unless they were found to be essential for the ESU's recovery (i.e., if we determined that the hatchery stock contained a substantial portion of the genetic diversity remaining in the ESU). The result of the Interim Policy was that a listing determination for an ESU depended solely upon the relative health of the natural populations in an ESU, and that most hatchery stocks determined to be part of an ESU were excluded from any listing of the ESU.

Subsequently, in *Alsea Valley Alliance* v. *Evans*, 161 F. Supp.2d 1154 (D. Or. 2001), appeal dismissed, (*Alsea* decision), the United States District Court for the District of Oregon, set aside our 1998 ESA listing of Oregon Coast coho salmon (*O. kisutch*) because it impermissibly excluded hatchery fish within the ESU from listing. The court ruled that the ESA does not allow listing a subset of an ESU or DPS, and that we had improperly excluded stocks from the listing that we had determined were part of the ESU. Although the court's ruling affected only one ESU, the interpretive issue raised by the ruling called into question the validity of the Interim Policy implemented in nearly all of our Pacific salmon and steelhead listing determinations.

Accordingly, we announced that we would revise the 1993 Interim Policy (67 FR 6215; February 11, 2002), and on June 3, 2004, published in the **Federal Register** a proposed policy for the consideration of hatchery-origin fish in ESA listing determinations (proposed hatchery listing policy; 69 FR 31354).

Summary of Proposed Hatchery Listing Policy

The intent of the proposed policy is to provide guidance to NMFS personnel for considering hatchery-origin fish in making ESA listing determinations for Pacific salmon and steelhead. Specifically, the policy proposed: criteria for including hatchery stocks in ESUs; guidance for considering hatchery fish in extinction risk assessments of ESUs; and a decision that hatchery fish determined to be part of an ESU will be included in any listing of the ESU, consistent with the *Alsea* ruling. The proposed policy reaffirmed application of the ESU policy in delineating DPSs eligible for ESA listing. We proposed that hatchery stocks be considered part of an ESU if they exhibit a level of genetic divergence relative to local natural populations that is no more than what would be expected between closely related populations within the ESU. We proposed that status determinations be based on the status of the entire ESU, including both natural populations and hatchery stocks in the ESU. We emphasized that the policy would be applied in support of a stated purpose of the ESA to conserve species and the ecosystems upon which they depend. We further emphasized that natural populations are the best indicator of a species' health. Status determinations would be based on the risks to the abundance, productivity, spatial structure, and diversity of an ESU, and how the hatchery-origin fish within the ESU affect each of these attributes. In the proposed policy we also reaffirmed our commitment to fulfilling trust and treaty obligations with regard to the tribal harvest of some Pacific salmon and steelhead populations. Tribal harvest, non-tribal harvest, and other beneficial uses of surplus listed hatchery fish may be allowed provided they are managed consistent with the conservation and recovery needs of listed salmon and steelhead ESUs. Specifically, NMFS proposed to allow for the harvest of hatchery fish listed as threatened that are surplus to the conservation and recovery needs of the ESU, in accordance with fishery management plans approved under section 4(d) of the ESA.

Public Comment Periods, Public Hearings, and Peer Review

With the publication of the proposed hatchery listing policy we announced a 90–day public comment period extending through September 1, 2004. In **Federal Register** notices published on August 31, 2004 (69 FR 53093), September 9, 2004 (69 FR 54637), and October 8, 2004, (69 FR 61347), we extended the public comment period for the proposed policy through November 12, 2004. The public comment period for the proposed hatchery listing policy was open for 162 days. Additionally, we held 14 public hearings (at eight locations in the Pacific Northwest, and six locations in California) to provide additional opportunities and formats to receive public input (69 FR 53039, August 31, 2004; 69 FR 54620, September 9, 2004; 69 FR 61347, October 8, 2004). In December 2004, the Office of Management and Budget (OMB) issued a Final Information Quality Bulletin for Peer Review establishing minimum peer review standards, a transparent process for public disclosure, and opportunities for public input. The OMB Peer Review Bulletin, implemented under the Information Quality Act (Public Law 106–554), is intended to provide public oversight on the quality of agency information, analyses, and regulatory activities, and applies to information disseminated on or after June 16, 2005. We solicited technical review of the proposed hatchery listing policy from over 50 independent experts selected from the academic and scientific community, Native American tribal groups, Federal and state agencies, and the private sector. We have determined that the independent expert review conducted for the science involved in this policy, and the comments received from several academic societies and expert advisory panels, constitute adequate prior review under section II.2 of the OMB Peer Review Bulletin (NMFS, 2005).

Summary of Comments and Recommendations

In response to the request for information and comments on the proposed hatchery listing policy, we received over 27,000 comments by fax, standard mail, and e-mail. The majority of the comments received were from interested individuals who submitted form letters or form e-mails. Comments were also submitted by state and tribal natural resource agencies, fishing groups, environmental organizations, home builder associations, academic and professional societies, expert advisory panels (including NMFS' Recovery Science Review Panel, the Independent Science Advisory Board, and the State of Oregon's Independent Multidisciplinary Science Team), farming groups, irrigation groups, and individuals with expertise in Pacific salmon and steelhead, and artificial propagation. The public comments expressed a wide range of views about how hatchery-origin fish should be considered in ESA listing decisions for Pacific salmon and steelhead.

We also received comments from four of the independent experts from whom we had requested technical review of the proposed policy. The independent expert reviewers noted several concerns with the proposed Hatchery Listing Policy including: vague and imprecise policy language; an apparent de-emphasis of the importance of naturally spawned self-sustaining populations for the conservation and recovery of salmon and steelhead ESUs, and the goal of the ESA to conserve the ecosystems upon which they depend; accumulation of long-term adverse impacts of artificial propagation due to unavoidable artificial selection and domestication in the hatchery environment; and the lack of scientific evidence that artificial propagation can contribute to the productivity and conservation of viable natural populations over the long term. Two of the reviewers felt that hatchery fish are inherently different from wild fish and should not be included in ESUs, and were concerned that the inclusion of hatchery fish in ESUs would jeopardize the conservation and recovery of native salmon and steelhead populations in their natural ecosystems. The other two reviewers were supportive of the scientific basis for including hatchery fish in ESUs, but felt that the policy did not appropriately emphasize that the conservation and recovery of listed ESUs depends upon the viability of wild populations and natural ecosystems over the long term.

There was substantial overlap between the comments from the independent expert reviewers, the independent scientific panels and academic societies, and the substantive public comments. Some of the comments received were not pertinent to the Hatchery Listing Policy and are not addressed below. We will consider and address comments relating to other determinations (for example, the proposed listing determinations for 27 West Coast salmon and steelhead ESUs (69 FR 33102; June 14, 2004), the proposed critical habitat designations for 20 West Coast salmon and steelhead ESUs (69 FR 74572, December 14, 2004; 69 FR 71880, December 10, 2004), and the biological opinion on the Federal Columbia River Power System (see *http://www.salmonrecovery.gov/R*▮*biop*▮*final.shtml*)) in the context of those determinations. The summary of comments and the responses below are organized into four categories: (1) comments regarding the scope of the proposed policy; (2) comments

regarding the composition of ESUs; (3) comments regarding the assessment of extinction risk of ESUs; and (4) comments of an editorial nature.

