

HABITAT HOTLINE *Atlantic*

2013 Annual Issue, Volume 2



HEALTHY FISHERIES NEED HEALTHY HABITAT

Atlantic Coast Fish Habitat Conservation Efforts by the States

As the Chair of the Atlantic States Marine Fisheries Commission's Habitat Committee, it is my pleasure to present the 2013 issue of **Habitat Hotline Atlantic: Volume 2**. There is so much good work happening along the Atlantic coast that this year's *Habitat Hotline* had to be divided into two volumes. The first of the two volumes provided information on the fish habitat related work that partners, such as the Atlantic States Marine Fisheries Commission committees, US Fish and Wildlife Service, NOAA Fisheries, regional fishery management councils, and ocean planning organizations have been working on this year. This second volume focuses on the Atlantic coastal states and Pennsylvania's largely on-the-ground work towards improving habitats for marine and diadromous fish species, highlighting the importance of collaborative habitat conservation across state boundaries and in riverine systems.



Both volumes of the 2013 *Habitat Hotline* will provide the reader with examples of the commitment of the Habitat Committee and all affiliated partners to improving fisheries habitat conservation through partnerships, policy development, and education. It additionally exemplifies the creative approaches to the challenges of effectively integrating habitat protection, restoration, and enhancement into fisheries management programs and plans. Please take a moment of your busy schedules to enjoy reading about the various fish habitat related projects happening along our coast.

KENT SMITH
Habitat Committee Chair

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REGIONAL OYSTER RESTORATION PROJECTS

Largest Oyster Restoration Project in New England

Ray Konisky, *The Nature Conservancy, New Hampshire*

The Nature Conservancy, University of New Hampshire, NH Fish and Game Department, local oyster farmers, and numerous funding and permitting partners have worked together again in 2013 to rebuild native oyster reefs in New Hampshire's Great Bay Estuary. This year's project, totaling five acres of constructed shell reefs and restoration of an estimated one million oysters, is the largest project of this kind north of the Mid-Atlantic. The project builds on the previous five years of effort that has restored more than 13 acres of oyster reefs and two million oysters to the estuary. Its goal is to restore 100 acres by 2025.

Growing problems with excess nutrients, wastewater, and siltation in the Great Bay Estuary require a multi-faceted response that includes improved point and nonpoint source nutrient controls, stronger advocacy for estuary protection policies, accelerated coastal land conservation, and innovative in-the-water habitat restoration strategies. An important step in the recovery process is acknowledgement of the eastern oyster (*Crassostrea virginica*) and its role in the ecosystem. Healthy oyster populations provide significant water quality benefits as each adult oyster filters about 20 gallons of water per day. These resilient bivalves serve as the estuary's water purification system by filtering out nutrients and suspended solids that harm eelgrass beds and threaten other organisms. These oysters aggregate into subtidal reefs which provide habitat and feeding grounds for estuarine fish and other invertebrates.

Sustainable oyster populations are a keystone of the long-term health of the Great Bay Estuary. Since the early 1970s, about 90% of the local oyster population has been lost due primarily to disease, excessive silt pollution, and past over-harvest. There is now wide recognition that restoring oysters to Great Bay Estuary is one of the best direct actions that can be taken to improve water quality and the overall ecological health of the estuary. Oyster reefs are rebuilt using a two-stage process: 1) using



Oyster spat recruited on surf clam shell. Source: Ray Konisky

surfclam shell as substrate (about 100 cubic yards per acre), and 2) over-seeding with disease-resistant hatchery larvae settled on recycled oyster shells ("spat-on-shell"). The surfclam shell, spread by pressure hose off a barge, creates a shell reef foundation capable of recruiting natural set. Oyster spat-on-shell seeding is then added to the reef at about 50 spat per square meter, a target density observed on the 80+ acres of natural oyster reefs remaining in the system. Annual monitoring is showing the sustained presence of adult oysters on restored reefs three or more years after construction.

Reef placement is critical to success. Work is conducted in river channels with firm bottom and sufficient tidal currents to minimize silt accumulation. New reefs are constructed adjacent to existing live reef to increase natural recruitment. In addition, work occurs in areas closed to harvest due to water quality impairments, often near municipal wastewater outfalls. This not only protects new reefs from harvest pressure, it also provides a water filtration benefit exactly where it is most needed.

Building and sustaining connections with the community continues to be a major objective. It is increasingly recognized that



Spreading clamshell by hose and barge. Source: Megan Latour



Subtidal constructed oyster reef. Source: Ray Konisky



Oyster Conservationist and program coordinator. Source: Cathy Coletti

the ever-popular oyster is one of the best ways to relate tangible estuarine values to the average citizen. The Great Bay Estuary flagship outreach effort is the annual operation of an “Oyster Conservationist” program. Each summer up to 50 homeowners are recruited to raise oysters on their private docks. In the fall, the homeowners return the oysters to spread on a newly constructed reef. And then everyone celebrates! See our website at www.nature.org/nboysters for more information about all of these programs.

