*E. Steps Taken To Minimize Significant Economic Impact on Small Entities, and Significant Alternatives Considered*

48. The RFA requires an agency to describe any significant, specifically small business alternatives that it has considered in reaching its proposed approach, which may include the following four alternatives (among others): ''(1) the establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance or reporting requirements under the rule for small entities; (3) the use of performance, rather than design, standards; and (4) and exemption from coverage of the rule, or any part thereof, for small entities.'' [74]

49. The *NPRM* tentatively concludes to amend the Commission's rules to make clear that the operation of low power auxiliary stations within the 700 MHz Band will no longer be permitted after the end of the DTV transition because such operations could cause harmful interference to new wireless services in the band, particularly public safety operations. Although the *NPRM* tentatively concludes that the Commission will modify licenses so as not to permit operations past February 17, 2009, it makes this tentative conclusion because the Commission is concerned that continued use of this spectrum by existing licensees of low power auxiliary stations may be disruptive to new public safety and other wireless operations in the 700 MHz Band, and because of the ready availability of other means that those licensees have under the Commission's rules for obtaining access to various other spectrum frequencies in which to operate low power auxiliary stations. Moreover, such stations will continue to be permitted access to more than 300 megahertz of spectrum.[75]

50. The Commission also seeks comment on alternatives to modifying current licenses so as not to permit such operations in the 700 MHz Band after February 17, 2009. The Commission seeks comment on whether license terms should be reduced so as to terminate at some other date, *e.g.*, one year after February 17, 2009, or not reduced at all.

51. Along with prohibiting low power auxiliary devices within the 700 MHz Band after the end of the DTV transition, the Commission also proposes to prohibit the manufacture, import, sale, offer for sale, or shipment of devices that operate as low power auxiliary stations in the 700 MHz Band after the end of the DTV transition. The Commission tentatively concludes that this proposed prohibition will help facilitate the DTV transition by helping to address possible concerns about significant unauthorized operation of wireless microphones in the 700 MHz Band, and therefore help minimize the likelihood that additional unauthorized use would occur after the end of the DTV transition.[76] The Commission seeks comment on its tentative conclusions to prohibit the manufacture, import, sale, offer for sale, or shipment of low power auxiliary station devices that operate in the 700 MHz Band, and to have the prohibition take effect on the effective date of the revised rules.

52. To minimize significant economic impact to the firms, including small entities, that are or will become low power auxiliary station licensees or that manufacture, import, sell, or ship devices that operate as low power auxiliary stations in the 700 MHz Band, the *NPRM* seeks comment on the impact that such changes would have on small entities. The Commission will continue to examine alternatives in the future with the objective of eliminating unnecessary regulations and minimizing significant impact on small entities. Toward that end, the Commission seeks comment on alternatives commenters believe the Commission should adopt.

*F. Federal Rules That May Duplicate, Overlap, or Conflict With the Proposed Rules*

53. None.

**Ordering Clauses**

54. Accordingly, *it is ordered*, pursuant to sections 1, 2, 4(i), 4(j), 301, 302, 303, 304, 307, 308, 309, 316, 332, 336, and 337 of the Communications Act of 1934, as amended, 47 U.S.C. 151, 152, 154(i), 154(j), 301, 302a, 303, 304, 307, 308, 309, 316, 332, 336, and 337 that this Notice of Proposed Rulemaking and Order in WT Docket No. 08–166 and WT Docket No. 08–167 is hereby adopted.

55. *It is further ordered* that pursuant to applicable procedures set forth in sections 1.415 and 1.419 of the Commission's Rules, 47 CFR 1.415, 1.419, interested parties may file comments on the Notice of Proposed Rulemaking on or before October 3, 2008, and reply comments on or before October 20, 2008.

56. *It is further ordered* that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, shall send a copy of this Notice of Proposed Rulemaking and Order, including the Initial Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration.

Federal Communications Commission.

**William F. Caton,**

*Deputy Secretary.*

[FR Doc. E8–20502 Filed 9–2–08; 8:45 am]

BILLING CODE 6712–01–P

[74] 5 U.S.C. 603(c)(1)–(c)(4).

[75] *See* 47 CFR 74.802(a).

[76] *See NPRM* at para. 14.

---

**DEPARTMENT OF INTERIOR**

**United States Fish and Wildlife Service**

**50 CFR Part 17**

**DEPARTMENT OF COMMERCE**

**National Oceanic and Atmospheric Administration**

**50 CFR Part 224**

**[Docket No. 0808191116–81126–01]**

**RIN 0648–XJ93**

## Endangered and Threatened Species; Proposed Endangered Status for the Gulf of Maine Distinct Population Segment of Atlantic Salmon

**AGENCY:** National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce; United States Fish and Wildlife Service (USFWS), Interior.

**ACTION:** Proposed rule; 12–month petition finding; request for comments.

**SUMMARY:** We (NMFS and USFWS) have determined that naturally spawned and conservation hatchery populations of Atlantic salmon within the range of the Gulf of Maine (GOM) distinct population segment (DPS), including those that were already listed in November 2000, constitute a new GOM DPS and hence a ''species'' for listing as endangered or threatened consideration under the Endangered Species Act (ESA). This also constitutes a 12–month finding on a petition to list Atlantic salmon in the Kennebec River as endangered. We will propose to designate critical habitat for the GOM DPS in a subsequent **Federal Register** notice.

**DATES:** Comments on this proposal must be received by December 2, 2008. Public hearing requests must be received by November 17, 2008.

**ADDRESSES:** You may submit comments, identified by the RIN 0648–AW02, by any of the following methods:

- Electronic Submissions: Submit all electronic public comments via the FederaleRulemaking Portal *http://www.regulations.gov*
- Mail: Assistant Regional Administrator, NMFS, Northeast Regional Office, Protected Resources Division, One Blackburn Drive, Gloucester, MA 01930
- Fax: To the attention of Jessica Pruden at (978) 281–9394.

Instructions: All comments received are a part of the public record and will generally beposted to *http://www.regulations.gov* without change. All Personal Identifying Information (for example, name, address, etc.) voluntarily submitted by the commenter may be publicly accessible. Do not submit Confidential Business Information or otherwise sensitive or protected information.

NMFS will accept anonymous comments (enter N/A in the required fields, if you wish to remain anonymous). Attachments to electronic comments will be accepted in Microsoft Word, Excel, WordPerfect, or Adobe PDF file formats only.

The proposed rule and status review report are also available electronically at the NMFS website at *http://www.nero.noaa.gov/prot__res/altsalmon/*.

**FOR FURTHER INFORMATION CONTACT:** Rory Saunders, NMFS, at (207)866–4049; Jessica Pruden, NMFS, at (978)281–9300 ext. 6532; Lori Nordstrom, USFWS, at (207)827–5938 ext. 13; or Marta Nammack, NMFS, at (301)713–1401.

**SUPPLEMENTARY INFORMATION:**

## Public Comments Solicited

We solicit public comment on this proposed listing determination. We anticipate holding up to three public hearings on the proposed rule. Any public hearings will be announced in a separate **Federal Register** notice.

We intend that any final action resulting from this proposal will be as accurate and as effective as possible and informed by the best available scientific and commercial information. Therefore, we request comments or information from the public, other concerned governmental agencies, the scientific community, industry, or any other interested party concerning this proposed rule. We particularly seek comments concerning:

(1) Information on the effects of conservation hatchery supplementation in reducing the risk of extinction of the GOM DPS. As described in ‘‘Status of the Species’’ and ‘‘Factor E’’, the high numbers of fish stocked through the conservation hatchery program reduce the risk of extinction for the GOM DPS; however, the numbers of naturally-reared spawning adults in the GOM DPS are extremely low (less than 150). Numbers of naturally-reared spawning adults are an important measure of improved status or recovery. Because of the reduction in extinction risk provided by conservation hatchery supplementation, we seek additional information on the appropriate weight that should be given to the conservation hatchery program in evaluating the status of the GOM DPS;

(2) Information concerning the viability of and/or threats to Atlantic salmon in the GOM DPS; and

(3) Efforts being made to protect Atlantic salmon in the GOM DPS.

## Background

We issued a final rule listing the GOM DPS of Atlantic salmon as endangered on November 17, 2000 (65 FR 69469). The GOM DPS was defined as all naturally reproducing wild populations and those river-specific hatchery populations of Atlantic salmon having historical, river-specific characteristics found north of and including tributaries of the lower Kennebec River to, but not including, the mouth of the St. Croix River at the U.S.-Canada border. In the final rule listing the GOM DPS, we did not include fish that inhabit the mainstem and tributaries of the Penobscot River above the site of the former Bangor Dam, the upper Kennebec River, or the Androscoggin River within the GOM DPS (65 FR 69469; November 17, 2000).

In late 2003, we assembled the 2005 Biological Review Team (BRT) comprised of biologists from the Maine Atlantic Salmon Commission, the Penobscot Indian Nation (PIN), and both Services. The 2005 BRT was charged with reviewing and evaluating all relevant scientific information relating to the current DPS delineation (including a detailed genetic characterization of the Penobscot population and data relevant to the appropriateness of including the upper Kennebec and Androscoggin rivers as part of the DPS), determining the conservation status of the populations not included in GOM DPS listed in 2000, and assessing their relationship to that GOM DPS (the GOM DPS that is currently listed). The findings of the 2005 BRT, which are detailed in the 2006 Status Review for Anadromous Atlantic Salmon in the United States (Fay *et al*., 2006), addressed: the DPS delineation, including whether populations that were not included in the 2000 listing should be included in the GOM DPS; the extinction risks to the species; and the threats to the species. The 2006 Status Review (Fay *et al.*, 2006) underwent peer review by experts in the fields of Atlantic salmon biology and genetics to ensure that it was based on the best available science. Each peer reviewer independently affirmed the major conclusions presented in Fay *et al.* (2006).

We received a petition to list the ‘‘Kennebec River population of anadromous Atlantic salmon’’ as an endangered species under the ESA on May 11, 2005. NMFS published a notice in the **Federal Register** on November 14, 2006 (71 FR 66298), concluding that the petitioners (Timothy Watts, Douglas Watts, the Friends of Merrymeeting Bay, and the Maine Toxics Action Coalition) presented substantial scientific information indicating that a listing may be warranted.

This **Federal Register** notice announces our finding regarding the ESA listing status of the GOM DPS and 12–month finding on the petition to list Atlantic salmon in the Kennebec River as endangered.

### *Policies for Delineating Species Under the ESA*

Section 3 of the ESA defines ‘‘species’’ as including ‘‘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.’’ The term ‘‘distinct population segment’’ is not recognized in the scientific literature. Therefore, the Services adopted a joint policy for recognizing DPSs under the ESA (DPS Policy; 61 FR 4722) on February 7, 1996. The DPS policy requires the consideration of two elements when evaluating whether a vertebrate population segment qualifies as a DPS under the ESA: (1) the discreteness of the population segment in relation to the remainder of the species or subspecies to which it belongs; and (2) the significance of the population segment to the species or subspecies to which it belongs.

A population segment of a vertebrate species may be considered discrete if it satisfies either one of the following conditions: (1) it is markedly separated from other populations of the same taxon (an organism or group of organisms) as a consequence of physical, physiological, ecological, or behavioral factors. Quantitative measures of genetic or morphological discontinuity may provide evidence of this separation; or (2) it is delimited by international governmental boundaries within which differences in control of exploitation, management of habitat, conservation status, or regulatory mechanisms exist that are significant in light of section 4(a)(1)(D) of the ESA (i.e., inadequate regulatory mechanisms).

If a population segment is found to be discrete under one or more of the above conditions, its biological and ecological significance to the taxon to which it belongs is evaluated. This consideration may include, but is not limited to: (1) persistence of the discrete population segment in an ecological setting unusual or unique for the taxon; (2) evidence that the loss of the discrete population segment would result in a significant gap in the range of a taxon; (3) evidence that the discrete population segment represents the only surviving natural occurrence of a taxon that may be more abundant elsewhere as an introduced population outside its historic range; and (4) evidence that the discrete population segment differs markedly from other populations of the species in its genetic characteristics.

*Listing Determinations Under the ESA*

The ESA defines an endangered species as one that is in danger of extinction throughout all or a significant portion of its range, and a threatened species as one that is likely to become endangered in the foreseeable future throughout all or a significant portion of its range (sections 3(6) and 3(20), respectively). The statute requires us to determine whether any species is endangered or threatened because of any of the following five factors: (1) the present or threatened destruction, modification, or curtailment of its habitat or range; (2) overutilization for commercial, recreational, scientific, or educational purposes; (3) disease or predation; (4) the inadequacy of existing regulatory mechanisms; or (5) other natural or manmade factors affecting its continued existence (section 4(a)(1)(A-E)). We are to make this determination based solely on the best available scientific and commercial data available after conducting a review of the status of the species and taking into account any efforts being made by states or foreign governments to protect the species.

*Atlantic Salmon Life History*

Anadromous Atlantic salmon are a wide ranging species with a complex life history. The historic range of Atlantic salmon occurred on both sides of the North Atlantic: from Connecticut to Ungava Bay in the western Atlantic and from Portugal to Russia's White Sea in the Eastern Atlantic, including the Baltic Sea.

For Atlantic salmon in the United States, juveniles typically spend 2 years rearing in freshwater. Freshwater ecosystems provide spawning habitat and thermal refuge for adult Atlantic salmon; overwintering and rearing areas for eggs, fry, and parr; and migration corridors for smolts and adults (Bardonnet and Bagliniere, 2000). Adult Atlantic salmon typically spawn in early November. The eggs hatch in late March or April. At this stage, they are referred to as alevin or sac fry. Alevins remain in the redd for about 6 more weeks and are nourished by their yolk sac until they emerge from the gravel in mid-May. At this time, they begin active feeding and are termed fry. Within days, the fry enter the parr stage, indicated by vertical bars (parr marks) on their sides that act as camouflage. Atlantic salmon parr are territorial; thus, most juvenile mortality is thought to be density dependent and mediated by habitat limitation (Gee *et al.*, 1978; Legault, 2005). In particular, suitable overwintering habitat may limit the abundance of large parr prior to smoltification (Cunjak *et al.*, 1998). Smoltification (the physiological and behavioral changes required for the transition to salt water) usually occurs at age 2 for most Atlantic salmon in Maine. The smolt emigration period is rather short and lasts only 2 to 3 weeks for each individual. During this brief emigration window, smolts must contend with rapidly changing osmoregulatory requirements (McCormick *et al.*, 1998) and predator assemblages (Mather, 1998). The freshwater stages in the life cycle of the Atlantic salmon have been well studied; however, much less information is available on Atlantic salmon at sea (Klemetsen *et al.*, 2003).

