CNL(13)49

NASCO Implementation Plan for the period 2013-18

USA

CNL(13)42

NASCO Implementation Plan for the period 2013-18

The main purpose of this Implementation Plan is to demonstrate what actions are being taken by the jurisdiction to implement NASCO Resolutions, Agreements and Guidelines.

Questions in the Implementation Plan refer to the following documents:

- *NASCO Guidelines for Management of Salmon Fisheries, CNL(09)43 (referred to as the 'Fisheries Guidelines');*
- *Minimum Standard for Catch Statistics, CNL(93)51 (referred to as the 'Minimum Standard');*
- *NASCO Guidelines for Protection, Restoration and Enhancement of Atlantic Salmon Habitat, CNL(10)51 (referred to as the 'Habitat Guidelines');*
- *Williamsburg Resolution, CNL(06)48; and*
- *Guidance on Best Management Practices to address impacts of sea lice and escaped farmed salmon on wild salmon stocks (SLG(09)5) (referred to as the 'BMP Guidance').*

Party:	**United States**
Jurisdiction/Region:	**N/A**

1. Introduction

1.1 What are the objectives for the management of wild salmon? *(Max 200 words)*

Maine – The endangered populations

The objective for the Maine program is recovery the Gulf of Maine Population Segment (GOM DPS). Recovery criteria for the GOM DPS (the populations that are listed as Endangered under the U.S. Endangered Species Act) are as follows:

- Roughly 6,000 wild adult returns per year
- 90,000 fully accessible habitat units (1 unit = $100m^2$ of rearing habitat)
- Threats that were identified at the time of listing (in 2009) are reduced

When these recovery criteria are met, listing as endangered under the U.S. Endangered Species Act will no longer be warranted.

Southern New England – The extirpated populations

There are programs in several major river systems in Southern New England to restore or maintain some minimal run of salmon; these include the Saco River Program, the Merrimack River Program, Pawcatuck River Program, and the Connecticut River Program. Each of these programs has specific objectives for salmon management but each includes a substantial hatchery augmentation component for the foreseeable future.

1.2 What reference points (e.g. conservation limits, management targets or other measures of abundance) are used to assess the status of stocks? *(Max 200 words)* *(Reference: Sections 2.4 and 2.5 of the Fisheries Guidelines)*

Within the United States, the status of stocks are assessed in relation to the recovery criteria described in section 1.1. Assessments are conducted for each geographic area and are also described in relation to Conservation Spawning Escapement (CSE) goals. However, it is important to note that total CSE values are not the stated goals for management for the United States, but they can serve as a useful reference point. The CSE for New England is set at 29,199 adults. The strongest populations in the Gulf of Maine are at less than 8% of their total CSE (15,670 adults) and almost all these fish are hatchery origin while recovery goals include only wild spawners.

To help guide ICES with respect to the catch advice for the West Greenland fishery, we are revising management objectives for the United States. At the 2013 Annual Meeting of NASCO, we presented revised management objectives (NAC(13)4) that are consistent with the objectives for wild salmon in section 1.1 above. Also at the 2013 NASCO meeting, NASCO asked ICES to comment on the implications for the provision of catch advice of any new management objectives proposed for contributing stock complexes. Thus, we expect ICES to assess implications of the revised management objectives of 4,549 (wild) 2SW returns in its report in 2014.

1.3 To provide a baseline for future comparison, what is the current status of stocks relative to the reference points described in 1.2, and how are threatened and endangered stocks identified?

Category	Description of category and link to reference points	No. rivers
1	Endangered	see below*
2	Restoration	see below[#]
3		
4		
Insert additional categories as required		
TOTAL:		see below

Additional comments: The process for designating threatened and endangered stocks is specified in the US Endangered Species Act. The process is summarized in the U.S. Implementation Plan for the period 2007 -2011 (CNL(07)16). In short, the National Marine Fisheries Service or US Fish and Wildlife Service conducts a review of the species status. The report is called a Status Review which is typically peer-reviewed by an external panel of experts. The agencies then use the information in a Status Review and other scientific information to make a proposed listing decision. That proposal (to list as threatened, to list as endangered, or not to list) is published in the Federal Register and the public is invited to comment. The agencies review public comments and any new scientific information before publishing a final decision in the Federal Register.

*Endangered – The Gulf of Maine Distinct Population Segment includes all anadromous Atlantic salmon whose freshwater range occurs in the watersheds from the Androscoggin River northward along the Maine coast to the Dennys River. This represents roughly 14 major salmon rivers.

[#]Restoration – Historically, salmon occurred in most major watersheds south of the Androscoggin River (Maine) to the Housatonic River in the south (Connecticut), including 15 rivers. Currently, there are programs to restore self-sustained runs of salmon to three rivers and a legacy program in one river (the Connecticut).

1.4 How is stock diversity (e.g. genetics, age composition, run-timing, etc.) taken into account in the management of salmon stocks? *(Max 200 words)*

Low marine survival and the reduction in productivity of freshwater habitats have led to drastic population declines. Decreased population sizes could result in the loss of genetic diversity and increased risk of inbreeding. Reliance on hatchery supplementation could lead to artificial selection. Thus, maintaining genetic diversity levels within each of the Atlantic salmon populations is a primary tenet of salmon management in the United States.