Scope of Policy

Issue 1: Several commenters felt that the proposed policy would have significant implications beyond making ESA listing determinations of threatened or endangered under section 4(b) of the ESA. These commenters faulted the proposed policy for not elaborating on how hatchery-origin fish will be considered in: determining whether Federal agency actions are ''likely to jeopardize the continued existence of endangered species or threatened species'' under section 7(a)(2) of the ESA; and developing recovery plans and delisting goals that establish ''objective, measurable criteria which, when met, would result in the determination ... that the species be removed from the list'' under section 4(f)(1)(B)(ii) of the ESA.

Response: As emphasized in the notice of proposed policy, this new hatchery listing policy applies only to ESA listing determinations for Pacific salmon and steelhead. In the proposed policy, we stated that separate guidance will be provided on how artificial propagation programs may contribute to salmon and steelhead conservation and recovery, in the context of ESA consultations, permitting, and recovery planning. In collaboration with regional state and tribal co-managers, we are developing draft guidance. Once completed we will make this draft guidance available for public review and comment. Additionally, we are developing draft recovery plans for listed Pacific salmon and steelhead ESUs. These recovery plans will establish biological and threats criteria that if satisfied would result in a proposal to remove the ESU from ESA protections, and will be informed by ESU-specific factors including artificial propagation.

The final hatchery listing policy described in this notice applies only to determinations of what constitutes a species for ESA listing consideration, and to determinations of whether the defined species warrants listing as threatened or endangered.

Issue 2: One commenter felt that we had not fulfilled our requirements under the National Environmental Policy Act (NEPA) by not evaluating a range of alternative actions to the proposed hatchery listing policy. The commenter argued that the proposed policy constitutes a major Federal action significantly affecting human health and the environment such that it requires the preparation of an environmental impact statement (EIS).

Response: We do not agree with the commenter that the proposed hatchery listing policy or this final policy is subject to the requirements of NEPA. The hatchery listing policy represents our interpretation of statutory terms, including ''species,'' ''endangered,'' and ''threatened.'' Agency interpretations of statutory terms are not major Federal actions under NEPA. Moreover, ESA listing decisions are non-discretionary actions by the agency which are exempt from the requirement to prepare an environmental assessment or EIS under NEPA. See NOAA Administrative Order 216 6.03(e)(1) and *Pacific Legal Foundation* v. *Andrus*, 675 F. 2d 825 (6th Cir. 1981).

Issue 3: Several commenters felt that the hatchery listing policy should require a mandatory periodic review of the best available scientific information regarding the benefits and risks of artificial propagation, as well as of the ESU relationships of hatchery fish being propagated within the geographic range of listed ESUs. Commenters were concerned that in many areas there are no programs in place to monitor the impacts of hatchery programs with respect to ESU status determinations.

Response: The commenters raise a valid concern that in many instances there are limited available information or monitoring programs in place to evaluate the impacts (positive or negative) of specific hatchery programs on local natural populations. Through the process of developing Hatchery and Genetic Management Plans (HGMPs), we are collaborating with co-managers and hatchery managers to ensure that hatchery programs are operated in a manner consistent with the conservation and recovery of listed salmon and steelhead ESUs. Through this process we expect that monitoring and evaluation protocols will be implemented consistently among hatchery programs, and that the availability of information to evaluate the contributions of artificial propagation will improve.

This policy interprets several statutory terms (such as ''species,'' ''endangered,'' and ''threatened'') as instructive guidance to NMFS staff in considering artificial propagation in ESA status reviews and listing determinations for Pacific salmon and steelhead. In developing this policy we found it unnecessary to build in a requirement for periodic review. Interpretive guidance, such as this policy, is subject to updating as new information becomes available. We intend to review the relationships of hatchery programs to listed ESUs as sufficient new information becomes available to indicate that such a review is warranted. Similarly, if substantial new scientific information becomes available regarding the benefits and risks of artificial propagation, we may reconsider the approach described in this policy to ensure that it is based upon the best available information.

Composition of ESUs

As reflected in the issues summarized below, the comments express the full range of opinion regarding the inclusion of hatchery-origin fish in ESUs for listing consideration. Some commenters felt that hatchery fish should not be included in ESUs under any circumstances, while others felt that hatchery-origin fish should be included in ESUs but disagreed with the threshold for inclusion presented in the proposed policy.

Issue 4: Several commenters felt that the ESA does not allow including hatchery-origin fish as part of a species for listing consideration. The commenters argued that protecting hatchery-origin fish that are dependent on active human intervention, and that are absent from the natural ecosystem for part of their life cycle, is contradictory to the stated purposes of the ESA which include ''to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved'' (ESA section 2(b)). The commenters noted that the ESA defines artificial propagation as a method of conserving threatened and endangered species (ESA section 3(3)), but contended that protecting recovery programs (in this case, hatchery programs and the hatchery stocks they produce) is not the intent of the ESA. The commenters argued that the ESA clearly separates the species to be listed (natural populations in their natural ecosystems) from the ''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'' (ESA section 3(3), definition of ''conserve,'' ''conserving,'' and ''conservation'').

Response: In arguing that the ESA precludes including hatchery-origin fish in ESUs, the commenters argue that non-biological criteria should factor into the delineation of species for listing consideration (such as interpretations of the ESA's intent, the aesthetic value of species, and their ecological significance). We agree that the intent of the ESA is to conserve natural self-sustaining populations and functioning

ecosystems. However, in developing and adopting the ESU policy the agency chose not to include inherently non-biological considerations in delineating DPSs. The ESU concept emphasizes the unique genetic diversity within a species and the importance of conserving distinct evolutionary lineages. We believe that attempting to preserve populations for their aesthetic, ecological, scientific, or recreational value without regard to the underlying genetic basis for diversity focuses on attributes that are not directly related to the long-term survival of the species. The ESU concept recognizes that, under certain circumstances, important genetic resources may reside in hatchery stocks. We believe that the ESU policy's interpretation of the statutory definition of ''species'' is consistent with the goal of the ESA to conserve genetic resources, both within and between species. If this goal is achieved, then other benefits of biodiversity and esthetic values will follow. NMFS' basis for not including the policy interpretations highlighted by the commenters in delineating ESUs is more thoroughly discussed in the response to comments in the final ESU policy (56 FR 58612; November 20, 1991). Further, under the *Alsea* decision, once we determine that an ESU includes a hatchery component, that component must be considered with the naturally spawning component in the listing decision (i.e., NMFS may not list only a portion of an ESU).

Issue 5: One commenter argued that the ESA does not allow identifying an entity as both a threat and part of the species considered for listing. The commenter cited a recent District Court ruling that invalidated USFWS' listing determination for Westslope cutthroat trout (*O. clarki lewisi*) (*American Wildlands* v. *Norton*, 193 F. Supp. 2d 244 (D.D.C., 2002)). USFWS identified hybridization as a threat, but included hybridized fish in its assessment that the subspecies did not warrant listing under the ESA because abundant populations remained well distributed. The court ruled that USFWS' stated rationale for the inclusion of hybrid stocks in the entity considered for listing in that case was arbitrary and capricious. The commenter argues that, consistent with the court's ruling, hatchery fish cannot be simultaneously regarded as a risk to natural populations of Pacific salmon and steelhead and included in an ESU for listing consideration.

