environmentalcommons

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Chief, Protected Resources Division
NMFS
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RE: Endangered and Threatened Species: Proposed Policy on the Consideration of Hatchery-Origin Fish in Endangered Species Act Listing Determinations for Pacific Salmon and Steelhead

Background

On June 3, 2004, the National Marine Fisheries Service (NMFS) issued a proposed policy addressing the role of hatchery produced Pacific salmon and steelhead in determining listings under the Endangered Species Act (ESA) of 1973. Twenty-three of the listed Pacific salmon populations (or evolutionary significant units) include hatchery populations. In many cases, hatchery spawned salmon populations exceed the numbers present of naturally spawned fish.

The hatchery fish policy asks us to consider two primary questions that will have enormous implications for how to consider and recover impacted wild or natural populations of species. The questions to be addressed in our comments are:

1. Are hatchery (or artificially propagated) populations of salmon and steelhead part of the endangered and threatened biological units?
2. How should we consider hatchery fish in terms of extinction risk?

Response #1: Are hatchery (or artificially propagated) populations of salmon and steelhead part of the endangered and threatened biological units?

The ways in which hatchery propagated salmon are considered when making an endangered species act listing decision can dramatically affect the outcome of the listing decision, and therefore the recoverability of wild, naturally spawning salmon populations. Listing determinations determine; 1) the extent of available monies for recovery efforts; 2) the extent to which impacted species obtain special consideration for habitat safeguards; and, 3) the measure of staff and agency effort in formulating recovery plans.

The intent of the Endangered Species Act (ESA) is to recover and conserve natural populations of species as well as the ecosystems upon which the species depend. The ESA specifically defines "conserve" as meaning "to use all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this chapter are no longer necessary." [16 U.S.C. §1532(2)].

To answer these questions, it is prudent to examine the current definitions being used for a "biological unit."

Definition of Biological Unit

According to ESA, to be listed as endangered or threatened, a group of organisms must constitute a ''species,'' which is defined 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."

To qualify as a *distinct population segment*, a Pacific salmon or steelhead population must be substantially reproductively isolated from others in its species, and represent an important component in the evolutionary legacy of the biological species. A population meeting these criteria is considered to be an *Evolutionary Significant Unit* (ESU) (56 FR 58612; November 20, 1991). According to the written proposed policy, a distinct population segment and an ESU are considered one and the same.

That hatchery propagated fish have stored genetic resources and can interbreed with the naturally spawning species in question is an acknowledged and recognized reality. But, the 1993 hatchery policy as well as the newly proposed policy fails to address the importance of the artificially propagated hatchery fish to evolutionary legacy of the naturally spawning biological species.

The Importance of Maintaining Evolutionary Legacy

Hatchery fish have known phenotypic differences and weaknesses that must be considered when examining the importance of them to the evolutionary legacy of natural salmon and steelhead populations. Current research and study has shown that hatchery fish have diminished fitness and survival relative to naturally spawned fish; have genetic deficiencies as a result of poor stock and rearing including inbreeding and selection; have a greater incidence of disease; and increased rates of competition with and predation on naturally spawned populations.[1]

Our Conclusion

Based on the best available science, hatchery propagated fish seem to impair the evolutionary legacy of natural spawned populations, not enhance those populations. For this reason, we do not believe hatchery salmon and steelhead populations should be considered a part of the endangered and threatened naturally spawning biological units. Additionally, we recommend the definition of an ESU address and clarify the importance of captive bred and artificially propagated species to the evolutionary legacy of the natural species.

[1] Myers et al., "Hatcheries and Endangered Salmon," *Science* 2004 303: 1980

Response #2: How should we consider hatchery fish in terms of extinction risk?

In considering artificially propagated hatchery fish in terms of their contribution to naturally spawning Pacific salmon extinction risk, we must take into account their role in recovery as well as the intent of the Endangered Species Act. The proposed policy focuses much of its language on the definitions of species, distinct population segments, and evolutionary significant units, and fails to underscore the purposes of the Act itself, which provides **"a means whereby the ecosystems upon which endangered and threatened species depend may be conserved**… (§2 (b))."

The Endangered Species Act mandates the restoration of species in their natural habitats such that they can sustain themselves. Introducing hatchery fish and subsequently including them in the definition of an ESU would institute a system whereby artificial fish propagation would run counter to the equally important intention of the Act which is to restore habitat.

While hatchery fish increase total numbers of fish in a stream, they threaten natural populations and increase extinction risk by diverging phenotypically from naturally spawning populations. From a purely biological standpoint, hatchery fish could further the extinction risk of naturally spawning populations based on their phenotypic differences. Hatchery propagated fish have increased rates of predation and competition thus provide an advantage to them over natural populations.[2] Inbreeding and poor stock choice can add adverse genetic effects altering the gene pool, and genetic introgression can alter adaptations to the naturally spawning population.

Our Conclusion

Based on the phenotypic differences between hatchery and naturally spawning salmon populations, we believe artificially propagated hatchery fish will most likely augment the extinction risk of naturally spawning salmon. Again, the intent of the Endangered Species Act is to recover natural species.

Additional Comments

If hatchery fish were to be included in the listing and de-listing process, where is the incentive to recover naturally spawning populations and safeguard their necessary habitat?

The proposed hatchery policy does not address the intent of the Endangered Species Act which is ``to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved.' Introducing hatchery fish and subsequently including them in the definition of an ESU would institute a system whereby artificial fish propagation would run counter to the equally important intention of the Act to restore habitat.

[2] Myers et al., "Hatcheries and Endangered Salmon," *Science* 2004 303: 1980

Current research shows that individual species benefit more from an ecosystem-based fishery management (EBFM) plan.[3] Adding artificially bred populations of fish to streams does not substitute for the naturally spawning evolutionary legacy of our wild salmon populations. The Endangered Species Act mandates that we conserve the habitat as well as the species. An ecosystem-based plan has been scientifically shown to better support recovering natural populations.

Environmental Commons appreciates your careful consideration of our comments.

Sincerely,

Britt Bailey, M.A.
Director

[3] Pikitch et al. Ecosystem-Based Fishery Management. *Science* 2004; Vol 305, Issue 5682: 346-347.