Maintaining genetic diversity is critical to preventing the extinction in the United States. As such, a rigorous genetic research and management program has been implemented in recent years. The first major milestone of this program was the development of a broodstock management plan in 2006. This plan set forth a rigorous broodstock genetic management program that provides screening, mating guidance, and assessment information for hatchery activities. To monitor if genetic diversity is being maintained over time, metrics such as allelic variability and heterozygosity are assessed annually, using a suite of variable molecular markers. Thus, a science-based broodstock management program is implemented to support Atlantic salmon recovery and restoration programs at the federal hatcheries in the United States.

1.5 To provide a baseline for future comparison, what is the current and potential quantity of salmon habitat? *(Max 200 words)*
(Reference: Section 3.1 of the Habitat Guidelines)

Quantitative estimates are available for the GOM DPS only. Within the GOM DPS, there are approximately 39,000 accessible and suitable habitat units. The recovery goal is 90,000 accessible and suitable habitat units. This represents a shortfall of 51,000 units. Further actions to improve passage through dam removal and culvert replacement are clearly needed.

Historically, there was much more habitat available than these 90,000 units in Maine. The range in Maine has shrunk substantially, but no formal estimate is available for just how much habitat was lost. The picture in Southern New England is similar. Many thousands of river kilometres were historically accessible. However, dams significantly limited access to every salmon river in Southern New England by the year 1900. Given substantial resource limitations to carry out necessary actions to facilitate recovery of even the endangered populations, the resource expenditure to accurately describe the current and potential quantity of salmon habitat for the entire United States has not been conducted and is unlikely to occur before 2018.

1.6 What is the current extent of freshwater and marine salmonid aquaculture?

Number of marine farms	28 leases authorized to raise finfish in Maine
Marine production (tonnes)	5,100 mt (estimated)
Number of freshwater facilities	**Commercial** - Three hatcheries in Maine supporting U.S. east coast Atlantic salmon farming industry. **Recreational** – Each state has a recreational stocking program. There are eight facilities in Maine, six in New Hampshire, four in Massachusetts, and four in Rhode Island. **Salmon Conservation** – The US Fish and Wildlife Service operates six conservation hatcheries that are involved in Atlantic salmon recovery and restoration. The State of Connecticut also operates one hatchery.
Freshwater production (tonnes)	**Commercial** - The freshwater facilities raise smolts to support the marine sites. Commercial smolt production is approximately 2 million (individuals) annually. **Recreational** – In 2012, the total freshwater production was roughly 191 tons in Maine and 228 tons in New Hampshire. **Salmon Conservation** – Tonnage estimates are not available; however, the estimated number of individuals is as follows: 10,000,000 fry; 450,000 parr (age 0, age 1, and age 2 inclusive); and 808,000 smolts (age 1 and age 2 inclusive).

Append one or more maps showing the location of aquaculture facilities and aquaculture free zones in rivers and the sea.

1.7 To aid in the interpretation of this Implementation Plan, have complete data on rivers within the jurisdiction been provided for the NASCO rivers database?
Yes/no/comments

Yes; although, the information provided within the NASCO rivers database is more extensive than what is provided within this implementation plan. As such there may be apparent inconsistencies, but this is due to the need to condense information within the implementation plan and changing conditions of management programs, particularly areas south of the GOM DPS.

2. Fisheries Management:

2.1 What are the objectives for the management of the fisheries for wild salmon? *(Max. 200 words)*

Endangered populations

The objective is to facilitate recovery of the endangered populations and their ecosystems to a level where: 1) Native Americans can once again exercise their rights to ceremonial and sustenance purposes; and 2) recreational fisheries can once again be considered. This can only occur after the endangered populations are either "downlisted" to threatened or "de-listed" because they are recovered (meeting the recovery criteria outlined in section 1.1).

Legally, socio-economic factors can not be taken into account when decisions are made regarding listing species as endangered or threatened under the U.S. Endangered Species Act. The law requires that these decisions be based solely on the best scientific and commercial data available. This law (specifically the "take" prohibitions of Section 9 of the ESA) currently prevents a directed fishery from being executed anywhere within the freshwater range of endangered salmon populations in Maine.

Restoration populations

Socio-economic factors are considered when deciding whether or not to execute a fishery involving restoration populations. However, the severely depressed status of these populations has prevented managers from executing fisheries for sea-run salmon in these rivers in recent years. There is, however, a small recreational fishery on post-spawned domestic broodstock in the Merrimack River, an area south of the GOM DPS. In recent years, roughly 1,500 broodstock have been released to the river to support the fishery with approximately 1,200 permits sold each year. Similar broodstock fisheries have existed in Connecticut River tributaries (Shetucket and Naugatuck) in recent years.

2.2 What is the decision-making process for fisheries management, including predetermined decisions taken under different stock conditions (e.g. the stock level at which fisheries are closed)? *(Max. 200 words)*
(This can be answered by providing a flow diagram if this is available.)
(Reference: Sections 2.1 and 2.7 of the Fisheries Guidelines)

Fishing for endangered salmon is not allowable under the U.S. Endangered Species Act. A fishery could be considered if the populations were listed as threatened (a less protective category under the U.S. Endangered Species Act) if the fishery had a net conservation benefit to the species. This could occur through several mechanisms such as:

- proceeds from license sales funding habitat restoration work; and
- increased public awareness of salmon and threats to salmon populations.