Gulf of Maine Atlantic salmon migrate vast distances in the open ocean to reach feeding areas in the Davis Strait between Labrador and Greenland, a distance over 4,000 km from their natal rivers (Danie *et al.*, 1984; Meister, 1984). During their time at sea, Atlantic salmon undergo a period of rapid growth until they reach maturity and return to their natal river. Most Atlantic salmon (about 90 percent) from the Gulf of Maine return after spending two winters at sea; usually less than 10 percent return after spending one winter at sea; roughly 1 percent of returning salmon are either repeat spawners or have spent three winters at sea (three sea winter 3SW salmon) (Baum, 1997).

In addition to anadromous Atlantic salmon, landlocked Atlantic salmon have been introduced to many lakes and rivers in Maine, though they are only native to four watersheds in the State: the Union, including Green Lake in Hancock County; the St. Croix, including West Grand Lake in Washington County; the Presumpscot, including Sebago Lake in Cumberland County; and the Penobscot, including Sebec Lake in Piscataquis County (Warner and Havey, 1985). There are certain lakes and rivers in Maine where landlocked salmon and anadromous salmon co-exist. Recent genetic surveys have confirmed that little genetic exchange occurs between these two life history types (Spidle *et al.*, 2003, NMFS unpublished data).

*Review of Species Delineation*

Fay *et al.* (2006) concluded that the DPS delineation as proposed by the previous BRT that resulted in the 2000 listing designation (65 FR 69469; November 17, 2000) was largely appropriate, except in the case of large rivers that were excluded in previous listing determinations. As described below in the analyses of discreteness and significance of the population segment, Fay *et al.* (2006) concluded that the salmon currently inhabiting the larger rivers (Androscoggin, Kennebec, and Penobscot) are genetically similar to the rivers included in the GOM DPS as listed in 2000 (Spidle *et al.*, 2003), have similar life history characteristics, and/or occur in the same zoogeographic region. Further, the salmon populations inhabiting the large and small rivers from the Androscoggin River northward to the Dennys River differ genetically and in important life history characteristics from Atlantic salmon in adjacent portions of Canada (Spidle *et al.*, 2003; Fay *et al.*, 2006). Thus, Fay *et al.* (2006) concluded that this group of populations (population segment) met both the discreteness and significance criteria of the DPS Policy and, therefore, recommended that the new GOM DPS include all anadromous Atlantic salmon whose freshwater range occurs in the watersheds from the Androscoggin River northward along the Maine coast to the Dennys River, including all associated conservation hatchery populations used to supplement these natural populations; currently, such conservation hatchery populations are maintained at Green Lake National Fish Hatchery (GLNFH) and Craig Brook National Fish Hatcheries (CBNFH).

The precise genetic boundary between Atlantic salmon in the United States and Canada is difficult to determine because there are no genetic data on the wild salmon that once occurred in the St. Croix watershed along the U.S.-Canada border. As listed in 2000, the northern terminus of the GOM DPS was the U.S.-Canada border at the St. Croix River, but as described on page 54 of Fay *et al.* (2006), the best available science suggests that the St. Croix groups with other Canadian rivers. Therefore, we find that the northern terminus of the GOM DPS is the Dennys River watershed, rather than the St. Croix, because genetic analyses found that salmon in the Dennys River are more similar to populations in the United States than to Canadian salmon populations that are geographically proximate to the Dennys (Spidle *et al.*, 2003).

We determined the southern terminus of the GOM DPS to be the Androscoggin River based on zoogeography rather than genetics because there are extremely few Atlantic salmon in the rivers as one moves southward on which to base genetic analyses. The Androscoggin River lies within the Penobscot-Kennebec-Androscoggin Ecological Drainage Unit (Olivero, 2003) and the Laurentian Mixed Forest Province (Bailey, 1995), which separates it from more southern rivers that were historically occupied by Atlantic salmon.

With respect to the ''discreteness'' of this population segment, Fay *et al.* (2006) considered ecological, behavioral, and genetic factors under the first discreteness criterion of the DPS Policy to examine the degree to which it is separate from other Atlantic salmon populations. Gulf of Maine salmon are behaviorally and physiologically discrete from other members of the taxon because they return to their natal Gulf of Maine rivers to spawn, which leads to the separation in stocks that has been observed between the Gulf of Maine and other segments of the taxon. This phenomenon is known as homing and is characteristic of all other anadromous salmonids (Klemetsen *et al.*, 2003; Utter *et al.*, 2004). Baum and Spencer (1990) found that roughly 98 percent of all tagged salmon returned to their natal rivers to spawn.

Ecologically, Gulf of Maine salmon are discrete from other members of the taxon. The core of the riverine habitat of this population segment lies within the Penobscot-Kennebec-Androscoggin Ecological Drainage Unit (Olivero, 2003) and the Laurentian Mixed Forest Province (Bailey, 1995). In particular, Gulf of Maine salmon life history strategies are dominated by age 2 smolts and 2SW adults whereas populations to the north of this population segment are generally dominated by age 3, or older, smolts and 1SW adults (i.e., grilse). Smolt age reflects growth rate (Klemetsen *et al.*, 2003), with faster growing parr emigrating as smolts earlier than slower growing ones (Metcalfe *et al.*, 1990). Smolt age is largely influenced by temperature (Symons, 1979; Forseth *et al.*, 2001) and can therefore be used to compare and contrast growing conditions across rivers (Metcalfe and Thorpe, 1990). For Gulf of Maine populations, smolt ages are quite similar across rivers with naturally-reared (result of either wild spawning or fry stocking) returning adults predominantly emigrating at river age 2 (88 to 100 percent) with the remainder emigrating at river age 3 (Fay *et al.*, 2006).

The strongest evidence that Gulf of Maine salmon are discrete from other members of the taxon is genetic. Fay *et al.* (2006) described genetic structure of this population segment and other stocks in detail in section 6.3.1.3. In summary, three primary genetic groups of North American populations (Spidle *et al.*, 2003; Spidle *et al.*, 2004; Verspoor *et al.*, 2005) are evident. These include the anadromous Gulf of Maine populations (including salmon in the Kennebec and Penobscot Rivers) (Spidle *et al.*, 2003), non-anadromous Maine populations (Spidle *et al.*, 2003), and Canadian populations (Verspoor *et al.*, 2005).

Because of these behavioral, physiological, ecological and genetic factors, we conclude that the Gulf of Maine anadromous population is discrete from other Atlantic salmon populations under the provisions of the DPS Policy.

With respect to the ''significance'' of this population segment, Fay *et al.* (2006) found three of the four ''significance'' factors described in the DPS policy applicable to the GOM DPS.

Under the first ''significance'' factor, Fay *et al.* (2006) concluded that this population segment has persisted in an ecological setting unusual or unique to the taxon for several reasons. First, Gulf of Maine salmon live in and migrate through a unique marine environment. The marine migration corridor for Gulf of Maine salmon begins in the Gulf of Maine that is known for unique circulation patterns, thermal regimes, and predator assemblages (Townsend *et al.*, 2006). Gulf of Maine salmon undertake extremely long marine migrations to feeding grounds off the west coast of Greenland because the riverine habitat they occupy is at the southern extreme of the current North American range. While such vast marine migrations are more common for stocks on the northeast side of the Atlantic, the combination of the long migration distances and the unique setting of the Gulf of Maine, described above, make the oceanic life history of the GOM DPS quite unique from those of other stocks. In addition, the core of the riverine habitat of this population segment lies within the Penobscot-Kennebec-Androscoggin Ecological Drainage Unit (Olivero, 2003) and the Laurentian Mixed Forest Province (Bailey, 1995). The importance of this setting is evidenced by the tremendous production potential of its juvenile nursery habitat that allows production of proportionately younger smolts than Canadian rivers to the north (Myers, 1986; Baum, 1997; Hutchings and Jones, 1998). Thus, the combination of the unique rearing conditions in the freshwater portion of its range combined with the unique marine migration corridor led Fay *et al.* (2006) to conclude that this population segment has persisted in an ecological setting unusual or unique to the taxon.

Under the second ''significance'' factor, Fay *et al.* (2006) concluded that the loss of this population segment would result in a significant gap or constriction in the range of the taxon. The extirpation of this population segment would represent a significant range reduction for the entire taxon Salmo salar because this population segment represents the southernmost native Atlantic salmon population in the western Atlantic; the temperature regimes in these southern rivers made possible the tremendous growth and production potential which resulted in the historically very large populations in these areas. Historic attempts to enhance salmon populations (in Gulf of Maine rivers) using Canadian-origin fish failed. This further illustrates the importance of conserving native populations and the difficulties of restoration if they are lost.

Under the third ''significance'' factor, Fay *et al.* (2006) concluded that this population segment differs markedly from other populations of the species in its genetic characteristics. While genetic differences were used to examine the ''discreteness'' of this population segment, Fay *et al.* (2006) suggested that the ''significance'' of these observed genetic differences is that they provide evidence of local adaptation. That is, low returns of exogenous smolts (i.e., Canadian-origin smolts stocked in Maine) and lower survival of smolts from these Maine rivers stocked outside their native geographic range (e.g., into the Merrimack River) indicate that this population segment is adapted to its native environment.

These three factors led Fay *et al.* (2006) to conclude that this population segment is significant to the Atlantic salmon species, and therefore, qualifies as a DPS (the new GOM DPS) under the provisions of the DPS Policy.

Fay *et al.* (2006) explicitly considered whether to include hatchery populations in the GOM DPS and concluded that all conservation hatchery populations (currently maintained at GLNFH and CBNFH) should be included in the GOM DPS. This determination was based on the fact that there is a low level of divergence between conservation hatchery populations and the rest of the GOM DPS because: (1) the river-specific hatchery programs collect wild parr or sea-run adults annually (when possible) for inclusion into the broodstock programs; (2) broodstocks are used to stock fry and other life stages into the river of origin, and, in some instances, hatchery-origin individuals represent the primary origin of Atlantic salmon due to low adult returns; (3) there is no evidence of introgression from Canadian-origin populations; and (4) there is minimal introgression from aquaculture fish because of a rigorous genetic screening program. Because the level of divergence is minimal, Fay *et al.* (2006) suggested that hatchery populations should be considered part of the GOM DPS. However, Fay *et al.* (2006) also noted the dangers of reliance on hatcheries. In short, these risks include artificial selection, inbreeding depression, and outbreeding depression. The reader is directed to ''Artificial Propagation'' in ''Factor E'' of this **Federal Register** document and Section 8.5.1 of the 2006 Status Review report for an in depth discussion of these risks.

We concur with the findings and application of the DPS policy described in Fay *et al.* (2006) and therefore conclude that the GOM DPS warrants delineation as a DPS (i.e., it is discrete and significant). Specifically, we conclude that the GOM DPS is comprised of all anadromous Atlantic salmon whose freshwater range occurs in the watersheds from the Androscoggin northward along the Maine coast to the Dennys, including all associated conservation hatchery populations used to supplement these natural populations; currently, such populations are maintained at GLNFH and CBNFH. We consider the hatchery-dependent populations that are maintained at CBNFH and GLNFH essential for recovery of the GOM DPS because the hatchery populations contain a high proportion of the genetic diversity remaining in the GOM DPS (Bartron *et al.*, 2006). Excluded are those salmon raised in commercial hatcheries for aquaculture and landlocked salmon because they are genetically distinguishable from the GOM DPS. The marine range of the GOM DPS extends from the Gulf of Maine to feeding grounds off Greenland. The most substantial difference between the GOM DPS as listed in 2000 and the GOM DPS as proposed in this rule is the inclusion of the entire Androscoggin, Kennebec and Penobscot basins.

Several rivers outside the range of the GOM DPS in Long Island Sound and Central New England contain Atlantic salmon (Fay *et al.*, 2006). The native Atlantic salmon of these areas south of the GOM DPS were extirpated in the 1800s (Fay *et al.*, 2006). However, efforts to restore Atlantic salmon to these areas (e.g., Connecticut, Merrimack, and Saco Rivers) involve stocking Atlantic salmon that were originally derived from the GOM DPS. Atlantic salmon whose freshwater range occurs outside the GOM DPS do not interbreed with salmon within the GOM DPS and are not considered a part of the GOM DPS and are not being considered for protection under the ESA.

Status of the GOM DPS

Since the listing of the GOM DPS of Atlantic salmon in 2000, the numbers of returning adults (both naturally-reared and conservation hatchery stocked) have remained low (Table 1). Of greatest concern is the extremely low number of naturally-reared adults in the GOM DPS. In 2006 (the most recent year for which complete data is available at the time of writing), approximately 1,144 adult salmon returned to rivers within the freshwater range of the GOM DPS. Of these, only 117 were naturally-reared; 91 percent (1,044) of the adult salmon returned to the Penobscot, 95 percent (996) of which were stocked through conservation hatchery programs as smolt (Table 2). The remainder was predominantly naturally-reared salmon that returned to smaller rivers such as the Narraguagus, Pleasant, and Sheepscot Rivers (Table 2). Conservation spawning escapement (CSE) goals are widely used (e.g., International Council for the Exploration of the Sea (ICES), 2005) to describe the status of individual Atlantic salmon populations. When CSE goals are met, Atlantic salmon populations are generally self-sustaining. When CSE goals are not met (i.e., less than 100 percent), populations are not reaching full potential which can be indicative of a population decline. For all rivers in Maine, current Atlantic salmon populations are well below CSE levels required to sustain themselves (Fay *et al.*, 2006), which is further indication of their poor population status.

TABLE 1. ADULT RETURNS TO RIVERS WITHIN THE RANGE OF THE GOM DPS AS LISTED IN 2000, THE PENOBSCOT RIVER, THE KENNEBEC RIVER, AND THE ANDROSCOGGIN RIVER FROM 2001 TO 2006. THESE DATA ARE SUMMARIZED FROM TABLE 3.2.1.2 AND TABLE 16 IN THE UNITED STATES ATLANTIC SALMON ASSESSMENT COMMITTEE REPORT (USASAC, 2007).

| Year | Rivers within the range of the DPS as listed in 2000 estimate | Penobscot River Trap Count | Kennebec River Trap Count [a] | Androscoggin River Trap Count | Total Known Returns |
|---|---|---|---|---|---|
| 2001 | 103 | 785 | -- | 5 | 893 |
| 2002 | 37 | 780 | -- | 2 | 819 |
| 2003 | 76 | 1112 | -- | 3 | 1191 |
| 2004 | 82 | 1323 | -- | 11 | 1416 |
| 2005 | 71 | 985 | -- | 10 | 1066 |
| 2006 | 79 | 1044 | 15 | 6 | 1144 |

[a] Counts not conducted on the Kennebec until 2006

TABLE 2. ADULT RETURNS TO RIVERS WITHIN THE FRESHWATER RANGE OF THE GOM DPS BY ORIGIN IN 2006. THESE DATA ARE SUMMARIZED FROM TABLE 1 IN THE UNITED STATES ATLANTIC SALMON ASSESSMENT COMMITTEE REPORT (USASAC, 2007).

| River | Conservation Hatchery | Naturally-reared | Total |
|---|---|---|---|
| Androscoggin | 6 | 0 | 6 |
| Kennebec | 10 | 5 | 15 |
| Dennys | 4 | 2 | 6 |
| Narraguagus | 0 | 15 | 15 |
| Other GOM DPS | 11 | 47 | 58 |
| Penobscot | 996 | 48 | 1044 |
| **Total** | 1027 | 117 | 1144 |

Currently, the GOM DPS of Atlantic salmon is largely dependent on conservation hatchery supplementation for its persistence. The ultimate goal of the conservation hatchery program is to lead to the recovery of the GOM DPS. We use two recent analyses to inform us about the role of conservation hatcheries in reducing the risk of extinction of the GOM DPS given the low numbers of naturally-reared salmon in the GOM DPS. We do not use either of these analyses to define a point at which we predict the GOM DPS may go extinct or to analyze threats to the GOM DPS because of the assumptions made by each that make them inappropriate to use for such purposes. The two analyses are: (1) Fay *et al.* (2006) in which recent adult return data were used in a population viability analysis (PVA) to assess the extinction probabilities for the GOM DPS (as defined in this proposed rule); (2) Legault (2004 and 2005) in which a novel population modeling tool (SalmonPVA) was used to, in part, begin examining quantitative recovery criteria for the GOM DPS as listed in 2000.

