Agenda item 7.2
For information

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US Draft Implementation Plan

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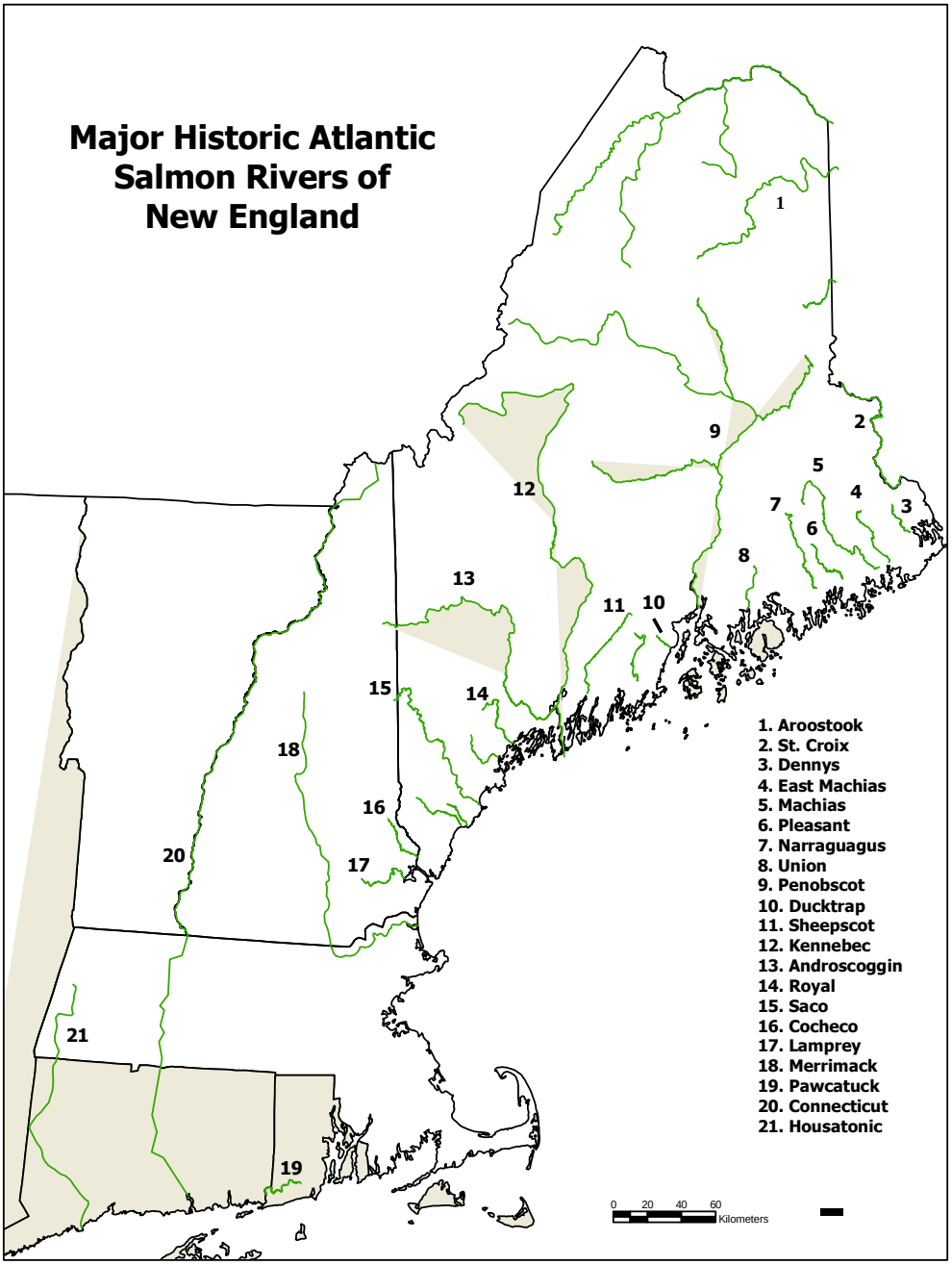

1 Introduction

1.1 Objectives of the U.S. Strategy for Atlantic Salmon

The NASCO Vision is to pursue the restoration of abundant Atlantic salmon stocks throughout the species' range with the aim of providing the greatest possible benefit to society and individuals. Within the U.S., there are two primary types of Atlantic salmon programs – those targeted toward recovering endangered Atlantic salmon populations where they have persisted in the Gulf of Maine and those aimed at restoring Atlantic salmon to areas where they have been extirpated in Central New England and Long Island Sound.

The goal of the U.S. Strategy for the Gulf of Maine (GOM) Distinct Population Segment (DPS) of Atlantic salmon listed as endangered under the U.S. Endangered Species Act (ESA) is to recover and ultimately delist this species. The first objective of the recovery effort is to immediately halt the decline of the DPS and demonstrate a persistent increase in population abundance such that the overall probability of long-term survival is increased. The second objective is to achieve the conditions necessary for the establishment of self-sustaining populations. The third objective is to ensure that threats have been diminished such that the self-sustaining populations will remain viable over the long-term future.

The mission of the Connecticut River Atlantic Salmon Commission (CRASC) is to protect, conserve, restore and enhance the Atlantic salmon population in the Connecticut River basin for the public benefit, including recreational fishing. The Strategic Plan for the Restoration of Atlantic Salmon to the Connecticut River includes the following seven goals: (1) manage Atlantic salmon production to produce sea-run Atlantic salmon returns; (2) enhance and maintain the quantity, quality and accessibility of salmon habitat necessary to support re-established spawning populations; (3) protect Connecticut River Atlantic salmon from exploitation; (4) allocate adult Atlantic salmon to maximize benefits to the Program; (5) asses the effectiveness of the Program by conducting monitoring, evaluation, and research and implement changes when appropriate; (6) create and maintain a public that understands and supports salmon restoration efforts and participates whenever possible; and (7) improve administration and operations within the Program.

