ATS 2015: Maine Atlantic Salmon Commission's 10-Year Strategic Plan

Introduction

In November 2004, the Maine Atlantic Salmon Commission began a strategic planning process to chart a course of action over the next 10 years to support the statewide recovery and restoration of Atlantic salmon. Most recovery actions for Atlantic salmon to date have not focused on restoring the ecosystems these fish inhabit; rather they have focused on hatchery centric solutions. Immediate actions through continued stocking are required to reverse the decline of the Atlantic salmon populations throughout their native range, but these measures are not long-term solutions (National Research Council 2004). There is a need to look at the recovery of Atlantic salmon from a holistic, ecosystem perspective because salmon are a part of the river system, not separate from it. A holistic ecosystem approach to restoration is more likely to result in a restored population because it focuses on ecological function and how patterns of habitat affect the biotic community structure and vice versa (Beechie et al. 1996; Bond and Lake 2003; Palmer et al. 1997). This approach to restoration refers to the practice of restoring natural processes (e.g. hydraulics and riparian function) by focusing on the ecosystem. Most endangered species recovery efforts tend to be species specific and not focused on the ecosystem due to the complexity of this approach (Beechie et al. 1996; Bond and Lake 2003; Rojas 1992). In addition, the socio-economic processes that impact the river ecosystem and Atlantic salmon are as important to understand and address as the ecosystem processes.

An identified barrier in the recovery efforts has been confusion by the public over who is in charge (National Research Council 2004). The Maine Atlantic Salmon Commission is the lead entity for Atlantic salmon recovery statewide. The enabling legislation for the Commission [Title 12 M.R.S.A. §9901 (1)] states the purpose of the Commission is: *to protect, preserve, enhance, restore and manage the Atlantic salmon and its habitat; to secure a sustainable recreational fishery in the State; and to conduct and coordinate all projects involving research, planning, management, restoration or propagation of the Atlantic salmon.* Efforts have been underway to halt the downward trend of salmon in Maine for over 130 years. However, in light of both budget constraints and the precarious status of the population of Atlantic salmon, the Commission will be proactive in looking at the problems

in new ways. Even though the Commission is focused on Atlantic salmon, there is broad recognition that efforts to restore salmon benefit the entire community of organisms in the watersheds they inhabit, as has been suggested in past planning efforts (Atlantic Sea Run Salmon Commission 1995; Maine Atlantic Salmon Task Force 1997). It is again time for a shift in how we think about recovery of Atlantic salmon in Maine.

This shift will not happen overnight and patience is required while the Commission and our partners navigate the many challenges ahead, including dealing with resource shortages, developing public and political support, and addressing other challenges that are barriers to recovery. It is imperative that we address the multiple threats (see the section on threats on page 10) to salmon systematically through adaptive management over a period of time in order to identify the degree of impact each has on the species. Although this document reflects what the Commission views is important to address over the next ten years, we will continue to work closely with our partners, old and new, to work to recover salmon and the watersheds upon which they depend.

The Commission - The Maine Atlantic Salmon Commission is a natural resource agency that oversees the management of a single species, anadromous Atlantic salmon. This species was once common in Maine's coastal rivers, with adults migrating far inland in search of their natal waters. Now less than 2,000 fish return to Maine rivers. The Maine legislature recognized the national significance of this fish and in doing so reestablished the Commission in 1998. The major roles of the Commission in Atlantic salmon recovery and restoration are to: regulate sport fisheries, assess and manage populations, support the U.S. Fish and Wildlife Services hatchery operations, assess and improve fish passage, protect riparian habitat, and coordinate State conservation efforts. A three member Atlantic Salmon Board consisting of the Commissioner of the Department of Marine Resources, the Commissioner of the Department Inland Fisheries and Wildlife, and an at-large Gubernatorial Appointee serving as the public member, govern the Commission. The Board appoints an Executive Director to carry out the directives of the Commission.

Scope of this plan – ATS 2015 outlines a broad strategy for changing the way the Commission operates over a period of ten years to better address the issues and barriers inhibiting recovery efforts. The plan focuses on both scientific and policy components of recovery and builds on the priorities identified by the Commission during the development of this plan (Table 1), the 2004 *Draft Recovery Plan for the Gulf of Maine Distinct Population Segment of Atlantic Salmon (Salmo salar)* and the 2004 National Academy of Science report**,** *Atlantic Salmon in Maine* report. The plan's focus is on changing the way recovery is approached in Maine, and leaves the specific science issues to other documents. It is intended that a detailed annual work plan will be developed yearly using the guiding principals of this document. Although the Commission recognizes the importance of the marine environment in the life cycle of Atlantic salmon and the suite of issues pertaining to that environment, this plan focuses on freshwater issues.