There is, however, a small recreational fishery on post-spawned domestic broodstock in the Merrimack River, an area south of the GOM DPS. In recent years, roughly 1,500 broodstock have been released to the river to support the fishery with approximately 1,200 permits sold each year. Similar broodstock fisheries have existed in Connecticut River tributaries (Shetucket and Naugatuck) in recent years. These fish have been determined to be excess to the needs of the hatchery and it was therefore determined that providing them for a limited fishery was an appropriate use and a way to engage stakeholders in the restoration effort.

2.3 Are fisheries permitted to operate on salmon stocks that are below their reference point and, if so, how many such fisheries are there and what approach is taken to managing them that still promotes stock rebuilding? *(Max 200 words.)*
(Reference: Section 2.7 of the Fisheries Guidelines)

Not domestically, but U.S. salmon stocks below their reference points are harvested in mixed-stock fisheries in Greenland and St. Pierre et Miquelon.

2.4 Are there any mixed-stock salmon fisheries and, if so, (a) how are these defined, (b) what was the mean catch in these fisheries in the last five years and (c) how are they managed to ensure that all the contributing stocks are meeting their conservation objectives? *(Max. 300 words in total)*
(Reference: Section 2.8 of the Fisheries Guidelines)

(a) Not domestically, but as noted above, U.S. stocks are harvested in mixed-stock fisheries in Greenland and St. Pierre et Miquelon.

(b) See ICES WGNAS reports for detailed summaries of the fisheries at West Greenland. Some information on the catch at St. Pierre et Miquelon is available in reports tabled by France (in respect of St. Pierre et Miquelon) at the NASCO Annual Meeting, most recently in CNL(12)14.

(c) Genetic analyses from the fishery at West Greenland are monitored extensively, including the use of genetic methods developed by U.S. scientists to track the number of U.S. fish harvested in the internal-use fishery. As a member of the West Greenland Commission, the United States is able to actively participate in discussions and negotiations regarding the fishery in Greenland. The United States. remains very interested in continuing and expanding genetic testing of the salmon intercepted in the St. Pierre et Miquelon fishery to improve our collective understanding of the composition of the mixed stock so that informed management decisions can be made regarding this fishery. The U.S. receives information on the fishery through the reporting France (in respect of St. Pierre et Miquelon) has been making annually to the NASCO meeting but neither NASCO nor the United States has specific knowledge or a role in how management decisions are made regarding the salmon fisheries in St. Pierre et Miquelon.

2.5 How are socio-economic factors taken into account in making decisions on fisheries management? *(Max. 200 words)*
(Reference: Section 2.9 of the Fisheries Guidelines)

Endangered populations
Legally, socio-economic factors can not be taken into account when decisions are made regarding listing species as endangered or threatened under the U.S. Endangered Species Act. The law requires that these decisions be based solely on the best scientific and commercial data available. This law (specifically the "take" prohibitions of Section 9 of the ESA) currently prevents a directed fishery from being executed anywhere within the freshwater range of endangered salmon populations in Maine.

Restoration populations
Socio-economic factors are considered when deciding whether or not to execute a fishery involving restoration populations. However, the severely depressed status of these populations has prevented managers from executing fisheries for sea-run salmon in these rivers in recent years. There is, however, a small recreational fishery on post-spawned domestic broodstock in the Merrimack River, an area south of the GOM DPS. In recent years, roughly 1,500 broodstock have been released to the river to support the fishery with approximately 1,200 permits sold each year.

2.6 What is the current level of unreported catch and what measures are being taken to reduce this? *(Max. 200 words)* *(Reference: Section 2.2 of the Fisheries Guidelines and the Minimum Standard)*
The unreported catch in the U.S. is zero tons. In order to detect any catch of Atlantic salmon in the United States, commercial fishermen are required to report any bycatch and observers are also placed on a sample of vessels to document catch. Databases from the NMFS observer program and fish dealers are queried each year; it is rare to observe more than five salmon (individuals) in either database on an annual basis. For recreational fisheries that may encounter salmon as bycatch (e.g., brook trout fisheries), law enforcement officers operate surveillance programs to ensure that salmon bycatch is limited. In addition, angler education is emphasized to ensure that anglers can differentiate between juvenile brook trout and salmon parr.

2.7 What are the main threats to wild salmon and challenges for management in relation to fisheries, taking into account the Fisheries Guidelines and the specific issues on which action was recommended for this jurisdiction in the Final Report of the Fisheries Management FAR Review Group, (CNL(09)11)?	
Threat/ challenge F1	Spring and fall fishing in the Penobscot River – see page 13 in CNL(09)11.
Threat/ challenge F2	Bycatch of salmon parr in brook trout fisheries.
Threat/ challenge F3	Poaching.
Threat/ challenge F4	Interception of U.S.-origin salmon in West Greenland and St. Pierre et Miquelon

Copy and paste lines to add further threats/challenges which should be labelled F5, F6, etc.