Georgia's Restoration of Essential Fish Habitats through Creation of Oyster Reefs

*January Murray, Constituent Services Unit Leader,
Georgia Department of Natural Resources*

In 2008, the Georgia Department of Natural Resources (GADNR) expanded its Artificial Reef Restoration efforts to include an Oyster Reef Restoration (ORR) Program. Both programs were developed to restore long-term fisheries habitat, provide additional accessible recreational fishing opportunities, and enhance support of local and regional fisheries management efforts. Georgia's oyster reefs provide essential fish habitat (EFH) which the Magnuson-Stevens Fishery Conservation and Management Act defines as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” In Georgia, most living oyster reefs are found in the intertidal zone where they act as break waters reducing wave energy, thus protecting the marshes from erosion. Georgia's estuaries contain a high density of natural oyster spat. However, there is a lack of suitable “natural cultch” materials available for oyster settlement; therefore shell and other materials must be reintroduced into the environment to promote growth and expansion of new oyster reefs.

From 2008 through the 2013 restoration season, the ORR Program has created 10 sites with 2.14 acres of restored habitat. All shells used in restoration were obtained from GADNR's Oyster Shell Recycling Program. GADNR manages eight Shell Recycling Centers along the

coast that community members from restaurants, oyster roasts and other events voluntarily donate oyster shells. Shells then cure for three to six months before they are used. Through volunteer outreach events all shell is bagged and placed at designated restoration sites each spring. After shells are planted, oyster spat attach and grow creating a new oyster reef. ORR projects are sponsored, conducted, partnered, and funded by the GADNR Marine Fisheries Section through Federal Aid in Sport Fish Restoration, NOAA Fisheries, state fishing license fees, and private donations. These projects are truly a cooperative effort, involving environmental groups, universities, fishing organizations, federal agencies, and volunteers. Many of these projects could not have been accomplished without the coordinated efforts of all these partners.

In 2012, GADNR field tested a novel approach to transport thousands of bags of oyster shells and hundreds of pallets to the Jointer Creek Recreational Shellfish Harvest Area. Instead

of loading small amounts of materials on boats and motoring to the site, two GADNR helicopters lifted shell materials directly onto the site. A total of 200 pallets, 3,000 bags of shell, and 200 oyster gabions were transported and delivered on site in only nine hours. Staff on the site quickly positioned the airlifted materials along with 200 oak limb bundles to create 0.42 acres of restored habitat. This deployment tactic was so successful in reducing man hours and overall project costs that it was implemented again in 2013 at the Chatham County Recreational Shellfish Harvest Area in Oyster Creek (250 pallets, 3,750 bags of shell, and 248 oak limb bundles produced 0.12 acres of oyster habitat). Both “shell lift” operations served to familiarize numerous GADNR staff with helicopter operations, thus preparing them to assist the Aviation Unit in the event of a natural disaster or other emergency. GADNR also conducts monitoring at the oyster restoration sites to ensure project objectives are achieved. In addition to these sites providing bank stabilization, EFH, and improved water quality they also serve as excellent locations for education and outreach projects showcasing restoration of shellfish in Georgia's estuarine waters.



GADNR helicopter transferring shell material to Oyster Creek restoration site. Source: Larry Rogers, GADNR Aviation Division



GADNR staff quickly positioning airlifted shell material in Oyster Creek at low tide. Source: Larry Rogers, GADNR Aviation Division

Virginia Ramps Up Replenishment Effort

Tony Watkinson, Chief of Habitat Management, Virginia Marine Resources Commission

Virginia Governor Bob McDonnell announced on July 8, 2013, that the Commonwealth has begun an operation to mine fossilized oyster shells from beneath the James River as part of the largest oyster replenishment initiative in state history. General Fund appropriations for oyster replenishment funding have ranged from zero to as much as \$1.3 million over the past two decades, and have never surpassed the two million dollars allocated to the program in the 2013 state budget. The record-breaking appropriation was proposed by Governor McDonnell and approved by the Virginia General Assembly.

The oyster replenishment program began in May 2013. It was conducted by the Virginia Marine Resources Commission and has been the largest oyster habitat restoration undertaken in Virginia waters. By the end of July, approximately one million bushels of empty oyster shells were spread on public oyster grounds, which equates to roughly one billion individual empty oyster shells; enough to fill about 4,000 dump trucks.

This year's oyster replenishment program was supplied with oyster shell from local shucking houses as well as mined fossilized oyster shell deposits located roughly 40 feet beneath the James River near Jamestown. An estimated 200,000 bushels of oyster shells from shucking houses was spread on public oyster grounds in the Rappahannock, Piankatank and Great Wicomico Rivers. The fossil shells were mined, loaded into barges, floated downriver to public oyster grounds in the lower James River, and deployed on some of the historically best oyster grounds in the Commonwealth.