Purpose of the ATS 2015 Plan

Goal: To restore a viable population of Atlantic salmon with access to historical habitat that provides a public benefit.

Objective 1: To have improved Atlantic salmon population trends in Maine's Atlantic salmon rivers

Objective 2: To have wide public and political support for Atlantic salmon recovery efforts

SWOT Analysis

A SWOT (**S**trengths, **W**eaknesses, **O**pportunities and **T**hreats) analysis is a tool for looking at the current conditions of an organization, both internally (strengths and weaknesses) and externally (opportunities and threats). Threats refer to those items that are a risk to the Commission's recovery efforts – not to the species. The purpose of the SWOT analysis of the Commission was to get a baseline indication of conditions in order to identify how to move towards the established objectives.

Background: Every staff member of the Maine Atlantic Salmon Commission was interviewed by the Planning and Research Associate to gain an understanding of how the Commission is perceived from within. Each interview took about an hour and a half and staff were asked a standard set of questions. A summary of the results follows.

Strengths: The strengths of the Commission can be broken into three categories: the staff, the partnerships, and the narrow focus. The Commission has a small staff of extremely capable individuals who are all working toward a common goal. The field staff is technically proficient, knowledgeable in collecting data, documenting observations, and using the scientific method. The diversity of experiences and strengths of individual staff members are well balanced. The Executive Director is motivated to succeed and thinks outside of the box. He is seen as a champion for the cause, which boosts morale within the Commission. The senior staff is comprised of scientists who represent the Commission well at state, regional, national and international levels.

The long-term partnerships the Commission has developed with Federal and other State agencies allow the Commission to share resources and personnel. This partnership has also standardized data collection methods and allows all partners to learn from each other's experiences. The ability of scientists from several agencies to get together to strategize on direction is also viewed as a positive aspect. In addition, the Atlantic Salmon Commission Board comprised of the Commissioners of the Department of Marine Resources and the Department of Inland Fisheries and Wildlife along with a dedicated public member, strengthens these partnerships.

The focus of the Commission on Atlantic salmon provides an opportunity to understand the resource in detail and to make management decisions based on science. Quality sampling techniques have been developed that provide vital scientific data to shape management decisions. The dire condition of Atlantic salmon provides an opportunity to think of innovative approaches and challenges staff to make a difference before salmon disappear completely.

Weaknesses: Weaknesses within the Commission can be related back to lack of communication and perceived lack of direction. Internal communication between staff and the four offices (three field offices and headquarters) needs improvement. Direction and priorities for the Commission also need to be communicated to all levels to reduce uncertainty about how annual work addresses the priorities of the Commission.

Even though the quality of staff at the Commission is viewed as a strength, staff concerns sometimes lead to morale issues. There are not enough people to do everything that needs to be done, leading to overworked staff with limited ability to start new projects. Program direction and leadership need to focus efforts on priorities (Table 1), and encourage staff to take initiative for new projects. Clear direction and strong leadership will remove the tendency to lose site of the priorities and focus on discrete issues. Focus on priorities through a formal annual planning process will enable the Commission to stretch limited resources and better utilize staff talents.

The Commission has been focused on collecting data for years; unfortunately not all of it has been analyzed. Analysis of this data is a priority. Future fieldwork should be targeted at the priority threats and should continue to be coordinated with partner agencies. The end result of focused research is that potential limiting factors may begin to get eliminated. Research that does occur should be followed through and formally documented. The Commission should continue to take advantage of research opportunities that arise. Data gathering methods should be reviewed periodically to ensure that they are efficient and consistent.

In addition, the current status of the *Atlantic Salmon Conservation Plan for Seven Maine Rivers* (ASCP) is a source of confusion. The Commission needs to review the ASCP and decide how it should be used in the future.

Opportunities: The release in 2004 of both the *Draft Recovery Plan for the Gulf of Maine Distinct Population Segment of Atlantic Salmon (Salmo salar)* (DFRP) and the National Academy of Science report**,** *Atlantic Salmon in Maine* (NAS)**,** have the potential to guide planning and prioritization of salmon recovery actions. These reports are seen as a catalyst to shift the work of the Commission towards more research and analysis targeted at answering the overarching questions and threats, while continuing core population monitoring activities.