2.8 What actions are planned to address each of the above threats and challenges in the five year period to 2018?		
Action F1:	Description of action:	Work with state authorities to ensure that recreational fisheries for other species, such as brook trout, reduce bycatch of salmon to the maximum extent possible.
	Planned timescale:	2013-2018
	Expected outcome:	Closures of certain areas of rivers, gear restrictions, bag limit reductions and other means could be agreed to within the context of a conservation plan for recreational fishing permitted by the State of Maine.
	Approach for monitoring effectiveness & enforcement:	Publication of protective fishing regulations coupled with continued surveillance (to ensure that poaching is reduced to the maximum extent possible) of existing regulations and closed areas by law enforcement.
Action F2:	Description of action:	Maintain closures for all directed fisheries for Atlantic salmon, monitor recreational catches for any presence of Atlantic salmon, and conduct surveillance.
	Planned timescale:	2013-2018
	Expected outcome:	Reduced risk to productive capacity.
	Approach for monitoring	Continued surveillance by law enforcement. This directed closure is also enforced by the same authorities that conduct

	effectiveness & enforcement:	surveillance intended to reduce poaching in Action F1 above.
Action F3:	Description of action:	Continue to remain active in the West Greenland Commission and the North American Commission
	Planned timescale:	2013-2018
	Expected outcome:	Continued collaborative management of the fishery at West Greenland and enhanced collaboration with France (in respect of St. Pierre et Miquelon) regarding the fishery at St. Pierre et Miquelon
	Approach for monitoring effectiveness & enforcement:	Continued sampling at West Greenland and work with France (in respect of St. Pierre et Miquelon) to continue and expand genetic testing of the salmon intercepted off St. Pierre et Miquelon to improve our collective understanding of the composition of the mixed stock.

Copy and paste lines to add further actions which should be labelled F5, F6, etc.

3. Protection and Restoration of Salmon Habitat:

3.1 How are risks to productive capacity identified and options for restoring degraded or lost salmon habitat prioritised, taking into account the principle of 'no net loss' and the need for inventories to provide baseline data? *(Max. 200 words)*
(*Reference: Section 3 of the Habitat Guidelines)*

Identifying priority habitats and risks to productive capacity is a primary focus of Atlantic salmon recovery and restoration efforts in the United States. Prioritization of key habitats occurs at a variety of scales, ranging from the entire U.S. down to as fine as the river reach scale. At the national level, listing the populations within the GOM DPS as endangered and designating critical habitat for them reflects a desire to ensure that local adaptations and the habitats that created those adaptations are not lost. At the state and local level, prioritization schemes and restoration options are developed by local experts. Examples of these types of efforts include watershed-specific fishery management plans and watershed-based plans often developed by state authorities with intimate knowledge of local conditions. However, it is important to note that all restoration projects are ultimately opportunistic. Land owners must be willing to conduct the suggested restoration; funding must be available to support the necessary action; and all permitting authorities must agree that a given action would be consistent with all laws and regulations within the given jurisdiction.

For the Endangered populations in Maine, a recovery plan is currently being drafted. This document will take into account current habitat inventories and existing information on limiting factors specific to each watershed.

3.2 How are socio-economic factors taken into account in making decisions on salmon habitat management? *(Max. 200 words)*
(Reference: Section 3.9 of the Habitats Guidelines)

Endangered populations – When considering whether or not to list populations as threatened or endangered, by law, socio-economic factors cannot be considered. When federal agencies are considering effects of their actions on listed species, they must avoid jeopardizing the species and also avoid adversely modifying critical habitat. For actions that may cause some impact to the species or the habitats, when identifying alternative actions to avoid or minimize impacts, comparative economic impact of those alternatives are sometimes considered.

Restoration populations – A variety of cost-benefit analyses may be conducted through a number of state and federal environmental reviews for projects that may affect salmon. Similarly, NGOs and government agencies often consider restoration options with the highest biological benefit and lowest economic costs. Methods used by agencies, organizations and entities are different, however, making consideration of these factors less transparent.

3.3 What are the main threats to wild salmon and challenges for management in relation to estuarine and freshwater habitat taking into account the Habitat Guidelines, and the specific issues on which action was recommended for this jurisdiction in the Final Report of the Habitat Protection, Restoration and Enhancement FAR Review Group, (CNL(10)11)?

Threat/ challenge H1	Lack of accessibility
Threat/ challenge H2	Diminished productive capacity (reduced water quality and physical habitat structure)
Threat/ challenge H3	Climate change
Threat/ challenge H4	

Copy and paste lines to add further threats/challenges which should be labelled H5, H6, etc.

3.4 What actions are planned to address each of the above threats and challenges in the five year period to 2018?

Action H1:	Description of action:	Improve fish passage by removing dams, installing fishways, removing culverts, decommission roads, and upgrading road-stream crossings
	Planned timescale:	2013-2018
	Expected outcome:	Enhanced connectivity between freshwater habitats and the Atlantic Ocean
	Approach for monitoring effectiveness & enforcement:	Enumerate the number of habitat units and/or stream miles made accessible.
Action H2:	Description of action:	Continue to implement Clean Water Act and other federal and state laws
	Planned timescale:	2013-2018
	Expected outcome:	Continued water quality improvement
	Approach for monitoring	Publication of attainment of state standards by U.S. EPA

