ENDANGERED SPECIES ACT SECTION 7 CONSULTATION

BIOLOGICAL OPINION

Agency:	U.S. Department of Transportation, Federal Highway Administration, Maine Division
Activity:	Proposed replacement of a bridge over the Cathance Stream on Route 86 in Marion Township, Washington County, Maine
Conducted by:	U.S. Fish and Wildlife Service, Maine Field Office [MEFO 5-001F]
Date Issued:	July 8, 2005
Approved by:	

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INTRODUCTION

This constitutes the biological opinion (opinion) of the U.S. Fish and Wildlife Service (USFWS) on the proposed replacement of a structurally deficient bridge over Cathance Stream on Route 86 in Marion Township, Washington County, Maine by the Maine Department of Transportation (MEDOT). MEDOT is also proposing to make some improvements to an existing Denil fish ladder located downstream of the bridge. Cathance Stream, which is a tributary of the Dennys River, occurs within the geographic range of the Gulf of Maine (GOM) Distinct Population Segment (DPS) of Atlantic salmon (*Salmo salar*). The Maine Division of the Federal Highway Administration (FHWA) is providing federal funding for this project. FHWA's request for formal consultation was received on January 21, 2005.

This opinion is based on the following: (1) information provided in the FHWA's January 21, 2005 initiation letter and attachments in support of formal consultation under the ESA; (2) the March 29, 2005 permit application to the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act; (3) "Final Endangered Status for a Distinct Population Segment (DPS) of Anadromous Atlantic Salmon (*Salmo salar*) in the Gulf of Maine" (65 FR 69459, Nov. 17, 2000); (4) "Review of the Status of Anadromous Atlantic Salmon under the U.S. Endangered Species Act" [Anadromous Atlantic Salmon Biological Review Team (AASBRT) 1999]; (5) field investigations; (6) meetings between the USFWS, MEDOT, FHWA, the NOAA's National Marine Fisheries Service (NOAA Fisheries) and the Maine Atlantic Salmon Commission (MASC); and (7) other sources of information. A complete administrative record of this consultation will be maintained by the USFWS Maine Field Office in Old Town, Maine. The USFWS log number is MEFO 5-001F.

CONSULTATION HISTORY

September 21, 2001 – USFWS, NOAA Fisheries, MEASC, and MEDOT visit the Route 86 Cathance Stream bridge and Denil fish ladder to discuss future plans by MEDOT to replace the bridge and improve the efficiency of the fish ladder. Discussed the need for ESA Section 7 consultation due to the presence of endangered Atlantic salmon in Cathance Stream.

November 4, 2003 – MEDOT submits permit applications to the U.S. Army Corps of Engineers (ACOE) and the Maine Land Use Regulation Commission to replace the Cathance Stream bridge on Route 86 and make repairs to an existing fish ladder downstream of the bridge.

November 17, 2003 – Letter from Richard Bostwick (MEDOT) on behalf of FHWA to Wende Mahaney (USFWS) determining that the proposed replacement of the Cathance Stream bridge on Route 86 and work on the Denil fish ladder is not likely to adversely affect the endangered Atlantic salmon. FHWA has formally delegated informal Section 7 consultation duties to MEDOT.

December 23, 2003 – Letter from Wende Mahaney (USFWS) to Richard Bostwick (MEDOT) stating that the USFWS cannot concur with MEDOT and FHWA's conclusion that the proposed bridge replacement and fish ladder repairs are not likely to adversely affect endangered Atlantic salmon (as already reflected in November 20, 2005 Email from Wende Mahaney to Richard Bostwick). Additional information is requested to continue informal Section 7 consultation.

January 29, 2004 – Meeting in Augusta, Maine with the USFWS, NOAA Fisheries, FHWA, MEDOT, MASC, and the Maine Department of Marine Resources to discuss the proposed bridge replacement at Cathance Stream and potential modifications to the existing fish ladder.

May 4, 2004 – USFWS (Dick Quinn, Engineering) and MEDOT visit project site to discuss potential modification to existing fish ladder to improve fish passage.

July 12, 2004 - Email from Wende Mahaney (USFWS) to Mark Hasselmann (FHWA) providing comments on June 11, 2004 draft initiation letter from FHWA.

November 16, 2004 – Email from Wende Mahaney (USFWS) to Mark Hasselmann (FHWA) providing comments on October 4, 2004 draft initiation letter from FHWA.

January 5, 2005 – Meeting in Augusta, Maine with USFWS, MEDOT, and FHWA to discuss December 14, 2004 draft initiation letter from FHWA.

January 24, 2005 - USFWS receives January 21, 2005 letter from FHWA requesting initiation of formal Section 7 consultation for the proposed Cathance Stream bridge replacement.

January 26, 2005 – Email from Richard Bostwick (MEDOT) to Michael Bartlett (USFWS) to transmit corrected copies of mislabeled and unlabeled photographs that were erroneously included in the January 21, 2005 initiation letter from FHWA.

February 16, 2005 – Letter from USFWS to FHWA acknowledging initiation of formal consultation. The Service's opinion is due to FHWA by June 8, 2005.

March 29, 2005 - MEDOT submits revised permit application to the ACOE for bridge replacement and fish ladder improvements.

May 2, 2005 – Email from Richard Bostwick (MEDOT) to Wende Mahaney (USFWS) to modify the proposed action to include blasting as an option for ledge removal.

June 1, 2005 – Meeting in Augusta, Maine with USFWS, MEDOT, and FHWA to discuss progress of Section 7 consultation and the need for a time extension. FHWA and MEDOT agree to a time extension until the first week in July 2005. Draft opinion was reviewed and discussed.

BIOLOGICAL OPINION

I. DESCRIPTION OF THE PROPOSED ACTION

The FHWA is proposing to partially fund the replacement of a bridge over the Cathance Stream on Route 86 in Marion Township, Washington County, Maine (Figure 1). The bridge is structurally deficient and needs replacement to maintain safe vehicular travel along the highway. The project will also include some modification of a Denil fish ladder that was installed downstream of the bridge in 1962 by the MEASC to improve upstream passage of Atlantic salmon around a natural waterfall in the stream. The proposed project will be carried out by the MEDOT.

A. Bridge Replacement

Replacement of the bridge will involve removal of the existing bridge and construction of a new, longer span. The existing crossing is a ten foot wide bottomless box culvert. The new bridge will be a 7.32 meter (24-foot) concrete arch span on footings (Figure 2). The increased width of the new structure will reduce the occurrence of high stream flows overtopping the highway and will reduce high stream flow velocities through the bridge. Because of the increased stream channel width under the new structure, a new low flow channel will be created to supply sufficient water depths for fish passage at low flows (see below, **Denil Fish Ladder Improvements**).

All instream work associated with removal and replacement of the bridge will be conducted during low stream flows between July 15 and September 30. MEDOT anticipates completing all instream work during a single work season in 2006.

The removal of the existing three-sided box culvert (no bottom slab) will be done in two stages to allow traffic to be controlled by signal lights on the remaining structure. A concrete saw will cut the existing structure in half along the centerline, and a crane on the existing road will lift the deck superstructure from the vertical walls of the culvert. This work will involve diesel-powered backhoes or excavators, as well as the crane.

A sandbag cofferdam will be used in front of both existing abutments to maintain a “center” channel of water flow within Cathance Stream and to allow construction work in the dry. Sandbags will be placed using an excavator or backhoe working along the channel from the stream bank during low stream flows. Any work necessary for temporary stabilization and support of the existing bridge structure that will maintain one-way traffic during construction will be contained within the cofferdam area. Removal of the east abutment will take place entirely behind the cofferdam. Therefore, no construction equipment will need to work directly in Cathance Stream. Removal activities are expected to be completed within two weeks. MEDOT Best Management Practices (BMPs) for erosion and sediment control (e.g., sandbag cofferdam) will prevent sediments from getting into the stream (MEDOT 2002).