The mechanisms of the Endangered Species Act recovery planning process, including the Coordinating Committee and the Recovery Team are opportunities for advancing recovery actions. The Coordinating Committee is comprised of NOAA, USFWS and the Commission. The Recovery Team has representation from various entities based on expertise and is the entity that will advise the federal services on recovery actions. The Maine Atlantic Salmon Technical Advisory Committee (TAC) will be working closely with the federal recovery planning efforts to continue to coordinate salmon research and management actions. The Commission plays a lead role on the Coordinating Committee and has a member and a liaison to the Recovery Team, as well as membership on the TAC. There is a need to clearly articulate the roles and responsibilities of these entities and how they will interact, recognizing that the Commission has a statutory responsibility to manage Atlantic salmon.

There is a sense that all partners are working towards a common goal and cooperation between the partners is high. Efforts such as the Penobscot Project, the Capacity Building Project for the 8 Rivers Roundtable, the Machias Corridor Project and the joint meeting with the Federal Congressional Delegation are examples of cooperation. By working more closely with partners, duplication of effort is reduced and limited funds are stretched.

Threats: There are four categories of external threats: limited resources, mission conflicts with partners, lack of public support, and the tendency to look for a magic bullet solution.

Limited funding is a constant threat, making it all the more important to work closely with partners. Lack of funding from the State is seen as a threat to the Commission's credibility leaving the Commission reliant upon the federal partners for funding, which often drive efforts.

The partnership working on salmon recovery is complex within State government alone. Contradictory missions, territoriality, miscommunications, and incompatible policies between agencies lead to conflict. All conflicts are a threat to recovery efforts, causing partners to focus efforts away from the fish.

Public and political apathy for salmon recovery is probably the largest threat facing salmon recovery. The people of Maine have lost the connection with Atlantic salmon as a part of the State's heritage. Populations have been in a declining trend for so long, that very few people are able to witness an Atlantic salmon in the wild.

One of the largest identified problems external to the Commission is the tendency to look for a magic bullet rather than take a holistic view of the threats facing salmon in Maine. Although it is often necessary to isolate individual factors for research purposes, focusing on one issue at a time causes the partners to lose sight of the rest of the issues impacting salmon, as it is likely the cumulative impacts of multiple threats that are causing the decline – not a single issue. The challenge is to determine how each of these factors interact, affect the ecosystem, and impact Atlantic salmon.

Atlantic Salmon Recovery Priorities

The Commission recognizes that understanding and addressing both ecological and social processes relating to Atlantic salmon are critical to the recovery of the species. The Commission advocates the use of adaptive management to address the main scientific question: is the population decline driven by degraded habitat quality, fish quality problems or lost/degraded ecosystem structure and function problems? The use of the best available science is critical to making management decisions about the Atlantic salmon. In addition to addressing the scientific questions, however, a parallel effort is needed to address social issues.

Although the number of units of habitat in many rivers is known, the quality of the habitat is not. Quality refers to all parameters including physical (structure, substrate, flow, water chemistry and temperature etc.) and biological (community assemblages, food, etc.). Also, many of the smaller tributaries have not been surveyed for either quantity or quality of habitat. Habitat quality studies such as embeddedness, permeability and substrate complexity could provide some guidance on where this habitat is located, as well as provide information on how to improve marginal habitat. There is a need to correlate population data with habitat quality. The multiple index sites currently established can provide valuable information. Correlating bottlenecks in life stages with habitat parameters, such as over winter survival of large parr are needed as well. There is a concern about a lack of genetic diversity, especially in light of the river specific program, which does not have provisions for natural straying rates.

Non-point source pollution from roads, development, agriculture, and forest practices are a potential threat to Atlantic salmon. Water use, both from ground and surface waters, is another potential impact, which needs to be further explored. Increasing development, sprawl and land conversions also have the potential to impact the recovery of Atlantic salmon. Connecting land use changes to impact on the river systems and understanding how those changes affect salmon is important.

The socio-economic processes of restoration have not traditionally been researched or addressed fully although a recent effort was attempted to assess these processes (Demont & Associates 2005). A top priority is to attempt to re-engage the public in the recovery efforts. The Commission views the Watershed Councils as a key mechanism to make this happen. Public support is also needed to bolster political support. Atlantic salmon are part of the heritage of Maine, as illustrated by the continued support of conservation organizations such as the salmon clubs, both economically and socially, and the Commission is dedicated to re-establishing that connection.

Table 1 shows the priorities identified by the Commission as part of the development of this plan. The priorities are not listed in any particular order and are a compilation of the DFRP, the NAS Report and the professional opinion of the scientific staff of the Commission.