	effectiveness & enforcement:	
Action H3:	Description of action:	Conduct consultations on all federal actions in areas where Atlantic salmon Essential Fish Habitat is designated and issue conservation recommendations to avoid, minimize or mitigate impacts to salmon habitat
	Planned timescale:	2013-2018
	Expected outcome:	No net loss of productive capacity
	Approach for monitoring effectiveness & enforcement:	Completion of consultations under the Magnuson-Stevens Fishery Conservation Act
Action H4:	Description of action:	Issue conservation recommendations to avoid and minimize impacts to salmon habitat on all federal actions in areas where Atlantic salmon are listed as endangered and Critical Habitat is designated
	Planned timescale:	2013-2018
	Expected outcome:	No net loss of productive capacity
	Approach for monitoring effectiveness & enforcement:	Completion of consultations under the Endangered Species Act
Action H5:	Description of action:	Strategically evaluate use of limited resources in light of climate change (Threat H3 above).
	Planned timescale:	Ongoing
	Expected outcome:	Re-focus of limited funding and resources toward those actions and areas most likely to benefit salmon in light of climate change.
	Approach for monitoring effectiveness & enforcement:	Completion of a recovery plan that more fully integrates climate change into salmon management and research for the Endangered populations. Completion of a strategic evaluation of the Southern New England salmon programs.

Copy and paste lines to add further actions which should be labelled H5, H6, etc

4. Management of Aquaculture, Introductions and Transfers, and Transgenics:

4.1 What is the approach for determining the location of aquaculture facilities in (a) freshwater and (b) marine environments to minimise the risks to wild salmon stocks? *(Max. 200 words for each)*

(a) Private companies seek out locations for a fish culture facility based on suitable natural resources (i.e., sufficient water quality and quantity) which can provide optimal growing conditions for the species they are rearing. A formal application includes information on the species being cultured and an environmental characterization and baseline including a

description of the anticipated physical and environmental impacts as a result of the operation of the facility. The baseline serves as a benchmark for monitoring the effects of fish culture operations on the receiving body of water and subsequent water quality. Active salmon hatcheries require a variety of state and federal permits to conduct their activities, these include measures required to minimize impacts to wild Atlantic salmon. The potential ecological and environmental impacts are considered during the federal consultation and permit review process.

(b) Private companies seek out locations for a lease site based on suitable environmental characteristics which can provide optimal growing conditions for the species they are farming. A formal application includes information on the species being cultured and an environmental characterization and baseline including a description of the anticipated physical and environmental impacts as a result of the operation of the farm. The baseline serves as a benchmark for monitoring the effects of farm operations on sediments, marine organisms, and water quality. Active salmon farms require a variety of state and federal permits to conduct their activities including protective measures to minimize impacts to wild Atlantic salmon. The potential ecological and environmental impacts are considered during the federal consultation and permit review process for authorizing new and existing lease sites.

4.2 What progress can be demonstrated towards the achievement of the international goals for effective sea lice management such that there is no increase in sea lice loads or lice-induced mortality of wild stocks attributable to sea lice? *(Max. 200 words)*
(Reference: BMP Guidance)

A federal program established in 2001 by the United States Dept. of Agriculture (USDA) to manage disease outbreaks (i.e., Infectious Salmon Anemia (ISA)) in the commercial salmon farming industry in Maine includes a sea lice component (Integrated Pest Management guidelines) that describes strict biosecurity measures, mandatory surveillance, treatment regimes and site fallowing to control infestations. U.S. Army Corps of Engineers (ACOE) issues federal permits for marine net pens; permit conditions require companies operating in Maine to participate in this mandatory program. Both state and federal agencies review monthly reports to monitor for compliance. The information is, however, confidential and not available to the public. However, some ancillary information is available and is described below.

Sea–run Atlantic salmon returning to the Penobscot River have been monitored in some years for the presence of external parasites (*Argulus canadensis*, *Caligus elongates,* and *Lepeophtheirus salmonis*; Table 1).

Table 1. Summary of lice observed on Atlantic salmon captured at the Veazie Dam (1978-2013).

Year	Total # Salmon	# Salmon Without lice	# Salmon With lice	% Salmon With lice
1978	1464	1277	187	13%
1979	763	632	131	17%
1980	2498	2205	293	12%
1981	2704	2652	53	2%
1982	3241	2795	449	14%
1983	790	689	101	13%
1984	1449	1181	268	18%
1985	3034	2752	282	9%

1986	4137	3531	606	15%
1987	2335	1637	699	30%
1988	2684	2684	No Data	No Data
1989	2752	2752	No Data	No Data
1990	2955	2955	No Data	No Data
1991	1575	1575	No Data	No Data
1992	2233	2233	No Data	No Data
1993	1650	1650	No Data	No Data
1994	1042	1029	13	1%
1995	1336	1270	66	5%
1996	2044	1854	190	9%
1997	1355	1149	206	15%
1998	1210	835	378	31%
1999	969	791	188	19%
2000	534	490	46	9%
2001	786	511	275	35%
2002	784	555	229	29%
2003	1114	845	269	24%
2004	1324	1071	253	19%
2005	985	856	129	13%
2006	1045	870	175	17%
2007	916	672	244	27%
2008	2115	1666	449	21%
2009	1958	1361	597	30%
2010	1315	976	339	26%
2011	3125	2409	716	23%
2012	624	448	176	28%
2013	372	287	85	23%