The industrial oyster shell-mining equipment started mining in July 3, 2013. Barges containing 800,000 bushels of mined oyster shells were not only spread in the James River over the following few weeks, but also in Mobjack Bay, the York River, and off Tangier Island.



Mined fossil oyster shells are spread on the water bottom in Virginia's James River.
Source: Virginia Marine Resources Commission

The replenishment program provides substantial benefits for the environment as a single adult oyster can purge up to 50 gallons of water a day. Oyster reefs provide important forage and refuge habitat for invertebrates, as well as juvenile crabs and finfish species. These new beds will remain untouched for several years as they grow to adulthood

and spawn another generation of oysters before they can be harvested. It is important that harvesting take place at a timely basis otherwise they are susceptible to the two non-native diseases, Dermo and MSX, which kill adult oysters but doesn't harm people.

Oyster replenishment is just one of several initiatives undertaken by Governor McDonnell to improve the health of the Chesapeake Bay and its tributaries. This year's budget, signed by the Governor, included over \$220 million in clean water related funding, one of the largest commitments ever.

Southeast Aquatic Connectivity Assessment Project

Kat Hoenke and Scott Robinson, Southeast Aquatic Resources Partnership (SARP)

The rivers and streams of the southeastern United States are extremely diverse, containing numerous threatened and endangered species. In fact, southeastern rivers contain the largest number of at-risk freshwater fish and invertebrates than any other region of the country. The presence of dams and other man-made barriers fragment the river network, contributing to habitat loss and therefore negatively impacting freshwater biodiversity. In addition, dams often impede the movement of resident and diadromous fish species. Resident imperiled species of darter and redbreast are unable to move freely in the system, and anadromous fish such as the American shad and striped bass are unable to reach their historical spawning grounds upstream.

The Southeast Aquatic Connectivity Assessment Project (SEACAP), a project funded by the South Atlantic Landscape Conservation Cooperative, will address river fragmentation by assessing dams based on their ecological benefit if removed or bypassed. SEACAP will create a comprehensive spatial database of dams, an analysis ranking these dams, as well as a web based GIS tool allowing managers to prioritize dams for potential removal or passage by using a suite of ecological metrics. SEACAP will be modeled from the Northeast Aquatic Connectivity Project (NAC) and the Chesapeake Fish Passage Prioritization Project (CFPPP) (both recently completed), and will span from northern Virginia to northern Florida and as far west as Mississippi. The information provided by SEACAP



Shell mining in the James River.
Source: Virginia Marine Resources Commission



The SEACAP study area spans from Northern Virginia to Florida and eastern Mississippi.

The workgroup includes a representative from each state's fish and wildlife department, as well as numerous representatives from federal agencies such as the United States Fish and Wildlife Service (USFWS), The Nature Conservancy, and the University of Georgia. Presently, workgroup members and the SEACAP team are working to collect and process data necessary for the analysis, as well as collectively identify priorities that make a dam a prime mitigation candidate. These priorities will inform default prioritization scenarios used in the analysis. Current potential prioritization scenarios include a diadromous fish scenario as well as two resident species scenarios; one for large-bodied riverine species, and one for small resident fish species.

A comprehensive spatial dataset of dams is crucial for the success of SEACAP. The National Inventory of Dams maintained and updated by the United States Army Corps of Engineers will provide a baseline of data for the project. Smaller dams will be included in the new dataset, many of which are only present in state databases. These state databases often contain overlapping information which must be corrected prior to the analysis. In addition, all dams will be spatially aligned with the 1:100,000 scale National Hydrography Dataset through a manual review process. In order to create metrics for the prioritization, meaningful information that represents each metric must be collected and geospatially associated with each dam. Some examples of this information include percent impervious surface, species richness, and presence of diadromous fish species, all within each dam's upstream and downstream watersheds. Connectivity information such as the number of river miles opened by removal or passage of each dam will also be included. These metrics will be derived from datasets such as the National Land Cover Database and other state and national databases.

Once biological metric information is associated with each dam, these metrics will be ranked. For instance, for the connectivity metric of river miles opened if a dam were removed, higher river miles will be given a higher rank than lower river miles. However, each metric may be of different importance to different stakeholders. For instance, a coastal manager may place more importance on the presence of diadromous fish at a dam than a biologist working with resident species. For this reason, metrics will be weighted in order to create a final prioritization

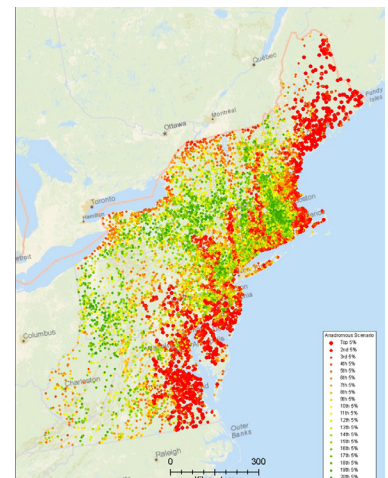
used in conjunction with expert knowledge and field assessments will allow resource managers to be more efficient in selecting fish passage projects in their area.