Table 1. Priorities Identified by the Commission

Habitat Quality		**Social/Governance**		**Fish Quality**
Carrying capacity		Adaptive management		Behavior
Channel morphology		Cooperative efforts		Effectiveness of hatcheries
Complexity		Council capacity		Genetics
Diadromous community		Water Use		Growth rates
Fish Passage		Holistic ecosystem approach		Hatchery practices
Hydrology		Impact of regulations/policy		Quality of hatchery product
Large woody debris		Land use trends		Spawning success
Predators		Public support		Stocking densities
Resident community		Reconnect people with ATS		Stocking strategies
Water Quality		Recreational fishing		
Riparian Condition				

Threats to Anadromous Atlantic Salmon

During the development of the *Draft Recovery Plan for the Gulf of Maine Distinct Population Segment of Atlantic Salmon (Salmo salar)* (2005) an evaluation of the geographic extent and life stage affected by threats, and the severity of these effects, resulted in the following threats being identified as high priority for action to reverse the decline of Atlantic salmon populations in the Gulf of Maine DPS:

- Acidified water and associated aluminum toxicity which decrease juvenile survival
- Aquaculture practices, which pose ecological and genetic risks
- Avian Predation
- Changing land use patterns (development, agriculture, forestry etc.)
- Climate Change
- Depleted Diadromous Fish Communities
- Incidental capture of adults and parr by recreational fishermen
- Introduced fish species that compete or prey on Atlantic salmon
- Low Marine Survival
- Poaching of adults in DPS rivers
- Recovery Hatchery Program (potential for artificial selection/domestication)
- Sedimentation
- Water extraction

The *Draft Recovery Plan for the Gulf of Maine Distinct Population Segment of Atlantic Salmon (Salmo salar) (2005)* also identifies a moderate threat to adult spawners warrant attention for priority action due to the extremely low population numbers. Low dissolved oxygen due to excess nutrients from agriculture, sewage treatment, septic systems, processing/manufacturing facilities, and/or hatcheries has the potential to cause impact adult spawners. Elevated water temperatures due to land use practices, impoundment of free-flowing reaches of rivers, low flows, thermal discharges and/or decreased stream shading also has the potential to impact adult spawners. Impacts to adult spawners are also possible from obstructions to passage that may be caused by man-made barriers (e.g. dams, poorly designed roads and culverts) or natural barriers (e.g. geological falls, beaver dams and debris dams). Although these threats are not now categorized as high, the fact that they impact adult spawners justifies the elevation of concern such that actions to address these threats should be prioritized.

In addition to the threats that are currently known to affect Atlantic salmon, there are factors that have the potential for significant adverse effects; however, the information needed to fully assess the severity of these factors is lacking. As such, additional research on the following factors is a critical recovery need: the effect of diseases and chemical contaminants on all life stages; the effect of marine mammal predation; and the effect of bycatch in U.S. commercial fisheries on adult spawners, smolts and in the marine environment (National Marine Fisheries Service and US Fish and Wildlife Service 2005).

Adaptive Management Process

The ATS 2015 Plan is a 10-year guidance document. The Commission will develop detailed annual work plans based on the recommendations in this document. Given the complexity of recovery and the influx of new data every year, communication and coordination within the Commission as well as externally with partners is required to successfully implement the recommendations. This strategy must be flexible and responsive to changing information and an increased understanding of the species, habitat and ecosystem processes.

The Commission established that we would use an adaptive management approach as part of this plan (Figure 1). The purpose of this approach is to combine the scientific method, the best available science and the experience of managers and stakeholders. The Commission views this approach as a systematic process to improve management practices and policies concerning Atlantic salmon recovery by reflecting annually on new information and adjusting practices accordingly.

- Assess Problems – look at the major questions we are trying to answer, assess where we need new or additional info and decide if the questions need to be revised.
- Design - develop process for reviewing annual work plans and review work plan to see what needs to change to better assess the problems.
- Implement – Carry out annual work plans and assessments to fill in information gaps.
- Analyze – Analyze data, write up outcomes in Commission reports and catalogue.
- Evaluate – Review the annual outcomes, progress of recovery, reassess objectives and questions, assess need to revise the strategic plan.
- Adjust – Incorporate annual results into designs for the next field season.

Figure 1. Adaptive Management Cycle

Five Elements Necessary for Recovery

The Commission has identified five critical elements necessary for recovery of Atlantic salmon in Maine. The five elements are interconnected and all must be managed concurrently. The Commission will use the five elements as the outline for developing yearly work plans.

