ATLANTIC COASTAL FISH HABITAT PARTNERSHIP

CONSERVATION STRATEGIC PLAN

2012-2016



For More Information

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Atlantic Coastal Fish Habitat Partnership

Conservation Strategic Plan 2012-2016

Executive Summary

The Atlantic Coastal Fish Habitat Partnership (ACFHP) is an assembly of groups interested in the conservation of habitat for Atlantic coast diadromous, estuarinedependent, and coastal fish species. It was formed in 2006 under the auspices of the National Fish Habitat Action Plan. Numerous human-derived threats are impacting Atlantic coastal drainages. ACFHP will work to address these threats with a broad coordinated approach, and to leverage resources from many agencies, organizations, and others to make a difference for fish habitat along the Atlantic coast.

The ACFHP Conservation Strategic Plan proposes key conservation strategies to confront pervasive threats to fish habitat along the Atlantic coast. While ACFHP is taking a collaborative coast-wide approach to addressing fish habitat needs, we realize that sub-regional prioritization may be needed to attend to more localized issues. Therefore, sub-regional Priority Habitats are identified in the Plan as well. These prioritizations were designed to focus the efforts of the Partnership in areas where ACFHP, together with our partners, can make a measurable difference for fish habitat.

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Introduction

Healthy waterways and robust fish populations are vital to the wellbeing of our society. They provide clean water and sustainable fisheries. They also are vital for less tangible reasons, as anyone who has fished wild waters or canoed a tranquil stream can attest. Unfortunately, in many waters around the country, fish and the habitats on which they depend are in decline...A tremendous amount of work has been undertaken to protect, restore and enhance these aquatic habitats...Although significant gains have been made, they have not kept pace with impacts resulting from population growth and land-use changes...Given the diverse array of federal, state, tribal, local, and private jurisdictions, the need has never been greater for increased action and improved coordination of fisheries conservation measures across boundaries and jurisdictions. (AFWA, 2006)

Developed by a coalition of anglers, conservationists, scientists, state and federal agencies, and industry leaders, and established in 2006, the National Fish Habitat Action Plan (NFHAP) seeks to protect, restore and enhance the nation's fish and aquatic communities through partnerships that foster fish habitat conservation and improve the quality of life for the American people (<u>AFWA, 2006</u>). NFHAP is currently composed of 17 Fish Habitat Partnerships, including the Atlantic Coastal Fish Habitat Partnership (ACFHP), and four 'candidate' Partnerships, across the United States.

From 2007-2009, the average annual value of all US marine fisheries landings was \$4 billion dollars (<u>NMFS, 2010</u>) and in 2006, saltwater anglers spent \$31 billion dollars (<u>NMFS, 2008</u>) however, the sustainability of these fisheries is at risk due to aquatic habitat damage and loss (<u>NMFS, 2009</u>). Many recreationally and commercially caught species use Atlantic coastal habitats for some portion of their life history.

Human use of aquatic habitats can potentially impact those habitats (<u>NMFS, 2009</u>) and 53% of our nation's total population currently lives in coastal counties (<u>Woods & Poole and NOAA, 2010</u>). ACFHP's boundary includes two of the five fastest growing coastal counties in the nation, from 1970-2011: Flagler and Osceola counties, located on the east coast of Florida (<u>Woods & Poole and NOAA, 2010</u>).

The issues that ACFHP will address are broad-based, and tackling them is important for the conservation of Atlantic coastal habitats. This Partnership is designed to bring diverse groups together to identify the causes of habitat declines, implement strategic corrective action, and measure and communicate progress. The end result will benefit not only a great number of species, from diadromous to marine, but a large population of human users as well.

History

In 2006, the Atlantic States Marine Fisheries Commission (ASMFC) was approached by the U.S. Fish and Wildlife Service (USFWS) to consider initiating a partnership under NFHAP. At that time, the existing NFHAP partners were primarily focused on freshwater habitats. ASMFC, with its existing infrastructure and administrative processes, seemed to be a logical organization to catalyze a partnership focused on coastal fish habitat. ASMFC agreed and subsequently charged its Habitat Committee with developing a coastal fish habitat partnership.

The Habitat Committee's charge led to a series of conference calls in the summer of 2006 between the Habitat Committee and NFHAP staff. In the fall, two letters indicating the ASMFC's interest and involvement with the partnership development process, and outlining efforts to date, were submitted to the NFHAP Board. In 2007, the NFHAP Board granted ACFHP 'candidate partnership' status.

Also in the fall of 2006, letters were sent to potential partners identified by the Habitat Committee, informing them of the partnership development and requesting their involvement.

Mission

To accelerate the conservation, protection, restoration, and enhancement of habitat for native Atlantic coastal, estuarinedependent, and diadromous fishes through partnerships between federal, tribal, state, local, and other entities. In the winter of 2007, a series of informational sessions were held along the Atlantic coast, with the aim of gathering potential ACFHP partners and disseminating information on NFHAP and ACFHP activities to date. These 'Listening Sessions' were held in Florida, South Carolina, Virginia, New Jersey, and New Hampshire.

In May 2007, a coast-wide workshop was held

in Baltimore, Maryland, to engage stakeholders and partners in developing and implementing ACFHP, including establishing its focus and administrative structure, as well as discussing strategies for addressing next steps. Approximately 80 participants attended, including representatives from state, federal, and non-governmental organizations. Among the many

outcomes, preliminary target species and habitats were determined, and the major committees of the Partnership were created: the Interim Steering Committee, the Science & Data Working Group, and the Communications Working Group.

In 2008, the ACFHP Charter and Bylaws were approved by the Interim Steering Committee and an ACFHP Coordinator was hired to assume coordination

Vision

Healthy, thriving habitats of sufficient quantity and quality to support all life stages of Atlantic coastal, estuarine-dependent, and diadromous fishes

of the Partnership's activities. In March 2009, the ACFHP Memorandum of Understanding (MOU) took effect, formalizing the Partnership. In October 2009, ACFHP was approved by the National Fish Habitat Board as an official Fish Habitat Partnership under NFHAP.

As of September 2011, ACFHP has supported four on-the-ground fish habitat conservation projects, one in Maine, one in New York and two in South Carolina.

Governance and Organization

The ACFHP MOU (available on the ACFHP web page at: <u>www.atlanticfishhabitat.org/2008-ACFHP-MOU.pdf</u>) is made up of 30 signatories including 16 states responsible for managing Atlantic coastal river drainage systems (see sidebar to the right for a complete list of ACFHP Partners). The Partnership hopes to bring in additional organizations committed to conserving fish habitat along the Atlantic coast in the future.

