US Army Corps of Engineers®
New England District

696 Virginia Road
Concord, MA 01742-2751

PUBLIC NOTICE

Date: March 28, 2017
Comment Period Ends: April 27, 2017
File Number: NAE-2017-00078
In Reply Refer To: Ruth M. Ladd
Or by e-mail: ruth.m.ladd@usace.army.mil

The District Engineer of the New England District, Corps of Engineers ("Corps") has received a prospectus on March 22, 2017 for an In-Lieu Fee ("ILF") Program covering the portion of Maine encompassing three Distinct Population Segments of Atlantic salmon in Maine. This prospectus proposes an ILF program in compliance with 33 CFR 332, Compensatory Mitigation for Losses of Aquatic Resources ("Mitigation Rule"), published in the Federal Register on April 10, 2008, and the U.S. Fish and Wildlife Services (USFWS) Endangered and Threatened Wildlife and Plants; Endangered Species Act Compensatory Mitigation Policy, published in the Federal Register on December 27, 2016.

SPONSOR: Maine Department of Marine Resources, 21 State House Station, Augusta, ME 04333-0021

If this prospectus is deemed sufficient, the sponsor will be authorized to develop a draft ILF instrument for review by an interagency review team of federal and state agencies. If the draft instrument is acceptable, the ILF program will be established through the development of a final ILF instrument to be signed by the sponsor, the Corps, the USFWS, and other agencies which choose to do so. The process will follow the Corps' Mitigation Rule and the USFWS's Compensatory Mitigation Policy.

The proposed ILF program would provide an alternative or a supplement to permittee-responsible mitigation if it is deemed appropriate during the review process for proposed unavoidable impacts authorized under Section 404 of the Clean Water Act ("Section 404") and Section 10 of the Rivers and Harbors Act of 1899 ("Section 10") which also impact federally listed Atlantic salmon and Atlantic salmon critical habitat. The entire prospectus, entitled **"Atlantic Salmon Restoration and Conservation Program,"** is attached to this Public Notice.

The decision whether to authorize the sponsor to proceed to the next step of developing a draft ILF instrument will be based on the District Engineer's ("DE") determination of the potential of the proposed ILF program to provide compensatory mitigation for activities authorized by Department of the Army permits and on the USFWS's determination that impacts to Atlantic salmon can be adequately compensated for through use of this program.

The Corps of Engineers is soliciting comments from the public: federal, state, and local agencies and officials, Indian Tribes, and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps of Engineers and USFWS to determine whether to allow the sponsor to proceed to develop a draft ILF instrument. Comments are also used to determine the need for a public hearing.

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In order to properly evaluate the proposal, we are seeking public comment. Anyone wishing to comment is encouraged to do so. **Comments should be submitted in writing by April 27, 2017.** If you have any questions, please contact Ruth M. Ladd at (978) 318-8818 or (800) 343-4789.

The initial determinations made herein will be reviewed in light of facts submitted in response to this notice. All comments will be considered a matter of public record. Copies of comment letters will be forwarded to the sponsor and the Interagency Review Team consisting of representatives of the Corps, US Fish and Wildlife Service, National Marine Fisheries Service, Environmental Protection Agency, Maine Department of Marine Resources, and Maine Department of Inland Fisheries and Wildlife.

For more information on the New England District Corps of Engineers programs, visit our website at http://www.nae.usace.army.mil.

THIS NOTICE IS NOT AN AUTHORIZATION TO DO ANY WORK NOR DOES THE IN-LIEU FEE PROGRAM, IF APPROVED, PREJUDGE FUTURE DEVELOPMENT PROJECTS WITHIN THE SERVICE AREA.

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JENNIFER L. MCCARTHY
Chief, Regulatory Division

If you would prefer not to continue receiving Public Notices, please contact Ms. Tina Chaisson at (978) 318-8058 or e-mail her at bettina.m.chaisson@usace.army.mil. You may also check here ( ) and return this portion of the Public Notice to: Bettina Chaisson, Regulatory Division, U.S. Army Corps of Engineers, 696 Virginia Road, Concord, MA 01742-2751.

NAME: ____

ADDRESS: ____

Atlantic Salmon Restoration and Conservation Program

March 20, 2017

In-Lieu Fee Proposal[1]

[1] The term "Proposal" is used here consistent with U.S. Fish and Wildlife ESA Compensatory Mitigation Policy. The U.S Army Corps of Engineers and the U.S Environmental Protection Agency Final Compensatory Mitigation Rule refers to this review and process step as a "Prospectus."

Author and Sponsor of the Proposal:

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Supporting Contributors:

The Proposal was developed with the technical assistance of The Conservation Fund (TCF), Arlington, VA, and the Maine Dept. of Transportation (MaineDOT); and funded by The National Academies of Science, Engineering and Medicine and the Transportation Research Board (TRB) through a Strategic Highway Research Program Grant (SHRP2)

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List of Acronyms

ASRCF	Atlantic Salmon Restoration and Conservation Fund
ASRCP	Atlantic Salmon Restoration and Conservation Program
CFR	Code of Federal Regulations
CWA	Clean Water Act
DEP	Department of Environmental Protection
DMR	Maine Department of Marine Resources
DPS	Distinct Population Segment
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
GIS	Geographic Information Systems
GOM	Gulf of Maine
HUC	Hydrologic Unit Code
ILF	In-lieu Fee
IRT	Inter-agency Review Team
MDEP	Maine Department of Environmental Protection
MDIFW	Maine Department of Inland Fisheries and Wildlife
MDOT	Maine Department of Transportation
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NRPA	Natural Resources Protection Act
RHA	Rivers and Harbors Act
RIBITS	Regulatory In-lieu fee and Bank Information Tracking System
SHRU	Salmon Habitat Recovery Unit

USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

1. Introduction

1.1 In-Lieu Fee Program for ESA Impacts

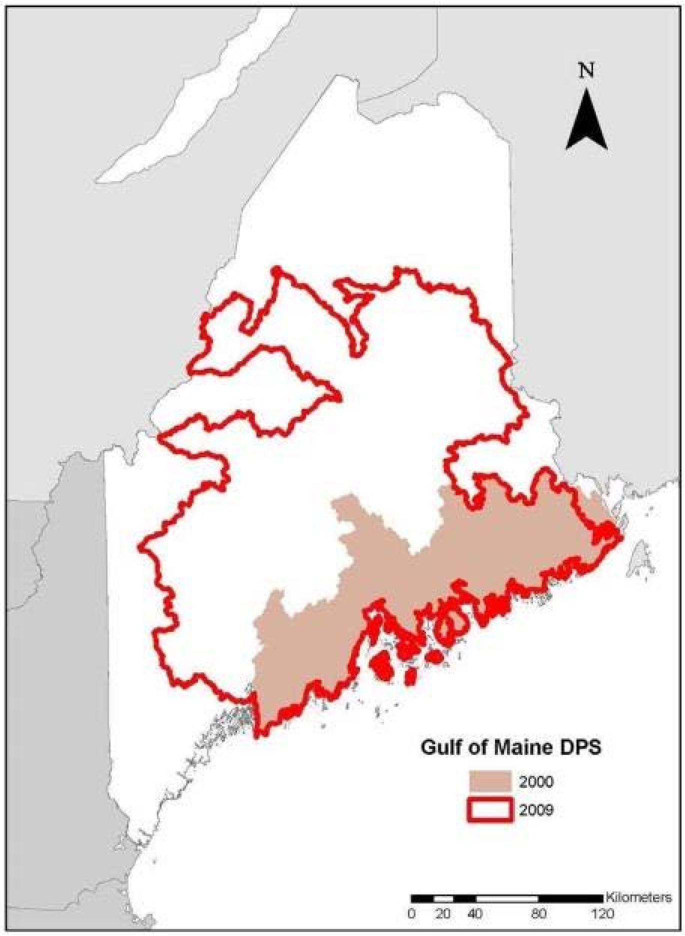
The following In-Lieu Fee (ILF) Prospectus (Prospectus) establishes the guidelines, responsibilities, and standards for the administration of the Maine Atlantic Salmon Restoration and Conservation Program (ASRCP). This program has been created as a means for permit applicants to meet U.S. Army Corps of Engineers (USACE) requirements for compensatory mitigation to offset adverse impacts for projects permitted under Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act of 1899with a focus on providing recovery and conservation measures for Atlantic salmon subject to Section 7 of the Endangered Species Act as administered by the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS).

The Maine Department of Marine Resources proposes to serve as the Sponsor of the ASRCP ILF. The following prospectus outlines the circumstances and manner in which the ILF Program will serve to satisfy compensatory mitigation requirements set forth in the USACE-U.S. Environmental Protection Agency (EPA) Compensatory Mitigation Rule (33 CFR Part 332), and the USFWS' compensatory mitigation policy (81 Fed. Reg. 95316 – 95349 (Dec. 27, 2016).)

1.2 Gulf of Maine DPS of Atlantic Salmon

The Gulf of Maine Distinct Population Segment (DPS) of Atlantic salmon was listed as endangered on December 17, 2000, and expanded on June 19, 2009 (See Figure 1.2-1). The expanded DPS encompasses all anadromous Atlantic salmon in a freshwater range covering the watersheds from the Androscoggin River northward along the Maine coast to the Dennys River. The DPS includes all associated conservation hatchery populations used to supplement natural populations. At the time of listing, there were at least eight rivers in the geographic range of the DPS known to still support wild Atlantic salmon populations (Dennys, East Machias, Machias, Pleasant, Narraguagus, Penobscot, Ducktrap and Sheepscot rivers), though populations continue to show a declining trend. The DPS range includes 87 watersheds within the State of Maine. Of these, 45 have been designated as critical habitat. Of the remaining 42 watersheds, many include biologically suitable habitat for Atlantic salmon, though many of these areas are currently unoccupied or inaccessible. In 2014, total adult returns to the eight rivers still supporting wild Atlantic salmon populations within the DPS were estimated to be less than 500 individuals, with approximately 375 of those returning to the Penobscot River watershed (NOAA 2015).

Figure 1.2-1. Geographic range of the GOM DPS as defined in the 2000 and 2009 listing rules.
(From Draft recovery plan for the Gulf of Maine Distinct Population Segment of Atlantic salmon (*Salmo salar*). USFWS-NOAA, 2016)



1.3 Habitat Requirements and Limiting Factors

The Atlantic salmon is an anadromous fish, typically spending 2-3 years in freshwater, migrating to the ocean where it also spends 2-3 years, and returning to its natal river to spawn. Suitable spawning habitat consists of coarse substrate (gravel or rubble) in areas of moving water. Eggs incubate slowly due to cold winter water temperatures, hatch in March or April and becomealevin . Alevin remain buried in the gravel for about six weeks. The alevin emerge from the gravel about mid-May and start feeding on plankton and small invertebrates. Now considered, fry they quickly disperse from the redd, a depression in the gravel substrate where eggs are deposited. Maturing from fry, juveniles then develop parr marks along their sides and enter the parr stage. Parr habitat (often called "nursery habitat") is typically riffle areas characterized by adequate cover (gravel and rubble up to 20 cm), moderate water depth (10-60 cm) and moderate to fast water flow (30-90 cm/sec) (NMFS-USFWS 2005).

Salmon parr spend two to three years in the freshwater environment then undergo a physiological transformation called smoltification that prepares them for life in a marine habitat. Atlantic salmon leave Maine rivers in the spring and reach Newfoundland and Labrador by mid-summer. They spend their first winter at sea in the area of the Labrador Sea south of Greenland. After the first winter at sea, a small percentage returns to Maine while the majority spend a second year at sea, feeding off the southwest or (to a much lesser extent) southeast coast of Greenland. Some Maine salmon are also found in waters along the Labrador coast. After a second winter in the Labrador Sea, most Maine salmon return to rivers in Maine, with a small number returning the following year as three sea winter (3SW) fish (NMFS-USFWS 2005).

The habitat within the range of the DPS is generally characterized as being free-flowing, medium gradient, cool in-water temperature and suitable for spawning in gravel substrate areas. Most is known about the watershed structure, available Atlantic salmon habitat, and abundance of Atlantic salmon stocks at various life stages for the seven largest salmon rivers with remnant Atlantic salmon populations. There is less known about the habitat of smaller rivers within the historic range of the DPS.

1.4 Reasons for Listing

Among the numerous factors that led to the endangered designation for the Gulf of Maine DPS of Atlantic salmon were the following:

- Critically low adult returns make the DPS especially vulnerable and susceptible to threats
- Continued low marine survival rates for U.S. stocks of Atlantic salmon
- Excessive or unregulated water withdrawal
- Multiple factors that are likely affecting the quality of freshwater habitat in the DPS
- Continuation of the commercial fishery in Greenland
- The threat of disease to the DPS from Infectious Salmon Anemia (ISA) and Salmon Swimbladder Sarcoma (SSS)
- Increased likelihood of predation because of low numbers of returning adults and increases in some predators
- Existing aquaculture practices, including the use of European Atlantic salmon, pose ecological and genetic risks

2. Need for Program

Mitigation is required to offset an adversely affected resource function with a function of equal or greater value. The goal of mitigation is to achieve no net loss of the species and their habitat functions and services. The U.S. Army Corps of Engineers requires mitigation to offset unavoidable adverse impacts under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899.

In addition, Under the authority of the Endangered Species Act of 1973, as amended (16 U.S.C. §§1531 et seq.) the USFWS published a compensatory mitigation policy (81 Fed. Reg.FR 95316 - 95349), on December 27, 2016. The USFWS' mitigation planning goal is to improve (i.e., a net gain) or, at minimum, to maintain (i.e., no net loss) the current status of affected resources, as allowed by applicable statutory authority and consistent with the responsibilities of action proponents under such authority. To meet this goal an applicant may choose to provide mitigation for unavoidable adverse effects or potential adverse modifications through design, implementation and maintenance of a permittee-responsible mitigation project or, through the payment of a fee in-lieu of such a project, may pay a compensation fee (ILF).

A variety of permitted activities, including road and bridge maintenance and construction, have the potential to impact aquatic, estuarine, and marine resources (referenced herein as “in-stream impacts”) used by the Gulf of Maine DPS of Atlantic salmon. An ILF Program would provide permit applicants with an option for compensatory mitigation after proper mitigation sequencing. In general, mitigation is a sequential process of avoiding adverse impacts, minimizing impacts that cannot be practicably avoided, and then compensating for those impacts that cannot be further minimized.