A Strategic Plan for the Merrimack River has the goal of restoring Atlantic salmon to a self-sustaining level and developing and maintaining American shad and river herrings to their historic habitat. The following three specific objectives have been identified by the state and federal agencies cooperating in the Merrimack River: (1) an adult Atlantic salmon population that will exceed the sea run brood stock holding capacity of the Nashua National Fish Hatchery (300) and provide some level of reproduction in the wild; (2) an annual average of 35,000 adult American shad passing the Essex fishlift in Lawrence; and (3) an annual average of 300,000 adult river herring passing the Essex fishlift in Lawrence. The Strategic Plan for the Merrimack River includes the following three strategies to reach the objectives: (1) implement a watershed approach to anadromous fish restoration; (2) continue to develop new and enhance existing partnerships with watershed stakeholders which maximize resources available for achieving program objectives; and (3) continue to develop and implement educational and outreach activities to protect anadromous fish restoration.

The Strategic Plan for the Pawcatuck River has the goal of reestablishing a self-sustaining population of Atlantic salmon in the Pawcatuck River Watershed, for maximum public benefit including recreational fishing. Given the sheer number of impediments to achieving the overall goal, the Rhode Island Division of Fish and Wildlife has identified an interim objective, "Produce the number of returning adult Atlantic salmon that will exceed the established sea-run broodstock holding capacity of Rhode Island Division of Fish and Wildlife hatcheries and provide some level of reproduction in the wild."

As illustrated above, the objectives of the US recovery and restoration programs for Atlantic salmon are consistent with the NASCO Vision.

1.2 Nature and Extent of the Resource

The known historic natural range of Atlantic salmon in U.S. rivers was from the Housatonic River in the south to the St. Croix River in the north. Anadromous Atlantic salmon were native to nearly every major river north of the Hudson River and were present in an estimated total of 28 to 34 rivers. The annual historic Atlantic salmon adult population returning to U.S. rivers has been estimated to be between 300,000 and 500,000. The largest historical salmon runs in New England were likely in the Connecticut, Merrimack, Androscoggin, Kennebec and Penobscot Rivers. By the early 1800s, the Atlantic salmon runs in the U.S. had been severely depleted, greatly reducing the species distribution. Natural Atlantic salmon runs had disappeared from southern New England by 1865. By the mid-20th Century, the total adult run of Atlantic salmon to U.S. rivers had declined from hundreds of thousands of fish to a probable range of 500 to 2,000 fish, mostly in rivers in eastern Maine.

Atlantic salmon were extirpated from the Connecticut River Basin in the early 1800s by hydropower dam construction, habitat degradation and overfishing. After an earlier attempt, a restoration program was initiated in the late 1960s and has grown to a major cooperative program involving four basin states and four federal agencies working together under guidance from the Connecticut River Atlantic Salmon Commission. A Strategic Plan was adopted to guide the restoration effort. Penobscot origin hatchery fish were used to restart the restoration program and over time returns to Connecticut were used for broodstock and continued importation from the Penobscot was eliminated. Over time it is expected that selective pressures in the freshwater and estuarine environment will produce a locally-adapted stock. With the exception of 2005, less than 100 adult salmon have returned to the Connecticut River in recent years.

By the mid-1800s the population of Atlantic salmon in the Merrimack River was extirpated because of the building of impassible dams, overfishing and possibly pollution. Efforts to restore Atlantic salmon to the Merrimack River in the later part of the 1800s were moderately successful, but eventually failed. Formal Atlantic salmon restoration efforts were initiated in the late 1960s by the States of Massachusetts and New Hampshire and the Services. The restoration program is administered by cooperating state and federal natural resource agencies through the Policy and Technical Committees for Anadromous Fishery Management of the Merrimack River. Approximately 125 adult salmon have returned to the Merrimack River in recent years.

Atlantic salmon were extirpated from the Pawcatuck River in the 1700s. Reestablishment of Atlantic fry, parr, smolts and adults would add to the biological diversity of the Pawcatuck River system. Other anadromous species such as river herring and American shad will benefit from the Atlantic salmon restoration effort through improved upstream and downstream fish passage, land acquisition, watershed protection, and public attention and support.

Runs of Atlantic salmon persisted at low levels in eastern Maine, and in 2000 a DPS of Atlantic salmon in the Gulf of Maine was listed as endangered under the U.S. Endangered Species Act. The DPS ranges from the Kennebec River in Maine to, but not including, the St. Croix River at the border between the U.S. and Canada. Atlantic salmon in the Kennebec River above the former site of Edwards Dam and salmon in the Penobscot River above the site of the former Bangor Dam were not included in the listed entity. Adult returns to the GOM DPS are low and are below 15% of the conservation spawning escapement, and have been approximately 100 adults across the DPS in recent years. Returns to the Penobscot River in recent years have been approximately 1,000 adult salmon.

Other rivers in Maine with documented adult returns include the Androscoggin, Saco, Union, Kennebec, and Aroostook Rivers. Less than a total of 100 adult salmon return to these rivers on an annual basis.

Approximately 15 million juvenile salmon are released into approximately 16 river systems in the U.S. on an annual basis. Over 90% of those stocked are fry with smolts being the second most common and parr and adults making up the balance.

1.3 Overview of the Fisheries

There are currently no fisheries in the U.S. on sea run returns. In some years a limited fishery has been conducted on reconditioned surplus broodstock released in the Merrimack River. The State of Maine is considering authorizing a thirty day catch and release fishery in the Penobscot River on an experimental basis in 2006. Any Atlantic salmon incidentally taken in other fisheries must be immediately returned to the water without harm. Special regulations have been promulgated to minimize the potential for incidental take of anadromous Atlantic salmon while fishing for other species including trout, landlocked salmon, and American shad. Educational campaigns have also been undertaken to reduce the potential for misidentification. Focused enforcement patrols and surveillance have been undertaken in order to protect endangered Atlantic salmon from poaching activities.

1.4 Management Entities

At the federal level in the U.S., the U.S. Fish and Wildlife Service and the National Marine Fisheries Service (collectively, the Services) share responsibility for Atlantic salmon conservation and recovery. The GOM DPS of Atlantic salmon is listed under the ESA, and therefore receives the greatest amount of protection. All federal agencies (Action Agencies) funding, permitting or carrying out activities in the vicinity of these listed populations must consult with the Services to evaluate and mitigate any impacts to these fish and their habitat. Such Action Agencies have the burden of conducting an analysis of the potential impact of their activities on salmon and their habitat and asking

for the review and concurrence of the Services. Federal agencies are prohibited from undertaking any activity that would jeopardize a listed species.