Response: The issues raised in *American Wildlands* v. *Norton* are an important consideration in determining whether a hatchery stock is part of a salmon or steelhead ESU. It may be appropriate to consider the threats faced by an ESU (such as risks posed by artificial propagation) when determining what constitutes a species under the ESA. We recognize that artificial propagation under certain circumstances can pose threats to natural populations, such as when it results in genetic dilution or direct competition with native populations. We also recognize that hatchery stocks may exhibit differences in behavior, genetic composition, morphological traits, and reproductive fitness from natural populations. However, conservation hatchery stocks under certain circumstances may exhibit few selective differences from the local natural population(s), and they may reduce the immediacy of extinction risk for an ESU. We think it is inappropriate to make universal conclusions about all hatchery stocks, but think their relatedness to natural populations and the relative risks and benefits they pose need to be evaluated on a case-by-case basis. The presence of substantive differences between hatchery stocks and natural populations provides a valuable indicator of divergence for determining whether a particular hatchery stock reflects an ESU's ''reproductive isolation'' and ''evolutionary legacy'' such that the hatchery stock should be included in the ESU, and for determining whether a given hatchery stock represents a net threat to the local natural populations in the ESU.

The *American Wildlands* v. *Norton* ruling faulted USFWS' listing determination for: (1) not providing a scientifically based explanation for its decision to include hybridized fish in its assessment of the Westslope cutthroat trout's current distribution; and (2) for not explaining how hybridized fish might contribute to the viability of the species or that some degree of hybridization is benign. This final policy provides a framework for explicitly considering hatchery-origin fish in listing determinations. The final policy requires that the relationship, risks, benefits, and uncertainties of specific hatchery stocks to the local natural population(s) be documented. We believe that listing determinations under this final policy will not suffer from the shortcomings highlighted by the court's ruling in *American Wildllands* v. *Norton*, given the transparent consideration of within-ESU and out-of-ESU hatchery-origin fish required by the policy.

Issue 6: Many commenters presented biological and policy arguments in support of excluding all hatchery-origin fish from ESUs. Commenters contended that artificial selection is unavoidable in the hatchery environment, altering the evolutionary trajectory of hatchery-origin fish such that they no longer represent the evolutionary legacy of the ESU. Commenters discussed scientific studies demonstrating that hatchery-origin fish differ from naturally-spawned fish in physical, physiological, behavioral, reproductive and genetic traits, and cited additional scientific studies indicating that artificial selection in hatcheries can result in diminished reproductive fitness in hatchery-origin fish in only one generation. Commenters argued that hatchery-origin and natural-origin fish should not be included in the same ESU because of these differences. Commenters also noted scientific studies describing negative ecological, reproductive, and genetic effects of hatchery stocks on natural populations. The commenters were concerned that including hatchery fish in an ESU confounds the risk of extinction in the wild with the ease of producing fish in a hatchery and ignores important biological differences between wild and hatchery fish. These commenters argued that hatcheries pose significant threats to the viability of salmon and steelhead ESUs, and thus should not be included as part of the same species under consideration for ESA protections.

In addition to the above arguments presented, commenters also recommended alternative approaches that would allow for the exclusion of all hatchery-origin fish from ESUs. Some commenters recommended revising the ESU policy to explicitly exclude hatchery-origin fish from ESUs. Others recommended that interpreting the ''reproductive isolation'' criterion of the ESU policy in light of the DPS policy would result in hatchery-origin fish being excluded from ESUs. These commenters argued hatchery fish satisfy the ''discreteness'' test of the DPS policy because they are ''markedly separated from other populations of the same taxon as a consequence of physical, physiological, ecological, or behavioral factors,'' and thus would not merit inclusion in the same DPS as natural populations.

Response: The derivation of hatchery stocks from local natural populations, and the established practice of incorporating natural fish into hatchery broodstock, can result in hatchery stocks and natural populations that share, to a considerable degree, the same genetic and ecological evolutionary legacy. Under this final policy we will evaluate individual hatchery programs and describe the relationship of the hatchery stocks they produce to the

local natural population(s) on the basis of: stock origin and the degree of known or inferred genetic divergence between the hatchery stock and the local natural population(s); and the similarity of hatchery stocks to natural populations in ecological and life-history traits. Although certain hatchery programs will be determined to be reproductively isolated and not representative of the evolutionary legacy of an ESU, we do not believe that it is scientifically supportable to make such a conclusion universally for all hatchery stocks. Many hatchery stocks are reproductively integrated with natural populations in an ESU and exhibit the local adaptations composing the ESU's ecological and genetic diversity. The shared evolutionary legacy of these hatchery stocks and their regular integration with natural populations does not support the universal exclusion of hatchery stocks from ESUs containing natural fish. We recognize that artificial selection in the hatchery environment may be unavoidable, that a well-managed hatchery stock could eventually diverge from the evolutionary lineage of an ESU, and that a poorly managed hatchery stock could quickly diverge from the evolutionary lineage of an ESU. However, the potential for divergence is not adequate justification for the universal exclusion of hatchery fish from an ESU. The ESU policy recognizes that the genetic resources that represent the ecological and genetic diversity of a species can reside in fish spawned in a hatchery as well as in fish spawned in the wild. Consistent with the ESU policy, a hatchery program should be excluded from an ESU if it exhibits genetic, ecological or life-history traits indicating that it has diverged from the evolutionary legacy of the ESU.

Issue 7: Several commenters criticized the proposed threshold for including hatchery stocks in an ESU as being overly inclusive, saying that the threshold was arbitrary and that no scientific rationale was provided as to its appropriateness. These commenters felt that the threshold would result in the inclusion of hatchery programs with divergent behavioral and life-history traits that would pose threats to the local natural population(s). These commenters argued that hatchery stocks should be included in an ESU only if they exhibit minimal divergence from the local natural population(s), regularly incorporate a substantial portion of natural-origin fish as broodstock, represent a substantial portion of the remaining ecological and genetic resources, and if it is likely that without the hatchery program propagating the hatchery stock the natural populations in the ESU would go extinct.

Other commenters criticized the proposed threshold for including hatchery stocks in an ESU as being overly restrictive, saying that the threshold was arbitrary and that no scientific rationale was provided as to its appropriateness. These commenters argued that hatchery-origin fish are derived from natural fish, spawn naturally and interbreed with natural-origin fish, and in most cases are physically and genetically indistinguishable from natural-origin fish. These commenters further argued that the ESA defines a species as including any subspecies or vertebrate DPS which ''interbreeds when mature,'' and thus hatchery-origin fish should be included in ESUs in all circumstances where natural-origin fish are incorporated into the broodstock or hatchery-origin fish spawn naturally with natural-origin fish.

Response: A key feature of the ESU concept is the recognition of genetic resources that represent the ecological and genetic diversity of the species (Waples, 1991). Considering the relationship of hatchery populations in the initial considerations of ESU delineation properly recognizes that these genetic resources may reside in hatchery fish as well as in natural-origin fish.

In applying the ESU policy and identifying those hatchery stocks that are part of an ESU, we are mindful of two types of risks. An overly restrictive approach to determining whether a hatchery stock should be included in an ESU risks excluding potentially important genetic resources. If the ESU is listed, the protections of the ESA would not be available to conserve these resources, and biologically appropriate conservation options may be lost or limited. Conversely, an overly inclusive approach risks including hatchery stocks that are not genetically similar to the native natural population, and would reduce the fitness of the natural population if they or their progeny spawn naturally and interbreed with the natural population. Either type of error may adversely affect the long-term viability of a listed species.