FIGURE 1. Location Map

FIGURE 2. Project Plan

The new west abutment will be cast in place, and sandbags will be used to keep stream flows away from the forms and concrete. All construction for the abutment will take place in the dry behind the sandbag cofferdam. Concrete will be placed into the forms using equipment on the roadway. No fresh concrete will come into contact with the stream until it is completely cured. The new east abutment is located behind (i.e., landward of) the existing abutment's vertical wall. Construction of the new abutments is expected to take about three weeks.

The new upstream westerly wing wall will be protected with riprap that will impact about 2.23 square meters of stream channel. All riprap will be placed behind the sandbag cofferdam using an excavator that is positioned on the road. The excavator will "key" the riprap into the stream bank and shape the slope to the specified plan grade. The riprap work will be completed within two days.

Construction of the new concrete arch span will be done using the "staged construction method" to maintain one-lane traffic on the existing roadway and avoid the need for a temporary bridge over Cathance Stream. All work will be done using MEDOT BMPs, designed to prevent sedimentation into streams from construction activities or storm events. These BMPs involve many filtering techniques and sedimentation structures designed to slow down water and settle out sediments. The project contractor will be required to submit an erosion and sedimentation control plan to MEDOT for review and approval prior to any work or soil disturbance.

For construction access, some vegetation clearing may need to be done within 7.62 meters (25 feet) of the existing bridge. Erosion and sedimentation control BMPs will prevent any sediments from getting into Cathance Stream. Since Cathance Stream is listed as a sensitive water body by MEDOT, two BMPs must be used with one of them being an erosion control BMP. The erosion control BMPs are selected according to site conditions and could include measures such as mulching. MEDOT's Environmental Office will review and approve all BMPs for this project and will conduct inspections of BMPs (usually daily) throughout the construction project. Any areas where woody vegetation is removed for construction will be replanted with native woody vegetation as soon as practicable to reestablish riparian cover along the stream.

The contractor will be required to submit a spill prevention and control plan to MEDOT for review and approval for the entire construction project, including the fish ladder improvements discussed below. The plan will be designed to protect Cathance Stream from spills of diesel fuel, hydraulic oil, and other hazardous materials.

MEDOT has developed a fish evacuation plan to be used in conjunction with the construction and dewatering of all cofferdams. MEDOT Environmental Office staff will be onsite to monitor this work and ensure that Atlantic salmon juveniles are netted and safely moved downstream below the action area.

To improve stormwater runoff treatment associated with the bridge and nearby road surface, a stone check dam will be constructed at each of the four corners of the new bridge in conjunction with the existing road ditch lines. These check dams will outlet onto the riprap placed around the new bridge abutments. The sediment traps associated with each check dam will be regularly monitored and maintained by MEDOT road maintenance staff.

B. Denil Fish Ladder Improvements

A Denil fish ladder was installed downstream of the Route 86 bridge in 1962 by the MEASC to enhance upstream fish passage above a natural waterfall in Cathance Stream during low flows. Although it was installed primarily to benefit Atlantic salmon, the fish ladder is also used by upstream migrating alewives. The fish ladder currently does not function properly (Dick Quinn, USFWS, pers. comm.).

Approximately 39.85 square meters (429 square feet) of ledge will be removed from the bottom of Cathance Stream to create access for fish to a low flow channel between the fish ladder exit and the new bridge. Ledge removal will be accomplished either 1) by an excavator using a "Hoe ram" attachment; or 2) by blasting with explosives. The "Hoe ram" will chip a predrilled area of ledge, per specifications on the project plans. Ledge will be removed by hand labor and an excavator. All work will be done in the dry behind a sandbag cofferdam placed during the specified instream work window. Ledge removal will be completed within one to two weeks. Blasting would be accomplished by a blasting subcontractor in a dry stream channel following installation of a sandbag cofferdam during the specified instream work window. A drill rig would drill holes for the blast charges along the path of the low flow channel. Following placement of low order charges and blasting mats, the confined charges would be detonated. The mats and all ledge debris would be removed from the stream and the channel shaped to design specifications; any remaining high spots would be removed with construction machinery already on site. Ledge removal by blasting is anticipated to take about one-half of the time required for removal with a "Hoe ram"; however, the footprint of ledge removal with blasting would likely not be as precise as with the "Hoe ram."

An existing concrete retaining wall along the east shoreline and a series of concrete blocks stacked in the stream create a side stream channel between the bridge and the fish ladder exit. This channel was intended to divert water down the fish ladder during times of low stream flows; however, this arrangement does not provide sufficient flow in the fish ladder for fish to pass upstream during low flow conditions. The newly excavated channel will divert flows of sufficient depth to allow fish passage. The retaining wall and all of the concrete blocks will be removed. A sandbag cofferdam will be installed to shut off water flow into the side channel, so that removal of the concrete retaining wall will be done in the dry.

The upland area behind the retaining wall will be excavated to expose the concrete for removal. The new stream bank will be appropriately shaped and stabilized with riprap to become the new east shoreline of the side channel to the fish ladder. The riparian zone will be planted with woody vegetation where appropriate. The concrete wall will be crumbled and removed from the side channel with an excavator or "Hoe ram" attachment. The large concrete blocks will be lifted out of the water and completely removed from the stream with an excavator, backhoe, or crane operating from the land.

In concert with the new low flow channel, a grade control weir will be constructed at the downstream terminus of the low flow channel just upstream of the fish ladder exit (station 0+030) to facilitate fish passage, particularly at low flows. The stream channel will be deepened by approximately 15 centimeters (5.85 inches) between the weir and the fish ladder exit (station

0+033). The flashboard weir will consist of a steel reinforced concrete frame that is anchored to the ledge stream bottom with steel bars and that can accommodate several wooden flashboards. The weir will be constructed in the dry using the same sandbag cofferdam installed for ledge removal. The weir frame will have an open width of 60 centimeters (23.6 inches), which is the approximate open width of the fish ladder vanes. The weir invert would then be calibrated to the operational requirements of the fish ladder to provide optimum fish passage conditions. The actual operation of the flashboard weir will be accomplished by the MEASC or other fishery agencies.

Additional work on the Denil fish ladder may be done by the MEASC or others at a later date to further improve upstream passage of Atlantic salmon and other anadromous fish species. Modification of the work currently proposed by MEDOT to improve fish passage may be necessary when additional work is done on the fish ladder.

C. Action Area

The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area (project area) involved in the proposed action (50 CFR 402.02). The action area must encompass all areas where both the direct and indirect effects of the proposed action would affect the GOM DPS of Atlantic salmon.

The proposed project will require work in Cathance Stream in two areas, as follows: 1) the stream area under and immediately around the existing and proposed bridge structures; and 2) the stream channel downstream of the bridge that leads to the existing Denil fish ladder. For construction access, some removal of vegetation may occur within 7.62 meters (25 feet) of the bridge on both banks and both upstream and downstream of the bridge. Downstream of the existing bridge, particularly in the area of the fish ladder, woody vegetation was previously cleared by others (as evidenced by numerous tree stumps).

Because the proposed project involves work in a flowing stream and impacts to a fish species (i.e., Atlantic salmon) that can move through the project site and utilize stream habitat both upstream and downstream of the work area, the action area will include all of Cathance Stream from the natural falls approximately 15.24 meters (50 feet) upstream of the bridge to the natural falls approximately 18.29 meters (60 feet) downstream of the bridge. Therefore, the action area is approximately 45.72 meters (150 feet) of Cathance Stream channel, as well as riparian areas within 7.62 meters (25 feet) of the shoreline extending from all four corners of the bridge. The action area is used by both adult (migration) and juvenile (rearing and migration) Atlantic salmon.

II. STATUS OF THE SPECIES

The Status of the Species section presents biological information relevant to formulating this opinion and documents the effects of all past human and natural activities that have led to the current status of the species throughout its range.

Federally-listed species known to occur in Washington County, Maine include the threatened bald eagle (*Haliaeetus leucocephalus*), the threatened Canada lynx (*Lynx Canadensis*), and the endangered Atlantic salmon. The bald eagle is not known to occur in the project area, except as occasional, transient individuals, and would not be affected by the project. The Canada lynx is not known to occur in the project area. Therefore, the bald eagle and Canada lynx will not be considered further in this consultation.