The Steering Committee is the decision-making body of ACFHP and has oversight responsibility for all ACFHP activities. It is self-directed, volunteer, and has no authority beyond that of its individual members. Each partner organization is allowed one voting member on the Steering Committee, with a cap of 25 voting members.

Working groups are organized by the Steering Committee, and members are appointed by Steering Committee members or they are volunteers. Working group chairs are not required to be current Steering Committee members. This is to facilitate as much involvement from the Partnership as possible and to share leadership opportunities. Established working groups include the Science and Data Working Group and the Communications Working Group. The Steering Committee also creates ad-hoc working groups and subcommittees in order to address issues identified by the Partnership as they arise.

The ACFHP Charter and By-Laws define the overall function, organization, and membership of the Steering Committee and working groups. This document includes guidance for meeting management and a decision structure (available on the ACFHP web page at: www.atlanticfishhabitat.org/ACFHP-Charter-and-Bylaws.pdf).

PARTNERS

Albemarle-Pamlico National Estuary Program

American Littoral Society

American Rivers

Atlantic States Marine Fisheries Commission

Chesapeake Bay Foundation

Connecticut Dept of Energy & Environmental Protection

Delaware Dept of Natural Resources & Environmental Control

Environmental Defense Fund

Florida Fish & Wildlife Conservation Commission

Georgia Dept of Natural Resources

Houlton Band of Maliseet Indians

Maine Dept of Marine Resources

Maryland Dept of Natural Resources

Massachusetts Division of Marine Fisheries

National Oceanic and Atmospheric Administration

New Hampshire Fish & Game Dept

New Jersey Division of Fish & Wildlife

New York State Dept of Environmental Conservation

North Carolina Dept of Environment & Natural Resources

Oyster Recovery Partnership Partnership for the Delaware Estuary Pennsylvania Fish & Boat Commission Rhode Island Division of Fish & Wildlife

South Carolina Dept of Natural Resources

The Nature Conservancy United States Fish and Wildlife Service United States Geological Survey Vermont Fish and Wildlife Department Virginia Marine Resources Commission Wells National Estuarine Research Reserve

Science and Data

The Partnership has completed two science projects to date: A Species-Habitat Matrix (<u>ACFHP</u>, <u>2009</u>) and Assessment of Existing Information on Atlantic Coastal Habitats (hereinafter referred to as 'the Assessment') (<u>Nelson et al., 2010</u>). These projects were completed to inform or verify the development of conservation objectives and priorities. The Partnership expects to further develop, analyze, or refine the outcomes of these projects primarily through the efforts of its Science and Data Working Group, as defined in <u>Section C</u> of this report.

The Species-Habitat Matrix is an assessment of the relative importance of specific estuarine and freshwater habitat types in terms of their value to the major life stages of over 100 fish species. The development, review, and analysis of the Species-Habitat Matrix was spearheaded by members of the ACFHP Science and Data Working Group, however it involved contributions from over 50 people, coast-wide to which scientists from state, federal, non-governmental, and academic entities contributed. It represents a coast-wide cooperative effort. The Species-Habitat Matrix Project Summary Report is available on the ACFHP web page at: www.atlanticfishhabitat.org/Species Habitat Matrix Summary Report.pdf

The Assessment was conducted through a contract supervised by NOAA's National Ocean Service. It is a database of over 500 documents, datasets, and information portals on Atlantic coastal fish species and habitats which were collected and analyzed for indicator, threat, and action information. A web-based queryable database allowing resource managers access to this information is available at <u>http://www8.nos.noaa.gov/bhv/spatbibindex.html</u>. Results are summarized in a final report available at <u>http://ccma.nos.noaa.gov/publications/nccostechmemo103.pdf</u>

Communications and Outreach

The Partnership has developed fact sheets, posters, and a website (<u>www.atlanticfishhabitat.org</u>) in order to engage its partners and the broader fish habitat conservation community. The Partnership plans to continue its communications and outreach program, primarily through its Communications and Outreach Working Group, as defined in <u>Section D</u> of this report.

Finances

In 2007, the Partnership received \$10,000, through a cooperative agreement with USFWS, for use towards communications related activities and materials. In 2008, the Partnership was awarded a grant under the Multistate Conservation Grant Program which has provided funding for its development and operations. In FY10 \$70,000 in USFWS-NFHAP funding was directed towards ACFHP on-the-ground projects. And in FY11, \$74,603 was directed towards ACFHP on-the-ground projects. The Partnership plans to continue its financial capabilities primarily through its Finance Subcommittee, as defined in Section E of this report.

Geographic Profile

Partnership Boundary *Geographic Range* Maine to the Florida Keys

Inland Extent Headwaters of coastal rivers

Marine Extent Offshore to the edge of the continental shelf

Subregion Boundaries

ACFHP utilizes subregional boundaries for the purposes of habitat prioritization. Subregions represent ecologically distinct units and were derived from Marine Ecoregions of the World (as established by the World Wildlife Fund and The Nature Conservancy). These include the Gulf of Maine, Virginian, Carolinian, and Floridian ecoregions which correspond to ACFHP subregions North Atlantic, Mid-Atlantic, South Atlantic, and South Florida, respectively. While these subregions are unique to ACFHP, the Partnership will work collaboratively with the appropriate partners to ensure optimal success.



Figure 1. Atlantic Coastal Fish Habitat Partnership and Subregion Boundaries

Effort Profile

With its mission statement in mind, ACFHP plans to work throughout the region outlined in **Figure 1**. However, ACFHP will place less emphasis on upstream headwaters and offshore marine ecosystems and more on coastal/estuarine environments.

ACFHP will seek to ensure contiguous watershed coverage with adjacent fish habitat partnerships while seeking to minimize overlap. As ACFHP develops on-the-ground projects, it will work with these partnerships to identify where cooperation should occur and to identify new avenues for collaboration. This will ensure that ACFHP is not working in competition, but in concert with existing partnerships towards fish habitat conservation. Figure 2 demonstrates the relative effort that will be dedicated to Atlantic coastal areas on a continuum from white water to blue water.



Figure 2. ACFHP Relative Effort Level in Relation to Distance from the Coast

Purpose

The ACFHP Conservation Strategic Plan is a broad coast-wide strategy for determining and addressing the threats affecting habitats important for all life stages of Atlantic coast diadromous, estuarine-dependent, and coastal species. The Plan is designed to address actions that the Partnership can take to improve the condition of Atlantic coast fish habitat over the next five years, with re-examination after three years of implementation.

The Plan was developed by the ACFHP Steering Committee and others and was reviewed by members of the ACFHP Science and Data Working Group. It will be provided to the Partnership-At-Large with a request for comment that will be considered during the development of future ACFHP Conservation Strategic Plans.

Implementation Plans will include steps towards achieving action items identified in this Conservation Strategic Plan and will be developed every one to two years.