We had essentially three choices of qualitative thresholds for including hatchery stocks in an ESU: (1) Minimal divergence of a hatchery stock from the local natural population(s); (2) moderate divergence from the local natural population(s) (characterized by genetic divergence relative to the local natural population(s) that is no greater than would be expected between closely related natural populations in the ESU); and (3) substantial divergence from the local natural population(s) (characterized by genetic divergence relative to the local natural population(s) that is comparable to the maximum amount of divergence to be expected among natural populations in the ESU). Mindful of the risk of being overly inclusive and overly restrictive, we proposed a threshold for including hatchery stocks that represents a balance of both types of risks. We recognize that in the majority of cases data will not be available to quantitatively assess relative levels of genetic divergence. Short of empirical genetic data, strong biological indicators of reproductive isolation and genetic divergence are: the length of time the hatchery stock has been isolated and the degree of domestication selection; the degree to which natural broodstock has been regularly incorporated into the hatchery population; the history of incorporating non-ESU fish or eggs into the hatchery population; the attention given to genetic considerations in selecting and mating broodstock; and the use of genetic engineering or cytological manipulation. Additional considerations include whether the hatchery stock exhibits traits (e.g., size and age at return, spawning time, etc.) that are substantially different from the natural-origin fish adapted to the area, and whether there is reason to believe that these traits have a genetic basis rather than simply being an artifact of the hatchery rearing environment. If there is evidence that a hatchery stock is reproductively isolated from the local natural population(s) in the ESU, and has diverged from the evolutionary lineage represented by the ESU, the hatchery stock will not be considered part of the ESU.

We recognize that there was considerable confusion generated by the genetic divergence standard in point (2) of the proposed policy (''Hatchery fish with a level of genetic divergence between the hatchery stocks and the local natural populations that is no more than what would be expected between closely related populations within the ESU: (a) are considered part of the ESU ...''). We have made changes in the final policy to clarify this threshold for the inclusion of hatchery stocks in an ESU (see ''Changes from the Proposed Policy'' section, below). The purpose of the genetic divergence standard in point (2) of the policy is to assure that hatchery stocks that can contribute to the survival or recovery of an ESU are taken into account at the time of a listing decision. In general

those will only be hatchery stocks that are related to the salmon or steelhead within the ESU, and that thus have a considerable degree of genetic similarity to the naturally-spawning fish. NMFS recognizes that there are a number of ways to compute and compare genetic divergence and that it is not possible to sample all fish within the ESU to precisely determine the range of genetic diversity within an ESU. For the purposes of the 2005 listing determinations, NMFS has included as part of each ESU those hatchery stocks with a level of genetic divergence relative to the local natural population(s) that is no more than what would be expected between the closely related natural populations within the ESU. Depending on the information available and the state of the science regarding determination of genetic relationships, NMFS may use other methods in future determinations.

Issue 8: Many commenters felt that the proposed threshold was overly focused on genetic characteristics, and failed to explicitly consider ecological and life-history traits that are known to impact reproductive fitness and likely are (at least in part) heritable. These commenters pointed out that in most circumstances quantitative information on the genetic differentiation of a specific hatchery stock relative to the local natural population(s) is not available. The commenters argued that, given the poor availability of genetic data, application of such a focus on genetics would make the decision of whether a hatchery stock is part of an ESU ambiguous, highly subjective, and arbitrary. Other commenters felt that the emphasis on genetic characteristics represented an incomplete treatment of the ESU policy's two criteria for defining an ESU: (1) that the populations be ''reproductively isolated'' and (2) that the populations represent an important component in the ''evolutionary legacy'' of the species. The commenters observed that the ESU policy notes that information on genetic differentiation is most useful in determining reproductive isolations. The commenters argued that the proposed threshold addresses the ''reproductive isolation'' component of the ESU policy, but fails to establish criteria for determining whether hatchery stocks are also representative of an ESU's ''evolutionary legacy.'' The commenters argue that a hatchery stock should not be included in an ESU unless it reflects: (1) the level of reproductive isolation characteristic of the natural populations in the ESU; and (2) the ecological, life-history, and genetic diversity that compose the ESU's evolutionary legacy.

Response: We agree with the commenters that in many cases empirical genetic data are not available to quantitatively assess the level of genetic differentiation and reproductive isolation of a hatchery stock relative to the local natural population(s). However, as stated in the preceding response to Issue 7, in lieu of empirical genetic data there are a number of proxies that can inform a qualitative assessment of the level of genetic divergence and reproductive isolation (such as stock isolation, selection of run timing, the magnitude and regularity of incorporating natural broodstock, the incorporation of out-of-basin or out-of-ESU eggs or fish, mating protocols, etc.). The ESA requires that we review the status of the species based upon the best available scientific and commercial information, and in many instances the agency must rely on surrogate information when quantitative genetic data are not available to assist in determining the ''species'' under consideration.

We disagree with the commenters that the threshold for including hatchery fish in an ESU, as articulated in the proposed policy, fails to address both the ''reproductive isolation'' and the ''evolutionary legacy'' criteria of the ESU policy. As the response to Issue 7 (above) described, considerations in determining the level of overall differentiation exhibited by a hatchery stock include the consideration of both ESU policy criteria. Information regarding the origin, isolation, and broodstock and mating protocols of a hatchery stock help determine its level of reproductive isolation from the local natural population(s). Information regarding the behavioral and life-history traits of a hatchery stock help inform evaluations of whether it is representative of an ESU's evolutionary legacy. A hatchery stock may also be representative of an ESU's evolutionary legacy if it supports introduced natural populations (outside the historic range of the species) in areas that are ecologically similar to and geographically near the source natural population(s) (Waples, 1991). If there is evidence that a hatchery stock is reproductively isolated from the local natural population(s) in an ESU, and has diverged from the evolutionary lineage represented by the ESU, the hatchery stock will not be considered part of the ESU.

Issue 9: Other commenters felt that the proposed threshold inappropriately compares genetic divergence in hatchery stocks with genetic variability among natural populations. These commenters contended that genetic differentiation of a hatchery stock relative to the local natural population(s) is attributable to domestication and artificial selection in the artificial hatchery environment, while genetic differentiation among closely related natural populations in an ESU is attributable to natural selection which uniquely adapts a group of natural-origin fish to local environmental conditions, habitat features, and ecological processes. The commenters argued that including genetic variability in an ESU caused by domestication and artificial selection (in the form of hatchery-origin fish considered part of an ESU) would erode the reproductive fitness and evolutionary legacy of the defined ESU. Other commenters similarly argued that hatchery-origin fish might not show appreciable genetic differentiation at neutral genetic markers, yet they are subjected to different selective pressures that would adversely affect their survival and reproductive success in the wild, and thus by definition are not part of an ESU's evolutionary legacy forged by natural selective pressures over thousands of years.

Response: The commenters raise a valid concern. A risk of applying an overly inclusive standard for hatchery membership in an ESU is that domesticated hatchery stocks might be regarded as part of an ESU but would erode the genetic diversity and reproductive fitness of the ESU if they spawned naturally and interbred with locally adapted natural populations. As described in the response to Issue 7 (above), the proposed standard for including hatchery stocks in an ESU balances this risk with the risk of being overly restrictive and excluding ecological, life history, and genetic resources from an ESU that may prove necessary for its conservation and recovery.