1. An Ecosystem Paradigm– The Federal Endangered Species Act (ESA) mandates ecosystem conservation (Section 2[b] of the ESA), assuming that biodiversity (biological diversity) is intact in functioning ecosystems. If a species becomes endangered, the disrupted ecological processes leading to the population decline should be evaluated and restored in time to halt the decline (Czech and Krausman 2001). In the case of Atlantic salmon, this is not how recovery is approached. A common criticism of the ESA is that a species approach does not conserve biodiversity, and the current list of 1,264 species is cumbersome (Threatened and Endangered Species System 2004). There appears to be consensus that focusing solely on the species is deficient and there is a call to look at different spatial scales, examining the ecosystem, community, or landscape level (Bond and Lake 2003; Minta and Kareiva 1994; Rojas 1992).

The Commission recognizes the need for a change in operations. Continued partnerships with the National Oceanic and Atmospheric Administration, Fisheries Division (NOAA Fisheries), U.S. Fish and Wildlife Service (USFWS), as well as all of our local partners are critical. However, there is a need to look "outside the box" when seeking answers. The threats that are causing the continued decline of Atlantic salmon need to be addressed by looking at the causes in a new way. The Commission is committed to a new approach and is looking forward to future needs and areas of concern, while setting realistic goals and establishing measurable objectives. An adaptive management approach will be utilized to assist in the transition.

It is an ecosystem approach that will ultimately save this species from extinction, as it is no longer enough to focus solely on the fish. The relationship of Atlantic salmon to the landscape in which they live is critical to understand. It is not enough to just put juvenile

fish in the water and hope they return as adults. While hatcheries will remain a key concept of the restoration program, the long-term goal is to see self-sustaining runs of salmon that do not need human intervention. Data collected over the past several decades should be used to connect species recovery to both in-stream habitat as well as landscape changes.

Barriers to Overcome – The culture of the Commission as well as recovery efforts in general in Maine have been mostly hatchery centric, focused on the fish. Habitat issues have not received the required attention. Lack of funding limits the Commission's ability to address all the issues as well as all of the historical rivers. Priorities for the Commission and partners have not always been communicated effectively. The information and knowledge partners have is not always applied, as it isn't always known about.

Recommendations – Establish an adaptive management approach to recovery. Adopt an ecosystem perspective to recovery efforts. Revisit staff responsibilities to better allocate resources and expertise to address the priority issues (Table 1). Improve communication both internally and externally. Establish a protocol for publishing reports and cataloging with the Commission documentation system. Establish a lead researcher for the Commission who will guide research activities. Document how decisions are made. Develop river specific plans.

2. Private and Public Cooperation - Voluntary cooperation between public and private sectors is critical to recovery. The Commission supports economically and environmentally sustainable management of agricultural and forest lands in Atlantic salmon watersheds to reduce the potential impact of sprawl. Recovery efforts need to include programs to provide technical and financial assistance to landowners. The Commission will facilitate communication between partners and lead the effort to expand the existing partnership, broadening collaborative efforts and stretching resources to better address priorities.

Several federal and state agencies provide services to landowners, including both technical and financial assistance. The Maine Department of Conservation's Maine Forest Service and the Maine Department of Environmental Protection are two examples of agencies that

provide grant and landowner assistance programs. In addition, the 16 Soil and Water Conservation Districts of the state also provide technical and finical assistance to landowners. The USDA Natural Resource Conservation Service administers Federal Farm Bill programs, many of which are applicable to or even targeted at landowners in Atlantic salmon watersheds. The Resource Conservation and Development Councils also have staff available to develop programs and to assist with funding. The Commission will work with these partners and others to build on these efforts to target priority threats.

Barriers to Overcome – The priority issues are not always communicated to partner agencies. There are many agencies that have not been involved in recovery. There has not been a focus on expanding the partnership nor communicating the issues to potential partners, particularly to non-traditional partners. This has not traditionally been viewed as a priority issue.

Recommendations – Continue to develop and promote partnerships between public and private sectors. Work with partners to develop lists of resources for landowners. Develop relationships with potential partners. Develop incentive based programs and promote voluntary actions targeted at addressing the priorities of the Commission. Work with partners to develop mutually beneficial programs. Assign a point person to coordinate work with agencies and partners.

3. Outreach and Community Engagement– Public apathy towards salmon is a threat to recovery. The awareness, cooperation and participation of stakeholders, landowners, NGOs, public agencies, municipalities, and the general public are essential for salmon recovery. Programs targeted at re-connecting people to the fish through a better understanding of the life history, habitat needs, economics, and importance to the people of Maine as well as the goals and objectives of recovery are crucial.