To obtain the most meaningful results, a workgroup consisting of experts from throughout the study area will be consulted.

for each scenario. To derive ranks and weights for the default prioritization scenarios, the workgroup will be consulted during each step of the process.

In addition to default prioritization outputs, a custom web-based tool will be available for use by managers to create their own prioritization scenarios for given geographic areas and scales. This tool will allow different managers to pick and choose the metrics they wish to use, and provide relative weights to the metrics different from the weights used in the default scenarios. For example, a biologist living in coastal North Carolina can use the custom tool to place higher weights on diadromous fish metrics and limit the prioritization to the coast of the state in order to create a prioritization specific to their needs.

The output of the custom tool is a list of dams ranked from highest to lowest representing which dams would provide a higher benefit if removed or bypassed. However, because differences between each dam may not be representative of true ecological differences, ranked dams are represented in five percent tiers within the map display.



Output of the NAC diadromous fish scenario. SEACAP output will be of a similar format in the southeast region.

It is important to note that while the results of this project will be developed using the best ecological data and methodologies, they are intended to be used as part of a screening process to assist stakeholders in efficiently selecting fish passage projects and not as a stand-alone list of projects. This analysis will not include social and economic factors, and will never replace local knowledge. Each dam must be further investigated prior to actual project selection.

The results of SEACAP will be used to better target and acquire funding for passage projects, as well as inform dam owners and the public in the same fashion that NAC and CFPPP are being used at this time. We think it is also useful to have the entire Atlantic slope covered with similar, compatible prioritization tools and data layers regarding aquatic connectivity and other important components of aquatic systems. In the future, SEACAP can be used as a basis to expand fish passage prioritization in other geographic regions and further improve the data and methodologies used to prioritize dams for passage.



ATLANTIC COASTAL FISH HABITAT PARTNERSHIP UPDATE

Thanks to the hard work and cooperation amongst our federal, state, conservation organizations, and local partners it has been an exciting and productive year for the Atlantic Coastal Fish Habitat Partnership (ACFHP)! We have made great strides in building our project funding and endorsement programs, strengthening our partnerships, and growing our science and data initiatives with the Landscape Conservation Cooperatives.

Emily Greene, Coordinator, Atlantic Coastal Fish Habitat Partnership

Project Funding and Endorsement Programs

2013 was the fourth year of ACFHP's successful partnership with the U.S. Fish and Wildlife funding on-the-ground fish habitat conservation projects. We were pleased to fund two new projects this year. The first, led by Cornell Cooperative Extension of Suffolk County, will focus on restoring eelgrass habitat in the Peconic Estuary, New York. The second, led by the University of North Florida, will focus on preventing shoreline erosion and promoting shoreline accretion using a combination of mussel and oyster-based living shorelines, and *Spartina alterniflora* planting in the Guana Tolomato Matanzas National Estuarine Research Reserve, Florida. We're excited about the expected results these projects will yield. If you'd like to learn more about these and other ACFHP-USFWS funded projects, please visit: www.atlanticfishhabitat.org/projects/fundedprojects/.

In cooperation with its state partners and with funding from its NOAA Fisheries partner, ACFHP moved towards implementing an on-the-ground project to extend conservation mooring technology currently in place in Massachusetts to a new location on the Atlantic coast. Conservation mooring is a system designed to avoid contact with the seafloor, thereby reducing physical damage to submerged aquatic vegetation. The system uses an elastic connection, akin to a bungee cord, to connect the surface buoy with the anchoring device. This eliminates any "chain sweep" that physically damages or eliminates vegetation growing on the seafloor. ACFHP is narrowing in on a location for the project and will reveal more in 2014!

ACFHP also endorsed several project proposals this year: a dam removal and riverine habitat restoration project in New Hampshire; a dam removal project in Connecticut; a salt marsh and tidal creek restoration project in North Carolina; and a culvert replacement and shoreline restoration project in South Carolina. In the absence of funding or other resources, endorsement is an opportunity to gain support from ACFHP for your completed, current, or proposed project. To learn more about past and present ACFHP endorsed projects and proposals please visit: www.atlanticfishhabitat.org/projects/endorsedprojects/.

Strengthening Partnerships

In collaboration with its neighboring Fish Habitat Partnerships (FHP), the Eastern Brook Trout Joint Venture (EBTJV) and the Southeast Aquatic Resources Partnership (SARP), ACFHP took steps to promote a more cohesive implementation of the National Fish Habitat Action Plan, which helps to direct



Assembled plants for restoration. Source: Cornell Cooperative Extension of Suffolk County

the work of protecting, restoring and enhancing fish habitats across their collective partner states. Through this alliance among ACFHP, EBTJV, and SARP - coined the Whitewater to Bluewater Partnership - the three FHPs are taking a more coordinated approach towards implementing their individual strategic plans, habitat assessments, and outreach activities.