Subregional action plans, with specific, time-bound, quantifiable action items will be considered in the future. Suggestions will be solicited from the ACFHP Science and Data Working Group and other regional experts.



Habitats

The full list of ACFHP Habitats (Table 1) is based on the list determined by members of the ACFHP Science Data Working Group for consideration in the ACFHP Species-Habitat Matrix. This list <u>should not be considered a comprehensive index</u> of all habitats along the Atlantic coast; however, these habitats were determined to <u>best represent the range of habitats</u> supporting Atlantic coastal, estuarine-dependent, and diadromous fishes at a coast-wide level.

Table 1 illustrates the 25 habitat types nested within seven habitat categories (see <u>Appendix A</u>. Habitat Characterizations for more detailed descriptions). **Table 1** has a hierarchical design where the habitat **types** are listed under a particular habitat **category**. The habitat types are examples of particular habitat characterizations that fall within a broader habitat category.

Habitat Category	Habitat Type			
Marine and Estuarine Shellfish Beds	Oyster aggregations/reef			
	Scallop beds			
	Hard clam beds			
	Shell accumulations			
Constand	Coral reefs			
Coral and Live/Hard Bottom	Patch reef, soft corals, or anemones			
	Live rock			
Macroalgae	Fucus spp., Laminaria spp., Ulva lactuca			
Submerged Aquatic	Tidal fresh & oligohaline plant species			
Vegetation	Mesohaline & polyhaline plant species			
Tidal Vegetation	Estuarine emergent marsh			
	Tidal freshwater marsh			
	Mangrove			
	Loose fine bottom			
Unvegetated	Loose coarse bottom			
Coastal Bottom	Firm hard bottom			
	Structured sand habitat			
Riverine Bottom	Higher gradient headwater tributaries			
	Lower gradient tributaries			
	Higher gradient large mainstem river			
	Lower gradient large mainstem river			
	Low order coastal streams			
	Non-tidal freshwater mussel beds			
	Coastal headwater pond			
	Non-tidal freshwater marsh			

Table 1. ACFHP Habitats by Category and Type

Subregional Priority Habitats

ACFHP has selected three priority habitats within each subregion using the results of the Species-Habitat Matrix as a guide, and professional judgment to factor in other considerations (such as habitat rarity or high potential for conservation). The matrix was used as a tool in developing the list of Subregional Priority Habitats, but it was not the sole factor in selecting Subregional Priority Habitats. In some cases, ACFHP specifically selected other habitats because although a habitat that ranked high in the Matrix results may be important and used by many species, it may not necessarily be threatened or in need of protection. Summary results of the Species-Habitat Matrix can be found in <u>Appendix B</u>.

ACFHP will support efforts to accelerate the conservation, protection, restoration, and enhancement of <u>all</u> habitats listed in Table 1. The Subregional Priority Habitats <u>will not</u> be the only habitats to which ACFHP will target its strategic actions. However, given limited resources, projects addressing the Priority Habitats appropriate for the given subregion will receive <u>heightened consideration</u> during the next five years (2012-2016).

ACFHP Priority Habitats by Subregion

North Atlantic

Riverine Bottom Submerged Aquatic Vegetation (meso- to polyhaline) Marine and Estuarine Shellfish Beds

Mid-Atlantic

Riverine Bottom Submerged Aquatic Vegetation Tidal Vegetation South Atlantic

Marine and Estuarine Shellfish Beds Riverine Bottom Tidal Vegetation

South Florida

Coral and live/hardbottom Submerged Aquatic Vegetation (meso- to polyhaline) Mangrove

In some instances a habitat **category** was identified as a Subregional Priority Habitat, whereas in other cases a specific habitat **type**, falling within a habitat category, was selected as a Subregional Priority Habitat. The three priority habitats selected for each subregion are not ranked or prioritized within the subregion.

Priority Threats

Habitat degradation and persistent declines in Atlantic slope coastal drainage systems, which provide critical habitats for diadromous, estuarine-dependent, and coastal fish species, must be reversed. **Threats that impact important spawning and nursery habitats are of particular concern.** The Partnership has identified Priority Threats that are currently impacting habitats along the Atlantic coast. ACFHP Priority Threats are verified by the results of the Assessment. A table which relates the results of this project with ACFHP Priority Threats identified in this Plan can be found in <u>Appendix C</u>. The Assessment Technical Memorandum NOS NCCOS 103 is available at the following location: <u>http://ccma.nos.noaa.gov/publications/nccostechmemo103.pdf</u>.

List of Priority Threats Impacting ACFHP Habitats at a Coast-wide Scale.

- Obstructions to Fish Movement/Habitat Connectivity
 - Includes: Dams; hydropower facilities; road crossings and culverts; thermal barriers; reduced stream flow and low flow areas caused by diversions, withdrawals, legacy effects, and reduced base flow; jetties and breakwater; tidal turbines; and beaver dams or debris jams.
 - Importance: This threat is a concern in estuaries as well as riverine and tidal systems, as hydrokinetic energy generation is further explored. Dams, culverts, sedimentation and other impediments to fish movement can impact and limit the

survivability of fish populations and lead to local extinctions in rivers, streams, and estuaries along the Atlantic coast. Obstructions to fish movement can adversely affect populations of diadromous species as well as important estuarine fish populations and life history stages.



• Dredging and Coastal Maintenance

- Includes: Dredging; blasting; port expansion and maintenance; dredge spoil disposal; and beach maintenance (including beach fill, mining of sand, bulldozing, sand bypass, sand bags, and shoreline stabilization).
- Importance: Human activities around marinas, ports, and residential docks can have major impacts on fish habitat. The direct impacts of this threat are the removal, degradation, or smothering of habitat. Indirect impacts involve the blockage of sunlight or are linked with other threats noted in this section. This threat is serious and persistent given its on-going and reoccurring nature. Once

habitat is allowed to re-establish in impacted areas, it is impacted again. The areas of greatest impact are nursery and spawning areas; protection of these areas is vitally important to ensure sustainability of critical life stages of many species.

• Water Quality Degradation and Eutrophication

- Includes: Surface water and groundwater quality and quantity; point/non-point source pollution; nutrient loading; atmospheric deposition; and dissolved oxygen concerns.
- Importance: This threat can occur in all aquatic habitats. Water quality decline and eutrophication are among the most common causes of aquatic habitat degradation. For example, nutrients promoting excessive algal blooms, such as nitrogen and phosphorus, can decrease oxygen levels in the water column and cause die off of fish and other marine species. This threat is one of the most pervasive and difficult to target and reverse. Often this threat must be addressed in order for habitat restoration to be successful over the long-term.