Other Atlantic salmon in the U.S. receive direct protection under the Magnuson-Stevens Fishery Management and Conservation Act and the Fish and Wildlife Act. These acts require consultation with the Services as well, but the recommendations of the Services are not as binding as they are under the ESA. Atlantic salmon and their habitat receive consideration and protection through a variety of other laws including the National Environmental Policy Act which requires a full analysis of environmental and economic impacts of all major federal actions in order to inform decision making. The Environmental Protection Agency administers the Clean Water Act which regulates discharges to rivers and waterways to ensure that water quality conditions are not degraded. The Federal Power Act authorizes the Services to prescribe fishways at hydroelectric facilities. The Federal Power Act requires that equal consideration be given to energy development and the protection, mitigation of damage to, and enhancement of fish and wildlife, including related spawning grounds and habitat. Proactive restoration and enhancement activities are implemented largely through federal grant programs.

Within the State of Maine, the Maine Atlantic Salmon Commission (MASC) has been charged with the management and conservation of all Atlantic salmon. The MASC's mission is to protect, preserve, enhance, restore and manage Atlantic salmon and their 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 Atlantic salmon. The MASC coordinates with other state agencies including the Department of Marine Resources and the Department of Inland Fish and Wildlife to carry out its responsibilities. The Services and the State of Maine have entered into a Cooperative Agreement for Atlantic salmon since the early 1940s. This Cooperative Agreement describes mutual interests in restoration, enhancement and conservation of Atlantic salmon in Maine and commits the parties to cooperate in field activities, propagation, and research. The Cooperative Agreement also establishes a Technical Advisory Committee (TAC) which is charged with advising the Signatories on any technical matters relative to Atlantic salmon restoration and rehabilitation programs in Maine.

The multi-state/federal, interagency Atlantic salmon restoration program in the Connecticut River is guided by the Connecticut River Atlantic Salmon Commission with recommendations from the Technical Committee. The Commission is composed of ten Commissioners representing the Connecticut Department of Environmental Protection, Massachusetts Division of Fisheries and Wildlife, New Hampshire Department of Fish and Game, Vermont Department of Fish and Wildlife, a public sector representative appointed by the governor of each State, the National Marine Fisheries Service, and the U.S. Fish and Wildlife Service. In addition to the above agencies, the Massachusetts Division of Marine Fisheries and the U.S. Forest Service are represented on the Technical Committee.

The Merrimack River Anadromous Fish Restoration Program is administered by the cooperating agencies through two committees. The Policy Committee for Anadromous Fishery Management of the Merrimack River (Policy Committee) provides overall program direction and resolves policy issues. The Technical Committee for Anadromous Fishery Management of the Merrimack River (Technical Committee) provides oversight

of program implementation and advises the Policy Committee on technical issues. The Policy Committee is composed of the Directors of the Massachusetts Division of Marine Fisheries, the Massachusetts Division of Fish and Wildlife, and the New Hampshire Fish and Game Department, the Regional Directors of the U.S. Fish and Wildlife Service (Region 5), and the National Marine Fisheries Service (Northeast Region), and the Forest Supervisor for the White Mountain National Forest. Each member of the Policy Committee assigns a staff member to the Technical Committee. There is also an advisory committee, the Sport Fishery Advisory Board, established by the Policy Committee in 1989. It is made up of members from the public (three representatives from Massachusetts and four representatives from New Hampshire) and advises the Policy Committee on sport fishery issues.

The Strategic Plan for the Restoration of Atlantic Salmon to the Pawcatuck River is administered by a Technical Committee that coordinates activities of the Rhode Island Division of Fish and Wildlife, U.S. Fish and Wildlife Service, and the National Marine Fisheries Service to provide consultation on any technical matters relating to the implementation of the anadromous fish restoration and rehabilitation program in the Pawcatuck River and related interjurisdictional waters. The Technical Committee consists of a member designated by each of the four signatories. In addition, the RIDFW will invite appropriate members of state and federal fisheries agencies and academia to join the TAC as advisors. The TAC members and advisors will be selected for their technical expertise and involvement in anadromous fish restoration and rehabilitation activities within their respective agencies.

In addition to the federal and state agency efforts and mandates referenced above, there is a great deal of local effort driven by private citizens, non-governmental organizations and industry representatives. The Atlantic Salmon Federation and Trout Unlimited are very active in the protection and enhancement of Atlantic salmon and their habitat throughout the U.S. The forest and agriculture industries in Maine have formed Project SHARE (Salmon Habitat and River Enhancement) which promotes landowner stewardship and the recovery of endangered Atlantic salmon. The Connecticut River Salmon Association is a non-profit organization formed with the mission of supporting the effort to restore Atlantic salmon in the Connecticut River basin. Watershed councils have formed around many of the watersheds in Maine to encourage land and water quality protection.

2 Status of Stocks

2.1 Abundance

As explained above in section 1.2, Atlantic salmon have been extirpated from much of their historic habitat in the U.S. Total return to US Rivers in 2005 was 1,313 salmon. Returns of 2SW fish from traps, weirs, and estimated returns were only 3.4% of the 2SW conservation spawner requirement for the US.

Replacement rate has been selected as a quantitative measure of recovery of the Gulf of Maine (GOM) DPS to indicate if the overall population decline has been halted. A replacement rate of 1 would indicate a stable population while a rate below 1 indicates a

declining population and a rate above 1 indicates a growing population. The replacement rate calculated for 2004 was 0.48 (0.20 – 1.26) and clearly indicates that the population has not stabilized. Surveys to estimate density or relative abundance of juvenile salmon are conducted annually on most rivers in Maine with wild or stocked populations of Atlantic salmon. Smolt traps are used on some rivers to provide an index, or a total smolt estimate on an annual basis. In addition, smolt migration in the Penobscot River has been assessed since 1997 using ultrasonic telemetry.