In support of this objective, the three partnerships developed a Whitewater to Bluewater website, where one can access information and products pertaining to the Fish Habitat Partnership's collaboration. This website development was generously supported by the EBTJV and Appalachian Landscape Conservation Cooperative. We encourage you to check out the new website, and while you're there visit the Whitewater to Bluewater Partnership's Species Spotlight page to learn about life history and habitat needs, habitat restoration efforts, and fun facts about select fish species. Winter flounder is the first featured species, and new species will be spotlighted on a bi-monthly basis.

In addition to collaborating with its neighboring FHPs, ACFHP has embarked on a national cooperative initiative with eight other FHPs, and one candidate FHP, which are helping to protect, restore, and enhance fish habitats in coastal marine environments: the Pacific Marine and Estuarine FHP, the California Fish Passage Forum, the Hawaii FHP, the Kenai Peninsula FHP, the Mat-Su Basin Salmon Habitat Partnership, the Southeast Alaska FHP (candidate FHP), the Southwest Alaska Salmon Habitat Partnership, the Western Native Trout Initiative, and SARP. The initial products of this effort include a poster and quarterly newsletters highlighting the activities that

these FHPs are undertaking. The coastal FHPs are building on these initial accomplishments and exploring additional avenues for joint action in the future.

Growing Our Science and Data Initiatives with the Landscape Conservation Cooperatives

With the funding support of the North Atlantic Landscape Cooperative, ACFHP and its partners have begun work with Downstream Strategies, LLC, in the Development of a Decision Support Tool to Assess Aquatic Habitats & Threats in North Atlantic Watersheds & Estuaries. Through this project, data will be assembled and conditions analyzed to understand distribution, habitat, and threats to inland, estuarine, and coastal aquatic species across the Northeastern Atlantic. Stakeholders will be engaged during all stages of the project to ensure that the results are useful to managers of aquatic resources and habitats.

The central focus of the project will revolve around a flexible modeling process that has been widely adopted by aquatic and fisheries experts across the country. Based on multiple models of individual species or species groups, Downstream Strategies will create species distribution maps along with identifying and quantifying threats and stressors to these species. It will then create a multi-criteria decision support tool that integrates the components of each model to provide an interactive and user-friendly mapping program for resource managers to visualize, rank, and manipulate inputs to prioritize areas for conservation action. More information on this project and the North Atlantic Landscape Conservation Cooperative can be found at: www.northeastatlanticlcc.org/.

In the spirit of Whitewater to Bluewater collaboration, ACFHP partners have also been providing input to a South Atlantic Landscape Conservation Cooperative funded project entitled: Southeast Aquatic Connectivity Assessment Project. Jointly led by The Nature Conservancy and the SARP, the project seeks to conduct a GIS-based assessment that prioritizes barriers to aquatic animal movement for mitigation throughout the Southeast Region. More specifically, the project will focus on strategically reconnecting fragmented freshwater habitat through removal or bypassing of key barriers to fish passage. Work under this grant will focus on developing region-wide spatial data, tools, and protocols to prioritize potential fish barrier mitigation projects, thereby more efficiently conserving and restoring habitat for both the diverse array of freshwater species as well as the many diadromous fish species of the Southeast. More information on the project can be found on Page 4 of this issue or at: www.southeastaquatics.net/groups/seacap. For more information on the South Atlantic Landscape Conservation Cooperative please visit: www.southatlanticlcc.org/#.



From left: ASMFC Executive Director Bob Beal, Wilson Laney, William Goldsbrough and ACFHP Steering Committee Chair Chris Powell.

Mr. William Goldsbrough Receives 2013 Melissa Laser Fish Habitat Conservation Award

Mr. William Goldsbrough of the Chesapeake Bay Foundation was presented the 2013 Melissa Laser Fish Habitat Conservation Award by the Atlantic Coastal Fish Habitat Partnership for his exemplary work in furthering the conservation, protection, restoration, and enhancement of habitat for native Atlantic coastal, estuarine-dependent, and diadromous fishes. The award was presented in October at the Atlantic States Marine Fisheries Commission's 72nd Annual Meeting in St. Simons Island, Georgia.