The PVA described in section 7.3 of Fay *et al.* (2006) generally shows that the GOM DPS is likely to continue to decline in terms of adult abundance. In short, these PVA projections show that the GOM DPS is trending towards extinction. The Fay *et al.* (2006) PVA does, however, show the positive population effects of conservation hatcheries (i.e., reducing the risk of extinction). The risk of extinction increases over time, and varies depending on how extinction is defined (i.e., a ‘‘Quasi-Extinction Threshold’’ (QET) of one individual vs. 50 or 100 individuals). Using an adult return dataset from a period of low marine survival (1991 to 2004), the likelihood of extinction (QET = 1) for the GOM DPS is 0.8 percent over a 20–year time frame. Even if the timeframe is extended to 100 years, for a QET of one individual the estimated extinction risk remains below 50 percent (37.2 percent). With a QET of 50 individuals, however, the extinction risk increases to 71.2 percent in 100 years. In the analyses, the probability of extinction increases when the QET is larger, and with longer timeframes. Without the smolt stocking program, the risks of extinction would be much greater (Fay *et al.*, 2006).

Legault's PVA (Legault, 2005) demonstrates that current levels of hatchery supplementation substantially reduce extinction risk to the GOM DPS as listed in 2000. For example, in simulations where marine survival estimates were set at the mean of the last 30 years, Legault (2005) estimated that the extinction risk (in the next 100 years) for the GOM DPS as listed in 2000 was near 100 percent if hatchery supplementation ceased in 2015, whereas extinction risks were only approximately 1 percent in simulations where hatchery supplementation continued through the year 2055. These simulations only included those populations specifically named in the GOM DPS as listed in 2000; given that smaller initial population sizes exacerbate the extinction process (Holmes, 2001), adding the Penobscot population into the GOM DPS, as is proposed here, would further reduce the extinction risks compared to those presented by Legault (2005).

Although PVAs are informative in assessing extinction risks, there are several assumptions that must be carefully scrutinized. In particular, the PVA presented by Fay *et al.* (2006) can be considered valid only if the following assumptions are accepted: (1) hatchery supplementation continues into the future at current levels with similar survival rates, and (2) similar threats to the species remain operative into the future (i.e., environmental conditions remain unchanged). Therefore, the PVA projections of extinction risk for the GOM DPS are not necessarily predictive of future conditions, especially over longer time frames, and caution must be used in interpreting results of this or any PVA when making a determination regarding a species' conservation status.

Importantly, all of the extinction risk scenarios assessed by Fay *et al.* (2006) assumed that hatchery supplementation would continue at its present level. The hatchery program, however, and specifically the smolt stocking program that currently sustains the GOM DPS, requires at least 150 returning adults in the GOM DPS. If there were less than 150 adults, smolt production goals could not be met and the hatchery program could not continue at its current level; the likelihood of this occurring has not been determined. The ramifications of an adult population falling below 150 are that severe genetic and demographic problems would arise in the population as the result of the extremely low levels of abundance (Fay *et al.*, 2006). The effect hatchery supplementation has on reducing the risk of extinction of the GOM DPS would also be lost without the smolt stocking program at its current levels, and a steep and rapid population decline to extinction would be expected if hatchery broodstock goals could not be met (i.e., less than 150 adults). In addition, because smolt stocking has a greater positive effect on population demographics than fry stocking (SEI, 2007), the cessation of the smolt stocking that currently sustains the GOM DPS likely would exacerbate extinctions risks considerably more than if fry stocking were discontinued (as considered by Legault (2005)).

In addition, there are negative consequences to hatchery supplementation that are not incorporated into the PVA. Despite managers' best efforts, long-term artificial propagation and maintenance of a population in captivity may result in negative effects resulting from small population size, inbreeding, and domestication selection that may reduce the long-term viability of the population (see Artificial Propagation in Factor E of this **Federal Register** Notice). We recognize that such effects may be difficult to detect, yet they may be irreversible.

Additional risks of relying on hatchery supplementation that are not explicitly considered in either PVA are described below. The entire hatchery stock for the GOM DPS is maintained in two hatcheries, GLNFH and CBNFH. Although there are strict biosecurity protocols and broodstock management plans in place, there is the potential for a catastrophe to occur at either or both facilities (e.g., disease, loss of funding, loss of electricity), which could result in the loss of many individuals or potentially entire broodstock sources. In the event of such a catastrophe, there would still be two to three age classes at sea; however, it would be extremely difficult to rebuild the broodstock with the remaining small population and limited gene pool. Given the current dependence of the GOM DPS on hatchery supplementation, catastrophic loss of either or both hatchery stocks would cause a steep and rapid decline to extinction, potentially more severe than if broodstock goals cannot be met (as described above). Neither of the PVAs (Legault, 2005; nor Fay *et al.*, 2006) explicitly considered the risk of catastrophic loss of both conservation hatchery programs.

To summarize the information we have obtained from the PVAs (Legault, 2005; Fay *et al.*, 2006), the GOM DPS is trending toward extinction though conservation hatchery supplementation buffers the extinction risk. If the number of returning adults falls below 150, the current levels of conservation hatchery supplementation (smolt stocking, in particular) would be impossible to maintain, resulting in a rapid and steep decline to extinction. This scenario was not modeled in either PVA; therefore, we are not able to predict timeframes to how soon extinction might occur without hatchery supplementation.

To summarize the status of the GOM DPS, the total number of naturally-reared, spawning adult salmon continues to be extremely low (117 in 2006 data summarized from USASAC, 2007). In 2006 there were 1,027 smolt-stocked adults in the GOM DPS (data summarized from USASAC (2007)). Hatchery supplementation reduces the risk of extinction by increasing the number of juveniles in the GOM DPS, thereby maintaining low levels of spawning adults returning to the system. However, these programs have not yet been successful at recovering or maintaining wild, self-sustaining populations of Atlantic salmon as evidenced by the low numbers of naturally-reared adults in the GOM DPS. The majority of salmon within the freshwater range of the GOM DPS return to a single river system, the Penobscot; of these, approximately 90 percent were stocked as smolts.

## Summary of Factors Affecting the GOM DPS

Section 4 of the ESA (16 U.S.C. 1533) and implementing regulations at 50 CFR part 424 set forth procedures for adding species to the Federal List of Endangered and Threatened Species. Under section 4(a) of the Act, we must determine if a species is threatened or endangered because of any of the following five factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence.

We have described the effects of various factors leading to the decline of Atlantic salmon in previous listing determinations (60 FR 50530, September 29, 1995; 64 FR 62627, November 17, 1999; 65 FR 69459, November 17, 2000) and supporting documents (NMFS and USFWS, 1999; NMFS and USFWS, 2005). The reader is directed to section 8 of Fay *et al.*, (2006) for a more detailed discussion of the factors affecting the GOM DPS. In making this finding, information regarding the status of the GOM DPS of Atlantic salmon is considered in relation to the five factors provided in section 4(a)(1) of the ESA.

### *A. The Present or Threatened Destruction, Modification, or Curtailment of its Habitat or Range*

Changes to the GOM DPS's natural environment are ubiquitous. Both contemporary and historic land and water use practices such as damming of rivers, forestry, agriculture, urbanization, and water withdrawal have substantially altered Atlantic salmon habitat by: (1) eliminating and degrading spawning and rearing habitat, (2) reducing habitat complexity and connectivity, (3) degrading water quality, and (4) altering water temperatures. These impacts and their effects on salmon are described in detail by Fay *et al.* (2006). Here we summarize the stressors that we believe are having the greatest impact on the GOM DPS.

Dams are among the leading causes of both historic declines and contemporary low abundance of the GOM DPS of Atlantic salmon. Dams directly limit access to otherwise suitable habitat. Prior to the construction of mainstem dams in the early 1800s, the upstream migrations of salmon extended well into headwaters of large and small rivers alike, unless a naturally impassable waterfall existed. For example, Atlantic salmon were found throughout the West Branch of the Penobscot River (roughly 350 km inland) and as far as Grand Falls (roughly 235 km inland) on the Dead River in the Kennebec Drainage (Foster and Atkins, 1867; Atkins, 1870). Today, however, upstream passage for salmon on the West Branch of the Penobscot is nonexistent and limited to trapping and trucking salmon above the first mainstem dam on the Kennebec. Dams also change hydraulic characteristics of rivers. These changes, combined with reduced, non-existent, or poor fish passage, influence fish community structure. Specifically, dams create slow-moving impoundments in formerly free-flowing reaches. Not only are these altered habitats less suitable for spawning and rearing of Atlantic salmon, they may also favor nonnative competitors such as smallmouth bass (*Micropterus dolomieu*) over native species such as brook trout (*Salvelinus fontinalis*) and American shad (*Alosa sapidissima*). Fish passage inefficiency also leads to direct mortality of Atlantic salmon. Upstream passage effectiveness for anadromous fish species never reaches 100 percent, and substantial mortality and migration delays occur during downstream passage events through screen impingement and turbine entrainment. The cumulative losses of smolts, in particular, incrementally diminish the productive capacity of freshwater rearing habitat above hydroelectric dams. Comprehensive discussions of the impacts of dams are presented in sections 8.1, 8.3, and 8.5.4 of Fay *et al.* (2006) and NRC (2004).

As supported by the information in the Status Review, we find that the threat of dams and their inter-related effects on freshwater salmon habitat is one of the three (in addition to the inadequacy of existing regulatory mechanisms for dams (see discussion in Factor D below) and the low marine survival, (see discussion in Factor E below) most influential stressors negatively affecting the persistence of the GOM DPS.

Some forest, agricultural, and other land use practices have reduced habitat complexity within the range of the GOM DPS of Atlantic salmon. Large woody debris (LWD) and large boulders are currently lacking from many rivers because of historic practices. When present, LWD and large boulders create and maintain a diverse variety of habitat types. Large trees were harvested from riparian areas; this reduced the supply of LWD to channels. In addition, any LWD and large boulders that were in river channels were often removed in order to facilitate log drives. Historical forestry and agricultural practices were likely the cause of currently altered channel characteristics, such as width-to-depth ratios (i.e., channels are wider and shallower today than they were historically). Channels with large width-to-depth ratios tend to experience more rapid water temperature fluctuations, which is stressful for salmon, particularly in the summer when temperatures are warmer. Further discussions of the impacts of reduced habitat complexity are presented in section 8.1.2 of Fay *et al.* (2006). Within Factor A, we find that the threat to the persistence of the GOM DPS from reduced habitat complexity is secondary to the significant threat posed by dams.

Habitat connectivity has been reduced because of dams and poorly designed road crossings. Further discussions of the impacts of reduced habitat connectivity are presented in section 8.1.2 of Fay *et al.* (2006). As a highly migratory species, Atlantic salmon require a diverse array of well-connected habitat types in order to complete their life history. Impediments to movement between habitat types can limit access to potential habitat and, therefore, directly reduce survival in freshwater. In some instances, barriers to migration may also impede recovery of other diadromous fishes as well. For example, alewives (*Alosa pseudoharengus*) require free access to lakes to complete their life history. To the extent that salmon require other native diadromous fishes to complete their life history (see ''Depleted Diadromous Communities'' in ''Factor E'' of this **Federal Register** notice), limited connectivity of freshwater habitat types may limit the abundance of salmon through diminished nutrient cycling, and a reduction in the availability of co-evolved diadromous fish species that provide an alternative prey source and serve as prey to GOM DPS Atlantic salmon. Restoration efforts in the Machias, East Machias and Narraguagus Rivers have improved passage at road crossings by replacing poorly-sized and poorly-positioned culverts. However, many barriers of this type remain throughout the GOM DPS. Within Factor A, we find that the threat to the persistence of the GOM DPS from reduced habitat connectivity (resulting from causes other than dams) is secondary to the significant threat posed by dams.

A number of other human-caused perturbations continue to negatively modify Atlantic salmon habitat within the range of the GOM DPS. Water withdrawals that reduce water quality (e.g., temperature and dissolved oxygen) and in-stream flows to levels that cannot sustain Atlantic salmon populations have been documented in rivers within the range of the GOM DPS. Elevated sedimentation from forestry, agriculture, urbanization, and roads can reduce survival at several life stages, most importantly egg survival, as well as alter in-stream habitat and habitat use patterns by filling pools, and adversely affect aquatic invertebrate populations that are an important food source for salmon. Acid rain reduces pH in surface waters with low buffering capacity, and reduced pH impairs osmoregulatory abilities and seawater tolerance of Atlantic salmon smolts. A variety of pesticides, herbicides, trace elements, and other contaminants are found at varying levels throughout the range of the GOM DPS. These contaminants have been demonstrated to cause lethal and sub-lethal impacts, such as impaired olfactory capabilities, to salmon. Fay *et al.* (2006) provide a thorough discussion of these habitat alterations in sections 8.1.1 and 8.1.3. Within Factor A, we find that the threat to the persistence of the GOM DPS from poor water quality is secondary to the significant threat posed by dams.

The GOM DPS of Atlantic salmon is negatively affected by ongoing changes in its freshwater habitat as a result of land and water use practices as considered above in Factor A. Within Factor A, we find that dams and their inter-related effects are significant threats to the persistence of the GOM DPS; secondary threats to the persistence of the GOM DPS are stressors that reduce habitat connectivity (other than dams), reduce habitat complexity, and negatively affect water quality. We conclude that threats from dams, the inadequacy of existing regulatory mechanism for dams (described below in Factor D), and low marine survival (described below in Factor E), are the most influential stressors negatively affecting the persistence of the GOM DPS.