In order to gain a better understanding of the temporal and spatial distribution of sea lice throughout the Gulf of Maine, preliminary investigations by NMFS and the University of Maine are assessing the presence and abundance of sea lice on wild fish communities in embayments with salmon farms (Cobscook Bay) and areas without (Penobscot Bay). Two preliminary studies examined 29 different species of marine fish (n=3,597), with no wild or hatchery-origin Atlantic salmon sampled. Three host species (lumpfish, *Cyclopterus lumpus*; three-spined sticklebacks, *Gasterosteus. Aculeatus*; and black spotted sticklebacks, *Gasterosteus wheatlandi*) had at least one louse per fish. In 2013, a subsample of fish from Penobscot Bay (n=236) and Cobscook Bay (n=592) were analyzed in the lab to identify different lice species and life stages. All of the lice identified on the samples analyzed were (*C. elongates*) and most were of the non-motile pre-adult Chalimus stage. The prevalence and intensity of lice loads (*C. elongates*) varied significantly between areas with only three infected fish in Penobscot Bay as compared to 118 fish observed with lice loads in Cobscook Bay.

4.3 What progress can be demonstrated towards the achievement of the international goals for ensuring 100% containment in (a) freshwater and (b) marine aquaculture facilities? *(Max. 200 words each)*
(Reference: BMP Guidance)

(a) There have been no escapes of farmed salmon reported since implementing measures to reduce escapes as part of a Containment Management System (CMS) plans developed for each facility in 2005. The annual CMS audits demonstrate 100% compliance rates for commercial freshwater hatcheries in Maine.

(b) There have been no escapes of farmed salmon reported from U.S. commercial marine salmon farms since implementing measures to reduce escapes as part of CMS plans developed for each facility in 2005. The annual CMS audits demonstrate 100% compliance rates for commercial marine salmon farms in Maine. However, putative aquaculture-origin escapes have entered Maine rivers in 2011 and 2012 indicating escapes of farmed fish are occurring. With the confirmed exception of two fish in 2012, genetic analyses conducted on farmed fish captured at fish passage facilities in Maine have indicated the origin of these fish are not from U.S. farms. The Dept. of Agriculture, Fisheries and Aquaculture in the province of New Brunswick, Canada, has reported several escape incidences occurring at marine salmon farms (2010-2012) that could have presumably led to farmed fish escapees entering U.S. rivers.

4.4 What progress has been made to implement NASCO guidance on introductions, transfers and stocking? *(Max. 200 words)*
(Reference: Articles 5 and 6 and Annex 4 of the Williamsburg Resolution)

Article 5 (Aquaculture) -- In 2003, the National Marine Fisheries Service analysed the effects from continued operations of commercial Atlantic salmon aquaculture facilities in Maine. The recommended protective measures include the following: 1) use only local North American salmon stocks for production; 2) implementation of containment measures to reduce escapes; 3) audits and reporting requirements; 4) prohibitions on stocking transgenic salmon, and; 5) marking all farmed salmon placed in marine pens within the United States.

Article 6 (State stocking programs) – None to report. Hatcheries still produce and stock brown trout in certain areas. Within each state there is, however, considerable coordination of inland and sea-run programs to minimize risks.

Annex 4 (Stocking Atlantic salmon) –
Endangered Populations - As referenced in other parts of this implementation plan, the U.S. has developed a rigorous broodstock management plan for federal hatcheries involved with salmon recovery efforts. This broodstock management plan is closely aligned with stocking plans developed by the State of Maine.

Restoration populations - In August of 2011, tropical storm Irene produced severe floods that damaged the White River National Fish Hatchery (WRNFH) and resulted in immediate high losses of domestic broodstock in the outside ponds. The USFWS determined that the hatchery had to be de-populated and shutdown by December, which created huge operational challenges for the Connecticut Program. The Connecticut River Atlantic Salmon Commmission quickly modified previous plans to deal with spawning, incubation space limitations, chiller availability, fish health testing and egg transfers. A brief but intensive spawning effort at WRNFH salvaged 1.2M eggs, which were taken to state facilities for incubation. It was decided not to stock any of the older broodstock (ages 1-4) in the basin due to the possible exposure of the WRNFH water system to the nuisance diatom *Didymosphenia geminate* along with other management and fish health concerns. Age-0 parr from inside tanks were stocked in the adjacent White River. In December (2011) and early January (2012) the remaining broodstock were provided to Northeast Indian Tribes for their ceremonial purposes. The future

of the Connecticut River program is currently being determined.

4.5 What is the policy/strategy on use of transgenic salmon? *(Max. 200 words)*
(Reference: Article 7 and Annex 5 of the Williamsburg Resolution)

Existing federal and State of Maine permits prohibit rearing transgenic salmon for commercial aquaculture within the United States. The U.S. Food and Drug Administration (FDA) is currently considering approval of Genetically Engineered (GE) Atlantic salmon for commercial sale and human consumption in the United States. The application filed by a private biotechnology company in the United States called Aqua Bounty specifically requested approval from the FDA for fish that are being grown outside of the United States that will be sold under the label AquaAdvantage® salmon as cleaned and gutted whole fish or further processed into filets. The FDA is considering information provided from the applicant and public comments before making a final determination.
http://www.fda.gov/AnimalVeterinary/DevelopmentApprovalProcess/GeneticEngineering/GeneticallyEngineeredAnimals/ucm280853.htm

In addition, The U.S. Department of Commerce (DOC) and the National Atmospheric and Atmospheric Administration (NOAA) have recently published Aquaculture policies that reflect broad goals including (1) encouraging and fostering sustainable aquaculture within the context of the National Ocean Policy; (2) protecting wild species and ocean ecosystems; (3) working internationally to learn from aquaculture best practices around the world and encourage the adoption of science-based sustainable practices; among others. There is, however, no specific mention of transgenic animals in these policies.