Studies of compensatory wetland mitigation across the country generally demonstrate that less than 50 percent of mitigation sites are successful in achieving their performance standards and intended goals (National Research Council 2001). Furthermore, they fail to effectively replace lost or damaged resources, habitats, and functions (National Research Council 2001). These studies identify several common flaws, including inappropriate site selection, project design without a landscape or watershed context, poor planning and implementation of projects, lack of oversight, maintenance, and follow-through, and insufficient long-term management and monitoring.

Federal regulations have identified in-lieu fee programs as one potential option to correct some of the shortcomings in existing mitigation techniques (33 CFR Part 332 and 40 CFR Part 230). Compensating adverse environmental impacts is an integral part of the ASRCP, a regulatory program to be administered by the DMR to mitigate for impacts to Atlantic salmon habitat and loss through the Endangered Species Act (ESA) (ESA; 7 U.S.C. § 136, 16 U.S.C. § 1531 et seq.), the Clean Water Act (33 U.S.C. § 1251 *et seq*.) and other authorities.

In-lieu fee programs consolidate compensatory mitigation projects and resources to target more ecologically significant functions and prioritize efforts on a landscape or watershed scale. ILF programs consistently include scientific analysis, planning, implementation, and monitoring for each project and the structure of an ILF program generally facilitates improved site selection and mitigation plan development, and provides scientific expertise and financial assurances that translate into a reduction in uncertainty for project success. Although ILF initially served as a way to mitigate wetland impacts, its principles can also apply to aquatic species and in-stream impacts.

3. Objectives

Program objectives include, but are not limited to, providing compensatory mitigation to offset in-stream impacts to aquatic resources in the State of Maine, with a focus on restoring and conserving federally-listed Atlantic salmon and Atlantic salmon habitat. The specific goals and objectives of the ASRCP are as follows:

a) Provide an alternative to permittee-responsible compensatory mitigation that will mitigate for unavoidable in-stream impacts regulated under CWA Section 404 and RHA Section 10 while also aiding in the success of recovery efforts for the Gulf of Maine DPS Atlantic salmon population, protected under the ESA, and/or restore Atlantic salmon habitat functions and services lost through permitted impacts;

b) Substantially increase the extent and quality of restoration, enhancement, creation, and preservation of protected Atlantic salmon natural resources over that typically achieved by permittee-responsible mitigation for activities that impact Atlantic salmon and their habitat;

c) Reduce the extent of cumulative adverse impacts to aquatic resources that are considered protected Atlantic salmon habitat under the ESA;

d) Provide project applicants greater flexibility in compensating for adverse impacts to Atlantic salmon; and

e) Achieve ecological success on a regional basis by directing ILF funds to projects that benefit federally protected Atlantic salmon and their habitat that are appropriate to the geographic service area, and by integrating ILF projects with other conservation activities whenever possible.

4. Program Establishment and Operation

4.1 Overview

The ILF Program will provide an option to permit applicants and regulatory agencies to provide mitigation for unavoidable in-stream impacts to Atlantic salmon and their habitat. Under the program, the preferred option for public and private environmental permit applicants would be to pay into an ILF fund instead of performing permittee-responsible mitigation for unavoidable impacts. The amount of the payment will be based on "full cost accounting", meaning that permittees will pay the costs to fully and successfully compensate for permitted impacts ("debits"). Proof of payment to the Sponsor will be required before permitted impacts can occur.

Payments into the ILF fund will be used to implement mitigation projects at prioritized locations that provide environmental improvement within the service area where the impacts occur. Mitigation projects will be selected based on an analysis of their ability to compensate for impacts and provide significant and broad ecological benefits.

Current federal, state, and local regulatory requirements to select the least damaging practicable alternatives to avoid and minimize impacts before allowing compensation remain unchanged. Mitigation sites will be designed and constructed to ensure success and managed in perpetuity to support ecological functions. Every dollar deposited into the ILF fund will be tracked using the Regulatory In-lieu fee and Bank Information Tracking System (RIBITS) to ensure that the appropriate actions are funded. The performance of the program will be monitored and reported (See Section 9 – Reporting). Any deficiencies will be corrected or adaptively managed.

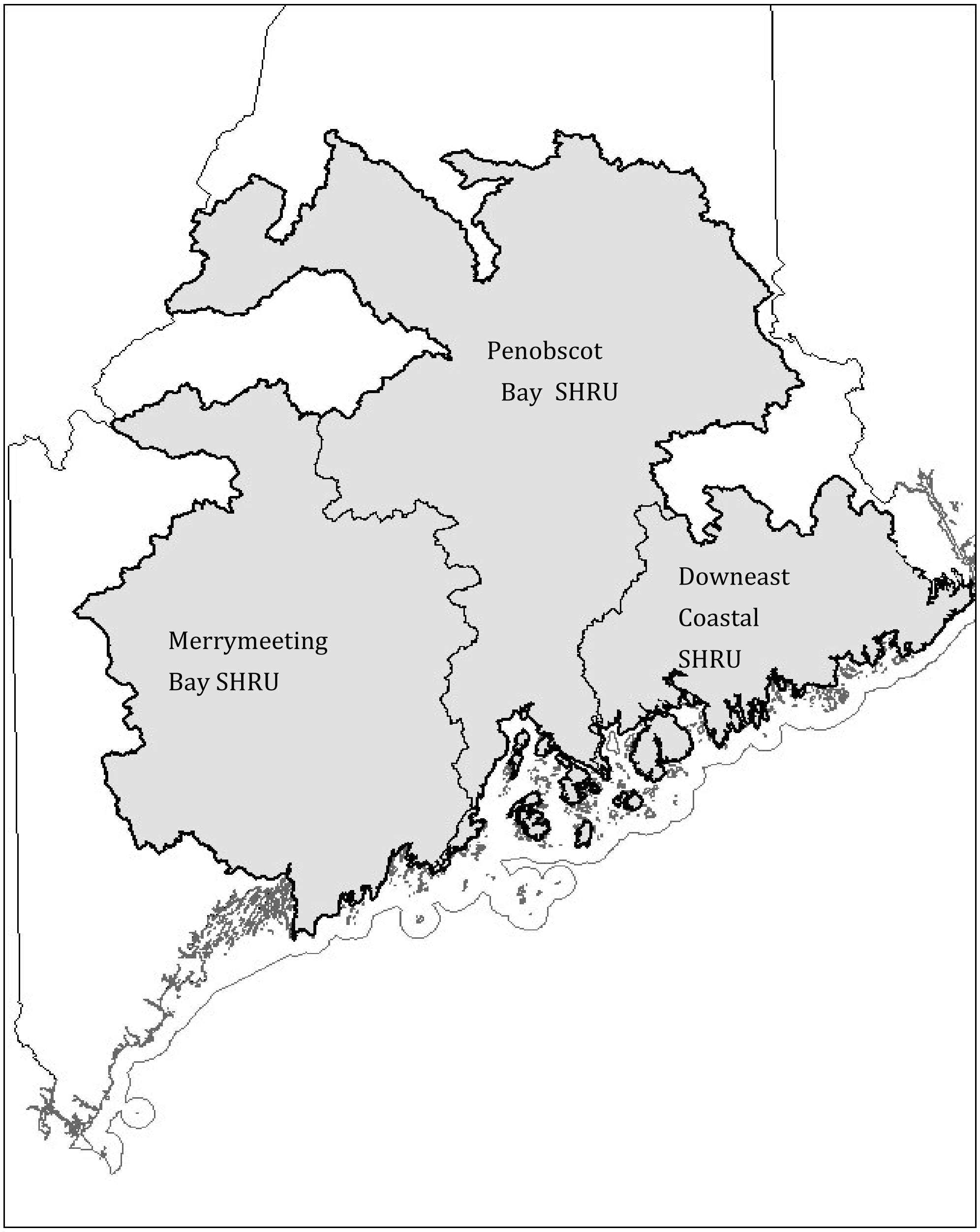
4.2 Program Scope

This prospectus addresses in-lieu fee mitigation for in-stream impacts and near stream activities that have in-stream impacts, with a focus on conservation actions that would be beneficial to recovery efforts for Atlantic salmon. The Sponsor proposes the following service areas, which correspond to the three Salmon Habitat Recovery Units (SHRU) within the Gulf of Maine DPS designated by the National Oceanographic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) in its 2009 "Biological valuation of Atlantic salmon habitat within the Gulf of Maine Distinct Population Segment" (Critical Habitat rule):

- Merrymeeting Bay SHRU
- Penobscot Bay SHRU
- Downeast Coastal SHRU

The three SHRUs are further depicted in Figure 4.2-1 below, and described in detail in Element 1 of the Compensation Planning Framework:

Figure 4.2-1 ASRCP Service Areas



4.3 Regulatory Authorities

USACE is the entity with permitting authority for in-stream impacts under Section 404 of the CWA and Section 10 of the RHA Act. The USFWS is responsible for implementing Section 7 of the Endangered Species Act. The Sponsor seeks to implement this ILF program in accordance with the 2008 Corps/EPA Compensatory Mitigation Rule (33 CFR Part 332), with funds generated from the ASRCP being used solely to preserve, create, enhance, or restore in-stream Atlantic salmon habitat and to preserve riparian buffers.

The USFWS published a compensatory mitigation policy (81 Fed. Reg. 95316 - 95349) which steps down and implements recent Executive Office, Department of the Interior, and USFWS mitigation policies that reflect a shift from project-by-project to landscape scale approaches to planning and implementing compensatory mitigation. The new policy was established to improve consistency and effectiveness in the use of compensatory mitigation as recommended or required under the ESA. The ESA Compensatory Mitigation Policy covers permittee-responsible mitigation, conservation banking, in-lieu fee programs, and other third-party mitigation mechanisms, and stresses the need to hold all compensatory mitigation mechanisms to equivalent and effective standards.

4.4 Mitigation Sequencing

The ILF Program provides project applicants an option for compensatory mitigation after higher priorities in the mitigation sequence have been exhausted.

In general, resource mitigation is a sequential process of:

1) avoiding adverse impacts whenever possible;
2) minimizing those impacts that cannot be practicably avoided;
3) compensating for those that cannot be further minimized.

Compensation for lost resource functions and services may be in the form of:

- on-site compensation projects;
- off-site compensation projects; and/or
- a fee in lieu of (ILF) a compensation project

Projects that require Clean Water Act authorization by the USACE must comply with the Section 404(b)(1) guidelines. These guidelines prohibit the USACE from authorizing a project under an individual permit unless that project would use the "least environmentally damaging practicable alternative". If a less environmentally damaging alternative is available and practicable, then a permit would be denied.

In-lieu fee programs allow a permittee to pay into a compensation fund in-lieu of implementing its own permittee-responsible mitigation. The ILF Program will become the preferred option for compensation unless the applicant can demonstrate that on-site mitigation alternatives can provide greater ecological benefits in the SHRU than can be achieved through off-site, in-lieu fee mitigation.

On a case-by-case basis, regulatory agencies may determine that it is appropriate to de-couple the functions associated with the impacts. This means that compensation for some functions that cannot be transferred off-site would occur on-site. However, compensation for other functions could occur off-site, such as through the purchase of ILF credits.

4.5 Technical Feasibility

4.5.1 Sponsor Qualifications and Responsibilities

The Maine Department of Marine Resources (DMR) will serve as the Sponsor for the Atlantic Salmon Restoration and Conservation Program (ASRCP). DMR was established to conserve and develop marine and estuarine resources; to conduct and sponsor scientific research; to promote and develop the Maine coastal fishing industries; to advise and cooperate with local, state, and federal officials concerning activities in coastal waters; and to implement, administer, and enforce the laws and regulations necessary for these purposes (Maine Title 12, Chapter 603 §6021).

DMR oversees the Division of Sea-Run Fisheries and Habitat (Division). Its mission is to protect, conserve, restore, manage and enhance diadromous fish populations and their habitat in all waters of the State; to secure a sustainable recreational fishery for diadromous species; and to conduct and coordinate projects involving research, planning, management, restoration or propagation of diadromous fishes. Atlantic salmon are a species of management concern for the Division.

The Division leads or participates in numerous efforts and projects related to Atlantic salmon, including streamside and instream incubation, thermal habitat and water quality monitoring in Atlantic salmon rivers, parr studies, and participation in the Atlantic Salmon Recovery Framework. The Framework is a partnership between state, tribal, and federal resource agencies working together to identify and implement management actions with the greatest potential to further the recovery of Atlantic salmon. Other participating entities include NMFS, USFWS and the Penobscot Indian Nation.

As the State department most intimately involved with issues impacting Atlantic salmon and salmon habitat, DMR is the best qualified Sponsor for the proposed ILF program.

The Sponsor will retain full responsibility for ensuring the success of its mitigation sites and the Atlantic Salmon Restoration and Conservation ILF program. The Sponsor will be responsible for the fulfillment of the following roles required of a program sponsor in 33 CFR §332.8:

- Prioritize, identify, select, and acquire sites for ILF projects.
- Design, permit, and oversee construction of mitigation sites.
- Monitor, maintain, and manage ILF projects.
- Ensure the success of compensatory mitigation for which fees have been collected.
- Maintain sufficient funds for the long-term management of mitigation projects.
- Report annually on the progress and status of the program including financial accounting reports, credit transaction reports, mitigation site monitoring and progress toward success, status of long term management endowment account, amount of mitigation provided for authorized impacts/fees collected, and any changes in land ownership or transfers of long term management responsibilities.

4.5.2 Program Administrator Responsibilities

In the case of this program, the Maine DMR as Sponsor may enter a contractual relationship with a third party Program Administrator to allocate certain additional responsibilities required of a program sponsor in 33 CFR § 332.8, including:

- Hold and manage funds collected by the program;
- Maintain accounting ledgers, tracking all fees collected and expenditures;
- Attain IRT approval for mitigation plans and expenditures from the ILF account; and
- Report annually on the progress and status of the program including financial accounting reports, credit transaction reports, mitigation site monitoring and progress toward success, status of long term management endowment account, amount of mitigation provided for authorized impacts/fees collected, and any changes in land ownership or transfers of long term management responsibilities.

4.6 Interagency Review Team

The Interagency Review Team (IRT) will be comprised of representatives of USFWS, NMFS, U.S. EPA, and the USACE. The co-chairs for the IRT shall be the USACE Regulatory Division Chief and a USFWS representative, or their designees. The Program Administrator shall provide administrative support for the IRT and shall be responsible for all retention of records of IRT proceedings. The primary role of the IRT is to assist the co-chairs in the final approval of mitigation site selection.