Mr. Goldsbrough was one of the earliest members of the Commission's Habitat Committee and its longest serving chair. Under his leadership and participation, the Committee developed habitat sections for many of the Commission's interstate fishery management plans and released numerous publications – all of which have elevated understanding of habitat and its critical link to supporting abundant fisheries. He was also a founding member of the Atlantic Coastal Fish Habitat Partnership Steering Committee. In the Chesapeake Bay region, he has worked to restore American oyster habitat and has advanced the importance of habitat as a critical common ground among all harvesters. And coastwide, he has promoted ecosystem-based fishery management. Mr. Goldsbrough's deep commitment to conservation and use of sound science as the basis for resource management fully embody Dr. Melissa Laser's own dedicated approach towards fish habitat conservation.

The Melissa Laser Award was established in memory of Dr. Melissa Laser, a biologist with the Maine Department of Marine Resources, who worked tirelessly to protect, improve, and restore aquatic ecosystems in Maine and along the entire Atlantic Coast.

UPDATES FROM AROUND THE COAST

MAINE

One Less Barrier

Gail Wippelhauser, Marine Resources Scientist,
Maine Department of Marine Resources

Maine's waters are home to 11 species of native diadromous fishes. Five are managed through Atlantic States Marine Fisheries Commission (alewife, blueback herring, American shad, American eel, and Atlantic striped bass), three are listed under the federal Endangered Species Act (shortnose sturgeon, Atlantic sturgeon, and Atlantic salmon), one is a federal species of concern (rainbow smelt), and two are minimally managed (sea lamprey and Atlantic tomcod). In 1867, Nathan W. Foster and Charles G. Atkins, Maine's newly appointed Commissioners of Fisheries, stated in their first report that the great abundance of fish in the state's rivers had declined during the 19th century. They attributed the decline to impassable dams, overfishing, and pollution of the water – in that order.

Today, 146 years later, impassable dams in Maine and other East Coast states continue to obstruct the movement of diadromous fishes between the ocean and fresh water. According to a report issued by the Maine Department of Environmental Protection, there were 103 federally licensed active hydropower projects (136 dams), 20 inactive dam projects, and 14 active non-jurisdictional projects covering 23 dams in Maine as of January 1, 2007. Approximately 45% of the hydropower dams are within the historic range of alewife, American shad, and blueback herring and 65% are within the historic range of American eel. Maine's waters also contain more than 525 non-hydropower dams. Because many of these latter dams are located at the outlet of a lake or pond, alewife populations are particularly impacted.

Since 1986, 20 dams in Maine have been breached, removed, or replaced with a rock ramp (Table 1). Most noteworthy is the removal of the lowermost dams on large river systems that have the greatest impact on diadromous fishes – both in terms of the number of species and the number of individuals. In addition, removal of these barriers has often initiated major fisheries restoration projects. Removal of the Smelt Hill Dam on the Presumpscot River allowed Maine to use a fishway law for the first time to obtain passage at the next upstream dam, and state and federal agencies to require passage at five upstream hydropower projects during the relicensing process. Removal of Edwards Dam on the Kennebec River led to fish passage at three municipal-owed dams, removal of Fort Halifax and Madison Electric

Works hydropower dams, and installation of fish lifts at three hydropower projects. In the Penobscot watershed, three fish passage projects were completed prior to the removal of Great Works Dam in 2012 and Veazie Dam in 2013, and several others should be completed in the next few years. To view the removal of Veazie Dam go to <http://www.maine.gov/dmr/searunfish/> or <http://www.penobscotrivers.org>

Adult returns are one way of evaluating the success of a fisheries management action. Prior to the removal of Fort Halifax Dam in 2009, the number of adult returns to the Sebasticook River, the largest tributary of the Kennebec River, could not be accurately determined because a fish pump was used for interim passage. However, recent returns (Table 2) are impressive – especially considering that alewife, blueback herring, and American shad were extirpated from habitat above Edwards Dam for nearly 150 years (1837-1999). Returns of river herring and American shad to the Presumpscot and Penobscot Rivers are anticipated to increase in the next few years in response to dam removal, fish passage, and stocking to jump-start extirpated runs.

Table 1. Summary of Maine barriers that have been removed, breached, or replaced with a rock ramp. Asterisk indicates the dam was a federally-licensed hydropower project prior to decommissioning and removal.

Barrier	Watershed/Subwatershed	Year	Status
Milton Leatherboard Lower Dam	Piscataqua/Salmon Falls	1986	Removed
Columbia Falls Dam*	Pleasant	1988	Removed
Bangor Dam	Penobscot	1995	Breached
Mast Point Dam	Piscataqua/Salmon Falls	1997	Removed
Grist Mill Dam*	Penobscot/Souadabscook	1998	Removed
Temple Mill Dam	Penobscot/Souadabscook	1999	Removed
Brownville Dam	Penobscot/Pleasant	1999	Removed
Edwards Dam*	Kennebec	1999	Removed
East Machias Dam	East Machias	2000	Removed
Mill Dam	Kennebec/Sebasticook	2000-2001	Removed
Sennebec Dam	St. George	2002	Rock ramp
Main Street Dam	Kennebec/Sebasticook	2002	Breached
Smelt Hill Dam*	Presumpscot	2002	Removed
Sherman Lake Dam	Sheepscot/Marsh	2005	Breached
Madison Electric Works Dam*	Kennebec/Sandy	2006	Removed
Fort Halifax Dam*	Kennebec/Sebasticook	2008	Removed
Mill Pond Dam	Penobscot/Sedgunkedunk	2009	Rock ramp
Montsweag Dam	Montsweag Brook	2010	Removed
Great Works Dam*	Penobscot	2012	Removed
Veazie Dam*	Penobscot	2013	Removed

Table 2. Adult returns (in numbers of fish) of ASMFC managed species to the Sebasticook River, Maine.

