

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

(<http://www.nwr.noaa.gov/reference/frn/2004/69FR31354.pdf>)

Comments Due: September 1, 2004

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Summary of the Issue:

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 ways in which hatchery bred 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 the wild salmon populations. Listing determinations made at the federal level determine the extent of available monies for recovery efforts, the extent to which impacted species obtain special consideration for habitat safeguards, and the measure of effort for formulation of recovery plans.

The Intent of the Endangered Species Act (ESA)

The intent of the Endangered Species Act is to recover and conserve natural populations of species. The ESA specifically defines "conserve" as meaning "to use and the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this chapter are no longer necessary." 16 U.S.C. §1532(2). The Endangered Species Act also clearly states its purpose in **providing a means whereby the ecosystems upon which endangered and threatened species depend may be conserved...** (§2 (b))

Upon its inception in 1973, the Endangered Species Act recognized that recovering and protecting endangered species implicitly preserves the evolutionary legacy of the species and its value to a biodiverse ecosystem. Biodiversity and genetic variability are

increasingly recognized as an essential facet of ecosystem function, and to a larger degree all life support systems on Earth.

Why Are We Being Asked to Consider this Hatchery Fish Policy?

In 1998, the National Marine Fisheries Service listed Oregon Coast coho under the Endangered Species Act. In its listing determination, the National Marine Fisheries Service determined that certain hatchery-bred fish were part of that ESU, due largely to their genetic similarity to listed naturally spawned fish. However, National Marine Fisheries Service then excluded these hatchery-bred fish from the listing because they were deemed not "essential to recovery."

A timber industry coalition (Alease Valley Alliance) sued the National Marine Fisheries Service. In September 2001, Judge Michael Hogan ruled in *Alease Valley Alliance v. Evans* (161 F. Supp. 2d 1154, D. Oreg. 2001; *Alease* decision) that the ESA does not allow NMFS to list a subset of an ESU, and that NMFS had improperly excluded stocks from the listing once it had decided that certain hatchery stocks were part of the ESU. Although the Court's ruling affected only one ESU, the interpretive issue raised by the ruling called into question nearly all of NMFS' Pacific salmon listing determinations.

The Court struck down the 1998 final rule listing Oregon coast coho as a threatened species, thus removing the ESU from the protections of the ESA. The National Marine Fisheries Service (NMFS) announced in November 2001 that it would not appeal a September ruling by U.S. District Court.

What Are We Being Asked to Consider?

The hatchery fish policy asks us to consider two primary questions that will have enormous implications for how the National Marine Fisheries Service will consider and recover impacted wild or natural populations of species.

The questions to be addressed 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?**

To break down the first question, we have to examine the current definitions being used for a "biological unit."

1. According to the Endangered Species Act, 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). For the purposes of the policy, a distinct population segment and an ESU are considered one and the same.

The National Marine Fisheries Service’s 1993 Interim Policy on Artificial Propagation of Pacific Salmon under the Endangered Species Act [see: <http://www.nwr.noaa.gov/reference/frn/1993/58FR17573.pdf>], states that genetic resources important to the biological species’ evolutionary legacy may reside in hatchery fish...in which case hatchery fish can be considered part of the endangered and threatened biological unit.”

That hatchery fish have stored genetic resources and can interbreed with the naturally spawning species in question is an acknowledged and recognized reality. But, according to the definition of a distinct population segment, consideration must also be given to the importance of hatchery fish to the evolutionary legacy of the natural biological species. The importance of the hatchery fish to the evolutionary legacy of the listed biological unit is certainly questionable.

Hatchery Fish and their Weaknesses

Hatchery fish have known 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

Thus, hatchery 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. We urge the National Marine Fisheries Service to clarify the definition of an ESU and address the importance of captive bred and artificially propagated species to the evolutionary legacy of the natural species.

In considering hatchery fish in terms of extinction risk, again 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

¹ Myers et al., “Hatcheries and Endangered Salmon,” *Science* 2004 303: 1980

segments, and evolutionary significant units and fails to underscore the purposes of the Act itself, providing “**a means whereby the ecosystems upon which endangered and threatened species depend may be conserved...** (§2 (b)).”

If hatchery fish were included in the listing and de-listing process, where is the incentive to not only recover naturally spawning populations, but also to safeguard their necessary habitat and the functioning ecosystem of which they are an important biological member?

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 to restore habitat.

From a pure biological standpoint, hatchery fish could further the extinction risk of naturally spawning populations. This runs counter to the intent of the Endangered Species Act, which is to recover natural species. Hatchery fish do increase numbers, they do interbreed with naturally spawning populations, and they do possess genetic resources from natural populations, *but we believe they threaten natural populations and increase extinction risk by diverging phenotypically most likely as a result of the artificial breeding habitat and poor genetic selection.*

Conclusion

The hatchery fish policy, “Endangered and Threatened Species: Proposed Policy on the Consideration of Hatchery-Origin Fish in Endangered Species Act Listing Determinations for Pacific Salmon and Steelhead,” asks us to consider two primary questions that will have enormous implications for how the National Marine Fisheries Service chooses to consider and recover impacted wild or natural populations of species.

The questions to be addressed 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?**

According to the Endangered Species Act, 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). For the purposes of the policy, a distinct population segment and an ESU are considered one and the same.

The purpose of the Endangered Species Act requires that ecosystems upon which species depend as well as the individual species be conserved. The Endangered Species Act also requires consideration of the best available scientific information. 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. Current research shows that individual species benefit more from an ecosystem-based fishery management (EBFM) plan.² 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 scientifically shown to better support recovering natural populations.

Based on current science which shows 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, hatchery fish populations should not be included as a component of the endangered and threatened natural population biological unit.

We urge the National Marine Fisheries Service to clarify the definition of an ESU and address the issue of importance of captive bred and artificially propagated species to the evolutionary legacy of the natural species.

We further believe artificially propagated hatchery fish will increase the extinction risk of naturally spawning salmon based on the phenotypic differences between the fish.

We recommend that emphasis be placed on recovering the habitat of naturally spawning Pacific salmon populations. Scientific research states that an ecosystem based plan benefits the recovery of species.

² Pikitch et al. Ecosystem-Based Fishery Management. *Science* 2004; Vol 305, Issue 5682: 346-347.