A. Species Description

The Atlantic salmon is an anadromous fish species that spends most of its adult life in the ocean but returns to freshwater to reproduce. The Atlantic salmon is native to the basin of the North Atlantic Ocean, from the Arctic Circle to Portugal in the eastern Atlantic, from Iceland and southern Greenland, and from the Ungava region of northern Quebec south to the Connecticut River (Scott and Crossman 1973). In the United States, Atlantic salmon historically ranged from Maine south to Long Island Sound. However, the Central New England and Long Island Sound DPS have been extirpated (65 FR 69459, Nov. 17, 2000).

The ESA considers the term "species" to include "any subspecies of fish or wildlife or plants, and any distinct population segment (DPS) of any species of vertebrate fish or wildlife that interbreeds when mature." Species sub-structure is particularly important to anadromous salmonids, because their strong homing capability fosters the formation of discrete populations exhibiting important adaptations to local riverine ecosystems and the watersheds that determine their character (Berst and Simon 1981; Utter 1981; Utter *et al*. 1993; Nielsen 1998).

A DPS of anadromous Atlantic salmon in the Gulf of Maine was listed by the USFWS and NOAA Fisheries (collectively, the Services) as an endangered species on November 17, 2000 (65 FR 69459). The GOM DPS encompasses all naturally reproducing remnant populations of Atlantic salmon downstream of the former Edwards Dam site on the Kennebec River northward to the mouth of the St. Croix River. The watershed structure, available Atlantic salmon habitat, and abundance of Atlantic salmon at various life stages are best known for the following eight rivers: Dennys River, East Machias River, Machias River, Pleasant River, Narraguagus River, Ducktrap River, Sheepscot River, and Cove Brook (65 FR 69459, Nov. 17, 2000). The USFWS's GOM DPS river-specific hatchery-reared fish are also included as part of the listed entity. Critical habitat has not been designated for this species.

1. *Listing History*

In response to a petition submitted in 1993 to list Atlantic salmon under the ESA, the Services completed a review of the species' status in 1995 (USFWS/NOAA Fisheries 1995). The Services concluded that there was a danger of extinction and later in 1995 published a proposed rule to list a GOM DPS of Atlantic salmon in seven Maine rivers as threatened (60 FR 50530, Sept. 29, 1995). In that proposed rule, the State of Maine was invited to prepare a plan to eliminate, minimize and mitigate threats to Atlantic salmon and their habitat. On December 18, 1997, the Services withdrew the proposed rule to designate the Atlantic salmon GOM DPS as threatened (62 FR 66325, Dec. 18, 1997). The withdrawal was based on an evaluation of the information then known about the biological status of the species, as well as consideration of ongoing actions by international, state, federal, and private entities, including the state's Atlantic Salmon Conservation Plan for Seven Maine Rivers (Conservation Plan) (Maine Atlantic Salmon Task Force 1997).

In January 1999, the Services received the State of Maine's 1998 Annual Progress Report on implementation of the Conservation Plan. After review of the Annual Report, public comments, and a 1999 Atlantic salmon status review (AASBRT 1999), the Services determined that the species' status was more precarious than indicated by the available information at the time of their December 1997 determination not to list the species. On November 17, 1999, the Services proposed to list the Atlantic salmon GOM DPS, this time as an endangered species. After review of public comments and consideration of the best available scientific and commercial information and data, the Services published a final rule on November 17, 2000 listing the Atlantic salmon GOM DPS as an endangered species.

B. Life History

1. *Freshwater Lifestages*

Adult Atlantic salmon ascend the rivers of New England beginning in the spring and continuing into the fall, with the peak occurring in June. Once an adult salmon enters a river, rising river temperatures and water flows stimulate upstream migration. When a salmon returns to its home river after two years at sea (referred to as 2-sea-winter or 2SW fish), it is approximately 75 cm long and weighs approximately 4.5 kg. A minority (10-20%) of Maine salmon return as smaller fish, or grilse, after only one winter at sea (1SW) and still fewer return as larger 3-sea-winter (3SW) fish. A spawning run of salmon with representation of several age groups ensures some level of genetic exchange among generations. Once in freshwater, adult salmon cease to feed during their up-river migration. Spawning occurs in late October through November.

Approximately 20% of Maine Atlantic salmon return to the sea immediately after spawning, but the majority overwinter in the river until the following spring before leaving (Baum 1997). Upon returning to salt water, the spawned salmon or kelt resumes feeding. If the salmon survives another one or two years at sea, it will return to its home river as a repeat spawner.

The salmon's preferred spawning habitat is coarse gravel or rubble substrate (up to 8.5 cm in diameter) with adequate water circulation to keep the buried eggs well oxygenated (Peterson 1978). Water depth at spawning sites is typically between 30 and 61 cm, and water velocity averages 60 cm per second (Beland 1984). Spawning sites are often located at the downstream end of riffles where water percolates through the gravel or where upwellings of groundwater occur (Danie *et al.* 1984). Redds, the depression where eggs are deposited, average 2.4 m long and 1.4 m wide (Baum 1997). An average of 240 eggs is deposited per 100 m^2, or one "unit" of habitat (Baum 1997). Beland (1984) reported that the total original Atlantic salmon spawning and nursery habitat in Maine rivers was 398,466 units.

In late March or April, the eggs hatch into larval alevins or sac fry. Alevins remain in the redd for about six weeks and are nourished by their yolk sac. Alevins emerge from the gravel about mid-May, generally at night, and begin actively feeding. The survival rate of these fry is affected by stream gradient, overwintering temperatures and water flows, and the level of predation and competition (Bley and Moring 1988).

Within days, the free-swimming fry enter the parr stage. Parr prefer areas with adequate cover (rocks, aquatic vegetation, overhanging streambanks, and woody debris), water depths ranging from approximately ten to 60 cm, velocities between 30 and 92 cm per second, and temperature near 16EC (Beland 1984). Parr actively defend territories (Danie *et al.* 1984; Mills 1964; Kalleberg 1958; Allen 1940). Some male parr become sexually mature and can successfully spawn with sea-run adult females. Water temperature (Elliot 1991), parr density (Randall 1982), photoperiod (Lundqvist 1980), the level of competition and predation (Hearn 1987; Fausch 1988), and the food supply, all influence the growth rate of parr. Maine Atlantic salmon produce from five to ten parr per unit of habitat (Baum 1997). Parr feed on larvae of mayflies and stoneflies, chironomids, caddisflies and blackflies, aquatic annelids and mollusks, as well as numerous terrestrial invertebrates that fall into the river (Scott and Crossman 1973).

In a parr's second or third spring, when it has grown to 12.5-15 cm in length, physiological, morphological and behavioral changes occur (Schaffer and Elson 1975). This process, called smoltification, prepares the parr for migration to the ocean and life in salt water. In Maine, the majority of parr (80%) remains in fresh water for two years, while the balance remains for three years (Baum 1997). The biochemical and physiological modifications that occur during smoltification prepare the fish for the dramatic change in osmoregulatory needs that comes with the transition from a freshwater to a saltwater habitat (Bley 1987; Farmer *et al.* 1977; Hoar 1976; USFWS 1989; and Ruggles 1980). As smolts migrate from the rivers between April and June, they tend to travel near the water surface, where they must contend with changes in water temperature, pH, dissolved oxygen, pollution levels, and predation. Most smolts in New England rivers enter the sea during May and June to begin their ocean migration. It is estimated that Maine salmon rivers produce 19 fry per unit of habitat, resulting in five to ten parr per unit and ultimately three smolts per unit (Baum 1997).

2. *Marine Lifestages*

Atlantic salmon of U.S. origin are highly migratory, undertaking long marine migrations from the mouths of U.S. rivers into the northwest Atlantic Ocean, where they are distributed seasonally over much of the region (Reddin 1985). The marine phase starts with smoltification and subsequent migration through the estuary of the natal river. Upon completion of the physiological transition to salt water, the post-smolt stage grows rapidly and has been documented to move in small schools loosely aggregated close to the surface (Dutil and Coutu 1988). After entering into the nearshore waters of Canada, the U.S. post-smolts become part of a mixture of stocks of Atlantic salmon from various North American streams. Upon entry into the marine environment, post-smolts appear to feed opportunistically, primarily in the neuston (near the surface). Their diet includes invertebrates, amphipods, euphausiids, and fish (Hislop and Youngson 1984; Jutila and Toivonen 1985; Fraser 1987; Hislop and Shelton 1993).