The IRT shall meet as necessary at such times and places as determined by co-chairs. The IRT shall determine its own rules and order of business and shall provide for keeping a record of its proceedings. This record of the IRT meetings shall be maintained at the offices of the Program Administrator and shall be a public record open to inspection at the request of Sponsor or co-chairs.

All decisions by the IRT to grant approval to a proposed mitigation project, including but not limited to the number of credits awarded to the project, shall be documented in writing and signed by the co-chairs presiding at the meeting approving the project. The written decision to accept a mitigation project proposal constitutes approval for the expenditure of funds on that mitigation project by the Program Administrator.

5. Site Selection

There is a wealth of existing guidance to help identify mitigation projects that are financially and functionally feasible, and that will provide the greatest ecological benefits. These include NOAA's 2009 Critical Habitat rule, the Atlantic salmon recovery plan, ongoing field research, Geographic Information Systems (GIS) analyses, and watershed-based conservation efforts by non-profit groups and state agencies.

Current species recovery strategies have employed a watershed-based approach. In 2009, NOAA-NMFS used HUC 10[1] (level 5) watersheds to identify specific areas to designate as Critical Habitat. The HUC 10 level provides a framework to reasonably aggregate occupied river, stream, lake, and estuary habitats that contain the physical and biological features essential to the conservation of the species. Many Atlantic salmon populations within the GOM DPS are currently managed at the HUC 10 watershed scale, which corresponds well to Atlantic salmon biology and life history characteristics (NOAA 2009).

NOAA-NMFS established a geographic framework represented by the three SHRUs, each of which is an aggregate of several watersheds. This framework is intended to ensure that viable populations are established across the major geographic regions within the DPS, that threats are addressed effectively across the DPS, and to provide protection from demographic and environmental variation (U.S. Fish and Wildlife Service and NOAA-Fisheries, 2016). A total of 87 HUC10 watersheds define the geographic area of the Gulf of Maine Distinct Population Segment, which corresponds to the historical range of the species.

The 2016 Atlantic Salmon Draft Recovery Plan includes a description of site-specific management actions necessary to conserve the species, based on ecological and biological requirements of Atlantic salmon in the expanded Gulf of Maine DPS, as well as current threats and conservation accomplishments that impact long-term species viability.

One of the main objectives of this ILF program is to provide mitigation for in-stream impacts that result in greater ecological benefit than could be achieved through permittee-responsible mitigation. The program aims to achieve “no net loss” of functions within each Salmon Habitat Recovery Unit. Therefore, mitigation sites will be prioritized in accordance with the Compensation Planning Framework based on their ability to further species recovery goals within each SHRU.

5.1 Mitigation Project Review Committee

Sponsor shall establish and maintain an ASRCP “Mitigation Project Review Committee” (Review Committee) comprised of representatives from USFWS, NMFS, Maine Department of Inland Fisheries & Wildlife (MDIFW), DMR, and the Program Administrator. In addition, two seats will be made available on staggered three-year terms to representatives from other quasi-government or non-governmental organizations. The Program Administrator’s seat on the review committee shall be ex-officio, nonvoting. The Review Committee shall be chaired by the Sponsor representative.

The Review Committee shall meet twice a year, or as otherwise necessary, to review potential mitigation projects within each Atlantic Salmon Habitat Recovery Unit. The Review Committee shall determine its own rules and order of business and shall provide for keeping a record of its proceedings. This record of the Review Committee meetings shall be a public record maintained at

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[1] The Hydrologic Unit Code system is used to identify all of the drainage basins in the United States. The HUC system currently includes six nationally consistent, hierarchical levels of divisions from HUC 2 (Level 1) “Regions” to HUC 12 (Level 6) “subwatersheds”.

the offices of the Program Administrator open for inspection at the request of Sponsor or co-chairs.

The Review Committee will evaluate proposed mitigation projects based on site suitability, likelihood of mitigation project success, maximizing the environmental benefit of ILF funds expended, relative value of the natural resource type(s) involved, and, in the case of preservation, the relative threat of development of the proposed site. These evaluation criteria are described in more detail in the Compensation Planning Framework. Proposed mitigation projects recommended by the Review Committee will be forwarded to the IRT for final approval.

6. Credit and Debit Procedure

The standard unit of measure used for in-lieu fee programs to quantify an impact is a "debit". Lift at a mitigation site is measured in "credits."

The Sponsor proposes to use a credit/debit calculation method previously developed in collaboration with other natural resource agency stakeholders. The calculation method utilizes a database tool and GIS software (together referred to as the Credit/Debit Calculator) to help determine potential impacts and mitigation benefits at project sites within each SHRU service area.

6.1 Method for Determining Debits and Credits

The Credit/Debit Calculator will be used to assist the Sponsor in its determination of credits or debits for program activities. Each debit is equal to one unit (1 unit = 100 square meters) of in-stream Atlantic salmon rearing and spawning habitat that may be impaired as a result of permitted impacts. Each credit equates to one unit of Atlantic salmon habitat benefited by a mitigation project through restoration, creation, enhancement and/or preservation (potentially subject to mitigation ratios). For road crossing projects over streams and rivers, the credit and debit calculations include the effects on upstream as well as proximal rearing and spawning habitat.

Key data sources utilized by the Credit/Debit Calculator include:

- Detailed stream crossing inventory of several thousand Maine road crossings, which identifies known and potential barriers to fish passage and estimates the number of units of Atlantic salmon rearing habitat made inaccessible by each barrier (Maine Stream Connectivity Work Group and Maine Office of GIS);
- Surveys of Atlantic salmon spawning and rearing habitat within the DPS (Maine Dept. of Marine Resources - Division of Sea Run Fisheries and Habitat);
- Potential Atlantic salmon juvenile rearing habitat estimated using a USFWS model (Wright et al 2008);
- Cost estimation models to assess the cost per lineal foot (including all aspects of project design, implementation, monitoring and maintenance) to provide stream crossing structures that provide full habitat access for Atlantic salmon across the three SHRU's (Evergreen Funding Consultants, 2003., Neeson *et al*, 2015, New England Environmental Finance Center, 2010).

Debits will be determined by the regulatory agencies permitting the impacts, pursuant to the applicable regulatory program. If all regulatory agencies issuing permits for an unavoidable impact agree that the ILF Program is the most practicable way for the applicant to meet mitigation needs, then mitigation requirements must be quantified and approved prior to permit issuance. The Credit/Debit Calculator will provide the initial basis for quantifying credits and debits. However, the number of credits and debits may be adjusted for site-specific variables.

6.2 Advance credits

Advance credits pertain to any credits that are available for sale prior to being fulfilled as specified in an approved mitigation project plan. As described in the federal rule on compensatory mitigation (33 CFR §332.8(n)(1)), the ILF program Sponsor may request advance credits within each service area based on:

A. The Compensation Planning Framework.

B. The Sponsor's past performance for implementing aquatic resource restoration, establishment, enhancement and/or preservation activities in the proposed service area or other areas.

C. The projected financing necessary to begin planning and implementation of ILF projects.

Advance mitigation credits are like a pre-approved mitigation "credit card" with a set spending limit that the IRT issues to the in-lieu fee program Sponsor based on the three criteria listed above. When an unavoidable impact project occurs, the Sponsor can "borrow" a mitigation credit from the pre-approved credit card, and in turn sell that mitigation credit to the applicant who uses it to satisfy the compensatory mitigation requirements. The Sponsor must then pay off the balance on the credit card by fulfilling (i.e., "producing") mitigation credits equal to (or greater than) the number of credits borrowed from the credit card. The remaining allowable "spending limit" on the credit card decreases as mitigation credits are sold to applicants, but increases accordingly when the Sponsor produces mitigation credits at mitigation projects (i.e., pays off the balance on the card). Section 33 CFR §332.8(n)(3) of the federal rule describes this concept.

The number of advance credits available for each SHRU shall be determined by the number of estimated credits needed to compensate for impacts permitted over the five years prior to ILF program implementation.

7. Program Account

Subject to the terms of a separate Contract for Special Services, the Program Administrator shall hold and invest mitigation fees received from the Sponsor in a manner consistent with the Program Administrator's policies and procedures for the investment of its own funds. The Program Administrator will establish a separate internal subaccount for each SHRU and will credit each subaccount with its share of the net investment income earned. The program account will be established at a financial institution that is a member of the Federal Deposit Insurance Corporation. These funds will be invested so as to maximize the safety of the principal amount held by the Program Administrator. The Program Administrator shall account for the funds so held in accordance with generally accepted accounting principles and provide Sponsor with an itemized annual statement that includes a list of the account(s) in operation, and, for each account, the beginning and ending annual balances, investment income earned, and authorized expenditures. The annual statement shall be made available to the public.

7.1 Mitigation Fees

According to the Mitigation Rule, mitigation fees must represent full-cost accounting. "For in-lieu fee programs, the cost per unit of credit must include the expected costs associated with the restoration, establishment, enhancement and/or preservation of aquatic resources in that service area. These costs must be based on full cost accounting, and include, as appropriate, expenses such as land acquisition, project planning and design, construction, plant materials, labor, legal fees, monitoring, long term stewardship, and remediation or adaptive management activities, as well as administration of the in-lieu fee program." 33 CFR §332.8(o)(5)(ii). The Sponsor will ensure that the mitigation fees will be sufficient to implement all aspects of mitigation projects that will result in no net loss of the species and their habitat functions and services.

Mitigation fees are used to fund activities related to producing mitigation credit. Section 332.8(o)(5)(ii) of the federal rule states that credit costs may also be used for "administration of the in-lieu fee program". This statement implies that mitigation fees can be used for administrative activities, so long as they are directly related to production of mitigation credits.

Mitigation fees cannot be used for activities such as trail maintenance, litter patrol, and other types of routine public land stewardship or maintenance activities unrelated to management of a mitigation site.

7.2 Calculation of Mitigation Fees

Sponsor shall establish the ASRCP in-lieu fee schedule and compensation rate calculation formulas for restoring, enhancing, creating, and preserving Atlantic salmon resources in the State of Maine. The fee schedule will be established based on a dollar value per impacted unit of Atlantic salmon rearing and spawning habitat, including adjustments based on the quality of impacted habitat in the HUC10 watershed as determined in the NMFS 2009 critical habitat rule. One habitat unit is equivalent to 100 square meters of juvenile rearing or spawning habitat. Dollar values will include the projected costs associated with Atlantic salmon recovery project planning, design and construction, long-term monitoring, operations, stewardship, and maintenance. Values will account for annual inflation.

The monetary value of each credit and debit is specific to each SHRU, and calculated based on the relative costs of mitigation actions required to benefit one in-stream Atlantic salmon habitat unit within the SHRU where the activity takes place. Mitigation fees will be calculated by multiplying the cost of one credit by the number of credits required pursuant to the amount of in-stream impacts.

Estimated fees will be calculated using the Credit/Debit Calculator, and supplemented by additional information at the discretion of Sponsor.

7.3 Allocation and Use of Mitigation Fees

7.3.1 Financial Control and Accounting Procedures

Subject to the terms of a separate Contract for Special Services, the Program Administrator shall manage the fund referred to as the Atlantic Salmon Restoration and Conservation Fund (ASRCF). The ASRCF is established to finance mitigation projects to offset adverse in-stream impacts affecting protected Atlantic salmon in the State of Maine resulting from activities authorized under the CWA and the RHA. It is understood that, although the funds to be held may be referred to herein as the ASRCF, the Program Administrator is not expected to set up a fund that would qualify as a trust under state or federal law.

7.3.2 Administrative Costs

Administrative overhead costs in the amount of 15% of all fees entering the ASRCF may be deducted by the Sponsor at the time the funds are received, 8% of which may be paid to the Program Administrator as compensation for the contractual responsibilities of the Program Administrator, as defined in a separate Contract for Special Services.

7.3.3 ASRCF Disbursal Procedure

ASRCF assets may not be expended by the Program Administrator without prior written approval from the IRT except that the Program Administrator may be paid an administrative fee to cover its overhead and reimbursed for reasonable expenses it incurs in administrating the ASRCF, as described in paragraph 7.3.2. Each Atlantic salmon recovery unit subaccount may be charged for reasonable and appropriate expenses associated with the fee acquisition of land and/or conservation easements, design and implementation of mitigation projects, including monitoring and remediation, long-term stewardship of projects and contingency funds as determined appropriate. These expenses shall be included in the overall cost of each mitigation project. Project-specific expenses associated with implementing a mitigation project, including the purchase price of land, payment for a conservation easement, construction activities, appraisals, closing costs, and establishment of vegetation as well as the cost of long-term stewardship of a mitigation project may be debited from the SHRU subaccount and paid to the project proponent, and, in the case of stewardship funding, to the entity responsible for the long-term management of the mitigation project and monitoring of a permanent easement. For projects involving construction or other work that would occur after site acquisition, financial assurances must be provided by the project proponent or a percentage of the ASRCF allocation for the project will be held in abeyance until the IRT determines the project is successful following monitoring and any needed remediation. For preservation projects, evidence of the easement, deed restriction or other legal mechanism for protecting the property must be documented by the proponent and a management plan must be approved.

8. Ledger

Subject to the terms of a separate Contract for Special Services, the Program Administrator will maintain two ledgers on behalf of Sponsor: one to track mitigation fees and expenditures, and a second to track debits and credits. RIBITS will be used to track applicable portions of the ledger, with additional supplemental information. Both ledgers will be organized by Salmon Habitat Recovery Unit, and the two will be related to each other. The ledgers will be used to track the source of funding for mitigation projects as well as where and how mitigation fees are spent. The Program Administrator will compile an annual ledger report for the IRT that will include a program account ledger and a credit ledger.

8.1 Program Account Ledger

The program account ledger will track all income (Mitigation Fees) and expenditures within the program. The program account ledger will comprise separate "sub-ledgers" for each SHRU. The ledger for each Salmon Habitat Recovery Unit will clearly show the following:

A. Mitigation fee amounts and dates collected for each impact project
B. Deposits and Expenditures for the Atlantic Salmon Restoration and Conservation Fund

   1. Origin of deposits (permit number(s), location, permittee).
   2. Amount of deposits.
   3. Date of transactions.
   4. Expenditures (Mitigation Project Name(s)).

8.2 Credit Ledger

The credit ledger for each SHRU will track credits that are sold, as well as credits that will be released once mitigation projects achieve performance standards. At no point will the ledger for any SHRU have a negative credit balance.