*B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes*

The GOM DPS of Atlantic salmon has supported important tribal, recreational, and commercial fisheries. In the past, these fisheries have been conducted throughout nearly all of the GOM DPS's habitats, including in-river, estuarine, and off-shore (see section 8.2 of Fay *et al.* (2006) for additional information regarding Overutilization as it affects Atlantic salmon).

Atlantic salmon are an integral part of the history of Native American tribes in Maine, particularly the PIN. The species represents both an important resource for food, and perhaps more importantly, a cultural symbol of the deeply engrained connection between the PIN and the Penobscot River. In accordance with the Maine Indian Land Claims Settlement Act, the PIN retains the right of its members to harvest Atlantic salmon for subsistence and sustenance purposes, and to self-regulate that harvest. The PIN has harvested only two salmon under these provisions, and has voluntarily decided not to harvest any Atlantic salmon since 1988, because of the depleted status of the species.

Recreational fisheries for Atlantic salmon in Maine date back to the early to mid–1800s. Since 1880, over 25,000 Atlantic salmon have been landed in Maine rivers, roughly 14,000 in the Penobscot River alone (Baum, 1997). Historically, Atlantic salmon sport anglers practiced very little catch and release. Beginning in the 1980s as runs decreased, the Maine Atlantic Sea Run Salmon Commission imposed increasingly restrictive regulations on the recreational harvesting of Atlantic salmon in Maine. The allowable annual harvest per angler for these rivers was reduced from 10 salmon in the 1980s to 1 grilse in 1994. Angling was closed on the Pleasant River from 1986 to 1989. In 1990, a one year catch and release fishery was allowed on the Pleasant River. In 1995, regulations were promulgated for catch and release fishing for sea-run Atlantic salmon throughout the other Maine salmon rivers, closing the last remaining recreational harvest opportunities for sea run Atlantic salmon in the United States. In 2000, all directed recreational fisheries for sea run Atlantic salmon in Maine were closed until 2006 when a short, highly regulated, experimental catch and release fishery was opened on the Penobscot River below Veazie Dam. The 30–day angling season began on September 15, 2006, and resulted in one Atlantic salmon being caught and released on September 20, 2006. This fishery was opened again on September 15, 2007. In 2008, the Maine Atlantic Salmon Commission Board authorized a 30–day catch and release fishery for the spring of 2008. This fishery poses a risk to returning sea-run Atlantic salmon because it occurs at a time of year before broodstock have been collected, which is essential to maintain current levels of conservation hatchery supplementation, and would further risk the likelihood of achieving the scientifically sound and mutually-agreed goals set forth in the Broodstock Management Plan (P. Kurkul, NOAA, in litt. February 1, 2008).

Poaching and incidental capture remain concerns to the status of Atlantic salmon in Maine. Incidental capture of parr and smolts, primarily by trout anglers, and of adult salmon, primarily by striped bass anglers, has been documented. Targeted poaching for adult salmon occurs at low levels as well. Low returns of adult salmon to Maine rivers highlight the importance of continuing to reduce any source of mortality, particularly at later life stages.

Commercial fishing for Maine Atlantic salmon historically occurred in rivers, estuaries, and on the high seas. While most directed commercial fisheries for Atlantic salmon have ceased, the impacts from past fisheries are important in explaining the present low abundance of the GOM DPS. Also, the continuation of offshore fisheries for Atlantic salmon, albeit at reduced levels, influences the current status of the GOM DPS.

Nearshore fisheries for Atlantic salmon in Maine were quite common in the late 1800s. In 1888, roughly 90 metric tons (mt) of salmon were harvested in the Penobscot River alone. As stocks continued to decline through the early 1900s, the Maine Atlantic Sea Run Salmon Commission closed the nearshore commercial fishery for Atlantic salmon after the 1947 season when only 40 fish (0.2 mt) were caught. Directed fisheries for Atlantic salmon in U.S. territorial waters were further limited by regulations implementing the Atlantic salmon fishery management plan (FMP) in 1987 (NEFMC, 1987). These regulations prohibit possession of Atlantic salmon in the U.S. exclusive economic zone. While nearshore fisheries for Atlantic salmon have ceased, the impacts from past fisheries are important in explaining the present low abundance of the GOM DPS.

Directed fishing for other species has the potential to intercept salmon as by-catch. Beland (1984) reported that fewer than 100 salmon per year were caught incidental to other commercial fisheries in the coastal waters of Maine. Recent investigations also suggest that by-catch of Atlantic salmon in herring fisheries is not a significant mortality source for U.S. stocks of salmon (ICES, 2004).

Offshore, directed fisheries for Atlantic salmon continue to affect the GOM DPS, though these fisheries have been substantially reduced in recent years. The combined harvest of 1SW Atlantic salmon of U.S. origin in the fisheries off West Greenland and Canada averaged 5,060 fish, and returns to U.S. rivers averaged 2,884 fish from 1968 to 1989 (ICES, 1993); we estimate that roughly 87 percent of all U.S. adult returns during the time period 1968 to 1989 originated from the GOM DPS, and thus roughly 2,519 of the 2,884 of the above returns were to the GOM DPS. ICES (1993) estimated that adult returns to U.S.rivers could have potentially been increased by 2.5 times in the absence of West Greenland and Labrador fisheries during that time period. The United States joined with other North Atlantic nations in 1982 to form the North Atlantic Salmon Conservation Organization (NASCO) for the purpose of managing salmon through a cooperative program of conservation, restoration, and enhancement of North Atlantic stocks. NASCO achieves its goals by managing the exploitation by member nations of Atlantic salmon that originated within the territory of other member nations. The United States' interest in NASCO stemmed from its desire to ensure that interception fisheries of U.S. origin fish did not compromise the long-term commitment by the states and Federal government to rehabilitate and restore New England Atlantic salmon stocks. Since the establishment of NASCO in 1982, commercial quotas for the West Greenland fishery have steadily declined, as has the abundance of most stocks that make up this mixed stock fishery (including the GOM DPS). Quotas have been restricted to an internal use fishery (i.e., no fish were sold internationally) in the following years: 1998–2000; 2003–2007; and provisionally for 2008.

In addition, a small commercial fishery occurs off St. Pierre et Miquelon, a French territory south of Newfoundland. Historically, the fishery was very limited (2 to 3 mt per year). There is great interest by the United States and Canada in sampling this catch to gain more information on stock composition. In recent years, there has been a reported small increase in the number of fishermen participating in this fishery. A small sampling program was initiated in 2003 to obtain biological data and samples from the catch. Genetic analysis on 134 samples collected in 2004 indicated that all samples originated from North America, and approximately 1.9 percent were of U.S. origin. The 90–percent confidence interval around this estimate was 0–77 U.S.-origin salmon (ICES, 2006), and since roughly 87 percent of all U.S. returns originated from the GOM DPS in 2004 (USASAC, 2005), we estimate that up to 67 fish harvested in this fishery originated from the GOM DPS. Efforts to continue and increase the scope of this sampling program are ongoing through NASCO. These data are essential to understanding the impact of this fishery on the GOM DPS.

A multi-year conservation agreement was established in 2002 between the North Atlantic Salmon Fund and the Organization of Hunters and Fishermen in Greenland, effectively buying out the commercial fishery for Atlantic salmon for a 5–year period. The internal-use fishery is not included in the agreement. From 2002 to 2005, the internal-use fishery harvested between 19 and 25 mt (reported and unreported catch) annually. Genetic analysis performed on samples obtained from the 2002 to 2004 fisheries estimated the North American contribution at 64–73 percent, with the United States contributing between 0.1 and 0.8 percent of the total. The 90 percent confidence interval for the U.S. estimates are 0 to 141 salmon in 2002, 5 to 132 salmon in 2003, and 0 to 64 salmon in 2004 (ICES, 2006). In June 2007, the agreement was extended and revised to cover the 2007 fishing season. The agreement may continue to be extended on an annual basis through 2013.

Overutilization for recreational and commercial purposes was a factor that contributed to the historic declines of the GOM DPS. The current low numbers of adult salmon in the GOM DPS magnify the negative population effects caused by any take that occurs through commercial, recreational, scientific or educational purposes; however, we find the threats from overutilization (Factor B) to the persistence of the GOM DPS are secondary to threats identified above in Factors A (dams), and below in D (inadequacy of existing regulatory mechanisms for dams) and E (low marine survival).

*C. Disease or Predation*

Fish diseases have always represented a source of mortality to Atlantic salmon in the wild (for a more thorough discussion see section 8.3.2 of Fay *et al.* (2006)). Atlantic salmon are susceptible to numerous bacterial, viral, and fungal diseases. Bacterial diseases common to New England waters include Bacterial Kidney Disease (BKD), Enteric

Redmouth Disease (ERM), Cold Water Disease (CWD), and Vibriosis (Mills, 1971; Gaston, 1988; Olafsen and Roberts, 1993; Egusa, 1992). To reduce the likelihood of disease outbreaks or epizootic events, cultured salmon used for aquaculture purposes routinely receive vaccinations for these pathogens prior to stocking into marine sites. Fungal diseases such as Furunculosis can affect all life stages of salmon in both fresh and salt water, and the causative agent (Saprolignia spp.) is ubiquitous to most water bodies. The risk of an epizootic occurring during fish culture operations is greater because of the increased numbers of host animals reared at much higher densities than would be found in the wild. In addition, stressors associated with intensive fish culture operations (i.e., handling, stocking, tagging, and sea-lice loads) may increase susceptibility to infections. Disease from fish culture operations may be spread to wild salmon directly through effluent discharge or indirectly from either escapes of cultured salmon, or through smolts and returning adults passing through embayments where pathogen loads are increased to a level such that infection occurs and diseases may be transferred.

A number of viral diseases that could affect wild populations have occurred during the culture of Atlantic salmon, such as Infectious Pancreatic Necrosis, Salmon Swimbladder Sarcoma Virus, Infectious Salmon Anemia (ISA), and Salmon Papilloma (Olafsen and Roberts, 1993). In 2007, the Infectious Pancreatic Necrosis virus was isolated in sea run fish in the Connecticut River program. It is most likely these fish contracted the disease during their time at sea and it was detected in the hatchery due to the rigorous fish health monitoring and assessment protocols. ISA is of particular concern for the GOM DPS because of the nature of the pathogen and the high mortality rates associated with the disease. Most notably, a 2001 outbreak of ISA in Cobscook Bay led to an emergency depopulation of all commercially cultured salmon in the bay. In addition to complete depopulation of all cultured salmon, the MDMR ordered all cages be thoroughly cleaned and disinfected, all sites be fallowed for 3 months, and subsequent re-stocking of cages occur at lower densities with only a single year class. These measures were initially successful; however, subsequent testing for ISA has revealed additional detections of the virus in Cobscook Bay (Maine) sites in 2003, 2004, 2005, and 2006.

Disease(s) can have devastating population-wide effects when they occur; we find that the threat from disease (within Factor C) to the persistence of the GOM DPS is secondary to threats identified in above in Factors A (dams) and below in D (inadequacy of existing regulatory mechanisms for dams), and E (low marine survival).

Predation is a natural and necessary process in properly functioning aquatic ecosystems (for a comprehensive discussion see section 8.3.1 of Fay *et al.* (2006)). Atlantic salmon have evolved a suite of strategies that allow them to co-exist with the numerous predators they encounter throughout their life cycle. However, natural predator-prey relationships in aquatic ecosystems in Maine have been substantially altered through the spread of nonnative fish species (e.g., smallmouth bass), habitat alterations (e.g., river channel simplification and dams), and the decline of other diadromous species that would otherwise serve as an alternative prey source for fish that feed on Atlantic salmon smolts and adults.

The threat of predation on the GOM DPS of Atlantic salmon is important because of the imbalance between the very low numbers of adults returning to spawn and the recent increase in population levels of some native predators such as double-crested cormorants, striped bass, and several species of seals as well as non-native predators, such as smallmouth bass; we find that the threat from predation (within Factor C) to the persistence of the GOM DPS is secondary to threats identified above in Factors A (dams) and below in D (inadequacy of existing regulatory mechanisms for dams), and E (low marine survival).

*D. Inadequacy of Existing Regulatory Mechanisms*

A variety of state and Federal statutes and regulations directly or indirectly address potential threats to Atlantic salmon and their habitat. These laws are complemented by international actions under NASCO and many interagency agreements and state-Federal cooperative efforts specifically designed to protect Atlantic salmon. Implementation and enforcement of these laws and regulations could be strengthened to further protect Atlantic salmon. State and Federal agencies have established coordination mechanisms and joined with private industries and landowners in partnerships for the protection of Atlantic salmon. These partnerships will be critical to the recovery of the species. However, there are still major threats to the GOM DPS for which current regulatory mechanisms remain inadequate, such as dams, water withdrawals, and degraded water quality. For further discussion of these regulatory mechanisms, see section 8.4 of Fay *et al.* (2006).

Dams

Atlantic salmon require a diverse array of well connected habitat types in order to complete their life history. Present conditions within the range of the GOM DPS only allow salmon to access a fraction of river miles that were historically accessible. Even where salmon can presently access suitable habitat, they must often pass several dams to reach their natal spawning habitat.

Most hydroelectric dams in the large watersheds of the GOM DPS (Penobscot, Kennebec, and Androscoggin) are licensed by the Federal Energy Regulatory Commission (FERC) under the Federal Power Act (FPA). Currently, within the historic range of Atlantic salmon in the GOM DPS there are 19 hydroelectric dams in the Androscoggin watershed, 18 in the Kennebec watershed, and 23 in the Penobscot watershed. Although Section 18 of the FPA authorizes the Services to prescribe upstream and downstream fishways, 16 hydroelectric dams within the range of the GOM DPS in the Androscoggin watershed are impassible due to the lack of fishways, along with 15 dams in the Kennebec, and 12 dams in the Penobscot. Presently, 15 dams in the Androscoggin, 7 dams in the Kennebec, and 9 dams in the Penobscot are FERC-licensed without any prescribed fish passage requirements. In these cases, reservations of FPA section 18 authority are often in place that could allow fishways to be prescribed by the Services. However, a substantial amount of mortality and passage inefficiency would still occur even with fishways, given that fish passage facilities are never 100 percent efficient. In addition, implementing any new fishway prescriptions could take several years because the FERC rehearing process must first run its course.

Furthermore, fish passage is not the only threat to salmon caused by hydroelectric dams. The effects of habitat degradation and the altered environmental features that favor nonnative species pose an equal or even greater impediment to Atlantic salmon recovery via reduction in production capacity of freshwater rearing areas above dams. Sections 10(a) and 10(j) of the FPA could be used by the Services to recommend measures to minimize these effects, but these mechanisms are largely discretionary and often not required by the FERC (Black *et al.*, 1998). Section 4(e) of the FPA requires FERC to give equal consideration to developmental and nondevelopmental values on Federal reservations. In other parts of the country, section 4(e) is often used by the Services to recommend fisheries enhancements; however, Federal lands where Section 4(e) could be applied are rare in Maine.