The Commission views the main role of watershed councils as building community support for recovery efforts. The Commission is prepared to work with the watershed councils to develop strategies to garner support within each watershed with two main objectives in mind: to improve the effectiveness of local efforts and to develop the public and political support

that is essential for maintaining and expanding restoration program efforts. There is a need to build capacity at a watershed level through watershed councils to foster community engagement as watershed councils and other NGOs are critical to help protect existing funding and develop additional funding for Atlantic salmon restoration programs. The role of stakeholders in the communities is to inform state representatives and administrative officials of fish restoration benefits and issues, to educate the public about the need to restore habitat, the challenges associated with restoring fisheries and the broad scope of fish restoration activities and to encourage citizens to inform their Local, State and Federal representatives of their support for fisheries restoration.

Barriers to Overcome – The Commission has not clearly articulated to watershed Councils their role in recovery. To date there has been a limited coordinated effort to elevate public awareness and no comprehensive mechanism to share information. Since the listing there appears to be declining involvement by the public in recovery efforts, which has led to public apathy and political indifference towards salmon. The Commission does not have the staff or resources to devote to this issue.

Recommendations – Communicate to watershed councils that their main role in recovery is to build community support. Develop a capacity building plan for watershed councils. Facilitate the development of community outreach plans to foster support at the local level of recovery efforts. Seek funding for an economic assessment and encourage historical documentation of the importance of Atlantic salmon to Maine. Utilize the Commission's Advisory Group to communicate the benefits of Atlantic salmon restoration to the public. Assign Commission staff to focus on Outreach and Community Engagement efforts. Clearly define goals for an outreach program.

4. Assessment, Monitoring and Research – A framework needs to be established to monitor recovery efforts in order to track effectiveness of efforts and to evaluate the population, habitat conditions and anthropogenic effects. Most of the elements of this framework exist. A process for scientific planning and prioritization needs to be established that is coordinated between all the agencies and stakeholders. Several components will be established through

the planning and prioritization process including: appropriate metrics, sampling frameworks and designs, review process, and standard operating procedures. In addition, current efforts should be reviewed to determine applicability to recovery efforts. Data and knowledge gaps should be identified.

Management and communication of data is critical to the recovery process. The issues with the databases need to be addressed and a plan to resolve those issues needs to be formulated. A method to vet new research should be developed that relate back to the Commission's priorities (Table 1). Watershed level assessments of habitat quality, land use impacts and ecological processes are required in order to understand the underlying causes of environmental decline. Monitoring programmatic efforts, trends in populations and environmental conditions, implementation success and effectiveness are all required to implement adaptive management.

Barriers to Overcome - The data collected by the Commission has not been analyzed completely or recently using new tools. The databases are not complete and have format issues that limit use by staff, as well as partners. The ecological processes that shape habitat for salmon are poorly understood, including the changes to those processes from past and current land uses. Priorities have not always been communicated effectively both internally and externally.

Recommendations – Establish a framework in which to review recovery efforts. Establish a process for planning and prioritizing efforts. Based on the reviews of data done by the U.S. Atlantic Salmon Assessment Committee, implement an adaptive management approach. Identify data and knowledge gaps. Formulate a plan to resolve the database issues. Develop a method to vet research ideas including reporting procedures. Develop methods to assess ecological process disruption, habitat quality and land use impacts. Increase staff ability to use the scientific method and adaptive management.

5. Regulatory and Governance Roles in Recovery – The existing laws and regulations pertaining to anthropogenic impacts on Atlantic salmon need to be reviewed for possible

improvements in enforcement or implementation. Improved communication between governmental agencies, including local, state and federal, is critical. The roles of all partners need to be clearly defined. The current permitting process should be reviewed as well. The implementation of the Endangered Species Act needs to be better understood by the State and all partners. Administration of ESA protective measures is shared between NOAA and USFWS and multiple issues surround a joint listing that need to be addressed.

There is a need to improve public participation by local stakeholders in the development of state and federal fishery restorations plans, recovery objectives and policies. Stakeholder involvement is critical to promote public involvement in the restoration of Atlantic salmon and to advocate changes in key government policies and regulations that hinder or obstruct restoration of Atlantic salmon.

Barriers to Overcome – The joint listing (both USFWS and NOAA have authority under the ESA) is itself a barrier to recovery, as issues need to be addressed by two Federal agencies. The Federal staff leading the ESA process is located in Massachusetts. The approach often appears reactionary rather than proactive. There is no mechanism to vet policy or habitat issues through an advisory committee. The State and local laws and regulations pertaining to Atlantic salmon recovery are not well understood, nor documented. Communication between agencies needs improvement. The Services seem have a risk adverse interpretation of the ESA.