A. The credit ledger must include the following information.

   1. Beginning and ending balances of available credits for each SHRU.
   2. Beginning and ending balances of permitted impacts for each SHRU.
   3. Tracking of aquatic resource functions and services mitigated within each SHRU.
   4. All additions of credits including date of transactions.
   5. All subtraction of credits including permit numbers and date of transactions.
   6. Any other changes in credit availability (e.g., additional credits released, credit sales suspended).

B. The credit ledger will contain basic information about each impact site and mitigation project. The Program Administrator will include an example of the spreadsheet in the ILF Program Instrument.

9. Reporting

The Program Administrator will provide annual reports to the IRT in accordance with requirements contained at 33 CFR §332.8(q). Annual reports will be based on calendar years, and will contain updates on the progress of each SHRU and project implementation. The reports will be submitted not later than June 30 of the year following the reporting year. This report will provide an overview of what Atlantic salmon resources were lost and what projects were funded. It also will summarize the successes and the challenges, and suggestions for improvements to the program for next year. For restoration, creation and enhancement projects that may take several years to complete, the Program Administrator will summarize monitoring reports and the results of the work during the reporting period.

Every five years, the Program Administrator, with assistance from Sponsor, will produce a status and trends report summarizing the previous five years. The document will examine the goals for each SHRU and discuss how well the projects furthered those goals. Every ten years or as funds allow, the Program Administrator and others will reexamine and update the Compensation Planning Framework, including working with a broad range of stakeholders.

10. Compensation Planning Framework

Element 1: Geographic Service Areas

In 2009, NOAA-NMFS used HUC 10 (level 5) watersheds to identify specific areas to include as critical habitat because this scale accommodates the local adaptation and homing tendencies of Atlantic salmon. The HUC 10 level provides a framework to reasonably aggregate occupied river, stream, lake, and estuary habitats that contain the physical and biological features essential to the conservation of the species. Many Atlantic salmon populations within the GOM DPS are currently managed at the HUC 10 watershed scale, which corresponds well to Atlantic salmon biology and life history characteristics.

The strong homing characteristics of Atlantic salmon allow local breeding populations to become well adapted to a particular environment, while at the same time, limited straying does occur as a means to ensure population diversity and also allow for population expansion and recolonization of extirpated populations (USFWS/NOAA 2016). To accommodate these life history characteristics, NOAA-NMFS established a geographic framework represented by three Salmon Habitat Recovery Units, or SHRUs that "would be reasonably protective of these life history characteristics and to ensure that Atlantic salmon are widely distributed across the DPS to provide protection from demographic and environmental variation" (NOAA 2009). Each SHRU is an aggregate of several HUC10 watersheds. A total of 87 HUC 10 watersheds define the geographic area of the Gulf of Maine Distinct Population Segment, which corresponds to the historical range of the species.

The area served by the ASRCP includes all three SHRUs delineated and described in the "Biological valuation of Atlantic salmon habitat within the Gulf of Maine Distinct Population Segment" (NOAA 2009). The three SHRUs are Downeast Coastal, Merrymeeting Bay, and Penobscot Bay. These units respond to life history needs and the environmental variation associated with freshwater habitats. The three SHRUs are described below, with information excerpted from the NOAA-NMFS 2009 document.

Element 1.1 Downeast Coastal SHRU

Geography

The Downeast Coastal SHRU encompasses fourteen HUC 10 watersheds covering approximately 1,852,549 acres within Washington and Hancock Counties in Eastern Maine. Within this SHRU there are several watersheds actively managed for Atlantic salmon including the Dennys, Machias, East Machias, Pleasant, Narraguagus, and Union rivers. As a complex, these rivers are typically small to moderate sized coastal drainages in the Laurentian Mixed Forest Province ecoregion (Bailey 1995). This commonality of zoogeographic classification makes coarse level descriptions of watersheds very similar between the rivers. The watersheds of the Downeast Coastal SHRU are best known for containing five watersheds with extant Atlantic salmon populations.

Geology and climate

The surficial geology of Maine largely consists of sand, gravel and unconsolidated sediments transported and deposited by glaciers (Marvinney and Thompson 2000). The geology within the Downeast Coastal SHRU and the geology to the north and west can be separated by a line running from the Penobscot River near Winterport, ME northeast towards Topsfield, ME (Norumbega Fault). North and west of this line the rocks are mostly derived from former marine sediments with some rocks containing a fraction of carbonate minerals. The rocks south and east of this line (the vast majority of the Downeast Coastal SHRU) are derived from volcanic and more recent intrusive igneous rocks. These rocks differ in their chemistry (especially calcium, magnesium, aluminum, and iron) and resistance to erosion or dissolution (Surficial Geologic Map of Maine 1985) when compared to rocks north and west of this line. As a result of the geology within the Downeast Coastal SHRU, surface water chemistry may be affected in several ways. Rocks, such as those present south and east of the Norumbega fault weather slowly and produce relatively fewer ions per unit time (i.e., less calcium, magnesium) under similar conditions of hydrology than those present north and west of the fault. In addition, the mantle of marine clay or wetland within the Downeast Coast SHRU may hydrologically isolate bedrock or till from weathering. Therefore, surface waters within this basin have naturally low concentrations of major cations derived from chemical weathering, and experience a relatively high influence of vegetation on ion and nutrient chemistry.

Climate in the Downeast Coastal SHRU exhibits four seasons with mild summers and cold winters. Average annual air temperatures across Maine range from 4 – 7.3°C and average precipitation ranges from 95 – 112 cm/year (NOAA - National Climate

Data Center). As a result, the Downeast Coastal SHRU lies within the Laurentian Mixed Forest ecoregion, which is described as transitional zone between broadleaf deciduous and boreal forest (Bailey 1995). The basin is largely characterized by rolling hills with forested stream valleys and a number of barren areas with ground cover typically consisting of shrubs, including blueberries. The headwaters are composed mostly of hills and ridges, with forests of spruce, fir, and hardwoods. (Dube and Jordan, 1982; Beland et al., 1982a; Fletcher et al., 1982; Baum and Jordan, 1982). Dissolved organic carbon originating from decomposing organic material on stream banks and within bogs discolor many of the rivers and streams within the basin (Fletcher et al., 1982; Dube and Jordan, 1982; Johnson and Kahl, 2005).

<u>Hydrology</u>
The Downeast Coastal SHRU is composed of six major watersheds that have substantial potential for Atlantic salmon production. The Downeast Coastal SHRU is heavily forested with low relief rolling topography. The relatively recent glacial activity of river systems along coastal Maine has resulted in stream beds that typically contain bedrock and large boulders (Dudley, 2004). Unlike alluvial systems in other regions of the U.S. that are largely unregulated with routinely adjusting meandering stream corridors and channel slopes according to the size of the drainage and the amount of water and sediment transported through the system, coastal Maine systems appear to be largely bedrock controlled limiting stream channel mobility and sediment transport (Dudley, 2004). Stream flows are typically largest in late winter (March – April) and spring (May – June) given the combination of melting snow, spring rains and saturated soils (Dudley, 2005; Johnson and Kahl, 2005). Stream flows recede throughout the summer as the snow pack melts and evapotranspiration increases, conveying flows that are dominated by surface runoff in the winter and spring to flows that are dominated by ground-water discharge (Dudley, 2005). During the fall, evapotranspiration decreases followed by an increase in precipitation and occasional hurricane related events that can result in high flows (Dudley, 2005). During the winter (December – February) stream flows are often low, as both precipitation and surface waters are frozen for extended periods (Dudley, 2005).

<u>Current population structure and land use</u>
Washington and Hancock County have a population of approximately 55,000 people with a density of roughly 32.6 persons per square mile. Over 90 percent of the population living within Washington and Hancock Counties is located within five miles of the coast (Downeast RCD) with Machias (pop. 2,353) and Calais (pop. 3,447) being the two major population centers in Washington County; and Ellsworth (pop. 6,456), Bucksport (pop. 4,908) and Bar Harbor (pop. 4,820) being the three major population centers in Hancock County (U.S. Census of Population and Housing, 2000).

Today, approximately 89 percent of the Downeast Coastal SHRU is forested and supports a large wood, paper, and lumber industry. However, there are no paper mills located within the Downeast Coastal SHRU. Downeast Maine is also known for its wild blueberries with approximately 16,192 ha of land in wild blueberries (USDA, 2002) supporting Maine as the world's largest producer of wild blueberries (Yarborough, 1998).

Element 1.2 Penobscot Bay SHRU

<u>Geography</u>
The Penobscot Bay Salmon Habitat Recovery Unit includes the entire Penobscot basin and extends west as far as, and includes the Ducktrap River watershed, and east as far as, and includes the Bagaduce River watershed. The Penobscot basin is the largest river basin in Maine and the second largest in New England. The river drains a 22,225,200 ha (22,252 km$^{2)}$) watershed, roughly one-quarter of the state's land area, that occupies sections of Aroostook, Hancock, Penobscot, Piscataquis, Somerset, Waldo, and Washington counties (Baum 1983).

<u>Geology and climate</u>
The Penobscot lies mostly within the Laurentian Mixed Forest ecoregion, which is described as a transitional zone between broadleaf deciduous and boreal forest (Bailey, 1995). Portions of the West Branch lie within the New England Mixed Forest ecoregion, which is primarily composed of a transitional forest between boreal spruce-fir to deciduous forest with vertical vegetation zonation (Bailey, 1995).

The geology of the Penobscot Bay SHRU, like the rest of Maine, is a variable mixture of landforms resulting from numerous mountain-building and glacial events. The Penobscot SHRU ranges from non-erosive granite and rhyolite mountains in the headwaters to flat, expansive glacial moraines that are interspersed with some of the longest eskers in the world (Caldwell, 1998). Consequently, channels of the Penobscot SHRU range from high gradient channels in the headwaters to low gradient channels dominated by fine sediment in the forested lowlands. Along the main tributaries of the lower Penobscot are extensive, flat areas where the ocean invaded the land after the glaciers retreated, forming a layer of marine silt and clay that became the bottom layers of today's bogs and fens (Davis and Anderson, 2001). Sunkhaze Meadows, Alton Bog, and Caribou Bog are examples.

The West Branch originates on the Maine-Quebec border near Sandy Bay Township and Penobscot Lake, in mountainous terrain 520-550 meters above sea level (Baum, 1983). The East Branch begins at East Branch Pond, northwest of Baxter State Park, in a lakefilled region 300 meters above sea level. The mainstem of the river begins at the confluence of the East and West Branches at Medway and flows to Stockton Springs/Castine, where it opens up into Penobscot Bay.

Hydrology

The Penobscot watershed is comprised of several sub-basins. Water flow in the Penobscot River basin varies seasonally, with high flows in early spring and late fall and low flows generally in the summer and early fall. The great extent of wetland in the Penobscot watershed (almost one-third of the watershed; Jackson *et al.,* 2005) soaks up water when it rains and slowly releases it to rivers and groundwater, with the ultimate effect of moderating fluctuations in the river's flow.

Flows are also regulated by numerous dams and impoundments, which have a combined capacity of about 1.5 billion m^3 (Stewart *et al.,* 2006). The U.S. Geological Survey (USGS) maintains monitoring stations on the lower Penobscot at Eddington and West Enfield. The 102-year average flow at West Enfield is 334 cubic meters per second (m^3/s); the highest flow on record was 4,333 m^3/s in May 1923. The lowest flow on record was 46.2 m^3/s in October 1905 (Stewart *et al.,* 2006). Average annual discharge of the Penobscot River near the point of tidal influence is 402 cubic meters per second (Jackson *et al.,* 2005).

Current population structure and land use

Today, most of the Penobscot SHRU is sparsely populated, with the greatest proportion of the population being south of Old Town. Bangor, the largest urban center in the watershed, has a population of approximately 32,000 (U.S. Census of Population and Housing, 2000). Development issues are likely to grow in importance, as residential development is predicted to increase in over 121,400 ha of the Lower Penobscot watershed in the next few decades (Stein *et al.,* 2005).

Today, the Penobscot SHRU is over 90 percent forested, including forested wetlands which comprise approximately one third of the drainage (Jackson *et al.,* 2005). The upper Penobscot is predominantly spruce-fir forest and the lower is a mix of spruce-fir, pine, and maple-beech-birch stands (Bailey, 1995). The extensive private forests in northern portions of the drainage have experienced dramatic change in silvicultural harvest and ownership over the past two decades (Irland, 2000; McWilliams *et al.,* 2005). Silviculture techniques have shifted away from clear-cutting and land ownership has shifted from large industrial forest parcels to smaller fragmented ownership (e.g.,. Field *et al.,* 1994). Approximately five percent of the Penobscot is in agricultural use (Houtman, 1994). The 55,700 ha Kenduskeag Stream watershed is the most intensively farmed watershed in the Penobscot River basin. There are over 100 farms raising sheep, goats, dairy and beef cattle, and growing potatoes, beans, and other crops (PCSWCD 2005). Other agricultural land uses are along the eastern edge of the East Branch watershed in southern Aroostook County and the Piscataquis sub-basin.

Element 1.3 Merrymeeting Bay SHRU

<u>Geography</u>

The Merrymeeting Bay SHRU extends west as far as, and includes the Androscoggin River watershed, and east as far as, and includes the St. George River watershed. The Kennebec River, the largest watershed in the SHRU, flows 233 km from Moosehead Lake to Merrymeeting bay where it joins with the Androscoggin River (Maine DEP, 1999) and flows another 32 km out to the Atlantic Ocean (Reed & Sage, 1975). The Kennebec watershed drains a land area of 3,771,520 acres, constituting approximately one-fifth of the total land area of Maine occupying much of Somerset and Kennebec County and portions of Franklin, Penobscot, Waldo, Sagadahoc, and Androscoggin Counties (MSPO, 1993).

The Androscoggin River flows 277 km from Umbagog Lake to Merrymeeting bay, and drains approximately 2,208,000 acres (Maine DEP, 1999), occupying much of Oxford and Androscoggin Counties and portions of Kennebec, Franklin, and Cumberland Counties in Maine. The Androscoggin also occupies a portion of Coos County, New Hampshire.

The small coast drainages east of Small Point include the Sheepscot, Medomak and St. George Rivers. These drainages drain approximately 672,127 acres, or roughly 10 percent of the entire Merrymeeting Bay SHRU and occupy much of Knox and Lincoln Counties as well as portions of Waldo and Kennebec County.