For a hydropower project to be relicensed by the FERC, the State of Maine must first certify that continued operation of the project will comply with Maine's water quality standards pursuant to Section 401 of the Clean Water Act. The Maine Department of Environmental Protection (MDEP) is the certifying agency for all hydropower project licensing and relicensings in the State of Maine, except for projects in unorganized territories subject to permitting by the Land Use Regulation Commission (LURC). Through the water quality certification process, the MDEP can require fish passage and habitat enhancements at FERC licensed hydroelectric projects.

The vast majority of dams within the range of the GOM DPS do not require either a FERC license or MDEP water quality certificate. These non-jurisdictional dams are typically small, non-generating dams that were historically used for a variety of purposes, including flood control, storage, and process water (for industries such as blueberry harvesting). Practically all of these dams within the range of the GOM DPS do not have fish passage facilities and impact historical Atlantic salmon habitat. Many of these non-jurisdictional dams are no longer used for their intended purposes; however, many smaller dams maintain water levels in lakes and ponds. Although the MDEP can be petitioned by the public to set minimum flows and water levels at these dams, the MDEP has no direct statutory authority under Maine law to require fisheries related enhancements without public request or petition. Removal of non-hydropower generating dams in Maine may require a permit under the Maine Natural Resources Protection Act or the Maine Waterway Development and Conservation Act. Owners of non-hydroelectric dams can petition the MDEP to be released from ownership; however, the MDEP does not have the authority to require dam removal without the consent of the owner.

We find that the threat from the inadequacy of existing regulatory mechanisms for dams is one of the three most influential stressors, in addition to threats from dams on freshwater salmon habitat (see discussion in Factor A above) and low marine survival (see discussion in Factor E below), negatively affecting the persistence of the GOM DPS.

Water Withdrawals

Maine has made substantial progress in regulating water withdrawal for agricultural use. Requests for water withdrawals for irrigation in unorganized towns in Maine require approval from the LURC. In approving any request for water withdrawals, the LURC must ensure that the action does not cause a surface water body to be unsuitable for the existing and designated uses of the water body or otherwise result in a violation of state or Federal water quality laws. The State of Maine recently approved a new rule (Chapter 587) that establishes river and stream flows and lake and pond water levels to protect natural aquatic life and other designated uses in Maine's waters. These rules were passed in response to Maine statutory requirements of Title 38, sections 470–E and 470–H, to ''establish water use standards for maintaining in-stream flows and GPA (Great Pond Class A) lake or pond water levels that are protective of aquatic life and other uses and that establish criteria for designating watersheds most at risk from cumulative water use.'' The new standards are based on natural variation of flows and water levels, but allow variances if use will still be protective of applicable state and Federal water quality classifications. In addition, in 2002 the State of Maine enacted legislation (LD 1488), referred to as the Sustainable Water Use Policy, that requires the MDEP to work with state, regional, and local agencies to develop water use policies that protect the environment from excessive drawdown of water sources, including rivers, lakes, streams, and ground water, during low flow periods, and requires major water users to report any use that is above threshold levels. The Commissioner of the MDEP is then required to submit a summary report on major water uses to the legislature on an annual basis. It is unclear how many, if any, municipalities have developed their own water use policies and while these policies consider general effects on the environment; no special consideration is required for the protection of Atlantic salmon or its habitat.

We find the threat from the inadequacy of existing regulatory mechanisms for water withdrawals to the persistence of the GOM DPS to be secondary to the significant threat posed by dams (within Factor A above), the inadequacy of existing regulatory mechanisms for dams (within Factor D below), and low marine survival (within Factor E below).

Water Quality

The MDEP issues National Pollutant Discharge Elimination System (NPDES) permits for point source discharges from freshwater hatcheries, municipal facilities, and other industrial facilities. Currently, we review and comment only on NPDES permits issued to facilities that discharge within the range of the GOM DPS as listed in 2000 (i.e., excluding the upper Penobscot, upper Kennebec, and Androscoggin). Therefore, MDEP could potentially be permitting discharges that do not minimize adverse effects on salmon populations in the larger rivers in Maine (e.g., Penobscot). There is currently no mechanism that would require MDEP to seek the Services' review and comments on NPDES permits issued for river systems where populations of Atlantic salmon are not currently listed under the ESA. An overboard discharge (OBD) is the discharge of wastewater from residential, commercial, and publicly owned facilities to Maine's streams, rivers lakes, and the ocean. OBDs will continue to contribute to poor water quality throughout the State until the regulatory phase-out is complete. The regulatory framework for the phase-out of OBDs includes: the OBD Grant Removal Program that awards partial or full funding to facilities to purchase an OBD replacement system, with priority given to those OBDs that occur in high value shellfish areas; a prohibition on licensure for new OBDs unless the discharges were in continuous existence 12 months preceding June 1, 1987; a requirement that the buyers of properties served by OBDs obtain a qualified evaluation of whether the OBD can be replaced with a non-discharging alternative system prior to the sale of the property; and the requirement of proof, prior to license renewal, that the OBD owner had an evaluation completed to determine whether a technologically feasible replacement exists for an existing OBD system.

The NMFS Habitat Conservation Division has the opportunity to comment on draft NPDES permits with respect to potential effects on Essential Fish Habitat (EFH) under the provisions of the Magnuson-Stevens Fishery Conservation and Management Act. Because MDEP is not required to submit draft NPDES permits to NMFS' Habitat Conservation Division before issuing the final permit, however NMFS' Habitat Conservation Division does not consistently review and comment on NPDES permits and potential effects on Atlantic salmon EFH.

We find the threat from the inadequacy of existing regulatory mechanisms for water quality to the persistence of the GOM DPS to be secondary to the significant threat posed by dams (within Factor A above), the inadequacy of existing regulatory mechanisms for dams (within Factor D), and low marine survival (within Factor E below).

In summary, our review of state and national regulatory mechanisms under Factor D demonstrates that although regulatory mechanisms are in place that should address direct and incidental take of Atlantic salmon and conserve salmon habitat, these regulatory mechanisms are insufficient or are not being implemented effectively to address the needs of salmon. We find that the threat from the inadequacy of existing regulatory mechanisms for dams is one of the three most significant stressors negatively affecting the persistence of the GOM DPS (in addition to the threat from dams on freshwater salmon habitat (within Factor A) and low marine survival (within Factor E below). The threat to the persistence of the GOM DPS as a result of the inadequacy of regulatory mechanisms to address direct and incidental take of salmon, water withdrawals and water quality is secondary to threats from dams (within Factor A above), the inadequacy of existing regulatory mechanisms for dams (within Factor D), and low marine survival (within Factor E below).

*E. Other Natural or Manmade Factors Affecting its Continued Existence*

Artificial Propagation

Hatchery supplementation through captive propagation and maintenance of broodstocks can have positive and negative effects on the recovery and conservation of naturally spawning salmonid populations (see section 8.5.1 of Fay *et al.* (2006) for a more comprehensive discussion). We assessed the effect of the conservation hatchery programs in terms of the positive or negative contribution of the program to recovery and conservation of naturally spawning Atlantic salmon in the GOM DPS. From the following assessment, we were able to determine how the current conservation hatchery program may influence the extinction risk projections of the PVA. Below we describe several ways in which hatchery supplementation reduces the risk of extinction of the GOM DPS and also note several potential risks of reliance on the conservation hatcheries.

The USFWS operates two hatcheries in support of Atlantic salmon recovery efforts in Maine. Together, GLNFH and CBNFH raise and stock over 600,000 smolts and 3.5 million fry annually. The primary focus of the conservation hatchery program for Atlantic salmon in the GOM DPS is to conserve the genetic legacy of Atlantic salmon in Maine until habitats can support natural, self-sustaining populations (Bartron *et al.*, 2006). As such, a great deal of consideration is given to broodstock collection, spawning protocols, genetic screening for aquaculture escapees, and other considerations as outlined by Bartron *et al.* (2006). The current program started in 1992, when a river-specific broodstock and stocking program was implemented for rivers in Maine (Bartron *et al.*, 2006). This strategy complies with NASCO guidelines for stock rebuilding (USASAC, 2005). The stocking program was initiated for two reasons: (1) Runs were declining in every river in Maine, and numerous studies indicated that restocking efforts are more successful when the donor population comes from the river to be stocked (Moring *et al.*, 1995); and (2) The numbers of returning adult Atlantic salmon to the rivers were very low, and artificial propagation had the potential to increase the number of juvenile fish in the river through fry and other early life stage stocking. Current practices of fry, parr, and smolt stocking as well as recovery of parr for hatchery rearing ensure that river-specific brood stock is available for future production.

Atlantic salmon from the Narraguagus, Pleasant, Sheepscot, Machias, East Machias, and Dennys populations are maintained at CBNFH (Bartron *et al.*, 2006) in East Orland, Maine. Additionally, adult Atlantic salmon are trapped at the Veazie Dam on the Penobscot River, transferred to CBNFH, and held until spawning in the fall of each year. Adult Atlantic salmon (with the exception of the Penobscot River) are maintained in one of six river-specific broodstock rooms. Within each broodstock room, adults are maintained separately by capture year. Capture year is defined as the year parr were collected from a river. Each capture year may represent one to two year classes. In addition, fully captive lines, or ‘‘pedigree lines,’’ can be and are implemented when the recovery of parr from the river environment is expected to be low to ensure future spawning stock is available (Bartron *et al.*, 2006). Pedigree lines are established at the time of stocking, where a proportional representation of each family from a particular river-specific broodstock is retained in the hatchery while the rest of the fry are stocked into the river. If parr are recovered from the fry stocking for the pedigree lines, individuals are screened to determine origin and familial representation and are integrated into the pedigree line to maintain some component of natural selection.

The goals of the captive propagation program include maintenance of the unique genetic characteristics of each river-specific broodstock and maintenance of genetic diversity within each broodstock (Bartron *et al.*, 2006). Evaluation of estimates of genetic diversity within captive populations, such as average heterozygosity, relatedness, and allelic diversity and frequency are monitored within the hatchery broodstocks according to the CBNFH Broodstock Management Plan (Bartron *et al.*, 2006).

In summary, hatchery supplementation positively influences extinction risk projections (i.e., reduces the chances of extinction) for the GOM DPS through the following mechanisms:

1. A rigorous genetic screening program reduces the risks of outbreeding depression that may otherwise result from aquaculture escapees or their progeny being integrated into the genome of the GOM DPS;
2. The effective use of spawning protocols preserves genetic variation inherent in each of the genetically unique river populations maintained at CBNFH, ensures the long-term maintenance of genetic variation, and minimizes the potential for inbreeding or domestication selection and associated reductions in fitness in the wild;
3. The use of captive broodstock from seven separate populations reduces the risks of random environmental and demographic events;
4. The use of pedigree lines for those populations most at risk reduces the chance of catastrophic loss of an entire population;
5. Stocking of juveniles into rivers significantly reduces the risks of catastrophic loss at CBNFH. That is, if a catastrophic loss of one or more captive broodstock lines occurred at CBNFH, a component of the genetic variability lost could be recovered by collecting parr for broodstock;
6. Stocking of large numbers of smolts (Penobscot and Narraguagus) enhances adult returns, thus reducing demographic risks;
7. Stocking large numbers of smolts (Penobscot and Narraguagus) reduces the risks of catastrophic loss because at least one cohort is always at sea and could be collected as broodstock in case of a catastrophic event in freshwater

(e.g., a large contaminant spill) or in a hatchery (e.g., disease outbreak).

In evaluating the overall effect of hatchery supplementation to the extinction risk analysis presented by Fay *et al.* (2006), the potential negative effects of hatchery supplementation must also be carefully considered. The potential negative effects of hatchery supplementation include competition, artificial selection, inbreeding depression, and outbreeding depression.

Competition between hatchery-reared and wild Atlantic salmon is not well researched. Competition could occur between wild and hatchery juveniles (i.e., competition for food and space) or between wild and hatchery adults (i.e., competition for redd sites). To minimize competitive interactions that may occur between juveniles, fry are stocked at least 50 m from any known redd. At this time, competition for redd sites between wild and hatchery-reared salmon appears to be minimal, because there are substantial amounts of accessible yet unused spawning habitat throughout the range of the GOM DPS given the low abundance of returning adults in the GOM DPS.

Over the long term, artificial selection for the hatchery environment is considered a threat to survival. As pedigree lines become established, natural selection from fry to parr stage may no longer be incorporated into the life cycle if parr are not recovered in numbers sufficient for broodstock and spawning requirements. Over time, this process could result in a population that is well adapted to the artificial environment and poorly adapted to the natural environment; this form of artificial selection is widely know as domestication selection (Hey *et al.*, 2005).

Both inbreeding depression and outbreeding depression are widely accepted as potential risks in artificial propagation programs. As population sizes decrease, and the potential for mating related individuals increase, the threat of inbreeding in a population also increases. Inbreeding may also decrease overall fitness of a population (Spielman *et al.*, 2004; Lynch and O'Hely, 2001), reducing the long-term population viability and therefore inhibiting the success of restoration and recovery efforts. Of similar concern is the threat of outbreeding depression, and decreased fitness resulting from the mating of individuals from significantly genetically different populations.

Although actions are implemented to minimize these risks (see Bartron *et al.*, 2006), many risks cannot be fully removed from the captive propagation program, including potential risks that are currently unknown or cannot be managed against.

The conservation hatchery program for the GOM DPS Atlantic salmon in Maine is currently limited by capacity at CBNFH and GLNFH. Incorporating river-specific broodstocks for additional populations is currently limited by space and biosecurity constraints. Location of the six currently maintained river-specific broodstocks at a single facility (CBNFH) is thus considered a risk due to the possibility of a catastrophic event (such as disease, loss of electricity, or loss of funding for hatcheries), which could result in the loss of one or all of the river-specific broodstocks.

The positive and negative effects of hatchery supplementation have been reviewed by the National Research Council (NRC, 2004), Fay *et al.* (2006), and the Sustainable Ecosystems Institute (SEI, 2007). The review by SEI in 2007 was rigorous, specifically focusing on current hatchery operations, protocols, and practices and whether these practices are being implemented in the most scientifically sound manner to support recovery of Atlantic salmon in the GOM DPS. The overall recommendation from SEI with respect to the current river-specific program was that the river-specific integrity of the existing salmon populations should be retained, and there is no reason to depart from the river-specific nature of recovery and enhancement strategies without further extensive research on the fitness consequences of any potential alternative (SEI, 2007). While SEI was supportive overall of the current river-specific genetic maintenance program, it questioned the role the hatcheries play in increasing self-sustaining populations in the wild, and thus the contribution of the program to the recovery of the GOM DPS of Atlantic salmon. In short, SEI concluded that insufficient information is available to conclude whether supplementation significantly contributes to recovery objectives, aside from preservation of genetic diversity.