Consumptive Water Withdrawal

- Includes: Withdrawals for industrial, agricultural, residential, and recreational uses, such as irrigation, desalinization, and energy generation; flow concerns; and freshwater withdrawal in the salt front.
- Importance: Consumptive water withdrawal can lead to inadequate abundance of water quantity or flow for fish and their habitats, degraded water quality, and alter the location of the interface and salt water wedges. This is a particularly challenging threat to address because of the inherent difficulties of balancing conflicting water needs of fish and humans from a particular water body. Impacts to habitat can result from groundwater as well as surface water removals. These competing needs must be considered when decisions are made on consumptive water withdrawals.



- Sedimentation
 - Includes: Suspended and deposited solids; construction of impervious surfaces in the watershed (e.g. parking lots, roads, buildings); point and non-point source runoff; and development of shorelines and riparian areas.
 - Importance: Sedimentation is a particularly important threat to consider when dealing with riverine or estuarine habitats. Watersheds with a high percentage of impervious surfaces and erosion often have sedimentation impacts on aquatic habitats. Sediment runoff can smother fish eggs, impact physiological and behavioral responses in fish, vegetation, shellfish beds, submerged aquatic vegetation (SAV), dislodge plants, decrease light penetration, and increase susceptibility to disease.

• Vessel Operation Impacts

- Includes: Recreational and commercial vessel operation; prop washing; anchoring; grounding; and discharge.
- Importance: Vessel impacts are most prevalent in shallow water estuarine and marine habitats. Vessel operation can lead to propeller scarring, shoreline erosion due to wakes and grounding, and shading from boats and associated docks.

• Contamination of Water (ground and surface) and Sediments

- Includes: Heavy metal accumulation; acid precipitation; pesticides and herbicides; petrochemical spills; and pharmaceuticals.
- Importance: Contamination can degrade the health of both habitats and species, especially for elements that easily bioaccumulate in tissues and sediments. Identifying the sources of and avenues to address contamination issues can be particularly challenging. An emerging concern involves the prevalence of pharmaceuticals in water supplies that affect humans and fish alike. Contamination is a major concern because it can cause lethal and sub-lethal effects, disease, locomotor impairment, abnormal mating and other behaviors, incomplete or abnormal development, inadequate nutrient balance, susceptibility to parasites, and other problems.

• Invasive Species

- Includes: Introduction of invasive species, including plants, invertebrates, and vertebrates, and lack of invasive species eradication.
- Importance: Demonstrated many times over, invasive species can have a major impact on fish and their habitats. Native habitat types may be outcompeted, smothered, or displaced by invasive plants (such as common reed *Phragmites australis* or water lettuce *Pistia stratiotes*) and animals (such as zebra mussel *Dreissena polymorpha*, mitten crab *Eriocheir sinensis*, and pink barnacle *Tetraclita rubescens*). The best way to address this threat is to try to prevent introductions through public education and encouraging the use of best management practices (BMPs) (e.g. in vessel transport). Once an invasive species is introduced, it is difficult or impossible to eradicate.

Climate Change

- Includes: Sea level rise; ocean acidification; increased water temperatures; increased storm frequency and severity; habitat expansion, contraction, and fragmentation due to climate change; species geographic shifts, and eutrophication.
- Importance: The full impacts and timeline of impacts are still being debated. However, climate change is likely to influence all habitats and species along the Atlantic coast in some way. Climate change has the potential to strongly influence how we plan and execute habitat protection and restoration projects. The ways in which climate change influences projects will likely evolve over time as we learn more about how the atmosphere and oceans are changing.

• Other Threats

Other threats to Atlantic coast fish habitat were identified. However, those threats were determined not to be as high of a priority for ACFHP, or were of a nature that could not be effectively addressed by ACFHP. Those threats included: 1) fishing gear impacts (including hydraulic clamming, bottom-tending gears, and recreational and commercial fishing impacts on habitat); 2) energy development (including tidal, wave, wind, and hydropower); 3) aquaculture (including pathogen transfer, entanglement, nutrient issues, and genetic sustainability); 4) inadequate implementation of existing regulatory systems (including permitting, zoning, land-use planning, sewage treatment, floodplain management, and fishery management); and 5) physical impacts to fish (including entrainment, impingement, propeller strikes, prop wash, turbines).

All of these threats can be cumulative, which can possibly cause irreversible changes to the ecosystem.



Goals

ACFHP goals are modeled after the goals outlined in the National Plan, which highlight the protection, prevention, restoration, and enhancement of fish habitat.

Goal 1: Protect and maintain intact and healthy aquatic systems for native Atlantic coastal, estuarine-dependent, and diadromous fishes.

Goal 2: Prevent further degradation of fish habitats that have been adversely affected.

Goal 3: Restore the quality and quantity of aquatic habitats to improve the overall health of fish and other aquatic organisms (especially those habitats that play an important role in critical life history stages of fish species, e.g. nursery and spawning areas).

Goal 4: Restore aquatic habitats to aid in recovery of threatened or endangered species (state and federal).

Goal 5: Enhance the quality and quantity of aquatic habitats that support a broad natural diversity of fish and other aquatic species.

Objectives and Strategic Actions

To achieve its goals ACFHP has developed a series of objectives encompassing protection, restoration, science and data, communications and outreach, and financial needs and activities. Strategic actions were identified to achieve those objectives. The Partnership has considered the human drivers (indirect and direct) and the key opportunities to address Priority Threats. It has also assessed the constraints it must work within as well as its operational needs in developing the objectives and strategies in this Plan. The strategic actions are intended to guide the Partnership's activities towards achieving an overarching objective of protecting and restoring aquatic habitat, on a coast-wide scale. They focus on activities that ACFHP can reasonably work toward achieving over the next five years.

The **protection objectives** are proactive initiatives that highlight the need to address priority threats that are adversely impacting aquatic habitats along the Atlantic coast before the habitats are in need of restoration. The **restoration objectives** highlight the need to restore aquatic habitats along the Atlantic coast that have already been impacted by various human activities.

While each strategic action has a specified time frame to achieve that strategic action, many of the strategic actions (or portions of) should be considered ongoing. Once said actions have been accomplished, ACFHP will continue to carry out these actions according to the life of the Plan (five years), with an opportunity for review after three years. At the conclusion of three and again at five years, these strategic actions will be considered by ACFHP for continuation into the future, or for their conclusion.

Section A: Habitat Protection Objectives

Protection Objective 1: Ensure adequate and effective fish movement past existing or potential barriers to maintain connectivity within Subregional Priority Habitats.