<u>Geology and climate</u>

The Merrymeeting Bay SHRU south and east of a line extending from roughly Fryeburg to Livermore Falls and onward to Skowhegan lies within the Laurentian Mixed Forest ecoregion, which is described as a transitional zone between the broadleaf deciduous and boreal forests (Bailey, 1995). This region has moderately long winters with a frost-free season that lasts roughly 100 to 140 days, and moderate precipitation ranging from 61 to 115 cm a year (Bailey, 1995). Average annual precipitation in the Kennebec watershed is 106 cm. However there is a rain shadow from the White Mountains that affects the region from the Moosehead Lake watershed west to Jackman and the river corridor between Skowhegan and Waterville. In the rain shadow the average annual precipitation is below

97 cm (U.S. Fish & Wildlife Service, 1989). North and west of the line, the Merrymeeting Bay SHRU lies within the New England Mixed Forest ecoregion, which is primarily composed of a transitional forest between boreal spruce-fir to deciduous forest with vertical vegetation zonation (Bailey, 1995). The climate within this region can be characterized by well-defined summer maximum temperatures indicative of the dominating tropical air masses during the summer and winter minimum temperatures dominated by continental-polar air masses

during the winter (Bailey, 1995). The average-frost free period for this region is approximately 100 days.

The geology of the Merrymeeting Bay SHRU is heterogeneous, including subcatchments that are typical and atypical of the GOM DPS. In general, Maine's landscape is a result of a mountain building in the middle Devonian period followed by a long period of erosion and recent glaciation, and deposition of related deposits, which primarily include till and marine clay, with sand and gravel deposits in many of the valleys. More specifically, the Merrymeeting Bay SHRU is comprised of two general regions; highlands and lowlands. The upper portion of the Merrymeeting Bay SHRU, including the upper half of the Androscoggin Basin mostly north and west of Livermore Falls and the upper third of the Kennebec Basin mostly north and west of Bingham, is considered to be a high elevation (150 – 300 meters) mountainous region. This portion of the basin is comprised of the Appalachian Mountain belt, a region which borders the Atlantic Ocean. The bedrock of this region consists of a combination of gneiss and schist, and various granite plutons (Simplified Bedrock Geologic Map of Maine, 2002). The presence of these high elevation areas within the upper Kennebec and Androscoggin watersheds distinguishes the majority of the Merrymeeting Bay SHRU from much of the Penobscot and downeast Maine coastal basins. The high elevation areas of Maine are generally well-drained, resulting in lower dissolved organic carbon and low concentrations of dissolved aluminum. Dissolved organic carbon in surface waters plays several significant roles in water chemistry, causing lowered pH but adding buffering capacity at the ambient pH, increasing dissolved aluminum and iron, but reducing the toxic effects of much of the dissolved aluminum. Thus, dissolved organic carbon has both positive and negative effects on aquatic organisms (Steve Norton, Personal Communications, January 2008).

The "lowland" portion of the Merrymeeting Bay SHRU, including the Sheepscot, Medomak and St. George watersheds, consists of coastal lowlands that were depressed by the Laurentide ice sheet, which receded from the area about 15,000 to 10,000 thousand years ago. Following the retreat of the glacier margin, much of coastal Maine extending inland up to as much as about 100 miles from the present coast was submerged below sea level for up to a few thousand years (Caldwell, 1998). During that time, glacial marine silt and clay were deposited along many of the river valleys and lowlands of coastal Maine (Surficial Geologic Map of Maine, 2003). Today, much of Maine's coastal region has low relief with rolling hills (Bailey, 1995). Common features of the coastal region include moraines, drumlins, eskers, and outwash plains; all of which are typical features of the glaciated region (Bailey, 1995). Much of the bedrock geology throughout this lowland region is comprised of calcareous marine shale and calcareous gneiss and schists, as well as non-calcareous marine sandstone and slate (Simplified Bedrock Geologic Map of Maine, 2002). Bedrock throughout this area typically has a higher chemical weathering rate, and surface waters have higher calcium than in the granite dominated areas, and they dominate in the downeast Maine coastal basin and portions of the Appalachian Mountain belt in western Maine. The higher weathering rates and higher calcite concentrations within the bedrock material, in combination with the glacial marine clay, This provides greater opportunity for phosphorous release, and thereby results in potentially more productive surface waters in the lower Kennebec and Androscoggin watersheds than those waters east of the Penobscot.

Hydrology

The Merrymeeting Bay SHRU includes two major basins - the Kennebec and Androscoggin, each of which have numerous sub-basins; and three major coastal watersheds outside of the Kennebec and Androscoggin basins, which include the Sheepscot, Medomak and St. George watersheds.

In the Kennebec basin, historically important tributaries to Atlantic salmon included the Dead River, Carrabasset River and Sandy River (Atkins and Foster, 1867), which are generally characterized as high elevation tributaries that are dominated by rapids, riffles and the occasional falls with a substrate composed of boulders, cobble, and gravel. The lower Kennebec tributaries, including Messalonskee Stream which flows out of the Belgrade Lakes, and the Sebasticook River, which incorporates China Lake, Unity Pond, Moose Lake and Sebasticook Lake, were less important for Atlantic salmon spawning and rearing, yet the Sebasticook drainage was considered first rate by Atkins and Foster (1867) for production of alewives and shad.

The Androscoggin River originates at Umbagog Lake near Errol, New Hampshire and flows roughly 260 km past several towns including, Rumford, Dixfield, Jay, Livermore Falls, and Brunswick as well as the city of Lewiston-Auburn (Maine DEP, 1999). The upper portions of the Androscoggin, like the Kennebec, are high gradient. The Androscoggin River drops over 305 meters from its headwaters to where it meets the sea, with an average gradient of 3.9 meters per km. In the Androscoggin watershed, Rumford Falls was the upper extent of Atlantic salmon migration, while Lewiston Falls was believed to be the upper extent of alewife and shad migrations (Atkins and Foster, 1887). The Little Androscoggin River is the largest major sub-basin of the Androscoggin with historically important salmon habitat that was accessible as far up as Snow's Falls located 3.2 km outside of West Paris (Foster and Atkins, 1867). Prior to its damming, the Androscoggin River provided access to a large and diverse aquatic habitat for great numbers of diadromous and resident fish species (Foster and Atkins, 1867).

The Kennebec River itself originates at Moosehead Lake and falls about 312 meters over a distance of 193 km from its point of origin to Augusta, Maine, averaging a gradient of 4.1 meters per km (MSPO, 1993). Moosehead Lake has two outlets which form the beginnings of the Kennebec River: the East Outlet and West Outlet which converge at Indian Pond – the impoundment to the Harris Dam hydroelectric facility. With the exception of the Harris Dam impoundment, the upper third of the

Kennebec River from Moosehead Lake to Wyman Dam is high gradient rocky riffles and rapids with intermittent pools, incorporating a section of river which is known as the Kennebec Gorge (MSPO, 1993). Foster and Atkins (1868) describe a set of falls with a 4.3 meter vertical drop that was roughly 232 km from where the Kennebec entered the sea, putting the fall in the vicinity of what is now Harris dam. Foster and Atkins (1868) believed that these falls represented the upper extent of the Atlantic salmon migration. Though the falls are approximately 0.6 meters shorter in height then Carratunk Falls (now the site of Williams Dam), the lack of a plunge pool below the falls prevented salmon from passing.

From Wyman Lake, the Kennebec River flows 13.5 km to Williams Dam in the town of Solon, Maine. Williams Dam sits on top of what was known as Carratunk Falls. Of the 13.5 km of river above Williams Dam, the lower 6.8 km make up a shallow impoundment ranging from 0.9 – 4.6 meters in depth in which flow characteristics are more similar to riverine environment rather than lacustrine environment due to its high flushing rate (MSPO, 1993). From Solon, the Kennebec River flows roughly 22.5 km to the Madison Dam – the first dam above the confluence of the Sandy River. The topography through this stretch becomes less hilly and the river channel becomes alluvial and braided with stretches of meandering deadwaters with intermittent gravel bars and associated riffles.

Downstream from the Madison Dam, the river become more or less a series of reservoirs as it passes through the Weston Dam, Shawmut Dam, Hydro-Kennebec Dam and Lockwood – the lower- most dam in the Kennebec River. From Lockwood, the Kennebec flows approximately 64 km into Merrymeeting bay where the Kennebec River converges with the Androscoggin River. This stretch of river consists of long stretches of deadwater with intermittent stretches of riffles created by sand and gravel deposits.

The Sheepscot and St. George Watersheds lie easterly of the Kennebec basin and can be generally characterized as low gradient rivers with deadwaters and shallow pools with intermittent stretches of low gradient riffles and runs.

<u>Current population structure and land use</u>

Most of the human population within the Merrymeeting Bay SHRU is found in the lower portions of the Androscoggin and Kennebec Basins. Major population centers include Lewiston/Auburn (combined population of ~28,000) along the Androscoggin River in Androscoggin County; and Augusta (pop. 18,500) and Waterville (pop. 15,600) found along the Kennebec River in Kennebec County (U.S. Census of Population and Housing, 2000). Moving north and west out of Kennebec and Androscoggin Counties, population densities decline significantly. Kennebec and Androscoggin Counties have population densities of approximately 52 and 85 persons per square km respectively; while Oxford, Franklin and Somerset Counties, to the north and west, have population densities of 10, 7 and 5 persons per square km.

Today roughly 85 to 90 percent of the Kennebec and Androscoggin basins are still in forest land with forest products still being an important component of the SHRUs economy (McWilliams *et al.,* 2003). The paper industry dominates the manufacturing sector of Maine's forest- based economy with nine pulp and paper mills across the State (North East State Foresters Association, 2007), of which four (not including one in New Hampshire) are found within the Merrymeeting Bay SHRU. Three paper mills are situated along the Androscoggin River in Berlin, New Hampshire, Rumford and Jay, Maine; and two are found along the Kennebec River in Madison and Skowhegan, Maine.

Element 2: Description of Threats to Atlantic Salmon

The following primary and secondary threats to Atlantic salmon, excerpted from the "Draft Recovery Plan for the Gulf of Maine Distinct Population Segment of Atlantic Salmon (*Salmo salar*)" (USFWS/NOAA 2016) are those upon which the 2009 federal endangered species listing for the expanded Atlantic salmon Gulf of Maine Distinct Population Segment was based (74 Fed. Reg. 29344 (June 19, 2009)), and which continue to affect its survival and recovery. Additionally, the new and emerging threats of road and stream crossings, and climate change are detailed below.

<u>Dams</u>
Dams significantly impede migration pathways and increase direct and indirect mortality of Atlantic salmon. Within the range of the GOM DPS, dams hinder access to much of the suitable habitat that was historically available, and hydroelectric turbines cause significant mortality to kelts and smolts as they migrate past dams on their journeys to the ocean. Dams also create impoundments that inundate formerly free-flowing rivers, reduce water quality, and change fish and other aquatic species' community composition; delay migration of smolts and adults; change thermal regimes; alter natural flow regimes; and negatively affect diadromous fish upon which salmon depend.

<u>Inadequate regulatory mechanism related to dams</u>
Inadequacy of regulatory mechanisms is a concern for both hydroelectric and non-hydroelectric dams within the GOM DPS in terms of providing fish passage necessary for Atlantic salmon survival. Many of the Federal Energy Regulatory Commission's (FERC) rulings and regulations and State policies and regulations have proved to be ineffective at producing the necessary fish passage, or have not been adopted. Most dams within the range of the DPS do not contribute to generation of electricity, are typically small, and do not have fish passage, and many are no longer fully functioning or in use.

<u>Marine survival</u>
Survival of GOM DPS salmon in their marine environment has declined over the last 25 years. Continued low marine survival rates for U.S. stocks of Atlantic salmon can

be attributed to four general sources (direct and indirect): predation, starvation, diseases and parasites, and abiotic factors such as changing ocean conditions. Overall, marine survival is poor throughout the Atlantic Ocean and is heavily influenced by both nearshore and open ocean survival rates. Current investigations of mortality integrate the four mortality factors and, if applicable, fishing mortality. More research is needed to achieve a clearer picture of marine survival and what actions can be taken to increase survival rates.

The 2009 listing rule also mentioned a number of secondary stressors that collectively threaten the continued existence of the GOM DPS of Atlantic salmon. These factors are summarized below.

<u>Habitat Complexity</u>
Some forest, agricultural, and other land use practices have reduced habitat complexity within the GOM DPS. Historic timber harvest practices reduced the abundance and diversity of large wood and large boulders from many rivers. Large wood is important for Atlantic salmon during several life history stages. Survival of salmon fry has been correlated with the availability of low-velocity microhabitats, while older juveniles use large wood for stream cover, particularly during winter. In general, large wood may increase overwinter survival by increasing habitat complexity.

<u>Water Quantity</u>
Direct water withdrawals and groundwater withdrawals for crop irrigation and commercial and public use can directly impact Atlantic salmon habitat by depleting stream flow. Reduced stream flow can reduce the quantity of habitat, increase water temperature, and reduce dissolved oxygen. The cumulative effects of individual water withdrawal impacts on Maine rivers is poorly understood; however, it is known that adequate water supply and quality is essential to all life stages and life history behaviors of Atlantic salmon, including adult migration, spawning, fry emergence, and smolt emigration.

<u>Water Quality</u>
Maine's water quality classification system provides for different water quality standards for different classes of water. These standards were not developed specifically for Atlantic salmon, and the lower quality standard classes may not provide high enough water quality to protect all life stages of Atlantic salmon—many Atlantic salmon are found in these areas. Atlantic salmon may also be impacted by degraded water quality caused by point and non-point source discharges.

<u>Fish Harvest</u>
Intercept fisheries, by-catch in recreational fisheries, and poaching result in direct mortality or cause stress, thus reducing reproductive success and survival of Atlantic salmon. Although international commercial harvest has been highly

restricted since 2002, this issue has reemerged as a growing concern (see New and Emerging Threats below). Recreational angling of many freshwater species occurs throughout the range of the GOM DPS, and the potential exists for the incidental capture and misidentification of both juvenile and adult Atlantic salmon. Direct or indirect mortality may result even in fish that are released as a result of injury or stress.

Disease Outbreaks

Disease outbreaks, whether occurring in the natural or hatchery environment, have the potential to cause negative population-wide effects. Atlantic salmon are susceptible to numerous bacterial, viral, and fungal diseases. Parasites can also affect salmon. Federally-managed conservation hatcheries adhere to rigorous disease prevention protocols and management regulations designed to prevent the introduction of pathogens into the natural and hatchery environments; prevent and control, as necessary, disease outbreaks in hatchery populations; and prevent the inadvertent spread of pathogens between facilities and river systems.