4.6 What measures are in place to prevent the introduction or further spread of *Gyrodactylus salaris*? *(Max. 200 words)*

The United States has strict importation guidelines in place to minimize the risk of disease transfer between U.S. states and countries. The United States has a disease certification program in place for State, Federal and private commercial facilities rearing fish for commercial aquaculture, recreational fisheries and/or supporting the baitfish industry. Both State and Federal regulations are intended to complement one another to minimize the spread of pathogens into and across the United States. The United States is working to develop effective surveillance procedures and diagnostic testing techniques for all approved diseases of concern.

4.7 What are the main threats to wild salmon and challenges for management in relation to aquaculture, introductions and transfers, and transgenics, taking into account the Williamsburg Resolution, the BMP Guidance and specific issues on which action was recommended for this jurisdiction in the Final Report of the Aquaculture FAR Review Group, (CNL(11)11)?

Threat/ Challenge A1	Genetic introgression and disease transfer from escapes of farmed fish and continued operations of commercial Atlantic salmon aquaculture
Threat/ challenge A2	Disease transmission from baitfish trade
Threat/ challenge A3	Loss of diversity in wild stocks
Threat/ challenge A4	State stocking programs for non-salmon recreational fisheries

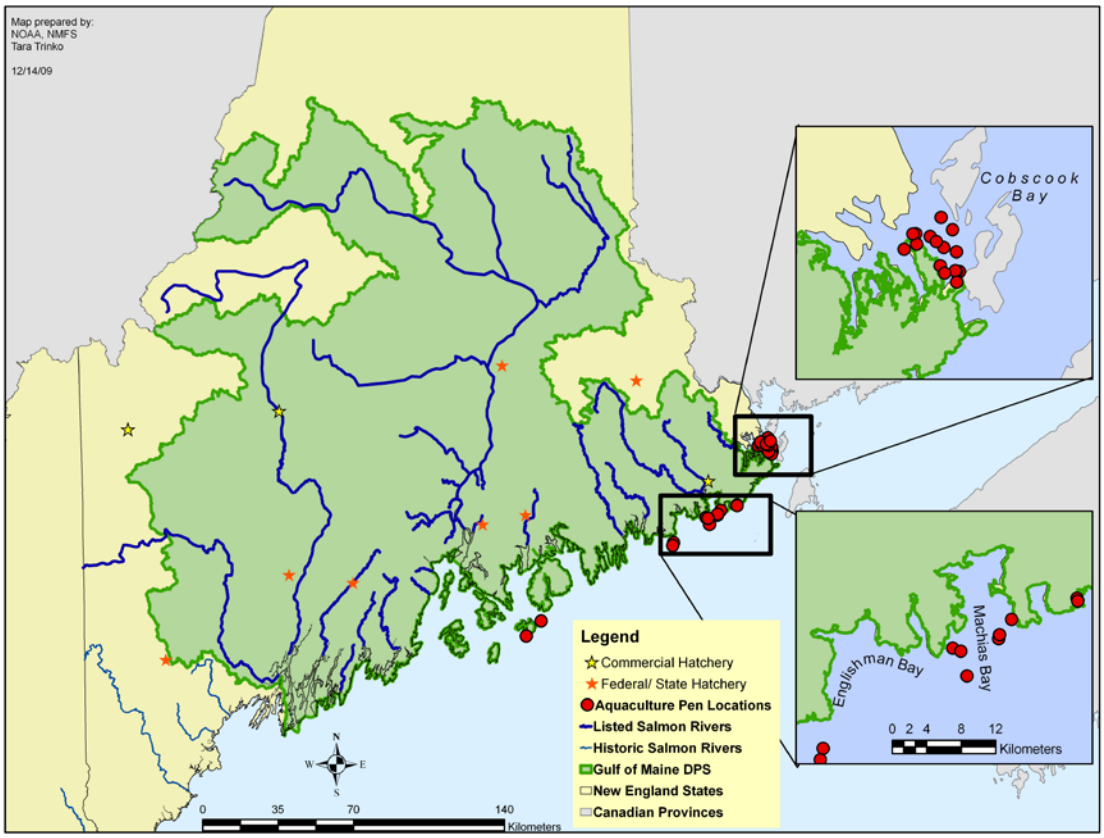
Copy and paste lines to add further threats/challenges which should be labelled A5, A6, etc.