Most of the GOM DPS-origin salmon spend two winters in the ocean before returning to streams for spawning. Aggregations of Atlantic salmon may still occur after the first winter at sea, but most evidence indicates that they travel individually (Reddin 1985). At this stage, Atlantic salmon primarily eat fish, feeding upon capelin, herring, and sand lance (Hansen and Pethon 1985; Reddin 1985; Hislop and Shelton 1993).

C. Population Dynamics

1. *Historical Abundance*

Anadromous Atlantic salmon were native to nearly every major coastal river north of the Hudson River in New York (Atkins 1874; Kendall 1935). The annual historic Atlantic salmon adult population returning to U.S. rivers has been estimated to be between 300,000 (Stolte 1981) and 500,000 (Beland 1984). The largest historical salmon runs in New England were likely in the Connecticut, Merrimack, Androscoggin, Kennebec, and Penobscot Rivers.

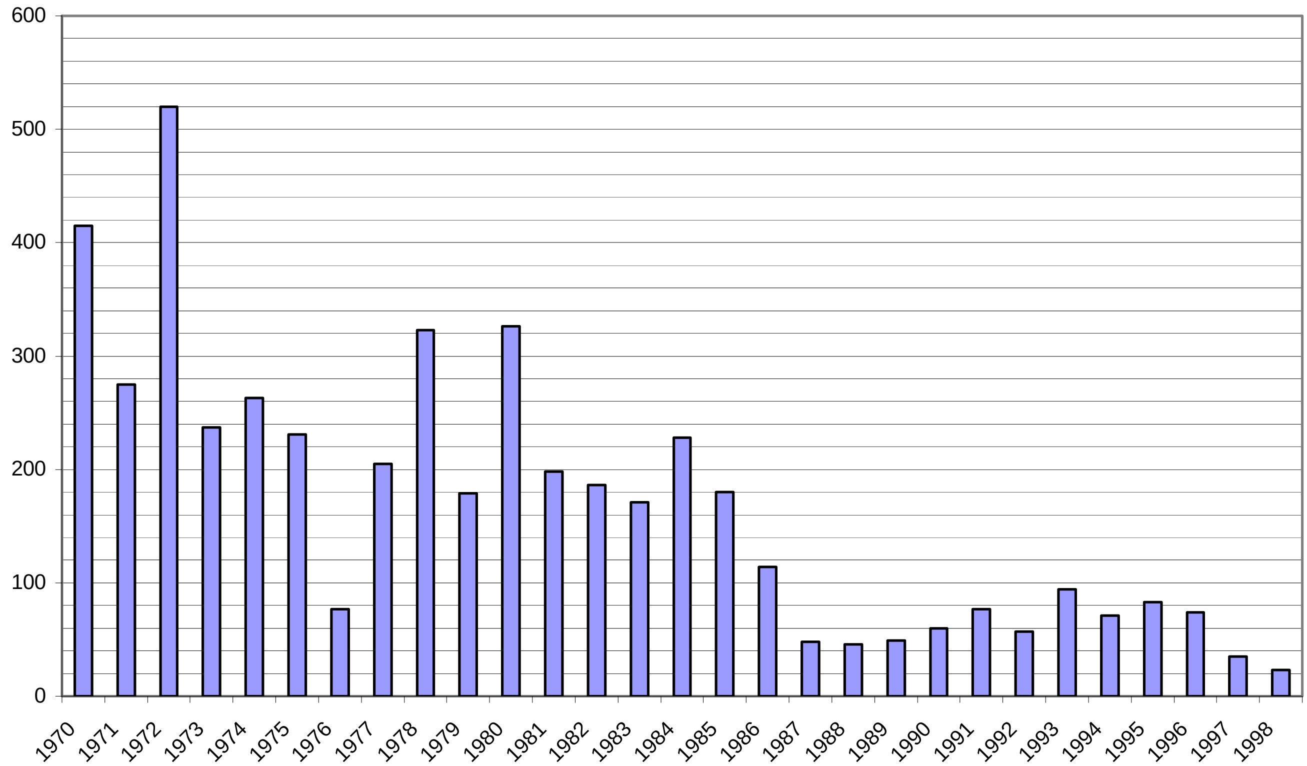
By the early 1800s, Atlantic salmon runs in New England had been severely depleted due to the construction of dams, over fishing, and water pollution, all of which greatly reduced the species' distribution in the southern half of its range. Restoration efforts were initiated in the mid-1800s, but there was little success due to the presence of dams and the inefficiency of early fishways (Stolte 1981). There was a brief period in the late nineteenth century when limited runs were reestablished in the Merrimack and Connecticut Rivers by artificial propagation, but these runs were extirpated by the end of the century (USFWS 1989). By the end of the nineteenth century, three of the five largest salmon populations in New England (in the Connecticut, Merrimack, and Androscoggin Rivers) had been eliminated.

2. *Current Abundance*

As with most anadromous species, Atlantic salmon can exhibit temporal changes in abundance. Angler catch and trapping data from 1970 to 1998 provide the best available composite index of recent adult Atlantic salmon population trends within the GOM DPS rivers. These indices indicate that there was a dramatic decline in the mid-1980s, and that populations have remained at low levels ever since. Figure 3 demonstrates this trend (AASBRT 1999).

Total documented (rod and trap caught fish) natural (wild and stocked fry) GOM DPS spawner returns for 1995 through 2001 are as follows: 1995 (85); 1996 (82); 1997 (38); 1998 (23); 1999 (32); 2000 (28); and 2001 (60) (USASAC Annual Report 2002/14). These counts (as well as the counts shown in Figure 3) represent minimal estimates of the wild adult returns, because not all GOM DPS rivers have trapping facilities (e.g., weirs) to document spawner returns in all years. The counts of redds conducted annually by the MEASC demonstrate that salmon do return to those rivers for which no adult counts are possible. Since 2001, scientists have estimated the total number of salmon returning to the GOM DPS with a linear regression model. This estimate is calculated using capture data on GOM DPS rivers with trapping facilities (Dennys, Pleasant, and Narraguagus Rivers), combined with redd count data from the other five GOM DPS rivers. Documented returns based on these redd counts and trap data estimate a total of 99 adults in 2001, 33 adults in 2002, 72 adults in 2003, and 82 adults in 2004 (at 90% probability).

Figure 3. Total Documented Natural (Wild and Fry Stocked) Spawner Returns from USASAC (1999) data (minimal estimates) for the GOM DPS 1970-1998.



Densities of young-of-the-year salmon (0+) and parr (1+ and 2+) generally remain low relative to potential carrying capacity. This depressed juvenile abundance is a direct result of low adult returns in recent years. Survival from the parr to the smolt stage has previously been estimated to range from 35-55% (Baum 1997). Research in the Narraguagus River, however, demonstrated at the 99% probability level that survival was less than 30% (Kocik *et al.* 1999). Survival from fry to smolt, based on results from hatchery fry stocking, is reported by Bley and Moring (1988) to range from about 1-12%; and survival from egg to smolt stage is reported by Baum (1997) to be approximately 1.25%.

In short, naturally-producing Atlantic salmon populations in the GOM DPS are at extremely low levels of abundance. This conclusion is based principally on the fact that: 1) spawner abundance is below 10% of the number required to maximize juvenile production; 2) juvenile abundance indices are lower than historical counts; and 3) smolt production is less than one-third of what would be expected based on the amount of habitat available. Counts of adults and redds in all rivers continue to show a downward trend from these already low abundance levels. Given recent estimates of spawner-recruitment dynamics, some researchers suggest that adult populations may not be able to replace themselves, and that populations would be expected to decline further (Beland and Friedland 1997).