Predation

The impact of predation on the GOM DPS is important because of the imbalance between the low numbers of adults returning to spawn and the increase in population sizes of both native and nonnative predators. Increased numbers of predators combined with decreased abundance of alternative prey have likely increased predation mortality on juvenile Atlantic salmon, especially at the smolt life stage.

Depleted Diadromous Communities

Damming rivers, thus preventing migration to former spawning grounds, was a major factor in the decline of Atlantic salmon, and much of the co-evolved suite of diadromous fish. Many coevolved diadromous species have experienced dramatic declines throughout their ranges, and current abundance indices are fractions of historical levels. The dramatic decline in diadromous species has negative impacts on Atlantic salmon populations, including depletion of an alternative food source for predators of salmon, serving as food for juvenile and adult salmon, nutrient cycling, and habitat conditioning. These impacts may be contributing to decreased survival in lower river and estuarine areas; further, although the impacts do not occur in the open ocean, the demographic impact to the species occurs after smolt emigration, and is thus a component of the marine survival regime.

Artificial Propagation

The conservation hatchery programs at Craig Brook and Green Lake National Fish Hatcheries (CBNFH and GLNFH) are vital to preserving individual and composite genetic stocks until freshwater and marine conditions improve, allowing for greater abundance of wild salmon. Without hatchery production, the likelihood of imminent extinction would be substantially higher, and it is also important to know that hatchery salmon are protected as part of the GOM DPS. Nonetheless, inherent risks associated with the broodstock and stocking program for the DPS include domestication and loss of genetic variability, along with the potential for catastrophic loss due to the limited number of hatcheries maintaining GOM DPS Atlantic salmon. To mitigate these risks, a broodstock management plan has been implemented with the goal of maintaining genetic diversity throughout the hatchery management process, including estimating genetic diversity for each captive broodstock.

Aquaculture
Concerns about aquaculture continue, including the risk of exposing native salmon to serious salmon pathogens and genetic and ecological risks. Although recent advances in containment and marking of aquaculture fish offer more control over the potential for negative impacts, they do not eliminate the risk aquaculture fish pose to wild Atlantic salmon.

Competition
Prior to 1800, the resident riverine fish communities in Maine were made up of native species. Today, Atlantic salmon coexist with a diverse array of nonnative resident fishes, including brown trout, largemouth bass, smallmouth bass, and northern pike. The range expansion of these nonnative species is of particular concern, because they often require similar resources and can exclude salmon from preferred habitats, reduce food availability, and increase predation.

New and Emerging Threats

In addition to the threats identified at the time of listing, the 2016 draft Recovery Plan provides additional information on two stressors causing growing concern due to their effects on Atlantic salmon in the Gulf of Maine:

Road and Stream Crossings
Together with dams, lack of access to suitable freshwater habitat due to road stream crossings has become a major concern with regard to recovery of the GOM DPS of Atlantic salmon. The amount of accessible freshwater habitat is a fraction of historical levels; this was initially caused by building dams and later by road stream crossings that created barriers to upstream migration. Fish passage barriers continue to prevent fish from reaching essential spawning and rearing habitat. These barriers also impair ecological complexity and increase the salmon's vulnerability to higher rates of extinction from demographic, environmental, and genetic stochasticity.

Intercept Fisheries
Intercept fisheries in the North Atlantic have posed a significant challenge to recovery of the GOM DPS. For instance, the reported catch estimate for the West Greenland fishery in 2014 was 57.8 tons; given the potential for under-reporting for

the 2014 fishery at West Greenland, total catch in Greenland that year may have been higher.

Populations of United States origin salmon are also harvested by St. Pierre and Miquelon (an offshore territory of France located off the coast of Newfoundland). Although smaller in scale than the West Greenland fishery, this fishery operates outside any international management regime, as France (with respect to St. Pierre and Miquelon) has refused to join NASCO as a party. Moreover, the domestic management regime in place does not effectively limit what can be caught.

Climate Change

At the time of listing in 2009, although there was reasonable certainty that climate change was affecting Atlantic salmon in the GOM DPS (e.g., NRC 2003, Fay et al. 2006), there was uncertainty about how and to what extent. Since listing, new and emerging science has led to a better understanding of climate change effects and their ramifications for salmon. Recent information indicates that climate change is having significant impacts on the ecosystems that Atlantic salmon depend on and, in turn, is affecting the overall survival and recovery of Atlantic salmon (Mills et al. 2013).

Briefly, climate change can affect all aspects of the salmon's life history as entire ecosystems shift from one state to another, altering habitat features through increases in sea surface temperatures. Global averaged combined land and ocean surface temperatures show a warming of 0.85°C (0.65 to 1.06 °C) over the period of 1880 to 2012 (Intergovernmental Panel on Climate Change 2013).

It can also affect changes in frequency of seasonal cycles of phytoplankton, zooplankton, and fish populations in the marine environment (Greene and Pershing 2007); changes in freshwater hydrologic regimes; and alterations in the timing and frequency of river ice flows. All of these factors influence environmental cues that stimulate Atlantic salmon migration, spawning, and feeding activities.

The ILF program will help offset a wide range of impacts resulting from the threats listed above. Element 5 below includes a list of potential mitigation project types that may be eligible for mitigation funding through the ASRCF, which respond directly to threats to Atlantic salmon and their habitat.

Element 3: Analysis of Historic Aquatic Resource Loss

The section below contains information sourced primarily from NOAA's 2009 Critical Habitat rule:

Atlantic salmon habitat

Today, only 8% of the habitat within the historical range of the DPS is fully accessible to Atlantic salmon (no artificial barrier between habitat and the ocean). Another 17% is considered accessible (includes areas where dam or culvert designs allow fish passage). 9% of the remaining 75% habitat is considered impeded (above a barrier that temporarily blocks or impairs passage) and 66% is considered completely inaccessible (NOAA 2015).

The Downeast Coastal SHRU once contained high quality Atlantic salmon habitat in quantities sufficient to support robust Atlantic salmon populations. Degradation of habitat and the construction of dams have diminished both habitat quality and availability. In the Downeast Coastal SHRU, there are approximately 61,400 units of historical spawning and rearing habitat for Atlantic salmon among approximately 6,039 km of rivers, lakes and streams. Of the 61,400 units of historical spawning and rearing habitat, approximately 53,400 units of habitat are considered to be currently occupied (NOAA 2009).

In the Penobscot SHRU, there are approximately 323,700 units of historically accessible spawning and rearing habitat for Atlantic salmon among approximately 17,440 km of rivers, lakes and streams. Of these, approximately 211,000 units of habitat are considered to be currently occupied (NOAA 2009).

In the Merrymeeting Bay SHRU, there are approximately 372,600 units of historically accessible spawning and rearing habitat for Atlantic salmon located among approximately 5,950 km of historically accessible rivers, lakes and streams. Approximately 136,000 units of habitat are considered to be currently occupied (NOAA 2009).

<u>Dams and Other Barriers</u>

Historically, dams were a major cause of the decline of Atlantic salmon runs in many Maine rivers and streams. Dams, along with degraded substrate and cover, water quality, water temperature, and biological communities have reduced the quality and quantity of habitat available to Atlantic salmon populations within the three SHRU's. As of 2015, a total of 460 dams existed within the DPS watersheds, including 245 in the Merrymeeting Bay SHRU, 139 in the Penobscot, and 76 in the Downeast Coastal recovery unit (NOAA 2015).

<u>Fisheries and fish introductions</u>

Introductions of non-indigenous species has significantly degraded habitat quality by altering predator/prey relationships. Historically, the geographic area encompassed by the three SHRUs was host to a variety of native resident and diadromous fish, including Atlantic salmon, alewives, blueback herring, American shad, sea lamprey, anadromous rainbow smelt, Atlantic sturgeon, shortnose sturgeon, American eel, white perch, Atlantic tomcod and striped bass (NOAA 2009).

Native resident species likely included brook trout, burbot, lake trout (togue), lake whitefish, brown bullhead, pumpkinseed sunfish, redbreast sunfish, and yellow perch; as well as numerous species of fish classified by Maine IF&W as "non-sportfish" which include numerous members of the family Cyprinidae (minnows), Catostomidae (suckers) and two species in the family Percidae (perch) – not including the yellow perch (NOAA 2009).

Today, much of Maine's waters are host to a variety of introduced and invasive species of fish. These include smallmouth bass, largemouth bass, landlocked salmon, brown trout, splake, rainbow trout, carp, white catfish, and several species of cyprinids have been introduced illegally or through accidental introductions often associated with the transport and release of live bait used for recreational fishing. Chain pickerel are native to portions of southern Maine, yet their range has been vastly expanded as these fish have been moved around to enhance angler opportunity (NOAA 2009).

Smallmouth bass, first introduced into Maine waters in 1868, are likely aggressive competitors as well as predators to Atlantic salmon as juvenile bass are found consistently in the same habitats as juvenile salmon feeding and utilizing space that would otherwise be utilized by parr. Largemouth bass, not native to New England, are believed to have been incidentally introduced into Maine in the late 1800s, and are also known to prey on Atlantic salmon. Brown trout were first introduced to Maine in 1885. They are likely responsible for reducing native fish populations, especially salmonids, through predation, displacement, and food competition. Splake were first introduced into Maine in 1958. Evidence of salmon smolt predation by adult splake has been documented in the Downeast Coastal SHRU. Landlocked salmon are native to only four river basins in Maine, but have since been introduced into many others. Because sea-run and landlocked Atlantic salmon are the same species (though differences in behavior and life history separate them from interbreeding), direct competition for food and space is inevitable when the fish are in the same area (NOAA 2009).

Element 4: Analysis of Current Aquatic Resource Conditions

This Element contains information sourced primarily from NOAA's 2009 Critical Habitat rule:

Element 4.1 Downeast Coastal SHRU

Atlantic salmon habitat

Of the 61,400 units of historical spawning and rearing habitat in the Downeast Coastal SHRU, approximately 53,400 units of habitat are considered to be currently occupied. The Machias, Narraguagus, and East Machias contain the highest quality habitat relative to other HUC 10's in the Downeast Coastal SHRU, and collectively account for approximately 40 percent of the spawning and rearing habitat in the Downeast Coastal SHRU.

Of the 53,400 occupied units within the Downeast Coastal SHRU NOAA-NMFS (2009) determined that these units were functionally equivalent to roughly 29,111 units of habitat, or approximately 47 percent of the estimated historical functional potential. "This estimate is based on the configuration of dams within the SHRU that limit migration and degradation of physical and biological features from land use activities which reduce the productivity of habitat within each HUC 10. For each SHRU 30,000 fully functional units of habitat are needed in order to achieve recovery objectives. Though the downeast SHRU does not currently meet this objective, there is enough habitat within the occupied range that in a restored state (e.g. improved fish passage or improved habitat) would satisfy recovery objectives" (NOAA 2009).

Dams and barriers to fish passage

Today, most of the dams in the SHRU have either been removed or breached and no longer threaten salmon migration. The Stillwater Dam on the Narraguagus River and the Ellsworth and Graham Lake dams on the Union River are the only remaining dams in the six major salmon rivers located in the Downeast Coastal SHRU that obstruct a significant portion of their associated watershed from free migration of diadromous fish (NOAA 2009).

Other obstructions to passage, including poorly designed road crossings and culverts, remain a potential hindrance to salmon recovery. Improperly placed or designed culverts can create barriers to fish passage through hanging outfalls, increased water velocities or insufficient water velocity and quantity within the culvert. Poorly placed or undersized culverts (usually from road building and maintenance) can also hinder fish passage, thus reducing access to potential habitat.

Water Quality

"In the Downeast Coastal SHRU pH has been identified by many scientists as one of the leading water quality concerns for Atlantic salmon. Atlantic salmon smolts are particularly sensitive to low pH as it affects their ability to osmoregulate as smolts make the transition from the freshwater environment to the marine environment (McCormick *et al.,* 1998). In the Downeast Coastal SHRU, rivers are particularly vulnerable to episodic events of low pH from acidic precipitation because of the geography and geology which contributes to the large number of bogs in the region; reduces the flushing rate of rivers and streams; and reduces the weathering rate of the underlying bedrock (Johnson and Kahl, 2005).

The Senator George J. Mitchell Center for Environmental and Watershed Research at the University of Maine (GMC) and the Maine Atlantic Salmon Commission (MASC), conducted the most spatially extensive assessment of water chemistry in Maine salmon rivers in 2003 - 2004 to understand the spatial and seasonal patterns in water chemistry. The goal of the survey was to characterize the water quality of Maine salmon rivers by sampling water at multiple sites along the rivers on the same day. The surveys were repeated seasonally to determine the range of chemistry found in each river. All the samples were analyzed at the Watershed Research Laboratory of the Senator George J. Mitchell Center to eliminate differences in analytical techniques that arise among different workers and laboratories.

The results from survey were: 1) all rivers experienced depressed pH and acid neutralizing capacity (ANC) values associated with rain events that occurred in the day(s) immediately prior to the sampling; 2) watersheds to the west of the Penobscot River (i.e., Ducktrap River, Sheepscot River, Cove Brook, Marsh Stream, Kenduskeag River, and Sandy River) have higher pH, acid neutralizing capacity (ANC), and Ca and lower DOC and Aluminum than sites to the east of the Penobscot River (i.e. Union River, Tunk Stream, Narraguagus River, Pleasant River, Machias River, East Machias River, and Dennys River); 3) tributaries tend to have lower pH than mainstem sites; 4) summer baseflow sampling showed that all of the rivers, except Tunk Stream, had pH values favorable for salmon health for that time of year. The lower ANC and higher DOC make the eastern sites more susceptible to event-driven pH depressions than sites to the west of the Penobscot River. Spatial patterns that relate to surficial geology are recognizable within individual drainages" (NOAA 2009).

Fisheries and fish introductions in the Downeast Coastal SHRU

In the downeast coastal basin, chain pickerel, smallmouth bass, largemouth bass, brown trout and splake are non – native species that compete with Atlantic salmon as either predators or competitors. Chain pickerel have been found to be aggressive predators of Atlantic salmon smolts in the Narraguagus River and Penobscot Rivers where, at times, between 20 and 30 percent of pickerel have been found to contain smolts (Barr, 1962; and Van de Ende, 1993).

Element 4.2 Penobscot Bay SHRU

Atlantic salmon habitat

There are 323,700 units of historically accessible spawning and rearing habitat within the Penobscot Bay SHRU, of which approximately 211,000 units of habitat are considered to be currently occupied. The mainstem Penobscot has the highest biological value to the Penobscot SHRU because it provides a central migratory corridor for the entire Penobscot SHRU.