Threat: Obstructions to Fish Movement/Habitat Connectivity; Consumptive Water Withdrawal

Impacted Habitat Categories: Marine and Estuarine Shellfish Beds; Tidal Vegetation; Riverine Bottom; Coral and Live/Hard Bottom; SAV

- ✓ A.1.1 Strategic Action: Coordinate with partners to synthesize existing information in order to identify and prioritize watersheds for conservation where fragmentation of, or barriers to, fish dispersal are a potentially critical threat to be addressed. Short-term
- ✓ A.1.2 Strategic Action: Coordinate with partners to develop and disseminate a "standardized toolbox" of fish passage technologies (techniques and methodologies) and guidance to assist ACFHP partners in the development and implementation of effective fish passage protocols designed to alleviate this threat for new projects. Long-term

Protection Objective 2: Maintain or improve water quality and hydrology in Subregional Priority Habitats that are currently functioning, through incorporation of BMPs and/or technological controls.

Threat: Water Quality Degradation and Eutrophication; Contamination of Water (ground and surface) and Sediments

Impacted Habitat Categories: Marine and Estuarine Shellfish Beds; Coral and Live/Hard Bottom; Submerged Aquatic Vegetation; Tidal Vegetation; Riverine Bottom

- ✓ A.2.1 Strategic Action: Define the critical water quality variables and hydrology needed to protect Subregional Priority Habitats. Short-term
- ✓ A.2.2 Strategic Action: Coordinate with partners to develop and disseminate a toolbox or guidance document of non-structural BMPs that will assist ACFHP partners in improving or protecting water quality for fish habitat. Long-term
- ✓ A.2.3 Strategic Action: Coordinate with partners to synthesize existing information in order to identify and prioritize watersheds for water quality improvement for fish habitat. Short-term
- ✓ A.2.4 Strategic Action: Encourage the use of BMPs designed to improve point/nonpoint discharge management that addresses the impacts of inorganic and organic contaminants, including emerging contaminants of concern for Subregional Priority Habitats. Long-term

Protection Objective 3: Define the water flows and volumes needed to sustain the structure and function of healthy aquatic ecosystems (including groundwater and surface water interactions, maintaining appropriate salinity regimes) and ameliorate consumptive water usage where detrimental to Subregional Priority Habitats.

Threat: Consumptive Water Withdrawal

Impacted Habitat Categories: Riverine Bottom; Coral and Live/Hard Bottom; Submerged Aquatic Vegetation; Marine and Estuarine Shellfish Beds; Tidal Vegetation

 A.3.1 Strategic Action: Identify current work being done on this objective (e.g. Southeast Aquatic Resources Partnership and Southern Instream Flow Network, instream flow work at Federal and state agencies) and determine how ACFHP can best partner with these efforts. *Short-term*

Protection Objective 4: Minimize or reduce adverse impacts to Subregional Priority Habitats associated with coastal development and water dependent activities (e.g. recreational boating, and marine transportation).

Threat: Vessel Operation Impacts; Dredging and Coastal Maintenance; Sedimentation

Impacted Habitat Categories: Marine and Estuarine Shellfish Beds; Coral and Live/Hard Bottom; Submerged Aquatic Vegetation; Tidal Vegetation; Riverine Bottom

✓ A.4.1. Strategic Action: Identify current work being doneon this objective (e.g. guidance on dredgingand low impact development) and determine how ACFHP can best partner with these efforts. *Mid-term*

Protection Objective 5: Maintain or increase the resiliency of Subregional Priority Habitats to the impacts of climate change.

Threat: Climate Change

Impacted Habitat Categories: Marine and Estuarine Shellfish Beds; Coral and Live/Hard Bottom; Submerged Aquatic Vegetation; Tidal Vegetation; Riverine Bottom

- ✓ A.5.1 Strategic Action: Work with partners to identify techniques and guidance documents that can be helpful in maintaining the priority habitats within each subregion against the adverse affects of climate change. *Short-term*
- ✓ A.5.2 Strategic Action: Encourage all institutions responsible for aquatic habitat management to include impacts to fish habitat in their climate change planning and modeling efforts. Long-term

Protection Objective 6: Increase public awareness of the threats facing Subregional Priority Habitats and the protection measures available to avoid and minimize those threats.

Threat: Obstructions to Fish Movement/Habitat Connectivity; Dredging and Coastal Maintenance; Water Quality Degradation and Eutrophication; Consumptive Water Withdrawal; Sedimentation; Climate Change; Vessel Operation Impacts; Contamination of Water (ground and surface) and Sediments; Invasive Species

Impacted Habitat Categories: Marine and Estuarine Shellfish Beds; Coral and Live/Hard Bottom; Submerged Aquatic Vegetation; Tidal Vegetation; Riverine Bottom

✓ A.6.1 Strategic Action: Develop and disseminate public outreach materials on the adverse impacts of human activities on fish and fish habitat as well as ways to avoid and minimize those impacts. Long-term

Section B: Habitat Restoration Objectives

Restoration Objective 1: Restore and enhance hydrological or physical connections between Subregional Priority Habitats to promote fish utilization and improve overall aquatic health.

Threat: Obstructions to Fish Movement/Habitat Connectivity; Consumptive Water Withdrawal

Impacted Habitat Categories: Marine and Estuarine Shellfish Beds; Tidal Vegetation; Riverine Bottom

- ✓ B.1.1 Strategic Action: Remove dams and other physical barriers in areas identified as a priority for fish movement restoration. *Mid-term*
- B.1.2 Strategic Action: Restore tidal hydrology in priority wetland areas (e.g. repairing or removing culverts or berms restricting flow or separating wetlands). Mid-term
- B.1.3 Strategic Action: Identify priority areas in each subregion where Priority Habitats have been degraded or eliminated by past alterations to hydrology, and where conditions for restoration of habitats exist. Mid-term
- B.1.4 Strategic Action: Compile information to identify barriers where fragmentation of habitats or barriers to fish movement exist. Short-term



✓ B.1.5 Strategic Action: Coordinate with partners to compile fish movement/habitat restoration techniques and guidance documents to aid partners in the planning, design, implementation, and monitoring of effective fish movement improvement projects. *Long-term*



Restoration Objective 2: Restore Subregional Priority Habitats, such as replanting eelgrass beds or restoring oyster beds, in locations where threats have been minimized or removed (does not include dam or other barrier removal).

Threat: Dredging and Coastal Maintenance; Water Quality Degradation and Eutrophication; Sedimentation; Climate Change; Vessel Operation Impacts; Contamination of Water (ground and surface) and Sediments; Invasive Species

Impacted Habitat Categories: Marine and Estuarine Shellfish Beds; Coral and Live/Hard Bottom; Submerged Aquatic Vegetation; Tidal Vegetation; Riverine Bottom

- B.2.1 Strategic Action: Restore Subregional Priority Habitats in each subregion where:
 (a) they have been damaged or destroyed by past declines in water quality or human activities, such as dredging, filling, development, or vessel operation; AND
 (b) conditions for restoration of habitats exist; AND (c) goal(s) of habitat restoration can be maintained. *Mid-term*
- ✓ B.2.2 Strategic Action: Prevent and attempt to control invasion of non-indigenous species, where feasible. Long-term

Restoration Objective 3: Restore water quality in areas where it has degraded or eliminated Subregional Priority Habitats.