D. Status of the Species and Factors Affecting its Environment

Atlantic salmon in the GOM DPS currently exhibit critically low spawner abundance, poor marine survival, and have been or are still confronted with a variety of threats, including artificially-reduced water levels, diseases and parasites, increased likelihood of predation because of low numbers of salmon and increased numbers of some predators, sedimentation of habitat, and genetic intrusion by commercially-raised Atlantic salmon that escape from freshwater hatcheries or marine cages. The Services listed the GOM DPS as endangered because of the danger of extinction created by inadequate regulation of agricultural water withdrawals, disease, aquaculture, and low marine survival (65 FR 69476, Nov. 17, 2000).

These and other factors, including conservation actions, affecting the current status of the Atlantic salmon GOM DPS are discussed in the following documents, which are hereby incorporated by reference: 1) Review of the Status of Anadromous Atlantic Salmon (AASBRT, 1999); 2) Final rule listing the Atlantic salmon as an endangered species (65 FR 69476, Nov. 17, 2000); 3) Final Biological Opinion to the U.S. Army Corps of Engineers on existing aquaculture permits (NOAA Fisheries, 2003); and 4) Draft Recovery Plan for the Atlantic Salmon (NOAA Fisheries and USFWS, 2004).

At this time, the Services consider the Atlantic salmon a critically endangered species that is faced with a variety of threats including acidified water and associated aluminum toxicity, Atlantic salmon aquaculture off the coast of Maine, poaching of adults in DPS rivers, incidental capture of adults and parr by recreational fishermen, predation, sedimentation of habitat, depletion of diadromous fish communities, and water withdrawals. No single factor can be pinpointed as the cause of the continuing decline of the DPS. Rather, all threats that were key factors in the listing determination, in combination with other recently identified threats, have the potential to adversely affect Atlantic salmon and their habitat. Continued research and assessment is needed to understand the impacts of and interactions among all the threats faced by the DPS. Not all threats are pervasive throughout the DPS rivers, and not all threats would be expected to adversely affect the DPS if populations were stable (e.g., predation and competition). Despite a wide variety of conservation activities already completed or currently in progress, the GOM DPS has not shown any recent signs of population recovery.

III. ENVIRONMENTAL BASELINE

The Environmental Baseline provides a snapshot of a species health or status at a given time within the action area and is used as a biological basis upon which to analyze the effects of the proposed action. Assessment of the environmental baseline includes an analysis of the past and present impacts of all state, federal, or private actions and other human activities in the action area, the anticipated impacts of all proposed federal projects in the action area that have already undergone formal or early Section 7 consultation, and the impact of state or private actions that are contemporaneous with the consultation in process (50 CFR §402.02).

A. Status of the Species in the Action Area

Cathance Stream is a tributary of the Dennys River, one of the eight Gulf of Maine DPS rivers in which endangered salmon are known to occur. The Dennys River originates at Meddybemps Lake and flows 32 km to its confluence with Cobscook Bay. Cathance Stream is the only major tributary of the Dennys River.

Based on a 2001 habitat survey, Cathance Stream contains 547.7 units (one unit = 100 square meters) of juvenile rearing habitat and 1.4 units of adult spawning habitat. The segment of the stream between the upstream falls and the Route 86 bridge inlet is mapped as riffle-rearing habitat, while the segment from the bridge inlet to the downstream falls is mapped as run-rearing habitat. The fish ladder and channel to the fish ladder are mapped as falls and not considered juvenile rearing habitat. The nearest spawning habitat is located more than 91.44 meters (300 feet) upstream of the bridge and about 152.4 meters (500 feet) downstream of the bridge. The upstream falls are likely passable by juvenile salmon, but the downstream falls are probably not (Norm Dube, MEASC, pers. comm.).

Salmon populations in the Dennys River and Cathance Stream are monitored on a regular basis by the MEASC and the Services. A weir on the Dennys River located at the head of tide is used to trap upstream migrating salmon, although this weir does not always document every returning salmon. Recent returns of wild (i.e., not aquaculture escapees) adult salmon at the Dennys weir are 17 in 2001, two in 2002, nine in 2003, and one in 2004. Redd surveys are conducted to document spawning activity, but high water from fall precipitation can make surveys difficult or impossible. Recent redd surveys yielded the following counts in the Dennys River drainage: 23 (1999), 60 (2000), 72 (2001), zero (2002), one (2003), and 51 (2004). Some of the redds found in 2000 and 2001 were attributable to aquaculture pen-reared adults that were released into the Dennys River those years as part of on-going salmon restoration activities. Redds found in 2004 may be almost entirely attributed to sexually mature hatchery broodstock that were stocked back into the river because they were excess to hatchery needs (Trial *et al*. 2005). The last confirmed redd (one) in Cathance Stream was in 2003, upstream of the Route 86 bridge.

Electrofishing surveys, based on the Basin-Wide Geographical Population Estimate sampling design, are used to estimate juvenile salmon (parr) populations in the Dennys River drainage (MEASC 2004). The average densities, per unit of habitat, for one-year old parr in Cathance Stream are as follows: 2.68 parr (2001), 1.02 (2002), 4.92 (2003), and 0.68 (2004). Electrofishing surveys have recently captured parr immediately downstream of the Route 86 bridge (Greg Mackey, MEASC, pers. comm.). These average densities are well below the expected five to ten parr per unit of habitat (Trial *et al*. 2005). Parr estimates at the mouth of Cathance Stream from 1977 to 1980 ranged from 4.1 to 14.8 per unit of habitat (Beland *et al.* 1982).

The Dennys River drainage, including Cathance Stream, is annually stocked with hatchery raised river-specific Atlantic salmon by the Services and the MEASC to aid in population recovery efforts. Table 1 gives recent juvenile stocking information for Cathance Stream.

Table 1. Number of juvenile Atlantic salmon stocked in Cathance Stream, 2001-2005.

	Fry		0+ Parr	
	Route 86 Bridge		Route 86 Bridge	
Year	Above	Below	Above	Below
2001	17,000	21,000	0	0
2002	26,000	21,000	0	14,000
2003	21,000	10,000	0	12,000
2004	34,000	17,000	0	22,000
2005	32,000	43,000	n/a	n/a

As with the rest of the Gulf of Maine DPS, the salmon population in Cathance Stream is extremely low and continues to demonstrate generally downward trends in abundance, despite ongoing conservation efforts such as stocking.

B. Factors Affecting Atlantic Salmon in Cathance Stream and the Action Area

The Dennys River is a relatively short coastal stream flowing out of Meddybemps Lake southeasterly for 32.2 km (20 miles) to Cobscook Bay on the Atlantic Ocean. The Dennys River watershed is 342 square km (86,400 acres). Cathance Stream, its only major tributary, drains 94.5 square km (36.5 square miles) of watershed (Beland *et al.* 1982). Cathance Stream originates at Cathance Lake and flows southeasterly approximately fourteen miles to its confluence with the Dennys River.

The drainage is sparsely populated. The major land cover is mixed deciduous-coniferous forest; the two major landownership types are currently private undefined (residential and unknown) and non-industrial timberland (Arter 2005). Water use is primarily recreational, with no known industrial or public drinking water uses. Water quality in Cathance Stream is classified by the Maine Department of Environmental Protection as either Class A (at the Route 86 bridge site) or Class AA water (below the Great Works impoundment in Edmunds Township), indicating high water quality. The MEASC Dennys River Corridor project consists of 1,903 hectares (4,700 acres) acquired along the main stem of the Dennys River and Cathance Stream that are managed primarily to protect and enhance Atlantic salmon habitat and water quality. MEASC allows a variety of land uses, including timber harvesting, that are consistent with the primary goal of restoring salmon populations.

Atlantic salmon populations in the Dennys River and Cathance Stream were historically impacted in a variety of ways, including the following: 1)hydroelectric power generation at Meddybemps Lake, which substantially reduced or even shut off water flows in the upper

Dennys from 1948 through 1973[1]; 2) construction of multiple artificial dams impassable to fish beginning in 1845; 3) commercial blueberry production; and 4) forest management practices, including clear cuts, log drives, construction of logging roads, and the use of herbicides (Beland *et al.* 1982).