After considering both the positive and negative effects of hatchery supplementation, we conclude that the overall effect of the hatchery programs designed to conserve the genetic legacy of Atlantic salmon in Maine and lead to recovery is to reduce the extinction risk of the GOM DPS. Currently the GOM DPS is largely sustained by artificial propagation, therefore, artificial propagation through conservation hatcheries is essential for the persistence of the GOM DPS despite the risks from artificial propagation. The risks of competition between hatchery-reared and naturally-reared salmon appear to be minimal at this time, as do the risks of domestication selection, inbreeding depression, and outbreeding depression (Fay *et al.*, 2006), although the historical loss of diversity cannot be dismissed (Lage and Kornfield, 2006). Further, we consider the hatchery-dependent populations that are maintained at CBNFH and GLNFH essential for recovery of the GOM DPS because the hatchery populations contain a high proportion of the genetic diversity remaining in the GOM DPS.

However, we believe the current conservation hatchery program must be improved to further recovery of the GOM DPS. We recognize that SEI (2007) questioned the role the hatcheries play in increasing self-sustaining populations in the wild, and thus the contribution of the program to the recovery of the GOM DPS. In particular, the program should be expanded to include more assessment and evaluation of hatchery fish in the wild to understand how hatchery-origin fish can effectively contribute to increasing wild populations. Hatchery supplementation of the GOM DPS is currently important in maintaining genetic diversity levels. However, even with hatchery supplementation, the GOM DPS remains at extremely low levels (less than 150 naturally-reared spawning adults in the GOM DPS in 2006).

Aquaculture

Atlantic salmon that escape from farms and commercial hatcheries pose a threat to native Atlantic salmon populations (Naylor *et al.*, 2005) because captive-reared fish are selectively bred to promote behavioral and physiological attributes desirable in captivity (Hindar *et al.*, 1991; Utter *et al.*, 1993; Hard *et al.*, 2000); for further discussion of the threat of aquaculture see section 8.5.2 in Fay *et al.* (2006)). Experimental tests of genetic divergence between farmed and wild salmon indicate that farming generates rapid genetic change as a result of both intentional and unintentional selection in culture and that those changes alter important fitness-related traits (McGinnity *et al.*, 1997; Gross, 1998). Consequently, aquaculture fish are often less fit in the wild than naturally produced salmon (Fleming *et al.*, 2000). Annual invasions of escaped adult aquaculture salmon have the potential to disrupt local adaptations and reduce genetic diversity of wild populations (Fleming *et al.*, 2000). Bursts of immigration also disrupt genetic differentiation among wild Atlantic salmon stocks, especially when wild populations are small (Mork, 1991).

Natural selection may be able to purge wild populations of maladaptive traits but may be less able to if the intrusions occur year after year. Under this scenario, population fitness is likely to decrease as the selection from the artificial culture operation overrides wild selection (Hindar *et al.*, 1991; Fleming and Einum, 1997), a process called outbreeding depression. The threat of outbreeding depression is likely to be greater in North America where aquaculture salmon have been based, in part, on European Landcatch strain. To minimize these risks, the use of non-North American strains of salmon has been phased out in the United States.

In addition to genetic effects, escaped farmed salmon can disrupt redds of wild salmon, compete with wild salmon for food and habitat, transfer disease or parasites to wild salmon, and degrade benthic habitat (Windsor and Hutchinson, 1990; Saunders, 1991; Youngson *et al.*, 1993; Webb *et al.*, 1993; Clifford *et al.*, 1997). Farmed salmon have been documented to spawn successfully, but not always at the same time as wild salmon (Lura and Saegrov, 1991; Jonsson *et al.*, 1991; Webb *et al.*, 1991; Fleming *et al.*, 1996). Late spawning aquaculture fish could limit wild spawning success through redd superimposition. There has also been recent concern over potential interactions when wild adult salmon migrate past closely spaced cages, creating the potential for behavioral interactions, disease transfer, or interactions with predators (Lura and Saegrov, 1991; Crozier, 1993; Skaala and Hindar, 1997; Carr *et al.*, 1997; DFO, 1999). In Canada, the survival of wild postsmolts moving from Passamaquoddy Bay to the Bay of Fundy was inversely related to the density of aquaculture cages (DFO, 1999).

The development and expansion of Atlantic salmon aquaculture has occurred in the North Atlantic since the early 1970s. Production of farmed Atlantic salmon in 2003 was estimated at over 1.1 million tons (1.1 metric tons (mt)) worldwide, 761,752 tons (773,976 mt) in the North Atlantic, and 6,435 tons (6,538 mt) in Maine (ICES, 2004). The Maine Atlantic salmon aquaculture industry is concentrated in Cobscook Bay near Eastport, Maine. The industry in Canada, just across the border, is approximately twice the size of the Maine industry. Five freshwater commercial hatcheries in the United States have provided smolts to the sea cages and produce up to four million smolts per year.

Three primary broodstock lines have been used for farm production. The lines include fish from the Penobscot River, St. John River, and historically an industry strain from Scotland. The Scottish strain was imported into the United States in the early 1990s and is composed primarily of Norwegian strains, frequently referred to as Landcatch. In recent years, milt of Norwegian origin has been imported by the industry from Iceland (Baum, 1998). However, placement of reproductively viable non-North American origin Atlantic salmon into marine cages in the United States has been eliminated.

Escaped farmed salmon are known to enter Maine rivers. For example, at least 17 percent (14 of 83 fish) of the rod catch in the East Machias River were captive-reared adults in 1990. In addition to the frequency and magnitude of escape events that drive annual variability, returns of captive-reared adults to Maine rivers are influenced by the amount of production and proximity of rearing sites in adjacent bays. About 60 percent of commercial salmon production in Maine occurs at sites on Cobscook and Passamaquoddy Bays, into which the Dennys and St. Croix (not a part of the GOM DPS) Rivers flow; 35 percent on Machias Bay and the estuary of the Little River, within seven miles of the Machias and East Machias Rivers; and the remainder on the estuaries of the Pleasant and Narraguagus Rivers, or adjacent to Blue Hill Bay. The percentage of captive-reared fish in adult returns is highest in the St. Croix (not a part of the GOM DPS) and Dennys Rivers and lowest in the Penobscot River (less than 0.01 percent in the years 1994 to 2001), with the Narraguagus runs having low and sporadic proportions of captive-reared salmon.

A large escape event also occurred in 2005 when four marine salmon aquaculture sites in Western New Brunswick, Canada, were vandalized from early May through November 2005, resulting in approximately 136,000 escaped farmed salmon. Most escapees were unmarked 1SW salmon of similar size (2–5 kg). Escaped aquaculture-origin salmon from these vandalism events entered the Dennys River and possibly other Eastern Maine rivers in 2005. The Services and MDMR are cooperatively implementing a program to minimize genetic and ecological risks from this escape (Bean *et al.*, 2006).

Aquaculture escapees and resultant interactions with native stocks are expected to continue to occur within the range of the GOM DPS given the continued operation of farms. While recent containment protocols have greatly decreased the incidence of losses from hatcheries and pens, the risk of large escapes occurring is still significant. Escaped farmed fish are of great concern in Maine because, even at low numbers, they can represent a substantial portion of the returns to some rivers. Wild populations at low levels are particularly vulnerable to genetic intrusion or other disturbance caused by escapees (Hutchings, 1991; DFO, 1999).

Despite the concerns with aquaculture described above, recent advances in containment and marking of aquaculture fish limit the negative impacts of aquaculture fish with the GOM DPS. Permit conditions required by the Army Corps of Engineers (ACOE) and MDEP require genetic screening to ensure that only North American strain salmon are used in commercial aquaculture, require marking to facilitate tracing fish back to the source and cause of the escape, containment management plans and audits, and rigorous disease screening. Given these conditions, within Factor E we find the threat from aquaculture to the persistence of the GOM DPS to be secondary to the significant threat posed by low marine survival, described below. If these measures were no longer in place or were less protective, the threat from aquaculture would be much greater.

Low Marine Survival

Large changes in marine survival are known to have occurred recently. Marine survival rates since 1991 continue to be low for U.S. stocks of Atlantic salmon, (see section 8.5.3 of Fay *et al.* (2006)). Natural mortality in the marine environment can be attributed to four general sources: predation, starvation, disease/parasites, and abiotic factors. While our understanding of the marine ecology of Atlantic salmon has increased substantially in the past decade, the factors responsible for reduced marine survival remain unclear. In general, return rates for Atlantic salmon across North America have declined over the last 30 years (ICES 1998). Reported Atlantic salmon marine survival rates prior to the 1990s ranged from zero to twenty percent (Bley and Moring, 1988). For the period 2001 to 2005, 2SW return rates for wild Narraguagus River smolts ranged from 0.2 to 1.2 percent. Return rates for this same period for 2SW hatchery Penobscot River smolts ranged from 0.06 to 0.17 percent (ICES, 2006). Chaput *et al.* (2005) reported on the possibility of a phase (or regime) shift of productivity for Atlantic salmon in the Northwest Atlantic. Strong evidence is presented to support a decrease in the recruit-per-spawner relationship for North American Atlantic salmon populations that likely occurred over several years in the late 1980s through early 1990s. The concept of phase shift has previously been documented and discussed for Pacific salmon populations (Beamish *et al.*, 1999). Chaput *et al.* (2005) did not speculate on the causes of this shift. Friedland *et al.* (2005) summarized numerous studies that suggest that climate mediates marine survival for Atlantic salmon as well as other fish species.

In summary, marine survival is critical to shaping recruitment patterns in Atlantic salmon and causing the subsequent low abundance of adult salmon; however, the mechanisms of the observed persistent decline in marine survival remain unknown. We find that low marine survival is a significant threat to the persistence of the GOM DPS. We conclude that low marine survival, dams and their inter-related effects (described in Factor A, above), and the inadequacy of existing regulatory mechanisms for dams (Factor D, above) are the most influential stressors negatively affecting the persistence of the GOM DPS.

Depleted Diadromous Communities

The ecological setting in which Maine Atlantic salmon evolved is considerably different than what exists today. Ecological changes that have occurred over the last 200 years are ubiquitous and span a wide array of spatial and temporal scales. Of particular concern for Atlantic salmon recovery efforts within the range of the GOM DPS is the dramatic decline observed in the diadromous fish community. At historic abundance levels, Fay *et al.* (2006) and Saunders *et al.* (2006) hypothesize that several of the co-evolved diadromous fishes may have provided substantial benefits to Atlantic salmon through at least four mechanisms: serving as an alternative prey source for salmon predators; serving as prey for salmon directly; depositing marine-derived nutrients in freshwater; and increasing substrate diversity of rivers. Following is a brief description of each mechanism.

Fay *et al.* (2006) and Saunders *et al.* (2006) hypothesized that the historically large populations of clupeids (i.e., members of the family Clupeidae, such as alewives, blueback herring, and American shad) likely provided a robust alternative forage resource (or prey buffer) for opportunistic native predators of salmon during a variety of events in the salmon's life history. First, pre-spawn adult alewives likely served as a prey buffer for migrating Atlantic salmon smolts. Evidence for this relationship includes significant spatial and temporal overlap of migrations, similar body size, numbers of alewives that exceeded salmon smolt populations by several orders of magnitude (Smith, 1898; Collette and Klein-MacPhee, 2002), and a higher caloric content per individual (Schulze, 1996); alewives were thus likely a substantial alternative prey resource (i.e., prey buffer) that protected salmon smolts from native predators such as cormorants, otters, ospreys, and bald eagles within sympatric migratory corridors (Mather, 1998; USASAC, 2004). Second, adult American shad likely provided a similar prey buffer to potential predation on Atlantic salmon adults by otters and seals. Pre-spawn adult shad would enter these same rivers and begin their upstream spawning migration at approximately the same time as adult salmon. Historically, shad runs were considerably larger than salmon runs (Atkins and Foster, 1869; Stevenson, 1898). Thus, native predators of medium to large size fish in the estuarine and lower river zones could have preyed on these 1.5 to 2.5 kg size fish readily. Third, juvenile shad and blueback herring may have represented a substantial prey buffer from potential predation on Atlantic salmon fry and parr by native opportunistic predators such as mergansers, herons, mink, and fallfish. Large populations of juvenile shad (and blueback herring, with similar life history and habitat preferences to shad) would have occupied main stem and larger tributary river reaches through much of the summer and early fall. Juvenile shad and herring would ultimately emigrate to the ocean, along with juvenile alewives from adjacent lacustrine habitats, in the late summer and fall. Recognizing that the range and migratory corridors of these juvenile clupeids would not be precisely sympatric with juvenile salmon habitat, there nonetheless would have been a substantial spatial overlap amongst the habitats and populations of these various juvenile fish stocks. Even in reaches where sympatric occupation by juvenile salmon and juvenile clupeids may have been low or absent, factors such as predator mobility and instinct driven energetic efficiency (i.e., optimal foraging theory) need to be considered since the opportunity for prey switching would have been much greater than today, and the opportunity for prey switching may produce stable predator-prey systems with coexistence of both prey and predator populations (Krivan, 1996).

At historical abundance levels, other diadromous species also represented significant supplemental foraging resources for salmon in sympatric habitats. In particular, anadromous rainbow smelt are known to be a favored spring prey item of Atlantic salmon kelts (a life stage after Atlantic salmon spawn; Cunjak *et al.*, 1998). A 1995 radio tag study found that Miramichi River (New Brunswick, Canada) kelts showed a net upstream movement shortly after ice break-up (Komadina-Douthwright *et al.*, 1997). This movement was concurrent with the onset of upstream migrations of rainbow smelt (Komadina-Douthwright *et al.*, 1997). In addition, Moore *et al.* (1995) suggested that the general availability of forage fishes shortly after ice break-up in the Miramichi could be critical to the rejuvenation and ultimate survival of kelts as they prepared to return to sea. Kelts surviving to become repeat spawners are especially important due to higher fecundity (Baum, 1997; NRC, 2004). The historical availability of anadromous rainbow smelt as potential kelt forage in lower river zones may have been important in sustaining the viability of this salmon life stage. Conversely, the broad declines in rainbow smelt populations may be partially responsible for the declining occurrence of repeat spawners in Maine's salmon rivers.