Recommendations – Review and evaluate existing federal, state and local laws, regulations and permits that affect salmon recovery. Work to strengthen enforcement or implementation of existing regulations where necessary. Develop an easy to read guide of pertinent laws. Continue to participate in the Coordinating Committee. Work with federal services to resolve joint listing issues. Work with the TAC Signatories to incorporate habitat and policy advisory committees in the process. Convene yearly meeting of all partners to share information and to provide updates on recovery progress. Establish a mechanism to coordinate actions between all partners. Convene a working research symposium to set a research agenda to establish priorities for funding. Streamline the ESA consultation process.

Develop MOUs with agencies to address mission conflicts. Communicate the needs of the Commission to other agencies. Hold annual meetings with other state agencies. Work to involve the municipalities.

Watershed Prioritization

The Commission is responsible for recovery of Atlantic salmon throughout its historical range in Maine (Table 2). When prioritizing work, the role of the large watersheds in Maine (Kennebec and Penobscot Rivers) must be taken into account.

The Commission has divided the state into six regions covering all Atlantic salmon rivers to facilitate priority setting. These regions are based on similarity of issues and watershed boundaries. The Commission will develop hierarchical priorities throughout the state and within each region. Priorities will be set within each watershed with input from stakeholders as river specific plans are developed. These priorities will guide restoration actions.

Figure 2. Map of the Regions

- Southern
- Kennebec
- Mid-coast
- Penobscot
- Downeast
- Northern

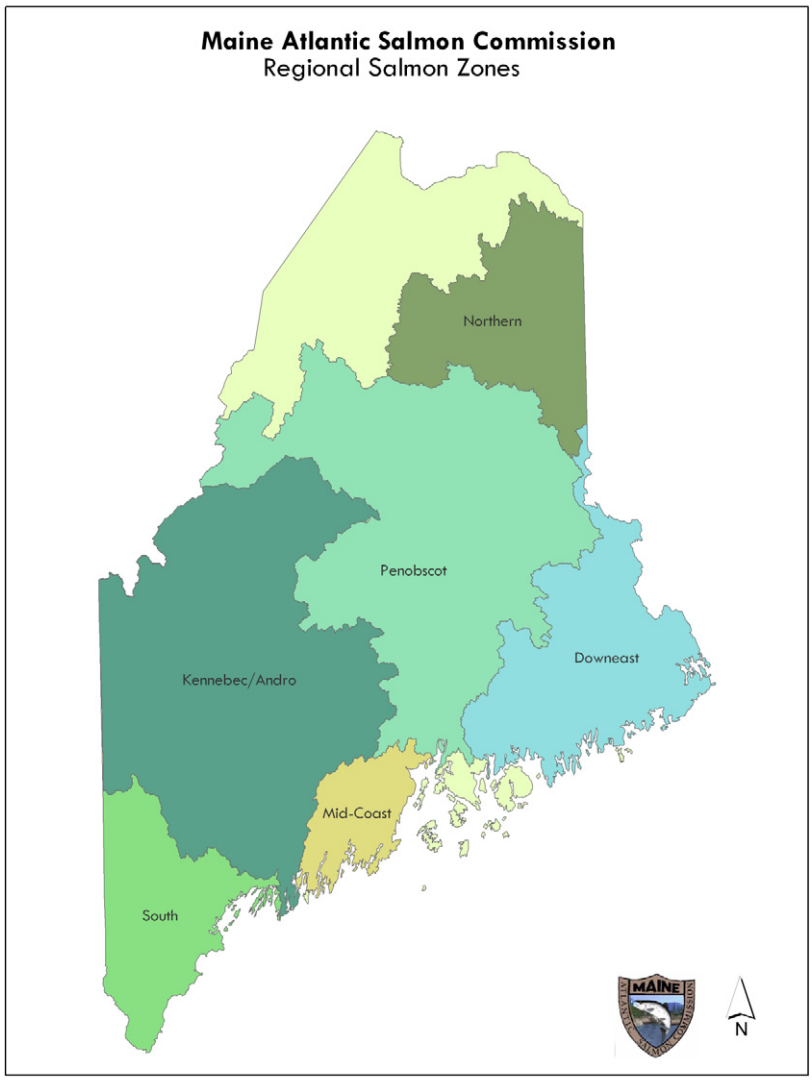

Table 2. Maine Atlantic salmon Rivers by Region*

Penobscot**
Penobscot River

Mid-Coast
Sheepscot River
Ducktrap River
St. Georges River
Passagassawaukeag River
Medomak River
Pemaquid River
Little River

Southern
Saco River***
Royal River
Presumscot River

Kennebec ***
Androscoggin River
Kennebec River

Downeast
Narraguagus River
Chandler River
Machias River
Dennys River
East Machias River
Pleasant River
Tunk Stream
St. Croix River
Union River
Boyden Stream
Pennamaquan River
Hobart Stream
Orange River
Indian River