Angling for adult Atlantic salmon returning to the Dennys River occurred possibly as early as 1832, with this river believed to be the first in Maine on which angling for adults was practiced (Beland 1982). The recorded adult rod catch from 1937 to 1982 averaged 60 salmon, with a high in 1980 of 190 adults.

Between 1999 and 2003, 69 non-point source (NPS) pollution sites were documented by various agencies and organizations within the Dennys River watershed (Arter 2005). There are nine known NPS sites within the Cathance Stream watershed (not including Cathance Lake), including the Route 86 bridge in Marion Township. As of February 2005, only eight of the 69 sites had been fully restored and eight more were in the process of being repaired. Eighty four percent of these NPS sites are associated with unpaved roads and include faulty culverts, improper ditching, road runoff, and unstable shoulders. Among the impacts that such NPS sites have on salmon and their habitat are sedimentation of gravel used by spawning adults or juveniles, loss of riparian vegetation and associated warming of stream water temperature, obstructions to fish passage (e.g., hanging or poorly aligned culverts), and addition of nutrients (primarily phosphorus and nitrogen) that can degrade water quality. An NPS management plan is being implemented to address these pollution issues in the Dennys River watershed, in part because of their impacts on Atlantic salmon (Arter 2005).

Recent monitoring in the Dennys River watershed has indicated pH levels which could be adversely impacting Atlantic salmon, especially during episodic runoff events. Research has demonstrated that depressed pH levels can reduce a smolt's ability to develop saltwater tolerance during the spring outmigration to the ocean. NOAA Fisheries is currently planning a water quality enhancement project to add calcium carbonate solution to the Dennys River during episodic storm events in an effort to increase pH to levels that are not harmful to salmon and other aquatic organisms (Arter 2005).

Because the existing bridge opening at Route 86 is too narrow to accommodate the natural channel size of Cathance Stream, water velocities through the opening are increased and may be having an adverse impact on upstream fish passage during certain flows. Furthermore, the existing narrow bridge crossing has experienced erosion around the abutments that contributes sediment to Cathance Stream. In 2001 the Dennys River Watershed Council received State and Federal permits to place geotextile fabric and rock rip-rap over the exposed and eroding soil at the southeast corner of the bridge to control the addition of sediments into the stream. Input of fine sediments to Cathance Stream from the bridge could have an adverse impact on downstream spawning and juvenile rearing habitat by filling interstitial spaces between cobbles (i.e., an embedded stream bed). Salmon juveniles use interstitial spaces for shelter from fast moving currents and to find thermal refuge, particularly during the winter months (Cunjak 1988).

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[1] Since 1973 the MEASC has owned and operated the dam at the outlet of Meddybemps Lake to optimize availability of Atlantic salmon habitat in the Dennys River.

Research by the MEASC in the Dennys River shows a negative relationship between the degree of stream substrate embeddedness and juvenile salmon densities (Trial *et al.* 2005).

The existing Denil fish ladder constructed by the MEASC in 1962 may have improved upstream passage for Atlantic salmon and other fish species around a natural falls in Cathance Stream. The effectiveness of the fish ladder, however, is unknown. When the fish ladder was installed, a number of large concrete blocks and a concrete retaining wall were placed in the stream to funnel stream flow towards the fish ladder. These concrete structures resulted in a minor loss of stream bottom habitat. Currently, the fish ladder is in disrepair and is probably impassable by Atlantic salmon and other fish species (Dick Quinn, USFWS, pers. comm.).

IV. EFFECTS OF THE ACTION

This section of the opinion analyzes the direct and indirect effects of the proposed action on the GOM DPS of Atlantic salmon, together with the effects of other activities that are interrelated or interdependent (50 CFR 402.02, June 30, 1986). Indirect effects are those that are caused by the proposed action, are later in time, but are still reasonably certain to occur. Interrelated actions are those that are part of a larger action and depend upon the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration.

A. Instream Work

All instream work (except removal of the concrete blocks associated with the channel leading to the Denil fish ladder) will be conducted in the dry behind a sand bag cofferdam. These cofferdams will be constructed according to MEDOT's most recent manual of best management practices for sediment and erosion control (MEDOT 2002). In the area of the proposed bridge replacement, Cathance Stream is primarily ledge outcrop with scattered boulders and rocks. The downstream channel bordered by concrete blocks leading to the fishway is gravel and silt deposits over ledge.

Atlantic salmon may be killed or more likely temporarily disturbed, displaced, or injured by instream work activities. Although isolation of stream work areas by a cofferdam is a conservation measure intended to minimize the adverse effects of construction activities on Atlantic salmon and their habitat, fish present in the proposed cofferdam area will impacted. These salmon will either be temporarily disturbed or displaced so that they move away from the work area, or they will be captured inside the cofferdam and then handled and released downstream outside of the action area according to a fish evacuation plan.

Capturing and handling salmon causes physiological stress and can cause physical injury, although these effects can be kept to a minimum through proper handling procedures. The MEDOT fish evacuation plan focuses on minimizing such stresses by requiring minimal handling time; minimal time that fish are held out of the water; and using transfer containers with aerated stream water of ambient temperature. Impacts to Atlantic salmon will be further minimized by requiring that only qualified biologists (either from MEDOT or fishery agencies) handle the fish. The contractor and its employees may not handle any Atlantic salmon.

Although it is likely that some juvenile Atlantic salmon (parr) will be present in the action area during the proposed instream work window from July 15 to September 30, the number of fish is expected to be quite low based on recent juvenile population estimates in Cathance Stream. The cofferdam that will be used for construction of the new westerly wing wall will temporarily displace about 9.29 square meters (100 square feet) of juvenile rearing habitat for about two months. The cofferdam used during ledge removal downstream of the bridge and near the fish ladder will not displace any juvenile habitat. Dewatering of the cofferdams will also result in the loss of aquatic invertebrates within the isolated stream channel areas; impacts are expected to be relatively minor, particularly within the section of stream with a ledge bottom, where an abundance and diversity of invertebrates would not be anticipated.

The new westerly wing wall and associated riprap will result in the permanent loss of 2.23 square meters (24 square feet) of Atlantic salmon juvenile rearing and adult/juvenile migration habitat. This loss will represent a very minor overall reduction in juvenile habitat within Cathance Stream, which contains 548 units of habitat. This loss amounts to less than three percent of one habitat unit. Although riprap along stream banks can increase stream water temperatures due to solar radiation, the small amount of riprap proposed likely will not have a measurable effect on water temperature in Cathance Stream.

Because the instream work areas will be isolated by cofferdams, the impacts of noise and vibration from construction equipment are expected to be very minimal, if any. The FHWA reports that noise from construction equipment does not carry from the air into the water column. Vibration through the bedrock into the stream outside of the cofferdam during ledge removal may result in some avoidance of the work area by juvenile salmon. Any fish that are disturbed, however, and leave the work area to head downstream of the bridge would probably not be able to regain access to the work area once they have gone over the falls.

Ledge may be removed from the bottom of Cathance Stream by blasting. The use of explosives in or near water produces a post-detonation compression shock wave with a rapid rise to a peak pressure followed by a rapid decay to below ambient hydrostatic pressure (Wright and Hopky 1998). This final pressure deficit causes most of the known adverse impacts to fish from blasting by damaging the swim bladder, kidney, liver, spleen, and sinus venous. Any of these organs may rupture or hemorrhage as a result of blasting, with the swim bladder being the most sensitive. The effects on fish are variable and relate to the type of explosive; size and pattern of charges; method of detonation; distance from the point of detonation; water depth; and species, size and life stage of fish (Wright and Hopky 1998). Small fish, including juvenile salmon, are more likely to be injured by an explosion than large fish (ADFG 1991). Wright (1982) demonstrates that effects on fish from blasting occur when the overpressure exceeds 100 kPa (kilopascals). Shock waves generated by inwater explosions generally have more adverse effects on fish than underground explosions, in part because some energy is reflected and lost at the ground-water interface (ADFG 1991).