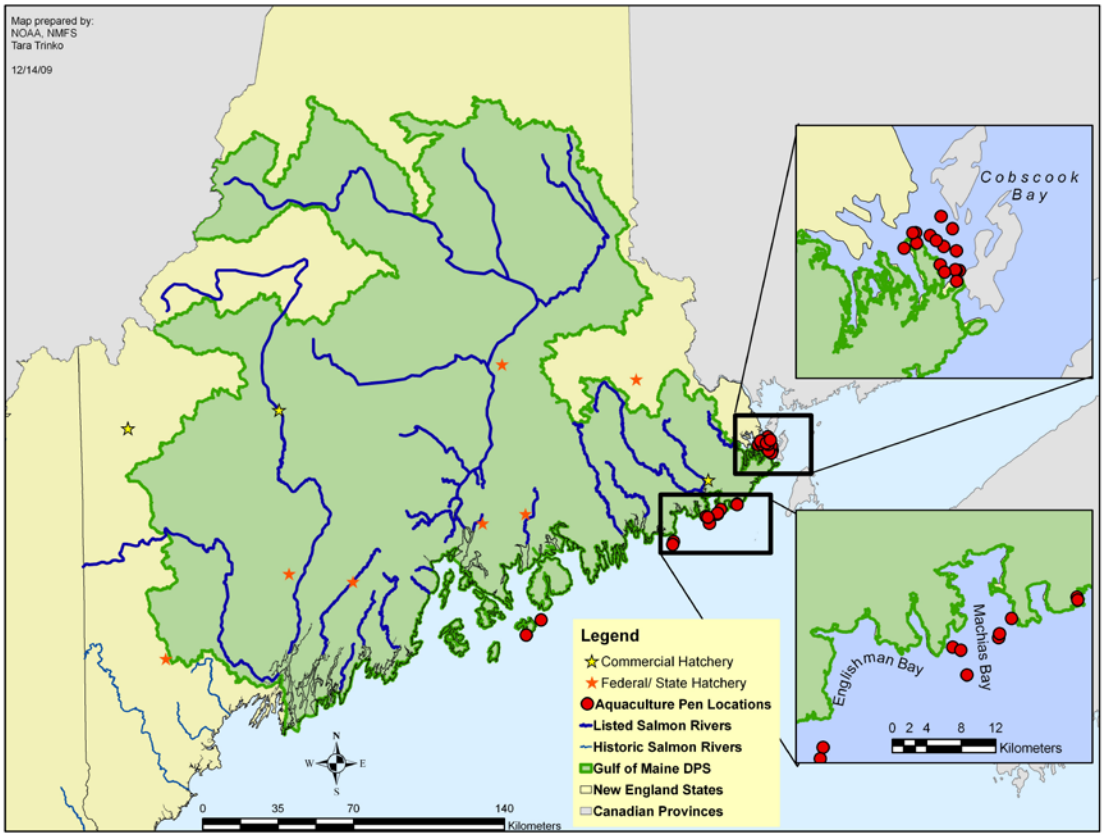
4.8 What actions are planned to address each of the above threats and challenges in the five year period to 2018?		
Action A1:	Description of action:	Continue to monitor implementation of protective measures identified in the Biological Opinion from 2003. Continue collaboration with Canadian provincial and federal agencies to inform new regulations for consistency with U.S. federal permit requirements. Wild fish brought to the USFWS hatchery and used for broodstock to support the recovery program are screened for specific disease pathogens and genetic composition to eliminate any potential Non North American or aquaculture origin fish.
	Planned timescale:	2013-2018 (ongoing)
	Expected outcome:	Zero escapes, reduced disease transfer
	Approach for monitoring effectiveness:	Annual audits and follow up audits after escape events. Existing notification of escape events and formal NAC reports as a way to notify Canada if and when an escape event occurs.
Action A2:	Description of action:	Implement specific regulations and guidelines for importation of baitfish described in State laws and a National Aquatic Animal Health Plan (NAAHP).
	Planned timescale:	2013-2018 (ongoing)
	Expected outcome:	Reduced transmission of diseases of concern including; Viral Hemorrhagic Septicemia and Bacterial Kidney Disease.
	Approach for monitoring effectiveness & enforcement:	Wild fish health surveys, baitfish dealers surveys and pathogen screening at fish culture facilities. Enforcement of appropriate disease certifications required for distribution and importation.
Action A3:	Description of action:	Implement broodstock management protocols at conservation hatcheries.
	Planned timescale:	2013-2018
	Expected outcome:	Slow the rate of the loss of genetic diversity.
	Approach for monitoring effectiveness & enforcement:	Estimates of genetic diversity, such as alleleic variability (i.e. number of alleles per locus, alleleic diversity), and heterozygosity are obtained through the use of a comparable suite of molecular markers that are consistently used to monitor diversity over time. Additionally, wild broodstock are genetically screened to prevent introgression of deleterious genotypes (see A-1 above).
Action A4:	Description of action:	Coordination with state programs that stock salmonids to support recreational fisheries.
	Planned timescale:	2013-2018
	Expected	Identification of potential areas of overlap of salmon and other

	outcome:	stocked salmonids.
	Approach for monitoring effectiveness & enforcement:	Review of stocking reports and consultation with state authorities.

Copy and paste lines to add further actions which should be labelled A5, A6, etc

Appendix 1. Location of salmon aquaculture facilities.




Map prepared by:
NOAA, NMFS
Tara Trinko
12/14/09
Cobscook Bay
Englishman Bay
Machias Bay
Legend
Commercial Hatchery
Federal/ State Hatchery
Aquaculture Pen Locations
Listed Salmon Rivers
Historic Salmon Rivers
Gulf of Maine DPS
New England States
Canadian Provinces
0 35 70 140
Kilometers
0 2 4 8 12
Kilometers