Site and Year	Alewife	Blueback Herring	American Shad	American Eel
Benton Falls				
2009	1,287,636	40,279	8	12,305
2010	1,202,444	424,428	3	11,977
2011	2,091,119	660,354	54	34,989
2012	1,498,892	204,629	163	206,089

NEW HAMPSHIRE

*Cheri Patterson, Supervisor of Marine Programs,
New Hampshire Fish and Game Department*

The members of the New Hampshire (NH) River Restoration Task Force have been busy this year with providing technical advice with several potential dam removal projects. Many of these dams under consideration for removal are due to safety concerns investigated by the NH Department of Environmental Services (NHDES), Dam Safety Section. Letters of Deficiency (LOD) have been issued and the dam owners (private, municipal, and state) are navigating through various studies to determine available options such as dam removal, repair, or modification to meet dam safety standards. These options consider many aspects such as public input, long and short term environmental and financial concerns, recreational impacts, etc. Below are some of the dams currently being considered for removal that affects NH coastal watersheds and diadromous fish passage and habitats.

Great Dam, Exeter, NH, Exeter/Squamscott River Owner, Town of Exeter

The dam located in downtown Exeter, NH, is the first dam above head-of-tide. While it does have a fish ladder and associated weir (help direct fish into fish ladder entrance) the Town must address safety issues concerning the dam. Three studies have been completed to assist the Town in making a decision: 1) dam modification alternatives; 2) water supply alternatives, and 3) dam removal and additional dam modification alternatives. Further legal advice is needed regarding an adjacent residential mill building's water rights. A decision by the Town is anticipated in 2014.

Taylor River Dam, Hampton, NH, Taylor River Owner, State of New Hampshire

The Taylor River Pond Dam is a head-of-tide dam with an associated fish ladder to pass anadromous fish. The dam created an impoundment over a saltmarsh in 1950. Both the dam and denil fish ladder are in need of repair and the dam has a NHDES LOD to address safety issues. In addition to the dam and fish ladder structure is the associated I-95 Bridge which needs to also be replaced. The NH Department of Transportation conducted a dam removal feasibility study in 2010 and is moving forward with replacing the I-95 Bridge within the next two years but is still determining whether to replace the dam.

Old Mill Pond Dam, Hampton, NH, Nilus Brook Owner, Town of Hampton

The Town of Hampton just recently finished an Initial Study of Alternatives to address a NH DES dam safety LOD on the Old Mill Pond Dam in Nilus Brook. There were dam repair or decommission options for the Town Selectman to consider. The Town of Hampton Selectman voted to decommission the dam

and will be placing a warrant article before the Town in March 2014 to fund the decommissioning.

Macallen Dam, Newmarket, NH, Lamprey River Owner, Town of Newmarket

The Macallen Dam is the head-of-tide dam on the Lamprey River in Newmarket, NH. The associated fish ladder is one of the most productive diadromous fish passage facilities in NH coastal rivers. The Town of Newmarket has just initiated a dam removal feasibility study to help define all alternative options to meet a safety LOD from the NHDES. The study is expected to be complete in 2014.

Gonic Dam (privately owned) and Sawmill Dam (abandoned), Gonic, NH, Cochecho River *(Kevin Lucey, Habitat Restoration Coordinator, NH Department of Environmental Services)*

The Gonic Sawmill Dam (GSD) and the Gonic Dam are the third and fourth dams on the mainstem of the Cochecho River. The City of Rochester and the NHDES continue to pursue removal of both dams (feasibility study conducted in 2005); however, the unresolved ownership status of the GSD and its adjacent 8.3 acre parcel continue to delay the project. In 2014, the City of Rochester with funding from NH DES and the US Fish and Wildlife Service will finalize a sediment management plan for the 3,000 cubic yards of impounded sediment that need to be removed from the river in conjunction with the removal of the GSD.

McLane Dam (owner, Town of Milford) and Goldman Dam (privately owned), Milford NH, Souhegan River, tributary of Merrimack River *(Deborah Loiselle, River Restoration Coordinator, NH Department of Environmental Services)*

The Merrimack Village Dam was removed in 2008 which was previously the first dam on the Souhegan River (tributary to the Merrimack River) and opened up 14 miles for diadromous and resident fish passage. The McLane and Goldman Dams are the next two dams on this river system which are currently being evaluated for removal. A feasibility study is being conducted and is expected to be completed during the summer of 2014. If dam removal is the selected alternative, it would open up an additional seven miles of the Souhegan River.