NOAA-NMFS (2009) determined that the 211,000 occupied units within the Penobscot are the equivalent of nearly 66,300 functional units or approximately 20 percent of the historical functional potential. "This estimate is based on the configuration of dams within the SHRU that limit migration and degradation of physical and biological features from land use activities which reduce the productivity of habitat within each HUC 10. For each SHRU 30,000 fully functional units of habitat are needed in order to achieve recovery objectives for the GOM DPS. The combined quality and quantities of habitats available to Atlantic salmon within the currently occupied areas in the Penobscot Bay SHRU currently meet this objective" (NOAA 2009).

Dams and diversions

As of 1997, FERC estimated that 27 percent of the habitat in the mainstem Penobscot was impounded by five dams between the head-of tide and the confluence of the West and East Branches of the Penobscot in Medway. Dam removals and fish passage enhancements since that time have resulted in major increases in accessible habitat, though dams within the Penobscot Bay SHRU continue to be an impediment to self-sustaining Atlantic salmon populations.

In 2004, a settlement agreement between PPL Corporation, state and federal resource agencies, and six conservation groups allowed for the purchase of three out of the four lowermost large dams in the Penobscot SHRU. The agreement has since resulted in the removal of the Great Works dam in 2012 and the Veazie Dam in 2013, as well as the construction of a natural bypass around the Howland dam, the lowermost dam on the Piscataquis sub-basin. At the Milford Dam located above Great Works, a state-of-the-art fish passage facility was completed in 2014.

Fisheries and fish introductions in the Penobscot SHRU

Today, much of Maine's waters are host to a variety of introduced and invasive species of fish. Many species, including smallmouth bass, largemouth bass, brown trout, splake and rainbow trout have been introduced as part of an effort to enhance recreational fishing opportunities.

The current fish community in the Penobscot drainage has shifted from a historically diadromous fish dominated to a resident freshwater fish dominated system. Warm water species widespread throughout the basin are yellow perch, white perch, chain pickerel and smallmouth bass. Other species commonly found are red breasted sunfish, white sucker, creek chub, common shiner, brown bullhead, American eel and sea lamprey. Non-indigenous fish introductions of warm water species have altered the fish community (NOAA 2009).

Element 4.3 Merrymeeting Bay SHRU

Atlantic salmon habitat

The Mainstem Kennebec has the highest biological value to the Merrymeeting Bay SHRU because it provides the central migration conduit for much of the currently occupied habitat found in the Sandy River. The Sandy River has the greatest biological value for spawning and rearing habitat within the occupied range of the Merrymeeting Bay SHRU but is currently only accessible to adult salmon through a trap and truck program around the four lowermost dams.

Of the 372,600 units of historically accessible spawning and rearing habitat within the SHRU, approximately 136,000 units of habitat are considered to be currently occupied. The 136,000 occupied units within the Merrymeeting Bay SHRU represent nearly 40,000 functional equivalents of habitat or approximately 11 percent of the historical functional potential (NOAA 2009). "This estimate is based on the configuration of dams within the SHRU that limit migration and degradation of physical and biological features from land use activities which reduce the productivity of habitat within each HUC 10. For each SHRU 30,000 fully functional units of habitat are needed in order to achieve recovery objectives. The combined quality and quantities of habitat available to Atlantic salmon within the currently occupied areas within the Merrymeeting Bay SHRU currently meet this objective" (NOAA 2009).

Dams

Both the Kennebec and Androscoggin watersheds are major hydropower producers. On the Androscoggin below Rumford (the upper extent of the range of Atlantic salmon), major hydro-power facilities include the upper and lower stations at the Rumford Falls project in Rumford; Riley/Jay/Livermore Projects in Jay, Riley and Livermore; Gulf Island/Deer Rips project in Lewiston-Auburn; Lewiston Falls project in Lewiston/Auburn; the Worumbo Project in Lisbon/Durham; Pejepscot in Topsham/Brunswick; and the Brunswick project in Brunswick/Topsham.

On the Kennebec River below Moosehead Lake, hydro-power facilities below the Moosehead Dam at Moosehead Lake include the Harris project in Township 1 Range 6; Wyman Project in Moscow/Pleasant Ridge Plantation; Williams Project in Embden and Solon; Abenaki Project in Anson and Madison; Weston Project in Skowhegan; Shawmut Project in Fairfield; Hydro-Kennebec and Lockwood both in Waterville and Winslow. Today, the lowermost project on the Kennebec is the Lockwood Project which currently operates a fish lift. From Lockwood, shad and alewives are released upstream whereas Atlantic salmon are most frequently transported to the Sandy River, which is free of dams.

Water quality

In addition to the dams within the Androscoggin, poor water quality within certain segments of the Androscoggin is of particular concern for fisheries restoration. The U.S. Environmental Protection Agency noted that two segments of the Androscoggin, including the lower four miles of the Gulf Island dam impoundment and the Livermore Falls impoundment do not attain water quality standards for class C waters (EPA, 2005). The non-attainment status is caused by point source discharges upriver from the 3 paper mills located in Berlin, New Hampshire (Fraser Paper), Rumford, Maine (Mead WestVaco), and Jay, Maine (International Paper); five municipal point sources from locations in Berlin and Gorham, New Hampshire and Bethel, Rumford-Mexico, and Livermore Falls, Maine; and non-point source pollutant loads from land use activities, particularly that related to residential development, silviculture, and agriculture (EPA, 2005).

The Maine Department of Environmental Protection has four standards for classification of freshwater which are not classified as “great ponds”. These are class AA, A, B, and C waters, in which class AA is the highest classification in which waters are considered to be “outstanding natural resources and which should be preserved because of their ecological, social, scenic or recreational importance”; and class C waters is the lowest classification in which class C waters “shall be of such quality that they are suitable for the designated uses of drinking water supply after treatment; fishing; recreation in and on the water; industrial process and cooling water supply; hydroelectric power generation, except as prohibited…, navigation, and as a habitat for fish and other aquatic life.” (State of Maine, Title 38 *§ 465*).

The Gulf Island Dam impoundment does not meet the Class C standards for dissolved oxygen concentration in the summer at depths of 30 to 80 feet. In addition to the pollution sources upstream from the dam, the dam itself contributes to non-attainment of DO criteria and algae growth by creating an environment of low water movement and low vertical mixing with the deeper water column (EPA, 2005).

The Livermore Falls impoundment does not attain the class C aquatic life criteria in which dissolved oxygen shall not fall below an instantaneous minimum of 5 ppm and 60 percent saturation, and a 30 day average long term minimum of 6.5 ppm (EPA, 2005).

Fisheries and fish introductions in the Merrymeeting Bay SHRU

Today, much of Maine’s waters are host to a variety of introduced and invasive species of fish. Smallmouth bass were likely first introduced into the Merrymeeting Bay SHRU around 1869 when a contract was made with Livingston Stone of New Hampshire to deliver 15,000 black bass to several points throughout the State, which included the Cobbosseecontee lake in Winthrop (Foster and Atkins, 1869). Largemouth bass were likely incidentally introduced into the Merrymeeting Bay SHRU alongside the planned smallmouth introductions around 1869. Landlocked salmon, although native to Maine, were not native to the Merrymeeting Bay SHRU. Landlocked salmon introductions may have first occurred in the Merrymeeting Bay SHRU around 1869 when three thousand landlocked salmon of the Schoodic Lake strain were hatched out and raised at a hatchery in Alna along the Sheepscot River (Foster and Atkins, 1869). Brown trout, splake and rainbow trout have all been introduced as part of an effort to enhance recreational fishing opportunities (Page and Burr, 1991). Carp were introduced in ponds in the late 1800’s for cultivation purposes and later likely escaped from these ponds into the tidal waters of the Scarborough and Kennebec Rivers (Lucas, 2001). White catfish, and several species of cyprinids have been introduced illegally or through accidental introductions often associated with the transport and release of live bait used for recreational fishing. Chain pickerel are native to portions of southern Maine, yet their range has been vastly expanded as these fish have been moved around to enhance angler opportunity.

Element 5: Statement of Goals and Objectives

The stated overarching goal of the USFWS-NOAA Atlantic salmon recovery program is "to improve the long-term population viability of the GOM DPS of Atlantic salmon to the point where it no longer requires the protections of the ESA and can be removed from the Federal List of Endangered Wildlife and Threatened Wildlife" (USFWS-NOAA 2016). Delisting objectives include:

- Maintaining self-sustaining, wild populations of Atlantic salmon within each SHRU;
- Ensuring access to sufficient suitable habitat in each SHRU for self-sustaining populations;
- Ensuring necessary and available management options for marine survival are in place;
- Reducing or eliminating individual and combined threats to the DPS.

The overall goal of the Compensation Planning Framework is to advance the conservation goals and objectives of ASRCP as outlined in Section 3 above, which are in concert with those in the USFWS-NOAA 2016 Draft Recovery Plan. The major areas of action are designed to stop and reverse the downward population trends of the remnant eight wild Atlantic salmon populations and minimize the potential for human activities that result in the degradation or destruction of Atlantic salmon habitat essential to survival and recovery, including:

- Enhance connectivity between the ocean and suitable freshwater spawning and rearing habitats;
- Protect and restore freshwater and estuarine Atlantic salmon habitat;
- Minimize potential for take in freshwater, estuarine and marine fisheries;
- Reduce predation and competition on all life stages of Atlantic salmon;
- Reduce risks from commercial aquaculture operations;
- Conserve the genetic integrity of the DPS;
- Assess stock status of key life stages;
- Providing long-term protection for suitable salmon habitat and its buffers.

The ASRCP, through the Atlantic Salmon Restoration and Conservation Fund, will fund projects in these key action areas to advance species conservation goals. The following is a list of potential projects that applicants may consider when developing proposals for funding under the ASRCF.

1. Prepare and implement plans to reduce pollution. Pollution problems in DPS rivers are generally not attributable to a single point source but are due to cumulative effects of many sources within individual watersheds. Water quality in the DPS rivers is generally good. However, several non-point source and point source pollution problems exist.

2. Repair or improve fish passage at dams, fishways and weirs currently in place. The efficiency of existing fishways on DPS rivers may need modifications to adequately pass Atlantic salmon. DMR's Division of Sea Run Fisheries, in cooperation with the state and federal agencies, has assessed the adequacy of existing fishways to provide up- and downstream passage for Atlantic salmon. Where identified, fishways should be repaired and maintained.

3. Identify and improve culverts or other road crossings that impede Atlantic salmon passage. In addition to dams, poorly designed or failed stream crossings can restrict salmon migration. These structures can act as barriers to passage for salmon of varying lifestages by altering natural flow regimes and affecting water depth and velocity.

4. Secure long term protections for freshwater and estuarine habitats. Long-term protections for freshwater and estuarine habitats includes protecting of the riparian zone as well as ensuring adequate water quality and quantity in the DPS river watersheds.

5. Protect estuarine habitat used by Atlantic salmon. Activities that have the potential to adversely affect Atlantic salmon should be evaluated and potential adverse impacts minimized. Estuarine habitat is used by both outmigrating Atlantic salmon smolts and returning adult Atlantic salmon. Atlantic salmon smolts are particularly sensitive during their transition to saltwater. Adult salmon are known to hold in estuaries during periods of low-flow in rivers.

6. Restore degraded stream and estuarine salmon habitat. Many historical land and water use activities have altered, and in some cases destroyed, the habitat needed by Atlantic salmon for spawning, growth and migration. There are many habitat restoration needs and opportunities within the DPS. These include stream channel restoration, enhancement of fish passage, riparian habitat restoration, bank stabilization, culvert repair and improved stream crossings. Maine DMR and other organizations may have information to identify, coordinate and implement necessary stream restoration activities. Habitat restoration opportunities in DPS rivers should be identified, catalogued and prioritized. Restoration projects should be implemented to restore degraded habitat and maximize production of juvenile salmon in Maine rivers.

7. Other projects not yet envisioned that demonstrate new or creative approaches to furthering the above stated goals and objectives of the ILF program.

Many mitigation priorities are common across the DPS range and are not specific to each SHRU. In other cases, guidance on SHRU-specific priorities will be sought through consultation with USFWS and NOAA, which will be developing SHRU-level workplans as part of the Atlantic salmon recovery program. Where appropriate, available ASRCF funding in each SHRU sub-account will be applied toward mitigation activities that respond to identified SHRU-specific priority actions.

Element 6: Prioritization Strategy for Selecting and Implementing Mitigation Projects

ASRCP compensatory mitigation projects will be selected using a competitive award approach. Each year, public agencies, and non-profit conservation organizations will be invited to submit a letter of intent for eligible restoration and preservation projects in Maine. Letters of intent are summary in nature and designed to provide sufficient information to determine whether a proposed project meets ASRCP's core eligibility requirements. Letters of intent will be evaluated by Sponsor and the Program Administrator. Applicants whose proposed projects are determined to meet or exceed ASRCP's core requirements will be invited to submit full proposals. Full proposals will be evaluated and ranked by the Review Committee (described in section 5.1 above) using the prioritization criteria outlined below, which can be modified upon approval by Sponsor.

Potential to Meet ASRCP Goals (30%). Assesses the extent to which the proposal meets the core program requirements that a mitigation project must restore, enhance, preserve, or create Atlantic salmon habitat and aquatic resources as functioning ecosystems that have been prioritized by ASRCP. Considerations include:

a) The sustainability of the proposed conservation action (restoration, enhancement, preservation, creation) and the SHRUs affected and permanently protected.

b) The resource types to be restored, enhanced, preserved or created and the degree to which the proposed project replaces the functional benefits of impacted resources in the SHRU based on a functional assessment of the project.

c) Proximity of proposed project to impacted resources in the SHRU. To fully meet this criterion, projects must occur within the same SHRU as a permitted impact.

d) For preservation projects, the threat of degradation to the site in the next 20 years.

e) Inclusion of upland areas sufficient to protect, buffer, or support identified resource functions and ecological connectivity to other conservation areas or undeveloped large blocks of habitat.

f) Current and proposed condition of the property, and "functional lift" provided by project (e.g., proposed change in habitat quality, contribution to functioning biological systems, water quality, level of degradation, etc.).

Landscape Context (20%). Assesses the extent to which the proposal meets the core program requirement to consider the location of a potential project relative to statewide focus areas for land conservation or habitat preservation identified by a state agency, or other regional or municipal plans. Considerations include:

a) Presence within or adjacent to the Atlantic salmon DPS habitat region to maintain and preserve habitat connectivity.