Historically, the upstream migrations of large populations of adult clupeids, sea lamprey and salmon themselves, provided a conduit for the import and deposition of biomass and nutrients of marine origin into freshwater environments. Mechanisms of direct deposition included discharge of urea, discharge of gametes on the spawning grounds, and deposition of post-spawn adult carcasses (Durbin *et al.*, 1979). Migrations and other movements of mobile predators and scavengers of adult carcasses likely resulted in further distribution of imported nutrients throughout the freshwater ecosystem. Conversely, juvenile outmigrants of these sea-run species represented a massive annual outflux of forage resources for Gulf of Maine predators, while also completing the cycle of importing base nutrients back to the ocean environment. These types of diffuse mutualism are only recently being recognized (Hay *et al.*, 2004). Sea lampreys also likely played a role in nutrient cycling. Lampreys prefer spawning habitat that is very similar (location and physical characteristics) to that used by spawning Atlantic salmon (Kircheis, 2004). Adult lampreys spawn in late spring, range in weight from 1 to

2 kg, and experience 100 percent post-spawning mortality on spawning grounds (semelparous). This results in the deposition of marine-origin nutrients at about the same time that salmon fry would be emerging from redds and beginning to occupy adjacent juvenile production habitats. These nutrients would likely have enhanced the primary production capability of these habitats for weeks or even months after initial deposition, and would gradually be transferred throughout the trophic structure of the ecosystem, including those components most important to juvenile salmon (e.g., macroinvertebrate production).

Sea lampreys likely provide an additional benefit to Atlantic salmon spawning activity in sympatric reaches. In constructing their nests, lamprey carry stones from other locations and deposit them centrally in a loose pile within riffle habitat and further utilize body scouring to clean silt off stones already at the site (Kircheis, 2004). Ultimately, a pile of silt-free stones as deep as 25 cm and as long as a meter is formed (Leim and Scott, 1966; Scott and Scott, 1988), into which the lamprey deposit their gametes. The stones preferred by lampreys are generally in the same size range as those preferred by spawning Atlantic salmon. Thus, lamprey nests can be attractive spawning sites for Atlantic salmon (Kircheis, 2004). Kircheis (2004) also notes the lamprey's silt-cleaning activities during nest construction that may improve the ''quality'' of the surrounding environment with respect to potential diversity and abundance of macroinvertebrates, a primary food item of juvenile salmon.

Thus, depleted diadromous fish communities have likely played an important role in the continued declines of the GOM DPS of Atlantic salmon. Conversely, if diadromous populations can be restored, the ecological functions those species confer may simultaneously be restored. In summary, within Factor E, we find the threat from depleted diadromous fish communities to the persistence of the GOM DPS to be secondary to the significant threat posed by low marine survival, described above.

Competition

Prior to 1800, the resident riverine fish communities in Maine were relatively simple, consisting of brook trout, cusk, white sucker, and a number of minnow species. Today, Atlantic salmon co-exist with a diverse array of nonnative resident fishes, including brown trout, largemouth bass, smallmouth bass, and northern pike (MDIFW, 2002). The range expansion of nonnative fishes is important, given evidence that niche shifts may follow the addition or removal of other competing species (Fausch, 1998). For example, in Newfoundland, Canada, where fish communities are simple, Atlantic salmon inhabit pools and lakes that are generally considered atypical habitats in systems where there are more complex fish communities (Gibson, 1993). Use of lacustrine (or lake) habitat, in particular, can increase smolt production (Matthews *et al.*, 1997). Conversely, if salmon are excluded from these habitats through competitive interactions, smolt production may suffer (Ryan, 1993). Even if salmon are not completely excluded from a given habitat type, they may select different, presumably sub-optimal, habitats in the presence of certain competitors (Fausch, 1998). Thus, competitive interactions may limit Atlantic salmon production through niche constriction (Hearn, 1987). The continued range expansion of nonnative species (e.g., smallmouth bass, brown trout, and rainbow trout) is of particular concern since these species often require similar resources as salmon and are therefore expected to be competitors for food and space (for a comprehensive discussion of the effects of competition on Atlantic salmon see section 8.3.3 of Fay *et al.* (2006)). In summary, within Factor E, we find the threat from competition to the persistence of the GOM DPS to be secondary to the significant threat posed by low marine survival, described above.

Climate Change

Global climate change may also affect thermal regimes within the range of the GOM DPS (see section 8.1.4 of Fay *et al.* (2006)). Within the range of the GOM DPS, spring runoff has become earlier, water content in snow pack for March and April has decreased, and the duration of river ice has become shorter (Dudley and Hodgkins, 2002). For Atlantic salmon specifically, Juanes *et al.* (2004) suggest that observed changes in adult run timing may be a response to global climate change. While some physiological changes at the individual level are quite predictable when changes in temperature are known, the interactions between individuals, populations, and species are impossible to predict at this time given we do not understand how or to what degree climate change may or may not affect the freshwater and marine environment of the GOM DPS. At this time we do not have enough information to determine whether climate change is a threat to the persistence of the GOM DPS.

In summary, of the threats described under Factor E, we find that low marine survival is a significant threat to the persistence of the GOM DPS given that marine survival is a vital component of Atlantic salmon demographics. Aquaculture, depleted diadromous communities, and competition (particularly with nonnative fish) are secondary threats to the continued existence of the GOM DPS; we do not have enough information at this time to evaluate how climate change may or may not affect the persistence of the GOM DPS. Artificial propagation poses risks to natural populations, as described in this proposed rule. However, given the low numbers of naturally-reared spawning adults in the GOM DPS, a carefully managed conservation hatchery program is essential to sustaining the GOM DPS.

## Efforts Being Made to Protect the Species

Section 4(b)(1)(A) of the ESA requires the Secretary of Commerce to make listing determinations solely on the basis of the best scientific and commercial data available after taking into account efforts being made to protect a species. Therefore, in making a listing determination, we first assess a species' level of extinction risk and identify factors that have led to its decline. We then assess existing efforts being made to protect the species to determine if those measures ameliorate the risks.

In judging the efficacy of existing protective efforts, we rely on the joint NMFS-U.S. Fish and Wildlife Service (FWS) ''Policy for Evaluation of Conservation Efforts When Making Listing Decisions'' (''PECE;'' 68 FR 15100; March 28, 2003). PECE provides direction for the consideration of protective efforts identified in conservation agreements, conservation plans, management plans, or similar documents (developed by Federal agencies, state and local governments, Tribal governments, businesses, organizations, and individuals) that have not yet been implemented, or have been implemented but have not yet demonstrated effectiveness. The policy articulates several criteria for evaluating the certainty of implementation and effectiveness of protective efforts to aid in determining whether a species should be listed as threatened or endangered. Evaluations of the certainty an effort will be implemented include whether: the necessary resources (e.g., funding and staffing) are available; the requisite agreements have been formalized such that the necessary authority and regulatory mechanisms are in place; there is a schedule for completion and evaluation of the stated objectives; and (for voluntary efforts) the necessary incentives are in place to ensure adequate participation. The evaluation of the certainty of an effort's effectiveness is made on the basis of whether the effort or plan: establishes specific conservation objectives; identifies the necessary steps to reduce threats or factors for decline; includes quantifiable performance measures for the monitoring of compliance and effectiveness; incorporates the principles of adaptive management; and is likely to improve the species' viability at the time of the listing determination.

PECE also notes several important caveats. Satisfaction of the above mentioned criteria for implementation and effectiveness establishes a given protective effort as a candidate for consideration, but does not mean that an effort will ultimately change the risk assessment. The policy stresses that just as listing determinations must be based on the viability of the species at the time of review, so they must be based on the state of protective efforts at the time of the listing determination. PECE does not provide explicit guidance on how protective efforts affecting only a portion of a species' range may affect a listing determination, other than to say that such efforts will be evaluated in the context of other efforts being made and the species' overall viability. There are circumstances where threats are so imminent, widespread, and/or complex that it may be impossible for any agreement or plan to include sufficient efforts to result in a determination that listing is not warranted.

In this section, we evaluate the Penobscot River Restoration Project (PRRP), perhaps the most significant of recent fish passage agreements, pursuant to PECE. The PRRP is the result of many years of negotiations between Pennsylvania Power and Light (PPL), U.S. Department of the Interior (i.e., USFWS, Bureau of Indian Affairs, National Park Service), Penobscot Indian Nation, the State of Maine (i.e., Maine State Planning Office, Maine Department of Inland Fisheries and Wildlife, and Maine Department of Marine Resources (MDMR)), and several non-governmental organizations (NGOs; Atlantic Salmon Federation, American Rivers, Trout Unlimited, and Natural Resources Council of Maine, among others). If implemented, the PRRP would lead to the removal of the two lowermost mainstem dams on the Penobscot River (Veazie and Great Works) and would decommission the Howland Dam and construct a nature-like fishway around it (dams with varying levels of fish passage would still exist upstream of these sites). This initiative would improve habitat accessibility for all diadromous species. There is a significant effort on behalf of the Parties and other Federal and non-Federal bodies to secure funds for the purchase, decommissioning, and removal of the dams. However, the certainty of funding and other necessary actions is not known at this time. We strongly support the PRRP; however, at this time it is not possible to state with certainty that this project will be fully implemented. This protective effort does not as yet provide sufficient certainty of implementation and effectiveness to counter the extinction risk assessment conclusion that the species is in danger of extinction throughout its range.

**Finding**

Regarding the petition to list the Kennebec population of Atlantic salmon, we find that the Kennebec River population is a part of the GOM DPS, based primarily on genetics, as described in this proposed rule. We have carefully considered the best scientific and commercial data available regarding the past, present and future threats faced by the GOM DPS of the Atlantic salmon. We find that listing the GOM DPS of Atlantic salmon, which includes the Kennebec River population, as endangered is warranted for the reasons described below.

The proposed GOM DPS is comprised of Atlantic salmon in larger river systems including the Androscoggin, Kennebec and Penobscot Rivers as well as the smaller coastal rivers (Narraguagus, Machias, Sheepscot, etc.) that were included in the DPS as listed in 2000 (65 FR 69459, November 17, 2000). There are extremely few naturally-reared spawning adult salmon present in the GOM DPS (117 in 2006). In 2006, 1,044 sea-run salmon were captured in the Penobscot River, representing approximately only ten percent of the CSE goals for the Penobscot River; however, the vast majority of these adult returns were stocked as smolts. With the addition of Atlantic salmon in the Penobscot and other large rivers to the GOM DPS, the demographic security is somewhat increased because populations that are geographically widespread are less likely to experience spatially correlated catastrophes. However, the numbers of naturally-reared spawning adults within the GOM DPS as currently proposed is still quite low and the majority of returning adults (whether naturally-reared or smolt-stocked) are found in the Penobscot River, despite the addition of other large rivers to the DPS. In 2006, only 15 adults returned to the Kennebec and 6 returned to the Androscoggin. The PVA generally shows that the GOM DPS is likely to continue to decline in terms of adult abundance and projections show that the GOM DPS is trending towards extinction.

The GOM DPS is sustained by a carefully-managed hatchery supplementation program. Hatchery supplementation is crucial to the continued existence of the GOM DPS, although we recognize that reliance on artificial propagation carries risks that cannot be completely avoided despite managers' best efforts. We have carefully examined both the positive and negative effects of hatchery supplementation. We have concluded that current hatchery supplementation practices reduce the risk of extinction of the GOM DPS. While we recognize that the conservation hatchery programs make a significant contribution to reducing the near term risk of extinction, they must continue to be improved. Although hatchery supplementation of the GOM DPS is currently important in maintaining genetic diversity levels, at this time, these programs have not been successful at recovering or maintaining wild, self-sustaining populations of Atlantic salmon. There is also the risk of catastrophic loss at either or both conservation hatchery facilities, despite managers' best efforts to reduce these risks.

Further, at the present time, there is no evidence to suggest that marine survival will increase in the near future. In short, without both conservation hatcheries continuing to operate and an increase in marine survival, the risk of extinction is quite high and would be even higher if and when broodstock goals for smolt production could not be met.

As described above, the demographic effects of the currently low marine survival on the GOM DPS are severe, dams limit the viability of salmon populations through numerous and sometimes synergistic ways (e.g., entrainment, water quality effects, fish community effects, among others), and the existing regulatory mechanisms for dams are inadequate. As a result, we find that Factor E (in particular) low marine survival, Factor A (in particular, dams), and Factor D (in particular, the inadequacy of existing regulatory mechanisms for dams) are the three most influential factors negatively affecting the persistence of the GOM DPS.

We find that threats from reduced habitat complexity, reduced habitat connectivity, and poor water quality within Factor A; overutilization, disease, and predation (within Factor B), inadequacy of existing regulatory mechanisms for water withdrawals and water quality within Factor D; and aquaculture, depleted diadromous fish communities, and competition within Factor E to be secondary threats compared to dams (within Factor A), low marine survival (within Factor E) and the inadequacy of existing regulatory mechanisms for dams (within Factor D). At this time, we do not have enough information to determine whether climate change (within Factor E) is a threat to the persistence of the GOM DPS. Artificial propagation through conservation hatcheries (within Factor E) is vital to sustaining the GOM DPS at this time despite the risks from artificial propagation. As a result, we propose to list the GOM DPS of Atlantic salmon as endangered.

As discussed under Efforts Being Made to Protect the Species, we cannot rely on the PRRP to offset the threats to the GOM DPS from dams in this decision regarding listing the GOM DPS; we also recognize that implementation of the PRRP would not alleviate the effects of dams in place on any of the other rivers within the GOM DPS.

**Available Conservation Measures**

Conservation measures provided to species listed as endangered or threatened under the ESA include recovery actions, requirements for Federal agencies to avoid jeopardizing the continued existence of the species, and prohibitions against taking the species, as defined in the ESA. Recognition through listing may improve public awareness and encourage conservation actions by Federal, state, and local agencies, private organizations, and individuals. The ESA provides for possible land acquisition and cooperation with the States and provides for recovery actions to be carried out for listed species. The requirement of Federal agencies to avoid jeopardy and the prohibitions against take are discussed below.

Section 7(a) of the ESA, as amended, requires Federal agencies to evaluate their actions with respect to any species that is listed as endangered or threatened and with respect to its critical habitat, if any is designated. Regulations implementing this interagency cooperation provision of the ESA are codified at 50 CFR part 402. Section 7(a)(4) requires Federal agencies to confer informally with us on any action that is likely to jeopardize the continued existence of a species proposed for listing or result in destruction or adverse modification of proposed critical habitat. If a species is subsequently listed, section 7(a)(2) requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of the species or destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into formal consultation with us under the provisions of section 7(a)(2) of the ESA.

Several Federal agencies are expected to have involvement under section 7 of the ESA regarding the Atlantic salmon. The Environmental Protection Agency may be required to consult on its permitting oversight authority for the Clean Water Act and Clear Air Act. The ACOE may be required to consult on permits it issues under section 404 of the Clean Water Act and section 10 of the Rivers and Harbors Act. The FERC may be required to consult on licenses it issues for hydroelectric dams under the FPA. The Federal Highway Administration may be required to consult on transportation projects it authorizes, funds, or carries out.