Estimates of basin-wide smolt production in the Connecticut River are approximately 250,000. This estimate does not include smolt mortality during migration which may be significant as most smolts have to travel long distances and pass multiple dams to reach the estuary. Rotary screw traps are used on some rivers within the GOM DPS to estimate smolt outmigration. In addition, telemetry has been used to better understand smolt migration.

During 2005, approximately 14 million juvenile salmon (92% fry) were released into 14 river systems in the US. Fry were stocked in the Connecticut (8 million), Merrimack (1 million), Saco, Penobscot (2 million) and six rivers within the geographic range of the GOM DPS (1.5 million total). Smolts were stocked in the Penobscot (530,600), Merrimack (50,000), Connecticut (85,000), Dennys (56,700), Pleasant (5,900) and Pawcatuck (16,600) Rivers. In addition to juveniles, nearly 4,000 adult salmon were released into rivers in the US.

2.2 Diversity

Within the range of the GOM DPS, naturally reared returning adults predominantly emigrated at river age two (88 to 100%) with the remainder emigrating at river age three. Smolt ages from naturally reared adults returning to the Merrimack and Connecticut River are also dominated by river age two smolts with some emigrating at river age three, but river age one smolts are also present (3-8%). Returns to the Penobscot River, however, are dominated by age one smolts as those smolts are reared in an elevated temperature regime in the hatchery which is not reflective of the natural freshwater rearing environment.

Trends in run timing among contemporary U.S. Atlantic salmon populations are difficult to discern due to low abundance and lack of collection facilities on all rivers. Genetic analysis of Atlantic salmon populations in Maine has identified statistically significant genetic variation among all rivers. As a group, however, these rivers are more alike each other than they are Canadian and European populations. The conservation hatchery program designed to facilitate recovery of these endangered populations is currently being managed on a river-specific basis. That decision may be revisited and mixing of the various river strains could be conducted if it was determined to be necessary or advisable for the conservation of the DPS.

2.3 Threatened or Endangered Stocks

In 2000, the Services listed the GOM DPS as an endangered species under the ESA. The GOM DPS is defined as all naturally reproducing wild populations of Atlantic salmon having historical river-specific characteristics found north of and including tributaries of the lower Kennebec River to, but not including the mouth of the St. Croix River at the

U.S. – Canada border and the Penobscot River above the site of the former Bangor Dam. The Services explicitly identified Atlantic salmon populations in the Dennys, East Machias, Machias, Pleasant, Narraguagus, Sheepscot and Ducktrap Rivers and Cove Brook as meeting these criteria. River-specific hatchery populations were included in the listing.

In the 2000 final rule listing the GOM DPS, the Services deferred the determination of inclusion of fish that inhabit the main stem and tributaries of the Penobscot River above the site of the Bangor Dam. The deferred decision reflected the need for further analysis of scientific information, including a detailed genetic characterization of the Penobscot population. Furthermore, the Services were committed to reviewing data regarding the appropriateness of including the upper Kennebec and other rivers as part of the DPS. In late 2003, the Services assembled a Biological Review Team to review and evaluate all relevant scientific information necessary to evaluate the current DPS delineations and determine the conservation status of the populations which were deferred in 2000 and their relationship to the currently listed GOM DPS. The Services will be receiving that Status Review in 2006, subjecting it to peer review, and determining what, if any, additional action is warranted under the ESA.

3 Threats to Stocks and Current Management Measures

In recent years there have been a number of initiatives to identify and prioritize threats to Atlantic salmon stocks in the US. The National Academy of Sciences highlighted the following threats to salmon in Maine: (1) dams; (2) hatcheries; (3) aquaculture; (4) acid deposition; (5) fishing; (6) change in atmosphere and ocean climate; (7) predation and food supply; (8) research and monitoring; and (9) governance. They recommended that the salmon population in the Penobscot River should be the primary focus for rehabilitating the species. The recovery plan for salmon populations listed under the ESA includes a threat assessment that prioritized the following threats: acidification of freshwater habitats, depleted diadromous fish communities, direct and indirect marine harvest, incidental capture and poaching, competition with non indigenous fish, hatchery supplementation, sedimentation, and avian predation. The Recovery Plan contains demographic and threat-based criteria that would need to be met in order for the species to be considered for downlisting from endangered to threatened or delisted/recovered. Dams, change in atmosphere and ocean climate, predation and food supply, low marine survival and upstream and downstream passage are the primary threats to restoration of Atlantic salmon populations to the Connecticut and Merrimack Rivers.

The Strategic Plans for the Merrimack and Connecticut Rivers and the Recovery Plan for the GOM DPS address the factors identified in the NASCO Guidelines on the Use of Stock Rebuilding Programs including an evaluation of the status of the stock, causes of stock decline and threats to stock, identification and involvement of stakeholders, prioritization of management actions, assessment of social and economic factors, and a plan for monitoring and evaluating progress.

3.1 Effects of All Salmon Fisheries and Fisheries Taking Juvenile or Adult Salmon as Bycatch (including fisheries in distant and home waters)

3.1.1 Directed Salmon Fisheries

As stated previously, there are currently no directed fisheries for sea run Atlantic salmon in the U.S. A Fishery Management Plan was adopted by the federal government in 1987 which prohibits the possession of Atlantic salmon in the U.S. exclusive economic zone. The only fishery currently contemplated is a catch and release fishery that is proposed to be conducted on an experimental basis for 30 days on the Penobscot River in Maine.

U.S. origin Atlantic salmon are susceptible to harvest in the mixed stock fishery off West Greenland and St. Pierre et Miquelon. Based on genetic and scale analysis, a fishery of 20-25 metric tons, as has been prosecuted off West Greenland in recent years, is estimated to include approximately 2-25 Atlantic salmon from the GOM DPS during the years 1997, 2000, 2001 and 2002. While this total number appears small, it could represent anywhere from 3 to 45% of the total documented returns to the GOM DPS during those years. Sampling of the fishery of St. Pierre et Miquelon was initiated in 2003 and continued in 2004 and 2005. Since genetic samples were only taken in 2004, only limited information on the composition of the catch in St. Pierre et Miquelon is available. In 2004, testing of 134 scale and tissue samples was made and, as expected, all the samples were assigned to North America. It was estimated that 2% of the harvest originated from the US and 98% originated from Canada. Additional genetic sampling on the St. Pierre et Miquelon fishery is needed to estimate with more certainty the potential impact of this fishery on US Atlantic salmon, including those listed as endangered.