Evaluating Extinction Risk

As with the comments received regarding the composition of ESUs (summarized above), the comments received concerning the consideration of hatchery-origin fish in assessing an ESU's level of extinction risk express the full range of opinion. Some commenters felt that extinction risk assessments should be based entirely on the status of natural populations, while others felt that hatchery-origin fish could be factored into risk assessments in the context of their contributions to the performance of natural populations, and others felt that extinction risk assessments should be based on the

abundance of fish in an ESU without discrimination between the means (spawning in a hatchery versus in the natural environment) by which the fish are produced. Although individual opinions varied considerably, as did the rationale presented in support of a particular opinion, it is possible to summarize the major themes, which we have done below.

Issue 10: Many commenters criticized the policy for appearing to de-emphasize the importance of natural populations in evaluating extinction risk. Commenters argued that the purpose of the ESA to ''provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved'' (ESA section 2(b)) appropriately establishes the fundamental importance of self-sustaining natural populations in functioning ecosystems in evaluating an ESU's status. Commenters felt that statements in the proposed policy reduced the importance of natural populations to: an optional consideration in evaluating extinction risk (for example, ''the ESA does not preclude NMFS from giving special recognition to natural-origin fish as a measure of the sustainability of the natural ecosystem,'' 69 FR at 31357); and ''a point of comparison for the evaluation of the effects of hatchery fish on the likelihood of extinction of the ESU'' (69 FR at 31358)). Commenters stated that a reasonable interpretation of the proposed policy is that an ESU could be found to not warrant listing under the ESA even if it was permanently reliant on artificial propagation. Commenters noted that such an interpretation would contradict the Joint NMFS-USFWS Policy on the Controlled Propagation of Species Listed under the ESA (65 FR 56916; September 20, 2000) which unambiguously states that ''[c]ontrolled propagation is not a substitute for addressing factors responsible for a * * * species' decline,'' as well as the interpretation of the ESA's purpose articulated in the 1993 Interim Policy that the ESA ''mandates the restoration of threatened and endangered species in their natural habitats to a level at which they can sustain themselves * * *'' (58 FR 17573; April 5, 1993). Commenters criticized the proposed policy for failing to provide any explanation for the apparent change in emphasis on natural populations and functioning ecosystems. Commenters noted that they were aware of no empirical or theoretical scientific information that would justify such a policy change, nor of any legal findings that would explain the apparent shift in interpretation of the ESA's purpose.

Response: As stated in a May 14, 2004, letter to the U.S. Congress, the Undersecretary of Commerce for Oceans and Atmosphere emphasized that the ''central tenet of the hatchery policy is the conservation of naturally spawning salmon populations and the ecosystems upon which they depend,'' and that NOAA did not believe that the purposes of the ESA would be satisfied by having all the salmon in an ESU in a hatchery (Lautenbacher, 2004). This policy does not represent a shift in interpretation, but rather recognizes the contribution that properly managed hatchery programs may provide. We have made clarifying changes in the final policy affirming that it is consistent with section 2(b) of the ESA (see ''Changes from the Proposed Policy'' section, below).

Issue 11: Several commenters were critical of the proposed policy, not for considering hatchery-origin fish in determining an ESU's listing status, but for where in the status evaluation process artificial propagation was to be considered. These commenters argued that artificial propagation and hatchery-origin fish are more appropriately considered in the context of ''taking into account those efforts, if any, being made by any State or foreign nation, or any political subdivision of a State or foreign nation, to protect such species, whether by predator control, protection of habitat and food supply, or other conservation practices'' (ESA section 4(b)(1)(A)). Commenters contended that the ESA defines artificial propagation as a method of conservation (ESA section 3(3)), and that the ESA directs that such ''conservation practices'' be considered in the context of efforts being made to protect the species, not as part of the biological extinction risk assessment based on the demographic performance of natural populations. Commenters argued that the joint NMFS-USFWS Policy for Evaluating Conservation Efforts When Making Listing Decisions (PECE; 68 FR 15100; March 28, 2003) provides guidance for evaluating the certainty that specific artificial propagation efforts will be reliably implemented and effective in mitigating the level of an ESU's extinction risk. Commenters felt that, by integrating hatchery-origin fish into the scientific assessment of extinction risk for natural populations, the proposed policy makes unsubstantiated implicit assumptions regarding uncertainties of artificial propagation including that: societal priorities will remain unchanged such that current staffing, funding, and facility requirements for hatchery programs will be maintained; permitting and other state and Federal regulatory authorizations and requirements will remain unchanged; the relative risks and benefits associated with specific hatchery programs are fully known; there are no temporal trade-offs between short-term benefits and accumulated risks over the long term; hatchery supplementation contributes to sustainable increases in abundance and productivity of natural populations; and natural populations will persist at abundance levels sufficient to meet hatchery broodstock needs and production goals. The commenters contended that these and other implicit assumptions are unsubstantiated, and a more objective and transparent treatment of uncertainties associated with artificial propagation would be provided by evaluating specific hatchery programs in the context of other protective efforts being made to protect the ESU under PECE. Other commenters believe that hatcheries universally pose threats to the viability of salmon and steelhead ESUs, and should only be considered in the context of evaluating the factors for a species' decline (i.e., ESA section 4(a)(1)(A)–(E)).

Response: We agree that assessing the relative risks and benefits of individual hatchery stocks requires an evaluation of the certainty that a given hatchery program will be implemented and effective. The PECE provides a useful framework for evaluating conservation programs, that is also applicable to evaluating the contributions of artificial propagation to the viability or risk of extinction of an ESU. However, we do not believe that it is possible to extricate hatchery stocks from analyses of extinction risk, particularly in the many instances where there is appreciable gene flow between natural populations and hatchery stocks (for example, when natural-origin fish and hatchery fish are substantially mixed on the spawning grounds and together represent an interbreeding population). We will evaluate the likelihood of implementation and effectiveness of a hatchery program in assessing its contribution to the abundance, productivity, spatial structure, or diversity of an ESU.

Issue 12: A few commenters felt that extinction risk should be evaluated based on the total abundance of fish within the defined ESU without discriminating between fish of hatchery or natural origin. These commenters contended that the District Court in *Alsea* ruled that once an ESU is defined, risk determinations should not discriminate among its components.

The commenters described the risk of extinction as the chance that there will be no living representatives of the species, and that such a consideration must not be biased toward a specific means of production (artificial or natural).

Response: The *Alsea* court ruled that if it is determined that a DPS warrants listing, all members of the defined species must be included in the listing. The court did not rule on how the agency should determine whether the species is in danger of extinction or likely to become so in the foreseeable future. We also do not agree with the commenters' assertion that the viability of an ESU is determined by its total abundance. The risk of extinction of an ESU depends upon the number, productivity, geographic distribution, and diversity of its component populations (Viable Salmonid Populations (VSP) criteria; McElhany *et al.*, 2000; Ruckelshaus *et al.*, 2002). In addition to having sufficient abundance, viable ESUs and populations have sufficient productivity, diversity, and a spatial distribution to survive environmental variation and natural- and human-caused catastrophes.