Project Readiness/Feasibility (20%). Assesses the extent to which the proposal meets the core program requirement to demonstrate project readiness and likelihood of success, where success is defined by the ability of the project to meet ASRCP goals as stated in the proposal. Considerations include:

a) Documentation of landowner willingness to participate in proposed project, including (for preservation projects) conveying a conservation easement or fee title, with conservation covenants, to the property (for projects not on public or private conservation lands).

b) Level of project urgency (e.g., area of rapid development or on-going site degradation, other available funding with limited timing, option to purchase set to expire, economics of scale, etc.)

c) Degree to which proposal demonstrates understanding of ecosystem functions and processes and associated needs.

d) Soundness of the technical approach of the conceptual plan presented in the application.

e) Initial progress (e.g., planning, fundraising, contracting, site design, etc.).

f) Likelihood that the project will meet proposed schedule and/or required deadlines.

g) Likelihood that the proposed actions will achieve the anticipated ecological benefits and results.

h) Completeness and feasibility of long-term stewardship and monitoring plan, including endowment.

i) Potential for adverse impacts (such as dewatering or habitat loss) associated with the project.

j) Conformance with appropriate financial assurances for any construction activity.

Project Sponsor Capacity (15%). Assesses the extent to which the proposal meets the core program requirement to provide for long-term management and/or stewardship. Considerations include:

a) Presence of qualified, capable conservation entity willing to sponsor and/or maintain the project.

b) Level of support and involvement of other relevant agencies, organizations, and local community.

c) Degree to which project sponsor, and any associated partners, demonstrate the financial, administrative, and technical capacity to undertake and successfully complete the project.

d) Adequacy of long-term stewardship to ensure the project is sustainable over time and funding mechanism for the associated costs (e.g., endowment or trust).

e) Legal and financial standing of the project sponsor.

f) Quality and completeness of proposal materials.

Cost Effectiveness (10%). Assesses the extent to which the proposal meets the program requirement that a project represent an efficient use of funds expended. Considerations include:

a) Clarity and detail of budget submitted.

b) Sufficiency of funds available in the applicable SHRU.

c) Availability and source of matching funds necessary to complete the project.

Other Benefits (5%). Assesses the potential for this project to support recreational access, scenic enhancements, economic activity, job creation, or other contributions to "Quality of Place" in the town or region where the project is located.

Proposal ranks are calculated out of potential total of 100 points, based on the percentages listed for each criterion. Final ASRCF allocation decisions are made by the IRT.

Element 7: Qualification of Preservation Actions

The 2008 rule (40 CFR Part 332) requires that preservation objectives identified in Element 5 and addressed in the prioritization strategy in Element 6 above also satisfy the criteria for use of preservation. In the rule, preservation may be used to provide compensatory mitigation for activities when the following criteria [§332.3(h)] are met:

(i) The resources to be preserved provide important physical, chemical, or biological functions for the watershed;

(ii) The resources to be preserved contribute significantly to the ecological sustainability of the watershed. In determining the contribution of those resources to the ecological sustainability of the watershed, the District Engineer must use appropriate quantitative assessment tools, where available;

(iii) Preservation is determined by the District Engineer to be appropriate and practicable;

(iv) The resources are under threat of destruction or adverse modifications; and

(v) The preserved site will be permanently protected through an appropriate real estate or other legal instrument (e.g., easement, title transfer to state resource agency or land trust).

"Securing long term protections for freshwater and estuarine habitats" is the preservation objective listed under Element 5 of the Compensation Planning Framework. This objective includes protection of the riparian zone as well as ensuring adequate water quality and quantity in the DPS river watersheds.

In the prioritization approach outlined in Element 6, the threat of degradation to a potential preservation site within the next 20 years, the importance of each project within a landscape context, the level of project urgency, and inclusion of upland areas sufficient to protect resource functions and ecological connectivity to other conservation areas are all considered. In addition, preservation projects will be prioritized based on landowner willingness to convey a conservation easement or fee title, with conservation covenants, to the property, and the adequacy of long-term stewardship to ensure the project is sustainable over time through an endowment or trust.

These stated considerations in Elements 5 and 6 help ensure that preservation actions will meet the [§332.3(h)] criteria.

Element 8: Description of Public and Private Stakeholder Involvement

The Sponsor, Maine Department of Marine Resources, has a long history of working with a variety of stakeholders in developing and implementing conservation plans and projects in the State of Maine. The ASRCP will be a continuation of that history of partner engagement.

The Sponsor has excellent working relationships with all of the agencies and stakeholder groups that will be involved with this program including the USACE, USFWS, NMFS, MDOT, non-profit conservation organizations and tribal governments.

Element 9: Description of Long Term Protection and Management Strategies

Each applicant that receives funds from the ASRCF shall be responsible for ensuring long-term protection of each project through an appropriate protection mechanism as practicable. The IRT will be responsible for making sure that each applicant receiving funds will have the needed legal status, experience and stewardship funds to ensure the long term protection and management of the site.

For preservation projects, permanent legal property protection instruments, such as conservation easements, will be held by entities such as Federal, Tribal, other State or local resource agencies, or non-profit conservation organizations. The protection mechanism shall assign long-term stewardship roles and responsibility for the project and will, to the extent practicable, prohibit incompatible uses that might otherwise jeopardize the objectives. Copies of such recorded instruments shall be maintained by the Program Administrator and shall become part of the official project record. Each protection instrument shall contain a provision requiring notification to Sponsor if any action is taken to void or modify it. Such protection mechanisms should be in place prior to site closure or final credit release, as stipulated in each mitigation plan.

Sponsor and USFWS shall be granted "third party" enforcement rights on all conservation easements entered into as part of an approved natural resource mitigation plan funded by the ASRCF.

Element 10: Strategy for Periodic Evaluation and Reporting on Program Progress

As described in section 9 above, the Program Administrator will provide annual reports, based on calendar years, to Sponsor and chairs of the IRT with updates on the progress of each SHRU and project implementation. The reports will be submitted not later than June 30 of the year following the reporting year. This report will provide an overview of what habitat units were lost and what projects were funded. It will also summarize the successes and the challenges, and ways to improve the program for next year. For restoration, creation and enhancement projects that may take several years to complete, the Program Administrator will summarize monitoring reports and the results of the work. For preservation projects, evidence of the easement or other protection details need to be documented.

Every five years, the Program Administrator, with assistance from Sponsor, will produce a status and trends report summarizing the previous five years. The document will examine the goals for each SHRU and discuss how well the projects assisted with promoting those goals. Every ten years, or as funds allow, the Program Administrator and others will reexamine and update the Compensation Planning Framework, including working with a broad range of stakeholders.

11. Mitigation Project Implementation

The Sponsor will be responsible for overseeing the design, permitting, construction, monitoring and maintenance of mitigation sites during the regulatory performance period, as required of a program Sponsor in 33 CFR § 332.8.

11.1 Mitigation Plan

The Sponsor will ensure that mitigation plans and site designs for each site selected to compensate for unavoidable, permitted impacts are produced. The plan will include a description of the proposed credits to be established.

A. The mitigation plan will meet the requirements specified in 33 CFR §332.4(c) and contain the following elements:

1. Goals and Objectives: A description of the resource type(s) and amount(s) that will be provided, the functions targeted, the method of compensation, and the manner in which the resource functions of the project will address the needs of the watershed.

2. Site Selection: A description of the factors considered during the site selection process.

3. Site Protection Instrument: A description of the legal arrangements and instrument that will ensure the long-term protection of the mitigation site.

4. Baseline Site Information: A description of the ecological characteristics of the proposed site.

5. Determination of Credits: A description of the number of credits to be provided, including a brief explanation of the rationale for this determination.

6. Credit release schedule: See section 11.3.

7. Mitigation Work Plan: Detailed written specifications and work descriptions for the project, including geographic boundaries; construction methods, timing, and sequence; source(s) of water, including connections to existing waters and uplands; methods for establishing the desired plant community; plans to control invasive plant species; the proposed grading plan; soil management; and erosion control measures.

8. Maintenance Plan: A description and schedule of maintenance requirements to ensure the continued viability of the resource once initial construction is completed.

9. Performance Standards: Ecological and measurable standards that will be used to determine whether the compensatory mitigation project is achieving its objectives.

10. Monitoring Requirements: A description of parameters to be monitored in order to determine if the compensatory mitigation project is on track to meet performance standards and if adaptive management is needed. A schedule for monitoring and reporting on monitoring results will also be included.

11. Long-term Management Plan: A description of how the project will be managed after achievement of performance standards to ensure the long-term sustainability of the resource, including long-term financing mechanisms and the party responsible for long-term management.

12. Adaptive Management Plan: A management strategy to address unforeseen changes in site conditions or other components of the project, including the party or parties responsible for implementing adaptive management measures. The adaptive management plan will guide decisions for revising mitigation plans and implementing measures to address both foreseeable and unforeseen circumstances that adversely affect the project's success.

13. Financial Assurances: A description of financial assurances that will be provided and how they are sufficient to ensure a high level of confidence that the compensatory mitigation project will be successfully completed, in accordance with its performance standards.

14. Other information, such as

    a. Nearby mitigation or restoration projects and how the mitigation project may compliment them.

    b. Adjacent land uses and potential effects of adjacent land uses on mitigation project.

    c. Other information as identified by the IRT as necessary for inclusion in the Mitigation Plan.

B. All Mitigation Plans for the Atlantic Salmon Restoration and Conservation ILF Program will adhere to the requirements for Mitigation Plans outlined in the federal rule, and the IRT will review and make approval decisions on all Mitigation Plans.

C. Mitigation Plans will also clearly delineate the areas of a site where mitigation activities can occur. For example, Mitigation Plans will identify features that would disallow creation of credits such as trail corridors, utility easements, prior mitigation projects without any available additional credit, and restoration projects.

11.2 Fulfillment of Advance Credits

For fulfillment of the sale of "advance credits", a compensatory mitigation project plan will be submitted to and approved by the IRT, preservation and the initial physical and biological improvements will be completed within 3 growing seasons after the impact that generated the credit sale(s). The submittal of the Mitigation Plans to the IRT will include a credit release schedule. Generally, the Sponsor will request credit release consistent with target schedules identified in Section 11.3.

11.3 Credit Release

Credits will be released as approved mitigation projects are completed in accordance with the following schedule, which may be modified with approval from the IRT:

Preservation:

100% Upon receipt of the signed and recorded preservation document, evidence that the non-wasting endowment has been established or receipt of a letter from the long-term steward stating that an endowment is not required to provide the long-term management as outlined in the long-term management agreement, and a long-term management agreement approved by the Sponsor and signed by the long-term steward, and fee owner, (if different), and acknowledged by the Program Administrator.

Restoration/Creation/Enhancement (Rehabilitation) with Associated Preservation:

100% of the preservation credits upon receipt of the signed and recorded preservation document and a long-term management agreement approved by the Sponsor and signed by the long-term steward, and fee owner, (if different), and acknowledged by the Program Administrator.

100% of the construction-related credits upon completion of construction and approval of the work by Sponsor, receipt of all required inspection and initial monitoring reports, and Sponsor determine the site is successful in meeting the goals and performance measures and concurs with the release.

Restoration/Creation/Enhancement (Rehabilitation) without Associated Preservation:

100% Upon completion of construction and approval of the work by Sponsor, receipt of all required inspection and initial monitoring reports, and Sponsor determine the site is successful in meeting the goals and performance measures and concurs with the release.

Credit releases for in-lieu fee projects must be approved by the USACE district engineer in coordination with the IRT Co-chair. In order for credits to be released, the Sponsor will submit documentation to the district engineer and IRT Co-chair demonstrating that the appropriate milestones for credit release have been achieved and requesting the release. The district engineer will provide copies of this documentation to the IRT members for review. IRT members may provide comments on this document. (See 33 CFR §332.8(o)(9))

The district engineer and IRT Co-chair may determine that a site visit is necessary prior to the release of credits.

If, at any step in the credit release schedule, it is determined through monitoring that performance standards are not being met, the Sponsor, in consultation with the IRT, shall identify appropriate adaptive management and/or contingency measures and devise a plan for implementation.

11.4 Project Implementation

Once the IRT has approved a mitigation plan and credit release schedule, the Sponsor will request spending authorization to initiate implementation of the mitigation project. The Sponsor will oversee contract development, select a qualified construction contractor, and perform construction management and oversight. The construction process will include routine inspections, special inspections, pre-construction site review meetings, post-construction meetings, and compliance reporting as necessary.

11.5 Monitoring and Maintenance

Monitoring will require qualitative and quantitative assessments of physical, chemical and biological characteristics of the project as appropriate, using scientifically appropriate analytical methods. The purpose of monitoring is to determine the level of compliance with ecological performance standards established in the site-specific mitigation plan. In addition, the monitoring data will help identify problems that may trigger maintenance activity, contingency plans, remedial action, or adaptive management measures.

Monitored parameters depend in large part on the type, scale and scope of a proposed project, but will generally include hydrologic conditions, vegetative cover, soil stability, and presence/extent of noxious weeds and nuisance species.

As necessary, the Sponsor will coordinate with land managers and appropriate contractors to outline maintenance protocols for each mitigation project. Active maintenance practices will generally follow a three to ten year program that may include repair/replacement of engineered structures, nuisance species control, and adaptive management measures, such as grade or hydrology modifications, species substitutions, replanting, replacement of habitat features, and temporary fencing.

11.6 Adaptive Management and Contingency Planning

Once ILF mitigation projects are installed, they will be adaptively managed in response to the outcome of regular and routine maintenance and monitoring events. If any monitoring data reveal that a mitigation project is failing in whole or in part, the Sponsor will determine whether conditions can be remedied through maintenance activities. If the failure is beyond the scope of routine maintenance, the Sponsor will submit a Contingency Plan to the IRT. The Contingency Plan may range in complexity from a list of plant substitutions, to cross-sections of proposed engineered structures. Once approved by the IRT, the contingency plan will be implemented and will replace the approved mitigation plan. If the failure is substantial, the Sponsor will extend the maintenance and monitoring period for that project and/or the credit release schedule may be adjusted.

12. Long Term Management/Site Stewardship

Projects will be designed, to the maximum extent practicable, to be self-sustaining once performance standards have been achieved. The ILF Sponsor will ensure that projects are maintained and managed to protect their long-term viability and functionality.

Following the performance period (i.e., regulatory monitoring period) and release of all credits, ILF mitigation projects will be managed in accordance with long-term stewardship guidelines. A long-term maintenance and management plan will be submitted to the IRT for approval prior to final credit release.

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