3.1.2 Bycatch in Commercial and Recreational Fisheries

Commercial fisheries in U.S. waters were examined to estimate the potential for the interception of salmon as bycatch, which was determined to be unlikely and rare. Recent investigations also suggest that bycatch of Atlantic salmon in herring fisheries is not a significant mortality source for U.S. stocks of salmon, as reported to the Working Group on North Atlantic Salmon at its 2004 meeting.

Poaching (i.e. illegal in-river harvesting) has been documented to occur at low levels in Maine Rivers. Given the value of each returning adult, efforts including enforcement, maximum size restrictions on brown trout and landlocked salmon, and closures of sections of rivers have been implemented. Minimum size restrictions on trout are placed in some rivers at some locations to reduce the potential for anglers to keep salmon parr misidentified as another salmonid species. A maximum length for landlocked salmon and brown trout was adopted in some areas in an attempt to avoid potential accidental sea run Atlantic salmon harvest in the winter and in estuaries.

3.2 Factors Affecting Estuarine and Freshwater Habitat

The earliest impacts to Atlantic salmon in the U.S. were from water quality degradation and barriers to migration. While many of the historical unregulated water and land use practices that adversely impacted salmon habitat within the range of the GOM DPS have been eliminated, the legacy of these impacts to the physical, chemical, and biological structure of these rivers and streams can remain for decades. In addition, contemporary

land and water use practices including forestry, agriculture, urbanization, flood control, water pollution, water withdrawal, and dams continue to substantially reduce the quantity and quality of Atlantic salmon habitat throughout Maine by (1) eliminating or degrading spawning and rearing habitat, (2) reducing habitat complexity and connectivity, (3) degrading water quality, and (4) altering ambient stream temperatures. The greatest impediment to self-sustaining Atlantic salmon populations in Maine is obstructed fish passage and degraded habitat caused by dams. The National Inventory of Dams lists 639 dams over four feet in height in Maine.

One of the major goals of the strategic plan to restore Atlantic salmon to the Connecticut River is to enhance and maintain the quantity, quality, and accessibility of salmon habitat necessary to support re-established spawning populations. Dams constructed on the mainstem Connecticut River and its tributaries were largely responsible for the extirpation of salmon in the basin. Currently, there is a large amount of salmon habitat in the Connecticut River that is not accessible to returning adults because of the presence of barrier dams. Providing access around these migratory barriers through dam removal and/or the provision of fish passage will allow salmon to use this habitat. Human activities, including industrial, residential and agricultural development, have also had a pronounced impact on the quantity and quality of Atlantic salmon habitat throughout the basin. In other cases, important habitat is accessible to salmon but it has been degraded by human land-use practices. Siltation of gravel beds essential for spawning and fry habitat is a frequent cause of habitat degradation. Challenges facing state and federal resource agencies are significant. Flows in the Connecticut River are highly controlled and impact Atlantic salmon passage success. The regulatory process to implement fish passage is resource intensive and slow. Effective downstream passage is also limited by existing technology. Downstream passage is important to protect smolts since many fry are stocked above barrier dams not yet equipped with upstream fish passage.

3.3 Impacts of Aquaculture, Introductions and Transfers and Transgenics (including diseases and parasites)

The New England Salmonid Health Committee was established in 1985 to address policy issues and provide guidelines related to Atlantic salmon disease management and other health needs related to salmon culture and restoration. Originally established only to address Atlantic salmon, their charge was expanded to all regional salmonid health issues in 1987. The guidelines created were implemented by the relevant agency within each state.

Aquaculture operations have been determined to pose a significant risk to wild stocks of Atlantic salmon in Maine. Permits have been conditioned to prohibit the use of reproductively viable non-North American strain Atlantic salmon, require marking of stocked smolts, and require stringent disease testing. In addition, weirs exist on some of the wild salmon rivers to allow for the interception of returning adults and removal of aquaculture escapees. Escapees and resultant interactions with native stocks are expected to continue to occur within the range of the GOM DPS given the continued operation of farms and growth of the industry. Recent containment protocols and audits have greatly decreased the incidence of losses from hatcheries and pens, however large escapes still occur.

Conservation hatcheries intended to facilitate restoration and recovery efforts, while essential to these efforts, have also been identified as a potential threat. The NAS concluded that available information was not sufficient to conclude whether hatcheries in Maine can actually help rehabilitate salmon populations, whether they might even be harming them, or whether other factors are affecting salmon so strongly that they overwhelm any good that hatcheries may do. It is recognized that hatchery supplementation can have deleterious genetic and possibly ecological effects.

3.4 Other Influences Affecting Salmon Abundance or Diversity (including marine environment)

For all U.S. Atlantic salmon stocks, one of the major environmental forces affecting salmon recovery and restoration is an increase in oceanic mortality. The reasons for the poor survival of salmon in the ocean are not fully understood.

Natural mortality in the marine environment can be attributed to four general sources: predation, starvation, disease/parasites, and abiotic factors. While our knowledge of the marine ecology of Atlantic salmon has increased substantially in the past decade, we cannot partition total natural mortality into these categories. Survival of the North American stock complex of Atlantic salmon appears to be at least partially determined when salmon are concentrated during the winter months in the habitat formed at the mouth of the Labrador Sea and east of Greenland.

The purpose of the ESA is to recover the ecosystems upon which listed species depend. Recovery of endangered Atlantic salmon, therefore, depends on our ability to recover the freshwater, estuarine, and marine environments in which salmon live. Historically, abundant runs of at least 10 other native diadromous species existed in Maine waters. These other species provided a variety of benefits for Atlantic salmon including contributing marine-origin nutrients to freshwater, serving as predator buffers, and serving as prey. Many of the historical connections among these co-evolved species and their habitats have been eliminated or severely compromised by the same environmental perturbations that have lead to the severe declines in salmon abundance. Restoration of at least a portion of this historical co-evolved diadromous fish assemblage, and the nutrient cycling function it maintained, may be required for the long-term recovery of the GOM DPS.