Issue 13: Many commenters contended that the proposed hatchery listing policy either largely ignored the best available scientific information on risks associated with artificial propagation, overstated uncertainties associated with these risks, or was overly optimistic about unspecified future advances in artificial propagation. Commenters cited numerous studies indicating risks to natural populations posed by hatchery-origin fish including increased competition, increased predation, reduced reproductive success, reduced genetic diversity, and erosion of local adaptations. Commenters maintained that there are no empirical examples where hatchery supplementation has increased the effective population size and productivity of natural populations, particularly after supplementation has stopped. Commenters argued that the documented benefits of hatchery programs in conserving natural populations of Pacific salmon and steelhead are confined to short-term risk reduction for natural populations that are not self-sustaining, maintaining genetic diversity in the short-term for severely depressed natural populations, and re-introducing naturally spawning populations into extirpated habitats.

Response: We are fully aware of the substantial scientific literature that exists regarding the benefits and risks of artificial propagation in the short and long term. We also recognize that the use of hatchery programs specifically designed to conserve depressed Pacific salmon and steelhead populations is relatively new, and the role of artificial propagation in the conservation and recovery of salmon and steelhead populations continues to be the subject of vigorous and well funded scientific research. In this final policy, we do not intend to render a final appraisal of the many functions that hatchery stocks serve and their relative risks and benefits to the viability of salmon and steelhead ESUs. There are so many different ways in which hatchery-origin fish interact with natural populations and the environment that there can be no uniform conclusion about the potential contribution of hatchery-origin fish to the survival of an ESU. The aim of this policy is to provide conceptual guidance for the consideration of hatchery-origin fish in ESA listing determinations on a case-by-case basis, and to require that the relationship, risks, and benefits of specific hatchery stocks within the geographical area of an ESU be transparently documented. Such an approach will help ensure that status evaluations of salmon and steelhead ESUs are based upon the best scientific and commercial information available at the time of some future ESA status review, rather than upon an appraisal of the information available at the time this final policy was developed.

Issue 14: Many commenters felt that how hatchery-origin fish are factored into extinction risk assessments depends on the time frame under consideration. Commenters felt that in considering whether an ESU was likely to become endangered in the foreseeable future (that is, whether the ESU was ''threatened'' or listing was ''not warranted''), risk evaluations should be based largely or entirely on the status of natural populations. They contended that the only way to ensure the long-term persistence of an ESU with a high degree of certainty is with self-sustaining natural populations in functioning natural ecosystems. These commenters maintained that there is no direct empirical data regarding the question of whether hatchery programs can contribute to the long-term sustainability of an ESU. Rather, empirical and theoretical considerations indicate that over the long term, compounding adverse effects of domestication will erode the ability of extant natural populations to sustain themselves without continual supplementation of hatchery-origin fish. Such a reliance on human intervention over the long term, the commenters argued, is highly uncertain given the unpredictable nature of funding, societal priorities, facility malfunctions, disease outbreaks, and catastrophic events. A review of the current and historical longevity of Pacific Northwest hatchery stocks conducted by NMFS' Northwest and Southwest Fisheries Science Centers (NWFSC and SWFSC, respectively) indicates that few if any hatchery programs have been maintained in isolation for a longer period than several decades (NMFS, 2004). All hatchery programs reviewed had required at least occasional infusions of natural-origin fish to sustain the programs during periods when they could not meet their broodstock or production goals. The NWFSC-SWFSC review concluded: long-term dependence on hatcheries is likely to lead salmon and steelhead ESUs into an evolutionarily and ecological path that will make the chance of full recovery in the wild more and more difficult as time passes; and dependence upon hatcheries is intrinsically risky because it is a dependence upon human actions that could cease at any time. Commenters noted that many of the hatchery reform efforts underway require the existence of healthy natural populations to ensure that every year a substantial proportion of the hatchery broodstock consists of natural-origin fish, while concurrently limiting the proportion of naturally spawning hatchery-origin fish to low levels.

Response: We agree, given the current state of scientific knowledge, that the risks and benefits of artificial propagation to the survival of an ESU over the long term can often be highly uncertain. The presence of well distributed self-sustaining natural populations that are ecologically and genetically diverse provides the most certain basis to determine that an ESU is not likely to become endangered in the foreseeable future (i.e., whether a species is threatened or listing is not warranted). We must base our status determinations upon the best available scientific and commercial information. If substantial information becomes available to better inform the consideration of the relative benefits and risks of artificial propagation to the long-term persistence of salmon and steelhead populations, we will incorporate such information into our future evaluations of an ESU's ESA listing status, and this policy provides adequate ability to do so.

Issue 15: Several commenters agreed that artificial propagation can alleviate extinction risk in the short term, under certain circumstances. These

commenters felt that the consideration of short-term reductions in extinction risk could inform determinations of whether an ESU was in danger of extinction, or likely to become so in the foreseeable future (that is, whether the ESU should be listed as ''endangered'' or ''threatened''). The commenters cited evidence that certain supplementation programs using locally derived stocks can increase the number of natural spawners, at least in the short term. Commenters also noted that supplementation programs using natural-origin fish as broodstock have the potential to benefit ESU productivity by providing short-term increases in adult returns, above what would be observed in the absence of the hatchery program, provided that sufficient natural habitat is available to support this increase. The commenters cautioned that hatchery supplementation is unlikely to increase the abundance and productivity of natural populations that are at or near the habitat's carrying capacity, and that temporary increases in population abundance and productivity will only persist if the underlying threats to salmon and steelhead in their natural ecosystems are adequately addressed.

The commenters also acknowledged that hatchery programs have the potential to increase spatial structure and reduce an ESU's level of extinction risk in the short term by reducing an ESU's vulnerability to catastrophic events, and by (re)introducing natural production into extirpated habitats. The commenters cautioned that any benefits to spatial structure over the long term depend on the degree to which the hatchery stock(s) add to (rather than replace) natural populations.

The commenters also felt that under certain circumstances, hatchery programs could conserve the genetic diversity of depressed populations, reduce vulnerability to catastrophic events by increasing spatial structure, and boost numbers of naturally spawning fish while factors for decline are being addressed. These commenters cited examples of the genetic diversity of severely at risk natural populations being conserved in captive broodstock programs for at least several salmon or steelhead generations. The commenters noted that the types of hatchery programs that provide these benefits are carefully designed and managed to minimize the effects of artificial selection. The commenters cautioned that the mitigation of the immediacy of extinction risk must be informed by the trade-offs between the short-term benefits of certain hatchery programs and the erosion of an ESU's ecological and genetic diversity if hatchery supplementation is continued over the long term.

Response: We agree with the commenters that the presence of carefully designed and operated hatchery programs with sufficient natural habitat can, under certain circumstances, mitigate the risk of extirpation for severely depressed populations and thereby reduce an ESU's risk of extinction. Whether a hatchery program or group of hatchery programs will warrant an ESU being listed as ''threatened'' rather than ''endangered'' will depend upon the specific demographic risks facing natural populations within the ESU, the availability and condition of the surrounding natural habitat, as well as the factors that led to the ESU's decline and current threats limiting the ESU's recovery.

Issue 16: Many commenters felt that the language in the proposed hatchery listing policy was ambiguous as to the standard against which the contributions of hatchery-origin fish were being measured. Commenters felt that it was unclear whether the abundance of hatchery-origin fish and the production of hatchery programs were of equal standing to the abundance and productivity of natural-origin populations in determining ESA status.