Because a precise blasting plan (e.g., the total of amount of explosives needed) for ledge removal in Cathance Stream is not available at this time, it is not possible to determine the effects of such blasting on Atlantic salmon. However, because small fish with swim bladders (e.g., juvenile

Atlantic salmon) are known to be particularly susceptible to injuries and death from blasting activities, FHWA and MEDOT will need to develop a blasting plan that limits the overpressure in the waters of Cathance Stream to 100 kPa. This pressure limit is derived from guidelines developed by the Canadian Department of Fisheries and Oceans to protect fishery resources from explosions in or near water bodies (Wright and Hopky 1998). If this pressure guideline cannot be met, then the “Hoe ram” alternative for ledge removal will need to be used (See further discussion below in Incidental Take Statement).

B. Water Quality Effects

Instream construction activities can result in temporary increases of suspended solids within the stream. Use of sandbag cofferdams to allow most of the construction work to be done in the dry and doing all instream work during the prescribed summer low-flow work window (July 15 to September 30) will minimize the amount of suspended solids entering Cathance Stream. Turbid water from within the cofferdams will be pumped into an appropriate area (such as a sedimentation basin or a tank truck) to avoid sedimentation impacts to Cathance Stream. Installation, maintenance, and removal of the cofferdams will be done in accordance with the MEDOT BMP manual; following these procedures will minimize the amount of construction-related sediment in Cathance Stream. A minor amount of sediment could be released downstream, causing temporary turbidity, when the concrete blocks associated with the existing fish ladder are removed from the stream channel using an excavator or crane. Likewise, a minor amount of sediment could be released downstream when the sandbag cofferdams are removed. These potential sedimentation events are expected to be very short in duration and involve very small amounts of sediment. Therefore, impacts on Atlantic salmon would be negligible.

Potential adverse effects of increases in stream turbidity on Atlantic salmon could include the following: 1) reduction in feeding rates; 2) increased mortality; 3) physiological stress; 4) behavioral avoidance of the work area; 5) physical injury (e.g., gill abrasion); and 6) reduction in macroinvertebrates. An increase in stream turbidity may provide temporary enhancement of cover conditions, which could result in less susceptibility to predation (Danie *et al.* 1984). Because of the minor amount of construction-related sediment expected to reach Cathance Stream and because of the small number of juvenile salmon expected to be in the Action Area, turbidity-related effects are expected to be minor and very short-term.

The contractor will use an MEDOT-approved spill prevention and control plan designed to avoid any impacts to Cathance Stream from hazardous chemicals associated with construction, such as diesel fuel, oil, lubricants, and other hazardous materials. All refueling or other construction equipment maintenance will be done at a location consistent with the spill plan and at least 100 feet from the shoreline of Cathance Stream. Petroleum-based materials, such as diesel fuel and oil, contain polycyclic aromatic hydrocarbons (PAHs). PAHs can be acutely toxic to salmonids and other aquatic organisms at high exposure levels or can cause sublethal effects at lower exposures (Albers 2003).

The construction of stone check dams in association with the existing roadside ditches should result in a reduction in road-generated pollutants, such as sediment, entering Cathance Stream near the Route 86 bridge. This should result in a local improvement in water quality, albeit minimal in the context of Cathance Stream, and a concomitant improvement in nearby juvenile Atlantic salmon rearing habitat. In order for these stone check dams to function properly over the long term, MEDOT will need to regularly monitor and maintain the structures, including removal and proper disposal of accumulated sediments.

Riprap will be placed in the stream channel (impacting 2.23 square meters of stream bottom) to protect the new upstream westerly wingwall of the bridge. Adding rock to stream banks can cause an increase in stream water temperature due to an increase in solar radiation. This minor amount of riprap, however, is not expected to have any effect on the water temperature of Cathance Stream.

The project will involve some minor vegetation removal within 7.62 meters of the stream for construction equipment access and placement of the new bridge. The riparian area on the downstream end of the bridge is dominated by herbaceous and some shrub vegetation, while the upstream area is relatively well vegetated with trees and shrubs. This minor vegetation removal will not result in any increase in stream water temperature. All disturbed areas will be seeded with herbaceous species to establish a quick vegetative cover for erosion control and then replanted with woody vegetation to restablish a riparian corridor along Cathance Stream. Furthermore, this minor vegetation removal should not result in any input of sediment into Cathance Stream, as long as appropriate erosion control BMPs are used.

C. Improvements to Fish Passage

Replacement of the existing narrow bridge will result in higher stream flow capacity through the structure. This will result in a reduced frequency of road flooding and a subsequent reduction in adverse impacts to stream water quality from flooding when road pollutants are washed into Cathance Stream. The new bridge will reduce stream flow velocities through the structure at high flows, improving the likelihood of successful salmon and other fish passage upstream through the bridge.

Furthermore, the removal of 39.85 square meters of stream bottom ledge to create a low flow channel between the exit of the Denil fish ladder and the new bridge should improve upstream salmon passage during low flows, particularly if further improvements to the fish ladder are completed in the future. A grade control weir that can accommodate several wooden flashboards will be installed at the downstream terminus of the low flow channel to allow further enhancement of salmon passage once the fish ladder is adequately repaired.

The relatively minor and short term effects to Atlantic salmon expected from the proposed instream work and related impacts to water quality are based on our analysis that all activities proceed as planned and according to the MEDOT BMP manual, as well as the contractor’s approved spill prevention plan. If anything extraordinary occurs during the project (e.g., accident, unusual rain storm event, etc.), potential effects on Atlantic salmon might need to be re-evaluated (see Section IX. Reinitation Notice).

V. CUMULATIVE EFFECTS

Cumulative effects include the effects of future state, tribal, local or private actions that are reasonably certain to occur in the action area considered in this opinion. Future federal actions that are unrelated to the proposed action are not considered in this section, because they require separate consultation pursuant to Section 7 of the ESA.

The MEASC may make additional modifications to the existing Denil fish ladder in Cathance Stream below the Route 86 bridge (e.g., repairing or replacing baffles) and operate the flashboard weir to adjust stream flows through fish ladder. Such actions would improve the ability of Atlantic salmon and other fish species to access habitat upstream of Route 86. At this time, however, with Atlantic salmon populations at critically low levels in Cathance Stream and the entire Dennys River watershed; access to spawning and juvenile rearing habitat is not a limiting factor.

The MEASC is likely to continue to conduct research and management activities in Cathance Stream, including the area around the Route 86 bridge. Although these activities will result in some “take” of Atlantic salmon (as considered under the ESA), adverse impacts are expected to be negligible and such take is authorized by an existing ESA permit. The information gained from these activities will be used to further salmon conservation actions in Cathance Stream and throughout Maine.

The USFWS is not aware of any other non-federal actions that are reasonably certain to occur in the action area considered in this opinion.

VI. CONCLUSION

The proposed action will adversely impact Atlantic salmon and its habitat in Cathance Stream by temporarily disturbing fish during instream construction activities (including possibly trapping some fish inside cofferdams), temporarily making some habitat unavailable during instream construction activities, and resulting in the permanent loss of a very minor amount of juvenile rearing habitat (2.23 square meters) from riprap placed around a new bridge abutment. All of these impacts are expected to affect juvenile Atlantic salmon that are residing in the action area.

The new bridge structure will eliminate the existing stream channel restriction and reduce stream velocities at high flows, improving the likelihood of successful upstream fish passage. Construction of a low flow channel from the bridge to the Denil fish ladder exit and a grade control weir could facilitate further improved upstream fish passage if additional repairs and improvements are made to the Denil fish ladder. Installation of stone check dams in association with existing road ditches will result in improved stormwater treatment at the site, assuming that the sediment basins are monitored and cleaned out as needed.

Therefore, after considering the environmental baseline, the effects of the proposed action, and the potential for future cumulative effects in the action area, the USFWS has concluded that the proposed project is not likely to jeopardize the continued existence of the GOM DPS of Atlantic salmon throughout all or a significant portion of its range. As no critical habitat has been designated for the Atlantic salmon pursuant to Section 4 of the ESA, no critical habitat will be adversely modified or destroyed.