4 Management Approach

4.1 Management of Fisheries

4.1.1 Directed offshore fishery

The U.S. will continue to be an active participant in the West Greenland Commission (WGC) of NASCO with the goal of negotiating a quota that is based on the scientific advice from ICES and is sufficiently protective of US stocks, most significantly those listed under the ESA. Another goal is to seek a long-term quota agreement for this fishery in light of the severely depressed state of the stocks and the stability of the scientific advice. The U.S. will continue to be actively engaged in collaborating with the

other members of the WGC to monitor this fishery and will use the information obtained to evaluate the risk the fishery poses to US stocks.

The U.S. is interested in learning the results of the Trust Fund established under the Conservation Agreement between KNAPK and NASF. The Trust Fund was established to jointly finance projects that were intended to benefit KNAPK and Greenland's inshore fishing industry and reinforce or complement development programs. According to the Agreement, projects were designed to facilitate development of new fisheries or other economic activities, with the potential to provide employment to Greenland society.

The US will continue to emphasize the need for robust sampling of the fishery off St. Pierre et Miquelon to improve our understanding of that fishery and to be able to quantify its potential impact on US stocks of salmon, including those listed under the ESA. We will continue to offer sampling and/or analytical support to process scales and/or genetic samples to determine continent of origin of the fish being intercepted off St. Pierre et Miquelon. Given the extremely poor status of stocks, reducing to the greatest extent possible the interception of U.S. origin salmon in mixed stock fisheries is a high priority for the U.S.

Specific Actions

4.1.1.1 Participate in the annual meeting of the WGC to negotiate a quota based on the scientific advice from NASCO (Years 1-5).

4.1.1.2 Reach a multi-annual regulatory measure for the West Greenland fishery.

4.1.1.3 Participate in annual sampling of the fishery off West Greenland (Years 1-5).

4.1.1.4 Facilitate a continent of origin analysis on salmon sampled off West Greenland to determine composition of the mixed stock affected by the fishery (Years 1-5).

4.1.1.5 Collaborate with Canada and France to implement sampling of the salmon fishery off St. Pierre et Miquelon and to conduct continent of origin analysis on the sampled fish (Years 1-5).

4.1.1.6 Request a report on the Trust Fund established under the Conservation Agreement in Greenland.

4.1.2 Directed Catch and Release Recreational Fishery

The State of Maine is currently considering authorizing a limited, experimental open season for directed angling for Atlantic salmon from September 15, 2006, to October 15, 2006, on the Penobscot River. Atlantic salmon are part of the identity of the State of Maine; Atlantic salmon supported a culturally and economically significant sport fishery up until the late 90's. This is addition to other factors has resulted in a strong connection between the citizens of the State of Maine and Atlantic salmon. The proposed fishery was thus precipitated by the desire of the State of Maine to maintain a connection

between the citizens of Maine and Atlantic salmon. The State believes that maintaining this connection is critical to recovering the species.

Conditions of the fishery would be as follows: catch and release only; fly fishing only; and no salmon shall be removed from the water for any reason. This fishery will be closely monitored and the regulations allow for closure if it is deemed necessary to protect the resource. The specific proposal for a limited fall catch and release fishery was developed on the basis of a scientific risk assessment which specifically considered: 1) the number of fish exposed; 2) proportion caught (exploitation); 3) survival of hooked fish at different temperatures; 4) potential to affect broodstock collection; and 5) potential loss of females. The risk assessment considered a range of alternatives and presented an evaluation of the relative risk of each alternative to current restoration and recovery programs for Atlantic salmon. This risk assessment facilitated transparency in the process of deciding whether to authorize a catch and release fishery by explicitly evaluating and balancing the potential risk to fish with the social and economic benefits of allowing such a fishery.

A significant benefit for recreational anglers along the mainstem of the Merrimack River within New Hampshire has been the Atlantic salmon broodstock sport fishery, initiated in 1993. This initiative provides exciting sport angling opportunities; led to the development and improvement of access sites along the river for anglers and many other recreational users; heightened awareness of anadromous fishery resources among public and political constituents; and increased economic support for anadromous fishery initiatives through the development of a stamp and print program. The New Hampshire Fish and Game Department via a permit system manages an Atlantic salmon broodstock fishery in the mainstem Merrimack River and a lower portion of the Pemigewasset River. Whereas angled Atlantic salmon required an angler tag for harvest in previous years, rule changes have now eliminated the angler tagging requirement but continue to recommend voluntary reporting of catch. Creel limits are one fish per day, five fish per season with a minimum length of 15 inches. The season is open all year for taking salmon with a catch and release season from 1 October to 31 March.

Specific Actions

4.1.2.1 Work with the Maine ASC to monitor the fishery in order to ensure that the assumptions of the risk assessment are met and that the fishery does not have a significant impact on Atlantic salmon in the Penobscot River (Year 1).

4.1.3 Bycatch in Commercial and Recreational Fisheries

Based on an analysis of the timing and location of herring fisheries off the coast of Maine, we have determined that the bycatch of salmon smolts is unlikely. Observer coverage in this fishery is being increased. We will review that observer information for any documented Atlantic salmon bycatch. In addition, on an annual basis, we will continue to query the observer and fishery log book database to detect any reported Atlantic salmon bycatch.

To address the potential bycatch of any Atlantic salmon listed under the ESA in recreational fisheries in Maine, the Services are currently meeting with the Maine Atlantic Salmon Commission and the Maine Department of Inland Fisheries and Wildlife. A review of activities including stocking practices, fish passage policies, regulations on recreational fisheries, and sampling is being conducted to identify ways that any interception or harm to Atlantic salmon can be avoided, minimized or mitigated. If take of listed Atlantic salmon cannot be avoided, then a permit may be pursued.

Bycatch of Atlantic salmon not listed under the ESA also needs to be eliminated. Laws now prohibit the taking of all salmon but incidental catching (mostly in commercial shad nets and recreational fisheries targeting American shad, striped bass, and trout) still occurs in the Connecticut, Pawcatuck, Merrimack, Saco, Androscoggin, and Kennebec Rivers. Closing these fisheries may not be necessary, but public education and law enforcement are needed to ensure all hooked or netted salmon are released.