Several commenters felt that, in light of uncertainties regarding the long-term benefits and risks of artificial propagation and the general lack of detailed information regarding the effects of specific hatchery programs on the local natural populations(s), a more prudent and precautionary approach is to assess the contributions of hatchery programs in terms of the performance of natural populations. Any contributions of hatchery-origin stocks to the viability of an ESU, the commenters noted, will be evident in the abundance, productivity, spatial distribution, and ecological, life-history, and genetic diversity of the natural-origin populations in the ESU.

Response: As stated in the response to Issue 14, above, we agree that the presence of well distributed self-sustaining natural populations that are ecologically and genetically diverse provides the most certain indicator that an ESU will persist over the long term. However, hatchery programs under certain circumstances can provide short-term benefits to the abundance, productivity, spatial structure, and diversity of an ESU. As several commenters noted (see summary of Issue 15, above), carefully designed and operated hatchery supplementation programs using locally derived stocks have the potential to contribute to short-term increases in the number of adult returns, thereby reducing short-term risks to an ESU's abundance and productivity. Certain hatchery programs also have the ability to increase the spatial structure of an ESU and thereby reduce the ESU's extinction risk in the short term. However, any benefits to spatial structure over the long term depend on the degree to which the hatchery stock(s) add to (rather than replace) natural populations. The long-term contributions of hatchery-origin fish being (re)introduced into vacant habitats depends upon the natural production of out-migrating juveniles and returning natural-origin spawners. With respect to hatchery contributions to the diversity of an ESU, many ''traditional'' harvest-oriented hatchery programs generally contributed to the loss of genetic diversity by altering run timing, transferring stocks from their natal watersheds, and using mating protocols that reduced effective population sizes. However, conservation hatchery programs have contributed to the short-term maintenance of an ESU's genetic diversity by preventing the extirpation of unique populations, thus potentially reducing the immediacy of extinction risk of the ESU and providing the opportunity for severely depleted populations of a particular genetic heritage to rebound.

Issue 17: Some commenters felt that the consideration of hatchery-origin fish in evaluating extinction risk inappropriately biases status assessments toward the adult stage of the life history. These commenters emphasized that extinction risk assessments must include an evaluation of all life-history stages in the natural environment. The commenters cautioned that the consideration of hatchery fish in extinction risk assessments must balance benefits to the adult life-history stage with attendant risks to other life-history stages such as exceeding habitat carrying capacity and increasing mortality rates in early life-history stages, and altering the duration and timing of outmigration.

Response: We agree with the commenters that extinction risk assessments must contemplate, to the extent possible, the performance of an ESU throughout its entire life cycle. In practice, however, data are often limited regarding less conspicuous life-history stages. We recognize that risk evaluations that focus on available data for the more conspicuous adult phase cannot necessarily resolve demographic threats to earlier life-history stages. The commenters' concern would be particularly worrisome if we focused

our risk assessments entirely on the abundance information. However, we evaluate information on the abundance, productivity, spatial structure, and diversity of an ESU as useful proxies for assessing demographic threats and the level of extinction risk integrated over an ESU's entire life-history.

Editorial Comments

Issue 18: Many commenters felt that certain terms used in the proposed hatchery listing policy were poorly defined. Commenters were concerned that the resulting ambiguity of key terms left the policy open to a wide range of interpretations. Specifically, commenters felt that the terms natural population, hatchery population, hatchery stock, and mixed populations were inadequately defined and although used to refer to distinct entities they appear to have overlapping biological meaning.

Response: We agree that the final hatchery listing policy would benefit by simplifying the terms used to refer to groups of hatchery-origin and natural-origin fish. We acknowledge that, as applied, the terms natural population, hatchery population, and mixed population have overlapping meanings and that this resulted in some ambiguity in interpreting the proposed policy. A given hatchery stock (a genetic lineage of hatchery fish propagated at one or more hatchery facilities) can have a wide range of genetic exchange with populations of natural-origin fish (natural populations), varying in the direction, magnitude and regularity of reproductive exchange. Accordingly, natural populations represent a spectrum of influence from artificial propagation, varying in the proportion and effectiveness of naturally spawning hatchery fish contributing to natural-origin offspring. In the context of this policy, individual hatchery stocks must be evaluated on a case-by-case basis in the context of the local natural population(s), and local habitat and ecological features. The terms ''hatchery population'' (a hatchery stock that is isolated from natural-origin populations) and ''mixed population'' (a population in which hatchery-origin and natural-origin fish spawn naturally and interbreed, and/or natural-origin fish are regularly incorporated into the hatchery broodstock) used in the proposed policy represent points in a continuum of gene flow between hatchery stocks and natural populations. In this final policy, we have simplified the terms used by referring to hatchery stocks and natural populations only, recognizing that these two terms encompass a wide range of circumstances (see the ''Changes from the Proposed Policy'' section, below).

Issue 19: Some commenters felt that the scope of the proposed policy was unclear, and that without a clear statement of the policy's purpose it could have unintended implications or be inappropriately applied. The commenters recommended that the final policy include a clear statement of purpose describing the scope of the guidance being provided and its intended application.

Response: We agree with the commenters that some of the confusion and concern regarding the proposed policy could be addressed by including an unambiguous statement of the scope of the guidance being provided. We recognize that the consideration of hatchery-origin fish in defining conservation units and in evaluating demographic threats and species' extinction risk is a challenge that is not limited to making ESA listing determinations. As stated in the proposed policy, this policy applies to the consideration of hatchery fish in ESA listing determinations for Pacific salmon and steelhead. Although we feel that the concepts upon which this policy is based have some general applicability, the agency did not develop this policy to be applied to species other than Pacific salmon and steelhead, nor for statutory and regulatory determinations other than whether a Pacific salmon or steelhead ESU warrants listing under the ESA. In this final policy we have included a brief statement of purpose that details the scope of specific guidance being provided (see the ''Changes from the Proposed Policy'' section, below).

Changes From the Proposed Policy

Substantive changes from the proposed hatchery listing policy based on the comments received are summarized below. We believe that these changes improve upon the proposed policy by clarifying its scope, intent, and implementation. We believe these changes address the points of confusion and concern highlighted by the many comments received regarding the proposed policy.

Clarification of Policy's Purpose

In response to the public comments received (see Issue 19 and Response, above), we have clarified the purpose of the direction being provided in this final policy. This policy applies to ESA listing determinations for only Pacific salmon and steelhead. Specifically, this final policy provides direction to NMFS personnel for considering hatchery-origin fish in: (1) determining what constitutes a species under the ESA; (2) evaluating the level of extinction risk for the defined species; (3) making listing determinations of ''threatened'' and ''endangered;'' (4) affirms our commitment to conserving natural salmon and steelhead populations and the ecosystems upon which they depend, consistent with the purposes of the ESA; and (5) affirms our commitment to fulfilling trust and treaty obligations with regard to the harvest of some Pacific salmon and steelhead populations, consistent with the conservation and recovery of listed salmon and steelhead ESUs.

Clarification of Key Terms

In response to the public comments received (see Issue 18 and Response, above), we are simplifying the terms used in this final policy in reference to groups of hatchery-origin and natural-origin fish. We use the term ''natural populations'' to refer to populations whose members are fish that originate from spawning in the wild, recognizing that these fish may be the progeny of naturally-spawned and hatchery-origin fish in varying proportions. We use the term ''hatchery stocks'' to refer to a genetic lineage of hatchery fish propagated at one or more hatchery facilities, recognizing that a hatchery stock can have a wide range of gene flow with populations of natural-origin fish varying in the direction, magnitude and regularity of reproductive exchange.