ESA section 9(a) take prohibitions (16 U.S.C. 1538(a)(1)(B)) apply to all species listed as endangered. Those prohibitions, in part, make it illegal for any person subject to the jurisdiction of the United States to take, import or export, ship in interstate commerce in the course of commercial activity, or sell or offer for sale in interstate or foreign commerce any wildlife species listed as endangered, except as provided in sections 6(g)(2) and 10 of the ESA. It is also illegal under ESA section 9 to possess, sell, deliver, carry, transport, or ship any such wildlife that has been taken illegally. Section 11 of the ESA provides for civil and criminal penalties for violation of section 9 or of regulations issued under the ESA.

The ESA provides for the issuance of permits to authorize incidental take during the conduct of activities that may result in the take of threatened or endangered wildlife under certain circumstances. Regulations governing permits are codified at 50 CFR 17.22, 17.23, and 17.32. Such permits are available for scientific purposes, to enhance the propagation or survival of the species, and for incidental take in the course of otherwise lawful activities provided that certain criteria are met.

It is our policy, published in the **Federal Register** on July 1, 1994 (59 FR 34272), to identify, to the maximum extent practicable at the time a species is listed, those activities that would or would not likely constitute a violation of section 9 of the ESA. The intent of this policy is to increase public awareness of the effects of the listing on proposed and ongoing activities within a species' range. With the original listing of the Atlantic salmon in 2000, the Services published lists of activities that we believed were unlikely and likely to result in a violation of section 9 (65 FR 69459; November 17, 2000); we find that the activities identified in that listing decision continue to apply for the GOM DPS as proposed in this rule.

The Services believe that, based on the best available information, the following actions are unlikely to result in a violation of section 9:

(1) Possession of Atlantic salmon acquired lawfully by permit issued by the Services pursuant to section 10 of the ESA, or by the terms of an incidental take statement in a biological opinion pursuant to section 7 of the ESA;

(2) Federally approved projects that involve activities such as silviculture, agriculture, road construction, dam construction and operation, discharge of fill material, siting of marine cages for aquaculture, hatchery programs, and stream channelization or diversion for which consultation under section 7 of the ESA has been completed, and when such activity is conducted in accordance with any terms and conditions given by the Services in an incidental take statement in a biological opinion pursuant to section 7 of the ESA;

(3) Routine culture and assessment techniques, including the FWS' river-specific rehabilitation program at CBNFH; and

(4) Emergency responses to disease outbreaks.

Activities that the Services believe could result in violation of section 9 prohibitions against "take" of the Gulf of Maine DPS of anadromous Atlantic salmon include, but are not limited to, the following:

(1) Targeted recreational and commercial fishing, bycatch associated with commercial and recreational fisheries, and illegal harvest;

(2) The escapement of reproductively viable non-North American strain or non-North American hybrid Atlantic salmon in freshwater hatcheries within the DPS range;

(3) The escapement from marine cages or freshwater hatcheries of domesticated salmon such that they are found entering or existing in rivers within the DPS range;

(4) Failure to adopt and implement fish health practices that adequately protect against the introduction and spread of disease;

(5) Siting and/or operating aquaculture facilities in a manner that negatively impacts water quality and/or benthic habitat;

(6) Discharging (point and non-point sources) or dumping toxic chemicals, silt, fertilizers, pesticides, heavy metals, oil, organic wastes or other pollutants into waters supporting the DPS;

(7) Blocking migration routes;

(8) Destruction and/or alteration of the species' habitat (e.g., instream dredging, rock removal, channelization, riparian and in-river damage due to livestock, discharge of fill material, operation of heavy equipment within the stream channel, manipulation of river flow);

(9) Violations of discharge or water withdrawal permits that are protective of the DPS and its habitat;

(10) Pesticide or herbicide applications in compliance with or in violation of label restrictions; and

(11) Unauthorized collecting or handling of the species (permits to conduct these activities are available for purposes of scientific research or to enhance the propagation or survival of the DPS).

Other activities not identified here will be reviewed on a case-by-case basis to determine if violation of section 9 of the ESA may be likely to result from such activities. We do not consider these lists to be exhaustive and provide them as information to the public.

## Critical Habitat

Section 4(b)(2) of the ESA requires us to designate critical habitat for threatened and endangered species ''on the basis of the best scientific data available and after taking into consideration the economic impact, the impact on national security, and any other relevant impact, of specifying any particular area as critical habitat.'' This section grants the Secretary of the Interior or of Commerce discretion to exclude an area from critical habitat if he determines ''the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat.'' The Secretary may not exclude areas if exclusion ''will result in the extinction of the species.'' In addition, the Secretary may not designate as critical habitat any lands or other geographical areas owned or controlled by the Department of Defense, or designated for its use, that are subject to an integrated natural resources management plan under Section 101 of the Sikes Act (16 U.S.C. 670a), if the Secretary determines in writing that such a plan provides a benefit to the species for which critical habitat is proposed for designation (see section 318(a)(3) of the National Defense Authorization Act, Public Law 108–136).

The ESA defines critical habitat under section 3(5)(A) as: ''(i) the specific areas within the geographical area occupied by the species, at the time it is listed, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and (ii) specific areas outside the geographical area occupied by the species at the time it is listed, upon a determination by the Secretary that such areas are essential for the conservation of the species.''

Once critical habitat is designated, Section 7 of the ESA requires Federal agencies to ensure they do not fund, authorize, or carry out any actions that will destroy or adversely modify that habitat. This requirement is in addition to the other principal section 7 requirement that Federal agencies ensure their actions do not jeopardize the continued existence of listed species.

The Services jointly listed the GOM DPS as endangered in 2000 but have yet to designate critical habitat. Critical habitat will be proposed in a separate rulemaking.

## Peer Review

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 of peer review planning, and opportunities for public participation. The OMB Bulletin, implemented under the Information Quality Act (Public Law 106–554), is intended to enhance the quality and credibility of the Federal government's scientific information, and applies to influential or highly influential scientific information disseminated on or after June 16, 2005. We obtained independent peer review of the scientific information compiled in the 2006 Status Review (Fay *et al.*, 2006) that supports this proposal to designate list the GOM DPS of Atlantic salmon as endangered.

On July 1, 1994, the Services published a policy for peer review of scientific data (59 FR 34270). The intent of the peer review policy is to ensure that listings are based on the best scientific and commercial data available. Prior to a final listing, we will solicit the expert opinions of three qualified specialists, concurrent with the public comment period. Independent specialists will be selected from the academic and scientific community, Federal and state agencies, and the private sector.

## References

A complete list of the references used in this proposed rule is available upon request (see **ADDRESSES**).

## Classification

### *National Environmental Policy Act*

Proposed ESA listing decisions are exempt from the requirement to prepare an environmental assessment (EA) or environmental impact statement (EIS) under the National Environmental Policy Act of 1969 (NEPA) (NOAA Administrative Order 216–6.03(e)(1); *Pacific Legal Foundation* v. *Andrus*, 675 F. 2d 825 (6th Cir. 1981)). Thus, we have determined that the proposed listing determination for the GOM DPS of Atlantic salmon described in this notice is exempt from the requirements of NEPA.

### *Information Quality Act*

The Information Quality Act directed the Office of Management and Budget to issue government wide guidelines that ''provide policy and procedural guidance to federal agencies for ensuring and maximizing the quality, objectivity, utility, and integrity of information (including statistical information) disseminated by federal agencies.'' Under the NOAA guidelines, this action is considered a Natural Resource Plan. It is a composite of several types of information from a variety of sources. Compliance of this document with NOAA guidelines is evaluated below.

- *Utility:* The information disseminated is intended to describe a management action and the impacts of that action. The information is intended to be useful to state and Federal agencies, non-governmental organizations, industry groups and other interested parties so they can understand the management action, its effects, and its justification
- *Integrity:* No confidential data were used in the analysis of the impacts associated with this document. All information considered in this document and used to analyze the proposed action, is considered public information.
- *Objectivity:* The NOAA Information Quality Guidelines standards for Natural Resource Plans state that plans be presented in an accurate, clear, complete, and unbiased manner. NMFS

and USFWS strive to draft and present proposed management measures in a clear and easily understandable manner with detailed descriptions that explain the decision making process and the implications of management measures on natural resources in the Gulf of Maine and the public. This document was reviewed by a variety of biologists, policy analysts, and attorneys from NMFS and USFWS.

*Administrative Procedure Act*

The Federal Administrative Procedure Act (APA) establishes procedural requirements applicable to informal rulemaking by Federal agencies. The purpose of the APA is to ensure public access to the Federal rulemaking process and to give the public notice and an opportunity to comment before the agency promulgates new regulations.

*Coastal Zone Management Act*

Section 307(c)(1) of the Federal Coastal Zone Management Act of 1972 requires that all Federal activities that affect the any land or water use or natural resource of the coastal zone be consistent with approved state coastal zone management programs to the maximum extent practicable. NMFS has determined that this action is consistent to the maximum extent practicable with the enforceable policies of approved Coastal Zone Management Programs of Maine. Letters documenting NMFS' determination, along with the draft environmental assessment and proposed rule, were sent to the coastal zone management program office in Maine. A list of the specific state contacts and a copy of the letters are available upon request.

*Executive Order (E.O.) 13132 Federalism*

E.O. 13132, otherwise known as the Federalism E.O., was signed by President Clinton on August 4, 1999, and published in the **Federal Register** on August 10, 1999 (64 FR 43255). This E.O. is intended to guide Federal agencies in the formulation and implementation of ''policies that have federal implications.'' Such policies are regulations, legislative comments or proposed legislation, and other policy statements or actions that have substantial direct effects on the states, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government. E.O. 13132 requires Federal agencies to have a process to ensure meaningful and timely input by state and local officials in the development of regulatory policies that have federalism implications. A Federal summary impact statement is also required for rules that have federalism implications. Pursuant to E.O. 13132, the Assistant Secretary for Legislative and Intergovernmental Affairs will provide notice of the proposed action and request comments from the appropriate official(s) in Maine.

*Environmental Justice*

Executive Order 12898 requires that Federal actions address environmental justice in decision-making process. In particular, the environmental effects of the actions should not have a disproportionate effect on minority and low-income communities. The proposed listing determination is not expected to have a disproportionate effect on minority or low-income communities.

*E.O. 12866, Regulatory Flexibility Act, and Paperwork Reduction Act*

As noted in the Conference Report on the 1982 amendments to the ESA, economic impacts shall not be considered when assessing the status of a species. Therefore, the economic analysis requirements of the Regulatory Flexibility Act are not applicable to the listing process. In addition, this rule is exempt from review under E.O.12866. This proposed rule does not contain a collection-of-information requirement for the purposes of the Paperwork Reduction Act.

*E.O. 13084–Consultation and Coordination with Indian Tribal Governments*

E.O. 13084 requires that, if we issue a regulation that significantly or uniquely affects the communities of Indian tribal governments and imposes substantial direct compliance costs on those communities, we consult with those governments or the Federal government must provide the funds necessary to pay the direct compliance costs incurred by the tribal governments. This proposed rule does not impose substantial direct compliance costs on the communities of Indian tribal governments. Accordingly, the requirements of section 3(b) of E.O. 13084 do not apply to this proposed rule. Nonetheless, we intend to inform potentially affected tribal governments and to solicit their input on the proposed rule. We will continue to give careful consideration to all written and oral comments received on the proposed rule and will continue our coordination and discussions with interested tribes as we move forward toward a final rule.

**List of Subjects**

*50 CFR Part 17*

Endangered and threatened species, Exports, Imports, Reporting and record keeping requirements, Transportation.

*50 CFR Part 224*

Administrative practice and procedure, Endangered and threatened species, Exports, Imports, Reporting and record keeping requirements, Transportation.

Dated: August 27, 2008.

**James W. Balsiger,**

*Acting Assistant Administrator for Fisheries, National Marine Fisheries Service.*

August 20, 2008.

**Kenneth Stansell,**

*Acting Director, U.S. Fish and Wildlife Service.*

For the reasons set out in the preamble, 50 CFR parts 17 and 224 are proposed to be amended as follows:

## PART 17—ENDANGERED AND THREATENED WILDLIFE AND PLANTS

1. The authority citation for part 17 continues to read as follows:

**Authority:** 16 U.S.C. 1361–1407; 16 U.S.C. 1531–1544; 16 U.S.C. 4201–4245; Pub. L. 99-625, 100 Stat. 3500, unless otherwise noted.

2. In § 17.11(h) revise the entry for ''Salmon, Atlantic'', which is in alphabetical order under FISHES, to read as follows:

### § 17.11 Endangered and threatened wildlife.

* * * * *

FISHES

| Species | | Historic Range | Vertebrate population where endangered or threatened | Status | When listed | Critical habitat | Special rules |
|---|---|---|---|---|---|---|---|
| Common name | Scientific name | | | | | | |
| * | * | * * | * | * | * | * | |
| Salmon, Atlantic, Gulf of Maine | *Salmo salar* | U.S.A., Canada, Greenland, western Europe. | U.S.A., ME, Gulf of Maine Distinct Population Segment. Includes all anadromous Atlantic salmon whose freshwater range occurs in the watersheds from the Androscoggin northward along the Maine coast to the Dennys River, including all associated conservation hatchery populations used to supplement natural populations; currently, such populations are maintained at Green Lake and Craig Brook National Fish Hatcheries. Excluded are those salmon raised in commercial hatcheries for aquaculture. | E | | NA | NA |
| | * | * * | * | * | * | * | |

## PART 224—ENDANGERED MARINE AND ANADROMOUS SPECIES

3. The authority citation for part 224 continues to read as follows:

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

4. Amend the table in § 224.101, by revising the entry for ''Atlantic salmon'' in the table in § 224.101(a) to read as follows:

**§ 224.101 Enumeration of endangered marine and anadromous species.**

* * * * *

(a) *Marine and anadromous fish.*
* * *

| Species[1] | | Where Listed | Citation(s) for Listing Determination(s) | Citation(s) for Critical Habitat Designation(s) |
|---|---|---|---|---|
| Common name | Scientific name | | | |
| * | * | * | * | * * * |
| Gulf of Maine Atlantic salmon | *Salmo salar* | U.S.A., ME, Gulf of Maine Distinct Population Segment. Includes all anadromous Atlantic salmon whose freshwater range occurs in the watersheds from the Androscoggin northward along the Maine coast to the Dennys River, including all associated conservation hatchery populations used to supplement natural populations; currently, such populations are maintained at Green Lake and Craig Brook National Fish Hatcheries. Excluded are those salmon raised in commercial hatcheries for aquaculture. | 65 FR 69469; November 17, 2000 [INSERT FR CITATION WHEN PUBLISHED AS A FINAL RULE] | NA |
| * | * | * | * | * * * |

* * * * *

[FR Doc. E8–20412 Filed 8–28–08; 4:15 pm]

BILLING CODE 3510–22–S