Specific Actions

4.1.3.1 Review commercial fisheries log books and observer database for any records of Atlantic salmon (Years 1 - 5).

4.1.3.2 Review activities conducted and authorized by Maine IFW to determine potential of incidental take of Atlantic salmon and evaluate the effect of any potential take on recovery (Years 1 and 2).

4.1.3.3 Work with Maine IFW to identify changes in regulations and practices that could avoid or minimize the take of endangered Atlantic salmon (Years 1 and 2).

4.1.3.4 Work with all state agencies to monitor incidental recreational catches and ensure that hooked salmon are released in an appropriate manner.

4.2 Protect and Restore Salmon Habitat

Essential fish habitat (EFH) for Atlantic salmon has been designated under the Magnuson-Stevens Fishery Conservation and Management Act. EFH is broadly defined to include “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” Because there is a federal fishery management plan for Atlantic salmon, EFH has been designated and includes all current and historic habitat. Fishery Management Councils must describe and identify essential habitat, minimize to the extent practicable adverse effects on EFH caused by fishing, and identify other actions to encourage the conservation and enhancement of EFH. NMFS must coordinate with other federal agencies to conserve and enhance EFH, and federal agencies must consult with NMFS on all actions or proposed actions authorized, funded or undertaken by the agency that may adversely affect EFH. NMFS must provide recommendations to federal and state agencies on such activities to conserve EFH. These recommendations may include measures to avoid, minimize, mitigate, or otherwise offset adverse effects on EFH resulting from actions or proposed actions authorized, funded, or undertaken by that agency. The NMFS Habitat Program has a goal of no net loss of fisheries habitat. In order to achieve this goal, a sequence is followed where emphasis is placed on

avoiding impacts first, then minimizing any unavoidable impacts and finally mitigating any remaining impacts.

The Fish and Wildlife Coordination Act requires that wildlife conservation receive equal consideration with other features of water resource development. The Act requires that federal permitting and licensing agencies consult with the NMFS and FWS before issuing a permit for activities that modify any body of water. The Services provide comments and recommendations to prevent loss of, and damage to, fish populations and their habitats.

The take of any species listed under ESA is prohibited, unless authorized through an incidental take statement or incidental take permit. Take is defined broadly under the ESA to include harm which includes significant habitat modification which results in death or injury by significantly impairing essential behavioral patterns including breeding, feeding or sheltering. In addition, under the ESA the Services are required to designate critical habitat which is defined as habitat that includes physical and biological features essential to the conservation of the listed species. Federal agencies must consult with the Services on any action they are permitting, funding or carrying out that may adversely affect critical habitat. The designation of critical habitat requires an economic analysis of the impact of designation and requires a full public rulemaking process.

The consultation requirements under the Magnuson-Stevens Act and ESA require action agencies to evaluate the potential impact on Atlantic salmon habitat of any action they are undertaking, funding, or carrying out. The action agency prepares this evaluation and submits it to the Services for their review and concurrence. The burden to prove that their activities will not adversely affect Atlantic salmon and their habitat is placed on the project proponent. In the face of uncertainty, the benefit of the doubt is given to the species. The Services review this analysis and may concur, may request additional information or analysis, or may reach a different conclusion regarding impacts.

As noted previously, dams remain the most significant barrier to successful Atlantic salmon restoration in the US. Traditional permitting processes are very long and require a great deal of resources for the Services to remain actively engaged. More innovative agreements have been reached on a number of rivers between the utility owners, state and federal resource agencies, and non-governmental organizations. These agreements establish deadlines for upstream and downstream passage, and outline required studies and methods for evaluating passage effectiveness. One such agreement in the Kennebec River in Maine resulted in the removal of the first barrier on that river, the Edwards Dam. A significant agreement reached in recent years is the Penobscot River in Maine that will result in the removal of the 2 lowermost dams in that River if funds to purchase those dams can be raised within 5 years. The purchase price is $25 million and the estimated costs of removal and restoration are another $25 million.

Specific Actions

4.2.1 Conduct consultations on all federal actions in areas where Atlantic salmon EFH is designated and issue conservation recommendations to avoid, minimize or mitigate impacts to salmon habitat (Years 1 - 5).

4.2.2 Designate critical habitat for listed Atlantic salmon populations (Years 1 and 2).

4.2.3 Conduct ESA Section 7 consultations on all federal actions in the GOM to determine and minimize impacts to endangered Atlantic salmon and their habitat (Years 1 - 5).

4.2.4 Remain active and involved in the oversight of fish passage agreements on the Kennebec, Saco and Penobscot Rivers (Years 1 - 5).

4.2.5 Remain active and involved in hydroelectric project licensing at dams located within Atlantic salmon habitat in the U.S. and advocate for upstream and downstream fish passage facilities, as appropriate.

4.2.6 Support efforts to raise funds to implement the Penobscot Agreement (Years 1 - 5).

4.3 Manage Aquaculture, Introductions and Transfers

Annual audits on containment management systems are conducted at all U.S. marine farms in order to verify compliance with standards and to identify any potential problems that could result in losses. In addition, on an annual basis all companies need to submit results of genetic screening to federal resource agencies to verify that all smolts stocked into U.S. marine cages are of North American origin. Companies also need to submit marking plans. All of these plans are required under state and federal permits. Emphasis over the next five years will be on ensuring compliance with these permit conditions and evaluating their effectiveness by monitoring the presence of escapes in rivers.

Some rivers such as the Connecticut, Pawcatuck, Merrimack and Penobscot have lost their native runs and it has been necessary to reintroduce salmon into these watersheds to facilitate restoration. Annual stocking programs are needed to maintain these efforts until self-sustained populations are established. In DPS rivers, enhancement of naturally-occurring populations need to be augmented with hatchery products to maintain the viability of the populations. Both types of stocking efforts have technical challenges pertaining to the source of stocked fish, the number of fish to be stocked, the location of stockings, the life phase to be stocked, and the techniques for stocking. Stocking plans that comply with the NASCO guidelines are needed and may vary from river to river. Particular attention is required to maintain genetic integrity of populations of fish to be stocked.