Threat: Water Quality Degradation and Eutrophication

Impacted Habitat Categories: Marine and Estuarine Shellfish Beds; Tidal Vegetation; Riverine Bottom; Coral and Live/Hard Bottom; SAV

- B.3.1 Strategic Action: Coordinate with partners to compile a list of areas where Subregional Priority Habitats have been degraded or eliminated due to poor water quality. *Mid-term*
- ✓ B.3.2 Strategic Action: Support local projects that address water quality improvements that are associated with Subregional Priority Habitat improvement. Short-term

Restoration Objective 4: Maintain or increase the resiliency of Subregional Priority Habitats to the impacts of climate change through restoration activities.

Threat: Climate Change

Impacted Habitat Categories: Marine and Estuarine Shellfish Beds; Coral and Live/Hard Bottom; Submerged Aquatic Vegetation; Tidal Vegetation; Riverine Bottom

✓ B.4.1 Strategic Action: Encourage all ACFHP-supported restoration projects address projected climate change impacts to Subregional Priority Habitats during project planning and implementation. Long-term

Section C: Science and Data Objectives

Science and Data Objective 1: Support ongoing research related to identifying or assessing fish habitat conservation activities and the threats to fish habitats.

- ✓ C.1.1 Strategic Action: Support the funding or endorsement of applied science/research projects aimed at (1) monitoring and reducing the impacts of Priority Threats on ACFHP habitats, (2) evaluating the effectiveness of fish habitat conservation techniques or methodologies, and (3) answering management questions. Long-term
- C.1.2 Strategic Action: Support research dedicated to identifying additional causes of habitat loss and the resulting effects on ACFHP species. Long-term

Science and Data Objective 2: Work to achieve ACFHP Science and Data Needs (<u>ACFHP</u>, 2011) and fulfill science and data responsibilities

established by NFHAP.

- C.2.1 Strategic Action: Develop additional products and conduct continuing analysis of the Species-habitat Matrix. Short-term
- C.2.2 Strategic Action: Continue to synthesize, update, and fill in information gaps in the Assessment, and identify new applications. *Mid-term*
- C.2.3 Strategic Action: Beginning with the results of the Assessment and the work conducted by the National Fish Habitat Science and Data Committee, refine data and associated GIS layers to produce maps and other products that can be used to inform the goals and objectives laid out in this plan and to develop time-bound, spatially-explicit, and quantitative conservation objectives in future Plans or revisions to the Strategic Conservation Plan. Short-term
- C.2.4 Strategic Action: Develop Fish Habitat Occupancy Models¹ and the information needed to support them. *Mid-term*



✓ C.2.5 Strategic Action: Develop project tracking and evaluation capabilities for the purpose of capturing, assessing, and reporting conservation results to stakeholders. Long-term

¹ "Occupancy models that identify and delineate current habitats of priority fish species and can project habitat occupancy needs in the future are a useful tool for targeting conservation actions. Such models utilize scenarios of climate change, land use alteration, fish harvest, and other potential impacts to identify habitat types of greatest importance for conservation planning." (ACFHP, 2011)

Section D: Communications and Outreach Objectives

Communications and Outreach Objective 1: Develop or maintain physical or virtual information or avenues for communicating information to partners and the broader conservation community.

- ✓ D.1.1 Strategic Action: Maintain a website that meets the needs of partners and the broader conservation community. *Short-term*
- ✓ D.1.2 Strategic Action: Develop/use outreach materials (e.g. display, fact sheets) that meet the needs of partners and the broader conservation community. *Short-term*
- ✓ D.1.3 Strategic Action: Attend events such as conferences or meetings to promote ACFHP's mission and activities and encourage new partners to join. Short-term

Communications and Outreach Objective 2: Develop or maintain relationships with partners and the broader conservation community.

- ✓ D.2.1 Strategic Action: Develop a protocol for identifying and bringing in new partners. Short-term
- ✓ D.2.2 Strategic Action: Cooperate and exchange lessons learned with other landscape or regional partnerships and the National Fish Habitat Board. *Mid-term*
- ✓ D.2.3 Strategic Action: Promote the missions of ACFHP and NFHAP by participating in NFHAP's legislative strategy to further the objectives of all fish habitat partnerships and coordinate such activities with the legislative staff in each partner organization. Long-term

Section E: Finance Objectives

Finance Objective 1: Develop a mechanism and infrastructure within ACFHP for managing finances.

✓ E.1.1 Strategic Action: Establish a financial infrastructure to receive and disburse grant funds, operational funds, and other finances. Short-term

Finance Objective 2: Leverage conservation dollars.

- ✓ E.2.1 Strategic Action: Secure operational funding. Short-term
- ✓ E.2.2 Strategic Action: Secure project funding opportunities. Short-term
- E.2.3 Strategic Action: Identify private partners who can assist in providing matching funds to support operational and on-the-ground project activities. Short-term

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Appendix A.

Habitat Characterizations

Note that the habitat category into which a habitat type falls is underlined.

Marine and Estuarine Shellfish Beds

Oyster aggregations/reef

Structures formed by the Eastern oyster (*Crassostrea virginica*) that provide the dominant structural component of the benthos, and whose accumulated mass provides significant vertical relief (> 0.5 m).

Scallop beds

Areas of dense aggregations of scallops on the ocean floor. Common Atlantic coast species include: (1) the large Atlantic sea scallop (*Placopecten magellanicus*), which ranges from Newfoundland to North Carolina; (2) the medium-sized Atlantic calico scallop (*Argopecten gibbus*), which is found in waters south of Delaware; and (3) the bay scallop (*Argopecten irradians*), which occurs from Cape Cod to Florida, as well as in the Gulf of Mexico.

Hard clam beds

Dense aggregations of the hard clam (*Mercenaria mercenaria*) found in the subtidal regions of bays and estuaries to approximately 15 m in depth. Clams are generally found in mud flats and firm bottom areas consisting of sand or shell fragments.

Shell accumulations

Shells of dead mollusks sometimes accumulate in sufficient quantities to provide important habitat. Accumulations of Eastern oyster shells are a common feature in the intertidal zone of many southern estuaries.

Coral and Live/Hard Bottom

Coral reefs

Reef-building corals are of the order Scleractinia, in the class Anthozoa, of the phylum Cnidaria. Coral accumulations are restricted to warmer water regions, where the average



monthly temperature exceeds 18°C (64°F) throughout the year. Through symbiosis with unicellular algae, reefbuilding corals are the source of primary production in reef communities.