Clarification of Genetic Divergence Standard

In response to the public comments received (see Issue 7 and Response, above), we are clarifying the genetic divergence standard in point (3) of the proposed policy, ''Hatchery fish with a level of genetic divergence between the hatchery stocks and the local natural populations that is no more than what would be expected between closely related populations within the ESU: (a) are considered part of the ESU ...''. As noted in the response to Issue 7, above, the consideration of genetic divergence is complex, and this complexity was not accurately captured in the proposed language. In the final policy we have changed this sentence to read ''Hatchery fish with a level of genetic divergence that is no more than what occurs within the ESU: (a) are considered part of the ESU ...''

Clarification of the Importance of Natural Populations

In the final policy we are making clarifying changes to the sentence in point (3) of the proposed policy, ''Natural populations that are stable or

increasing, are spawning in the wild, and have adequate spawning and rearing habitat reduce the risk of extinction of the ESU.'' The wording in the proposed policy was misinterpreted by many commenters to mean that natural populations can reduce the extinction risk of an ESU, but that an ESU could otherwise be determined to be viable if all the salmon in an ESU resided in hatcheries. As noted in the response to Issue 10, above, we do not believe that the purposes of the ESA would be satisfied by having all the salmon in an ESU in a hatchery. To clarify the importance of natural populations in evaluating an ESU's status, we are changing this sentence in the final policy to read, ''Hatchery fish will be included in assessing an ESU's status in the context of their contributions to conserving natural self-sustaining populations.''

We are striking the sentence in point (3) from the proposed policy that read, ''Such natural populations, particularly those with minimal genetic contribution from hatchery fish, can provide a point of comparison for the evaluation of the effects of hatchery fish on the likelihood of extinction of the ESU.'' This sentence generated considerable public confusion, with many commenters interpreting it to mean that the value of natural populations is confined to that of a comparative reference for supplemented populations (see Issue 10 and Response, above).

NMFS is also clarifying, in point (4) of the final policy (see Policy Statement, below), that hatchery-origin fish can positively affect the status of an ESU ''by contributing to the abundance and productivity of the natural populations in the ESU'' [emphasis added] (see Issue 16 and Response, above). NMFS believes that this change appropriately underscores the importance of natural populations in evaluating the extinction risk of an ESU. The proposed policy failed to note that certain hatchery programs can conserve the genetic resources of depressed natural populations, reduce their risk of extirpation, and thereby mitigate the immediacy of an ESU's extinction risk (see Issue 15 and Response, above). This potential benefit of hatchery stocks has been included in point (4) in the final policy statement (see *Policy Statement*).

Required Determinations

This Policy on the Consideration of Hatchery-Origin Fish in Endangered Species Act Listing Determinations for Pacific Salmon and Steelhead is a general statement of policy, to which the requirement of notice and comment procedures under the Administrative Procedure Act does not apply, pursuant to 5 U.S.C. 553(b)(A). Because prior notice and opportunity for public comment are not required under 5 U.S.C. 553(b)(A) or any other law, the analytical requirements of the Regulatory Flexibility Act are not applicable to this action.

Policy on the Consideration of Hatchery-Origin Fish in Endangered Species Act Listing Determinations for Pacific Salmon and Steelhead

For the foregoing reasons, NMFS adopts the following policy on the consideration of hatchery fish in Endangered Species Act (ESA) listing determinations for Evolutionarily Significant Units (ESUs) of Pacific salmon and steelhead.

Policy Purpose

This policy provides direction to NMFS personnel for considering hatchery-origin fish in making ESA listing determinations for Pacific salmon and steelhead. Specifically, this policy: establishes criteria for including hatchery stocks in ESUs; provides direction for considering hatchery fish in extinction risk assessments of ESUs; requires that hatchery fish determined to be part of an ESU will be included in any listing of the ESU; affirms NMFS' commitment to conserving natural salmon and steelhead populations and the ecosystems upon which they depend; and affirms NMFS' commitment to fulfilling trust and treaty obligations with regard to the harvest of some Pacific salmon and steelhead populations, consistent with the conservation and recovery of listed salmon and steelhead ESUs.

Policy Statement

1. Under NMFS' ''Policy on Applying the Definition of Species under the Endangered Species Act to Pacific Salmon'' (ESU policy)(56 FR 58612; November 20, 1991), a distinct population segment (DPS) of a Pacific salmon or steelhead species is considered for listing if it meets two criteria: (a) it must be substantially reproductively isolated from other conspecific population units; and (b) it must represent an important component in the evolutionary legacy of the species. A key feature of the ESU concept is the recognition of genetic resources that represent the ecological and genetic diversity of the species. These genetic resources can reside in a fish spawned in a hatchery (hatchery fish) as well as in a fish spawned in the wild (natural fish).

2. In delineating an ESU to be considered for listing, NMFS will identify all components of the ESU, including populations of natural fish (natural populations) and hatchery stocks that are part of the ESU. Hatchery stocks with a level of genetic divergence relative to the local natural population(s) that is no more than what occurs within the ESU: (a) are considered part of the ESU; (b) will be considered in determining whether an ESU should be listed under the ESA; and (c) will be included in any listing of the ESU.

3. Status determinations for Pacific salmon and steelhead ESUs will be based on the status of the entire ESU. In assessing the status of an ESU, NMFS will apply this policy in support of the conservation of naturally-spawning salmon and the ecosystems upon which they depend, consistent with section 2 (b) of the ESA (16 U.S.C. 1531(b)). Hatchery fish will be included in assessing an ESU's status in the context of their contributions to conserving natural self-sustaining populations.

4. Status determinations for Pacific salmon and steelhead ESUs generally consider four key attributes: abundance; productivity; genetic diversity; and spatial distribution. The effects of hatchery fish on the status of an ESU will depend on which of the four key attributes are currently limiting the ESU, and how the hatchery fish within the ESU affect each of the attributes. The presence of hatchery fish within the ESU can positively affect the overall status of the ESU, and thereby affect a listing determination, by contributing to increasing abundance and productivity of the natural populations in the ESU, by improving spatial distribution, by serving as a source population for repopulating unoccupied habitat, and by conserving genetic resources of depressed natural populations in the ESU. Conversely, a hatchery program managed without adequate consideration of its conservation effects can affect a listing determination by reducing adaptive genetic diversity of the ESU, and by reducing the reproductive fitness and productivity of the ESU. In evaluating the effect of hatchery fish on the status of an ESU, the presence of a long-term hatchery monitoring and evaluation program is an important consideration.

5. Many hatchery programs are capable of producing more fish than are immediately useful in the conservation and recovery of an ESU and can play an important role in fulfilling trust and treaty obligations with regard to harvest of some Pacific salmon and steelhead populations. For ESUs listed as threatened, NMFS will, where appropriate, exercise its authority under

section 4(d) of the ESA to allow the harvest of listed hatchery fish that are surplus to the conservation and recovery needs of the ESU, in accordance with approved harvest plans.

References

A complete list of all cited references is available on the Internet at *http://www.nwr.noaa.gov*, or upon request (see **ADDRESSES** section above).

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

Dated: June 16, 2005.

John Oliver,

Deputy Assistant Administrator for Operations, National Marine Fisheries Service.

[FR Doc. 05–12349 Filed 6–27–05; 8:45 am]

BILLING CODE 3510–22–S