A Broodstock Management Plan has been developed for the conservation hatchery program intended to facilitate the recovery of the GOM DPS. Increased attention is placed on developing more comprehensive annual stocking plans that include a justification for the life stage stocked, number stocked, location and also identification of

the approach for monitoring the effectiveness of the stocking. Emphasis is placed on the development and implementation of broodstock management plans and stocking plans that seek to optimize positive contributions while minimizing the potential for adverse effects. There is a commitment to adaptively manage hatchery supplementation efforts.

Specific Actions

4.3.1 Conduct annual audits of containment management systems (Years 1 - 5).

4.3.2 Review results of genetic analysis to ensure compliance with the permit condition that all smolts must be of North American origin (Years 1 -5).

4.3.3 Review marking plans to ensure compliance with permit conditions (Years 1 - 5).

4.3.4 Prepare and implement mitigation plan in response to large losses from Canadian marine cages in the summer and fall of 2005 (Year 1).

4.3.5 Install and operate weirs and traps on selected rivers to intercept aquaculture escapees and conduct genetic and fish health assessments of any captured escapees (Years 1-5).

4.3.6 Establish communication procedure with Canada for rapid notification of any reported escapees (Year 1 and 2).

4.3.7 Review and update as necessary, existing stocking plans in restoration rivers deemed capable of generating adult returns of 100 fish to maintain a minimum effective breeding population of 50 fish of each sex.

4.3.8 Review and update as necessary plans to manage broodstock to protect genetic integrity of restoration populations.

4.3.9 Review and update as necessary stocking plans for each restoration river system to ensure compliance with the NASCO guidelines contained in the Williamsburg Resolution.

4.3.10 Develop white paper proposing approaches for stocking in the DPS in order to optimize riverine production of hatchery fish and information gained on techniques and stock suitability (Year 1 and 2).

4.3.11 Conduct independent peer review of conservation hatchery program as a recovery tool for the GOM DPS (Years 1 and 2).

4.4 Actions to be Taken in Relation to Other Influences

Recovery of Atlantic salmon in the Gulf of Maine depends on recovery of the ecosystems upon which salmon depend. As a first step we must document the historical assemblage of species present in salmon rivers and estuaries and attempt to understand the linkages between these species and Atlantic salmon. Using this information we prioritize actions to recovery the ecosystems.

At the time the Services listed the GOM DPS in 2000, sufficient genetic and other information was not available to determine whether large river systems were part of the DPS or constituted a separate DPS. In 2004, the Services convened a Biological Review Team (BRT) composed of salmon biologists from the Services, the State of Maine, and the Penobscot Indian Nation. The Services will submit the Status Review completed by the BRT for peer review and then make a determination as to whether any additional action under the ESA is warranted.

The Connecticut River Atlantic Salmon Commission and the Merrimack River Policy Committee and the Pawcatuck River Technical Advisory Committee seek to restore all native diadromous fish species to respective rivers. One reason for this is the recognition that a full suite of diadromous fish in the watershed will convey biological benefits to Atlantic salmon.

Specific Actions

4.4.1 Prepare literature review of species diversity and abundance in Atlantic salmon watersheds (Year 1).

4.4.2 Prepare review of linkages between Atlantic salmon and other species in order to better understand the relationships and prioritize actions for recovery (Year 1 and 2).

4.4.3 Submit Status Review for Peer Review and determine if additional action under the ESA is warranted (Year 1).

4.4.4 In watersheds in which comprehensive diadromous fish restoration has already begun, continue to provide fish passage for American shad, alewife, blueback herring, sea lamprey, shortnose sturgeon, Atlantic sturgeon, American eel, and other diadromous species, as appropriate as well as other support activities such as habitat improvement and stock transplantation.

5 Evaluation

Efforts to restore and recover Atlantic salmon and their habitat in the U.S. have not yet achieved significant self-sustaining populations. Regardless, some success has been experienced. Since initiation of the program to restore Atlantic salmon on the Connecticut River over thirty years ago, an annual return of sea-run Atlantic salmon number in the hundreds has been established; a reliable river-specific egg source has been developed; in-stream production of smolts is occurring; upstream passage is in place at the first five mainstem dams; interim and permanent downstream passage is in

place at the lowermost eight mainstem dams and a number of tributaries; and fish culture, fish health management and stocking has been improved.

The status of U.S. stocks of Atlantic salmon is evaluated on an annual basis by the U.S. Atlantic Salmon Assessment Committee (USASAC). In 1988 the USASAC was formally created and charged with the following tasks: (1) to conduct annual U.S. Atlantic salmon stock assessments, (2) to evaluate ongoing U.S. Atlantic salmon research programs and develop proposals for new research, and (3) to serve as scientific advisors to the U.S. Section of NASCO. The USASAC meets annually and produces an Atlantic salmon program assessment that is used by US representatives to ICES to respond to the Terms of Reference from NASCO to the North Atlantic Salmon Working Group. Further, the USASAC responds to direct requests for information from the U.S. Commissioners to NASCO.

The Recovery Plan for the GOM DPS of Atlantic salmon includes recovery criteria. The Recovery Plan includes demographic and threat reduction recovery criteria. The most quantitative criteria requires a replacement rate (5-year geometric mean) of adult salmon greater than 1.0 to demonstrate stabilization. This is calculated on an annual basis by the USASAC identified above. The efficacy of management measures is partially evaluated by the response of Atlantic salmon in terms of parr abundance, outmigrating smolts and ultimately adult returns. In addition, the Recovery Team for the GOM DPS of Atlantic salmon conducts an annual inventory of actions being undertaken to facilitate recovery and the effectiveness of those efforts.

Water quality sampling will be conducted along with surveys of non point source pollution in watersheds. A reduction in the number of sites negatively impacted by non point source pollution will be considered a success. A reduction in the number of violations detected during annual audits of the containment management systems at marine aquaculture cages will be used to evaluate success. A reduction in the number of reported losses and detection of escapees in rivers will be considered a success.

6 References of Interest

Atlantic Salmon in Maine 2004 National Research Council of The National Academies The National Academy of Sciences created a multidisciplinary committee to review the available scientific information on the status of Atlantic salmon populations in Maine. The committee assessed causes of population declines and the current threats to their continued existence. The report can be found at: http://fermat.nap.edu/catalog/10892.html

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