Patch reef, soft corals, or anemones

A patch reef is an isolated, often circular, coral reef usually found within a lagoon or embayment. Soft corals are species of the anthozoan order Alcyonacea, of the subclass Octocorallia. In contrast to the hard or stony corals, most soft corals do not possess a massive external skeleton (e.g. sea pens and sea fans). Anemones are cnidarians of the class Anthozoa that possess a flexible cylindrical body and a central mouth surrounded by tentacles found in soft sediments.

Live rock

Calcareous rock that is removed from the vicinity of a coral reef with some of the life forms still living on it. These may include bacteria, coralline algae, sponges, worms, crustaceans, and other invertebrates.

<u>Macroalgae</u>

Large marine multi-cellular macroscopic algae (seaweeds). There are three types of macroalgae: green, brown, and red. Examples of macroalgae species found along the Atlantic coast include:

Chlorophyta (green algae) Ulva lactuca, sea lettuce

Phaeophyta (brown algae) Fucus vesiculosus, bladderwrack; Laminaria spp.; Sargassum spp.

Rhodophyta (red algae) Chondrus crispus, Irish moss

Submerged Aquatic Vegetation (SAV)

SAV refers to rooted, vascular plants that live below the water surface in large meadows or small patches in coastal and estuarine waters. SAV can be further classified by the range of salinity of the waters in which they are found.

Tidal fresh and oligohaline plant species

Generally found in areas where salinity ranges from 0.5 to 5.0 ppt. Examples include: *Vallisneria americana*, wild celery *Ceratophyllum demersum*, coontail

Mesohaline and polyhaline plant species

Generally found in areas where salinity ranges from 5 ppt up to 30 ppt. Examples include: *Zostera marina*, eelgrass *Ruppia maritime*, widgeon grass

Tidal Vegetation

Estuarine emergent marsh

Salt marsh is an environment in the coastal intertidal zone between land and brackish water. The low marsh zone floods twice daily, while the high marsh floods only during storms and unusually high tides. Smooth cordgrass (*Spartina alterniflora*) dominates the regularly flooded low marsh along much of the Atlantic coast. In addition, salt meadow cordgrass (*Spartina patens*), saltgrass (*Distichlis spicata*), and needle rush (*Juncus* sp.) species comprise much of the vegetative community of the mid to upper salt marsh and brackish marsh.

Tidal freshwater marsh

Tidal freshwater marsh occurs where the average annual salinity is below 0.5 ppt. It is found along free-flowing coastal rivers, and is influenced twice daily by the incoming tides. Tidal freshwater marsh can be located just upstream of the salt front, where the river essentially backs up as it meets resistance from high tides. Tidal freshwater marsh is characterized by salt intolerant plant species. These include: giant cordgrass (*Spartina cynosuroides*), sawgrass (*Cladium jamaicense*), cattails (*Typha* sp.), arrow arum (*Peltandra virginica*), pickerelweed (*Pontedaria cordata*), blue flag (*Iris virginica*), and soft stem bulrush (*Scirpus validus*).

Mangrove

The mangrove ecological community includes four tree species collectively called mangroves. This swamp system occurs along intertidal and supratidal shorelines in southern Florida. The four species found in Florida mangrove swamps are:

Rhizophora mangle, red mangrove *Avicennia germinans*, black mangrove *Laguncularia racemosa*, white mangrove *Conocarpus erectus*, buttonwood

Unvegetated Coastal Bottom

Loose fine bottom

Submerged underwater bottom habitat in estuaries and oceans where the dominant sediment type is mud, silt, or sand.

Loose coarse bottom

Submerged underwater bottom habitat in estuaries and oceans where the dominant sediment type ranges from gravel to cobble.

Firm hard bottom

Submerged underwater bottom habitat in estuaries and oceans where embedded rock or boulders are the dominate sediment types.

Structured sand habitat

Linear, narrow sand features that develop where a stream or ocean current promotes deposition of sand.

Riverine Bottom

Higher gradient headwater tributaries

Streams in which the dominant substrate is comprised of gravel and cobble. The stream slope is greater than 2%. This characterization includes 1st to 3rd order streams².

Lower gradient tributaries

Streams in which the dominant substrate is comprised of sand, gravel, and small cobble. The stream slope is between 0.51% and 2.0%. This characterization includes 1st to 3rd order streams.

² "Stream order is a simple and common classification system for river and stream size. The Strahler stream ordering system uses a technique where "first" order streams are the smallest streams. Two first order streams combine to form second order streams, two second order streams combine to form a third order stream, and so on." (NBII, 2008)

Higher gradient large mainstem river

Rivers in which the dominant substrate is sand, gravel, and cobble. The stream slope is between 0.51% and 2%. This characterization includes 4th order rivers and above.

Lower gradient large mainstem river

Rivers in which the dominant substrate is fine sediments (silt, mud, sand). The stream slope is between 0.51% and 2%. This characterization includes 4th order rivers and above.

Low order coastal streams

Generally low gradient 0% to 0.05% in slope. This characterization includes 1st to 3rd order streams located along the coast.

Non-tidal freshwater mussel beds

Freshwater mussel beds, located above tidal influence.

Coastal headwater pond

A pond connected to coastal streams and rivers, generally located near the headwaters.

Non-tidal freshwater marsh

A marsh that occurs in the non-tidal section along a river. The main feature of a freshwater marsh is its openness, with only low-growing or "emergent" plants. It may include grasses, rushes, reeds, typhas, sedges, and other herbaceous plants (possibly with low-growing woody plants) in a context of shallow water.



Appendix B.

Summary Results of the Species-Habitat Matrix by Subregion

The Species-Habitat Matrix is a tool to evaluate the relative importance of different coastal, estuarine, and freshwater habitats in terms of their value to selected fish and invertebrate species. In the tables below, "Habitat Type with Highest Overall Score" represents the sum of scores across all fish species and life stages within a habitat type. "Habitat Type with Highest Nursery Score" represents the sum of scores for the juvenile/young-of-year life stage across all fish species within a habitat type. Note that the habitat category in which a habitat type falls is shown in brackets. Raw analysis scores are shown in parentheses. To read the Species-Habitat Matrix Report Summary Report please visit the ACFHP web page at: www.atlanticfishhabitat.org/Species Habitat Matrix Summary Report.pdf.

Please note that the names of some habitat categories and types in Table 1 and Appendix A are modified versions of the names used in the Species-Habitat Matrix, however their descriptions are the same (with the exception of a clarifying footnote that was added in Appendix A of this Plan).