VII. INCIDENTAL TAKE STATEMENT

Section 9 of the ESA prohibits the take of endangered species without special exemption. The term “take” is defined to include harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Services to include an act that actually kills or injures wildlife. Such acts may include significant habitat modification or degradation that results in death or injury to a listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. The term “harass” is defined by the USFWS as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. (NOAA Fisheries has not defined the term “harass” in its ESA regulations.) Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of Section 7(b)(4) and Section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA, provided that such taking is in compliance with the terms and conditions of this ITS.

A. Amount or Extent of Take

The USFWS anticipates that a small number of juvenile Atlantic salmon will be taken as a result of the proposed actions addressed in this opinion. This take will be the result of instream work activities, including the placement and dewatering of cofferdams. Any Atlantic salmon captured during cofferdam installation will be properly handled and moved downstream outside of the action area. The amount of anticipated take is small because of the currently low population of salmon in Cathance Stream and because of the limited size of the action area (45.72 linear meters of stream channel). Furthermore, only a portion of the action area is mapped as juvenile rearing habitat. Some of the action area consists of ledge stream bottom where salmon would move through to reach upstream or downstream habitat but would not be expected to reside in for any length of time. Recent juvenile salmon estimates in Cathance Stream range from 0.68 to 4.92 fish per unit of habitat (one unit = 100 square meters).

The estimated instream work area of Cathance Stream within the action area is approximately 278.7 square meters of stream habitat. There is only 34.2 square meters of juvenile Atlantic salmon rearing habitat within 76.2 meters downstream of Route 86 (Alex Abbott, USFWS, pers. comm.), most of which is downstream of the action area described in this opinion. Juvenile population estimates since 2001 in Cathance Stream yield an average population of 2.32 parr per unit of habitat. Based on the small amount of juvenile salmon habitat available within the action area (albeit not specifically quantified) and consideration of recent juvenile population estimates by the MEASC, the USFWS anticipates that no more than two (2) juvenile Atlantic salmon (i.e., parr) will be taken as a result of the proposed project. This take includes both lethal and non-lethal take, including any salmon that are relocated downstream during placement of the sandbag cofferdams according to the prescribed fish evacuation plan.

This amount of incidental take assumes that if blasting is used to remove ledge within Cathance Stream, that the overpressure in the adjacent waters of Cathance Stream will not exceed 100 kPa. If this standard cannot be achieved through a carefully designed blasting plan, then the less harmful alternative of a “Hoe ram” will need to be used for ledge removal.

This ITS specifically does **not** authorize the take (lethal or non-lethal) of any adult Atlantic salmon. If an adult Atlantic salmon is seen in or near the action area, all instream work should cease immediately until either the USFWS (Maine Field Office) or NOAA Fisheries (Maine Field Office) is contacted and further work is subsequently approved by either or both offices.

B. Reasonable and Prudent Measures

The measures described below are nondiscretionary and must be implemented by the FHWA (or the MEDOT) in order for the exemption in Section 7(o)(2) to apply. The FHWA has a continuing duty to regulate the activity covered by this incidental take statement. The Service considers the following reasonable and prudent measures to be necessary and appropriate to minimize take of the Atlantic salmon:

1. Minimize the adverse effects to Atlantic salmon in Cathance Stream by employing construction techniques that avoid or minimize adverse effects to water quality, aquatic or riparian habitats, and aquatic organisms.

2. Minimize the amount of incidental take by developing a specific blasting plan for ledge removal prior to the start of construction to determine if this work can be done without producing overpressures in Cathance Stream that exceed 100 kPa. If the 100 kPa standard cannot be achieved, then ledge removal will be done with a “Hoe ram” attachment on an excavator.

C. Terms and Conditions

In order to be exempt from the prohibitions of Section 9 of the ESA, the FHWA and MEDOT must comply with the following terms and conditions, which implement the reasonable and prudent measures described above, and outline the required reporting/monitoring requirements. These terms and conditions are nondiscretionary.

1. Hold a pre-construction meeting with the contractor(s) to review all procedures and requirements for avoiding and minimizing impacts to Atlantic salmon and to emphasize the importance of these measures for protecting salmon.

2. Minimize the potential for impacts to Atlantic salmon and their habitat by conducting all instream work from July 15 to September 30 (of any given year) during periods of low stream.

3. While carrying out the fish evacuation plan during construction and dewatering of all cofferdams, the equipment disinfection procedures of the MEASC should be followed for all gear including waders, nets, and buckets (Attachment 1). Furthermore, only qualified MEDOT biologists (or qualified staff from state and federal fishery agencies) should handle Atlantic salmon according to the evacuation plan.

4. The contractor will develop a spill prevention and control plan for review and approval by MEDOT before any construction begins. The plan will require all refueling or adding of other fluids to be done in an appropriate location at least 100 feet away from Cathance Stream.

5. If blasting is employed for ledge removal, qualified MEDOT biologists shall be onsite during detonation of all explosives to monitor Cathance Stream for impacts to Atlantic salmon and other fish species.

6. FHWA and MEDOT staff should carefully monitor the actions described in this opinion and document the level of incidental take, with a report provided to the USFWS, to ensure that the project is minimizing the take of Atlantic salmon.

VIII. CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. The FHWA and MEDOT should collaborate with the MEASC and other fisheries agencies to monitor the effectiveness of upstream fish passage in Cathance Stream after installation of the new bridge and associated stream channel modifications.

2. The FHWA should work with the MEASC and MEDOT to ensure that repairs or modifications to the existing Denil fish ladder, which does not function correctly, are properly designed and implemented in a timely fashion. This work, in conjunction with the stream channel modifications that will be made when the bridge is replaced, will optimize upstream passage of Atlantic salmon and other anadromous fish species using Cathance Stream.

3. The FHWA should collaborate with the Dennys River Watershed Council and Project SHARE (Salmon Habitat and River Enhancement) on implementation of the Dennys River Watershed Non-point Source Pollution Management Plan (Arter 2005). Such collaboration could include surveys to identify non-point source pollution (NPS) sites, water quality monitoring of NPS sites, remediation of NPS sites, and evaluation of repaired NPS sites, with a particular emphasis on Cathance Stream.

In order for our agency to be kept informed of actions to minimize or avoid adverse effects or to benefit listed species or their habitats, please notify the USFWS Maine Field Office if FHWA implements of any of these conservation recommendations.

IX. REINITIATION NOTICE

This concludes formal consultation for the FHWA's proposed funding of a bridge replacement project and fish ladder improvements in Cathance Stream at Route 86 in Marion Township, Maine. As provided in 50 CFR §402.16, reinitiation of formal consultation is required when discretionary federal agency involvement or control over the action has been retained (or is authorized by law), and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; or (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease, pending reinitiation.

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Attachment 1

MAINE ATLANTIC SALMON COMMISSION
DISINFECTION PROCEDURES

A disinfecting area should be established at each office. The disinfecting area needs to have an outside water faucet and an adequate length of garden hose with sprayer. Ideally, the area should have excellent drainage or percolation.

Vehicles and equipment should be kept clean and free of dirt and mud, which can harbor pathogens and prevent effective disinfection. Normal soap and water goes a long way in accomplishing this.

Equipment needed:
- 1 large (40+ gal.) trash can
- Large stiff bristle brush
- Spray bottle
- Nolvasan disinfectant
- Rubbing alcohol

Crew vehicles:

Wash periodically during the field season.

Transport trucks and tanks:

All transport trucks and transport tanks are to be disinfected before they are used to haul fish from different river systems. Care must be taken to run all recirculation pumps and aerators during disinfection and rinsing. Disinfection is accomplished with a 2oz. Nolvasan/gallon water solution.

Field equipment:

All field equipment must be disinfected before use between river systems. Disinfection for most equipment is accomplished with a 2oz. Nolvasan/gallon water solution in the large trash can. Equipment that comes in constant contact with stream water, such as waders, dip nets, seines, gloves, live cars, shocker wand and tail, fish boards, etc., should be allowed to set in solution for 10 minutes then rinsed thoroughly. Delicate equipment, such as electronic scales, conductivity meters, thermometers, etc., should be sprayed with alcohol and allowed to air dry.