Northern/St. John
Aroostook River
Prestile Stream
Meduxnekeag River

* There are additional Atlantic salmon rivers that do not appear on this list. This is in no way meant to imply that these systems have low or no value to Atlantic salmon

** Includes the entire Penobscot River watershed north of Verona Island

*** Includes the Ossipee and Little Ossipee River

**** Includes all tributaries

Roles in Recovery

The partnership in Maine working collectively on the recovery of Atlantic salmon is complex, involving multiple local, state and federal governmental entities, non-governmental agencies and others such as the Penobscot Indian Nation and international organizations (Table 3). Each partner has a critical role, although often the roles are not clearly defined. The Commission will work with the partners to clearly articulate the roles and responsibly of each partner and work to improve communications between partners as well.

The Commission views the regional approach as a method to assist stakeholder groups with in each region. Staff from the Commission will work with each region to develop a regional structure to facilitate communication between the groups, to foster collaboration, and to assist individual groups increase capacity. Watershed groups are recognized as valuable assets and partners in the recovery of Atlantic salmon.

Table 3. Partners in Recovery

Governmental Organizations

State Agencies	*Tribal Government*
Maine Department of Inland Fisheries and Wildlife	Penobscot Indian Nation
Maine Department of Marine Resources	
Maine Department of Environmental Protection	*Federal Agencies*
Maine Department of Agriculture	NOAA Fisheries/National Marine Fisheries Service
Maine Department of Transportation	US Fish and Wildlife Service
Maine Department of Conservation	US Army Corps of Engineers
Maine Public Utilities Commission	US Environmental Protection Agency
Maine State Planning Office	US Department of Agriculture
	US Department of Agriculture
Others	US Geological Survey
National Fish and Wildlife Foundation	
University of Maine	
Cooperative Extension	
Wild Blueberry Commission	
Commission Advisory Panel	

Non-Governmental Organizations by Region and River

Region	River	Organization
Downeast	Dennys	Dennys River Watershed Council
	Dennys	Dennys River Sportsman's Club
	East Machias	East Machias River Watershed Council
	Machias	Machias River Watershed Council
	Narraguagus	Narraguagus River Watershed Council
	Narraguagus	Narraguagus Salmon Association
	Pleasant	Pleasant River Watershed Council
	Pleasant	Pleasant River Fish and Game Conservation Association
	Pleasant	Pleasant River Hatchery
	St. Croix	St. Croix International Atlantic Salmon Association
	St. Croix	St. Croix International Waterway Commission
	Union	Union River Watershed Council
	Union	Union Salmon Association
		Downeast Salmon Federation
		Project SHARE
		Quoddy Regional Land Trust
		Downeast Lakes Land Trust
		Washington County SWCD
Kennebec	Kennebec	Friends of Kennebec Salmon
	Kennebec	Kennebec County SWCD
		Kennebec Valley Chapter TU
Southern		Merrymeeting Bay Chapter TU
		York Rivers Assoc.
		Laudholm Trust
		Wells National Estuarine Reserve
	Saco	Saco River Salmon Club
Northern		Atlantic Salmon for Northern Maine

Region	River	Organization
Mid-Coast	Ducktrap	Ducktrap Coalition
	Ducktrap	Coastal Mountain Land Trust
	Passy	Belfast Bay Coalition
	Sheepscot	Sheepscot River Watershed Council
	Sheepscot	Sheepscot Valley Conservation Association
	Sheepscot	Sheepscot Wellspring Land Alliance
	Sheepscot	Branch Pond Association
	Sheepscot	Kennebec County SWCD
	Sheepscot	Knox-Lincoln SWCD
	Sheepscot	Sheepscot River Salmon Club
		Waldo County SWCD
		Georges River Chapter - TU
Penobscot	Cove	Cove Brook Watershed Council
	Penobscot	Penobscot Partners
	Penobscot	Penobscot Salmon Club
	Penobscot	Eddington Salmon Club
	Penobscot	F.I.S.H.
	Penobscot	Sunkhaze Chapter TU
	Penobscot	Northern Penobscot Salmon Club
	Penobscot	Matagamon Lake Assoc.
	Penobscot	Penobscot River Coalition
	Penobscot	Penobscot Riverkeepers
	Penobscot	Veazie Salmon Club
Statewide		Atlantic Salmon Federation
		Atlantic Salmon Unlimited
		Maine Rivers
		Trout Unlimited
		Maine Audubon
		Nature Conservancy
		Natural Resources Council of Maine