North Atlantic	Highest Score	2 nd Highest Score	3 rd Highest Score	4 th Highest Score	5 th Highest Score
Habitat Type with Highest Overall Score [Habitat Category]	Loose Fine Bottom (154.5) [Coastal Inert Substrate]	Loose Coarse Bottom (123) [Coastal Inert Substrate]	Structured Sand (108.5) [Coastal Inert Substrate]	Firm Hard Bottom Polyhal [Coastal Inert Sul	n and Mesohaline- ine (105) bstrate and SAV]
Habitat Type with Highest Nursery (juv/yoy) Score [Habitat Category]	Loose Fine Bottom (52) [Coastal Inert Substrate]	Meso-Polyhaline spp. (48.5) [SAV]	Loose Coarse I and [(Bottom (38.5), Structo Firm Hard Bottom (Coastal Inert Substrate	ured Sand (38), (37.5)]

Mid-Atlantic	Highest Score	2 nd Highest Score	3 rd Highest Score	4 th Highest Score	5 th Highest Score
Habitat Type with Highest Overall Score [Habitat Category]	Loose Fine Bottom (260) [Coastal Inert Substrate]	Mesohaline- Polyhaline spp. (175.5) [SAV]	Lower Gradient Large Mainstem River (147) [Riverine]	Loose Coarse Bottom (134.5) [Coastal Inert Substrate]	Structured Sand Habitat (124.5) [Coastal Inert Substrate]
Habitat Type with Highest Nursery (juv/yoy) Score [Habitat Category]	Loose Fine Bottom (93.5) [Coastal Inert Substrate]	Mesohaline- Polyhaline spp. ^(70.5) [SAV]	Lower Gradient Large Mainstem River (53) [Riverine]	Loose Coarse Bottom (50.5) [Coastal Inert Substrate]	Structured Sand Habitat (49) [Coastal Inert Substrate]
South Atlantic	Highest Score	2 nd Highest Score	3 rd Highest Score	4 th Highest Score	5 th Highest Score
Habitat Type with Highest Overall Score [Habitat Category]	Saltwater/ Brackish Marsh ^(353.5) [Tidal Vegetation]	Loose Fine Bottom (295.5) [Coastal Inert Substrate]	Mesohaline- Polyhaline spp. (151.5) [SAV]	Lower Gradient Large Mainstem River (126) [Riverine]	Tidal FW Marsh ^(125.5) [Tidal Vegetation]
Habitat Type with Highest Nursery (juv/yoy) Score [Habitat Category]	Saltwater/ Brackish Marsh ^(154.5) [Tidal Vegetation]	Loose Fine Bottom (109.5) [Coastal Inert Substrate]	Meso-Polyhaline spp. (79) [SAV]	Oyster Reef (55.5) [Marine & Estuarine Shellfish Beds]	Lower Gradient Large Mainstem River (53) [Riverine]

South Florida	Highest Score	2 nd Highest Score	3 rd Highest Score	4 th Highest Score	5 th Highest Score
Habitat Type with Highest Overall Score [Habitat Category]	Patch Reef, Soft Coral or Anemones Amidst Soft Sediment (322) [Other Sessile Fauna]	Primary Coral Reef Architecture ^(312.5) [Other Sessile Fauna]	Live Rock (303) [Other Sessile Fauna]	Firm Hard Bottom (241.5) [Coastal Inert Substrate]	Loose Fine Bottom (185.5) [Coastal Inert Substrate]
Habitat Type with Highest Nursery (juv/yoy) Score [Habitat Category]	Mesohaline- Polyhaline (139) [SAV]	Patch Reef, Soft Coral or Anemones Amidst Soft Sediment (110) [Other Sessile Fauna]	Live Rock (108.5) [Other Sessile Fauna]	Primary Coral Reef Architecture ^(97.5) [Other Sessile Fauna]	Mangrove (92) [Tidal Vegetation]

Appendix C.

The Assessment is a database of 527 documents, datasets, and information portals on Atlantic coastal habitats which were collected and analyzed for indicator, threat, and action information³. The full report, *Assessment of Existing Information on Atlantic Coastal Fish Habitats: Development of a web-based spatial bibliography, assessment query tools, and data summaries* (NOAA Technical Memorandum NOS NCCOS 103) can be found at http://ccma.nos.noaa.gov/publications/nccostechmemo103.pdf.

In the table below, the information presented in the Number of Instances column and the Assessment Classified Threat Column are pulled from Table 9. Classification of Threats as Recorded in the Assessment, from the NOAA Technical Memorandum. Table 9 from this report groups the number of threats (instances) reported (n=1260) into threat categories. The ACFHP Priority Threat column illustrates the category(ies) (as discussed in the *Identification of Critical Threats* section of this Plan) that an Assessment Classified Threat could fall into. Other threat categories displayed in Table 9 of the NOAA Technical Memo that do not fall into an ACFHP Priority Threat category are not included here.

Assessment Classified Threat	Number of Instances	ACFHP Priority Threat
Water Quality	225	Water Quality Degradation and Eutrophication; Climate Change; Consumptive Water Withdrawal
Dams and Passage	106	Obstructions to Fish Movement/Habitat Connectivity
Climate Change	97	Climate Change
Dredging Issues	89	Dredging and Coastal Maintenance
Contaminants	84	Contamination of Water (ground and surface) and Sediments
Impervious Surfaces	64	Sedimentation

³ "Indicator – any measurement or assessment of a relevant parameter"; "Threat - anything adversely affecting quality of fish habitat";

[&]quot;Action - any conservation action recommended or already occurring." (Nelson et al., 2010)

Invasive Species	54	Invasive Species
Water Withdrawals	25	Consumptive Water Withdrawal
Boating issues	15	Vessel Operation Impacts; Water Quality Degradation and Eutrophication
Temperature	8	Obstructions to Fish Movement/Habitat Connectivity
Other - Stormwater Issues	22	Sedimentation; Water Quality Degradation and Eutrophication
Other - Agricultural Runoff	20	Sedimentation; Water Quality Degradation and Eutrophication
Other - Agricultural Practices	17	Consumptive Water Withdrawal
Other - Tidal Restriction	17	Obstructions to Fish Movement/Habitat Connectivity; Consumptive Water Withdrawal
Other - Riparian Buffers	14	Sedimentation
Other - Sedimentation	14	Sedimentation
Other - Shoreline Erosion	10	Sedimentation; Vessel Operation Impacts
Other - Sewage and Septic Issues	9	Water Quality Degradation and Eutrophication; Contamination of Water (ground and surface) and Sediments
Other - Marine Infrastructure	5	Dredging and Coastal Maintenance
Other - Storm Events	3	Climate Change
Other - Shoreline Hardening	1	Dredging and Coastal Maintenance; Sedimentation