Sawyer Mill Dams, Dover, NH

Owner, private *(Derek Sowers, Conservation Program Manager,
Piscataqua Region Estuaries Partnership)*

The two existing dams at the Sawyer Mill complex in Dover, NH, represent the first diadromous fish passage barriers on the Bellamy River, a major tributary river to the Great Bay Estuary in NH. The dams lack any fish passage structures. Historically, migratory blueback herring, alewives, American shad, and Atlantic salmon had access to almost the entire extent of the Bellamy River system. Removal of the two dams at Sawyer Mills would reconnect 11.2 miles of upstream unobstructed stream

UPDATES FROM AROUND THE COAST

habitat to the estuary, which represents restoring diadromous fish access to 34% of the total stream habitat in the Bellamy River system. An initial feasibility study will be completed by March 2014.

Great Bay National Estuarine Research Reserve

(Cory Riley, Manager of GBNERR, New Hampshire Fish and Game Department)

NH Fish and Game Department (NHFGD) has completed a second round of saltmarsh monitoring to record the condition and health of our salt marshes, and help identify remedial actions to preserve the health of Great Bay. These surveys are charting changes in salt marsh structure related to climate change, particularly sea level rise effects. As sea level rises, there are concerns that salt marsh elevations will not be able to keep pace and the marshes will “drown” as exhibited by changes in vegetation, convert to other habitat such as mud tidal flats, or retreat into higher upland habitats if not blocked by human structures. Detailed salt marsh vegetation monitoring to track these potential changes was conducted at dozens of one-square meter plots along six transects at each of three marshes in the Great Bay Estuary – Sandy Point, Bunker Creek, and Great Bay Farms. Water quality was tested from wells at each plot to measure salinity and see if over time salinity increases with sea level intrusion. This information was used in correlation to show the changes in vegetation as the marsh transitions from low to high marsh, and to upland edge. The surface elevation table data gathered measures the yearly accretion levels of sediment in the marsh.

Modeling Changes in Salt Marsh

NHFGD is a partner of a newly awarded project called NH Resilient Coasts. The NH Resilient Coast Project is being coordinated through the NHDES Coastal Program, and will be working with several partners to build capacity in coastal communities to assess and adapt to potential risks associated with sea level rise and increased flooding. The five components of the project include 1) the creation of a coastal viewer within the NH GRANIT GIS framework of the University of NH (UNH); 2) two to three local adaptation action plans developed and implemented by two coastal communities (UNH Cooperative Extension); 3) outreach and a report on business receptivity to adaptation planning (UNH Cooperative Extension); 4) fluvial erosion hazards and culvert summary documents created for coastal communities (NHDES); and 5) marsh migration modeling summaries to support local community decision making (NHFGD).

NHFGD is currently running the SLAMM (Sea Level Affecting Marshes) model for the entire coast of NH to inform the state wildlife action plan. The NH Resilient Coast Project will give communities an opportunity to see SLAMM model results and provide input on relevant local data and preferred analysis

and product formats. The project team and NHFGD will incorporate updated and new data on infrastructure (bridges, culverts) and natural features (wetlands, channels, etc.) including marsh elevations as well as accretion/subsidence rates that can refine the results for the towns, and generate specific scenarios and analysis products that are tailored to the decisions facing their community. NHFGD will also attempt to look at projected changes in the quality of marsh habitat in addition to looking at changes in quantity by combining SLAMM results with existing data sets for the region, and information generated by similar projects in the region.

MASSACHUSETTS

*Mark Rousseau, Marine Fisheries Biologist,
Massachusetts Division of Marine Fisheries*



Billington Street Dam prior to removal. Source: Mark Rousseau, MADMF

Addressing Aquatic Habitat Impacts through the Massachusetts (MA) In-lieu Fee Program

In April, the Massachusetts In-lieu Fee Program (ILFP) funded four restoration projects to address coastal habitat impacts resulting from coastal alteration projects permitted under the Army Corp of Engineers (ACOE) General Permit (Cat II). Since 2009, 26 different alteration projects impacting almost 19,000 square feet of aquatic habitats have contributed ILF payments into a trust fund managed by the MA Division of Marine Fisheries (MA DMF). With ACOE approval, MA DMF awarded over \$200,000 in grants from the fund for restoration projects in four different coastal communities. MA DMF's ILFP fully funded two salt marsh restoration efforts in Newbury and Rowley on the north shore and partially funded dam removal projects on Town Brook in Plymouth and the Three Mile River in Taunton. All funded projects are required to submit annual monitoring reports to MA DMF for a period of five years. MA DMF will continue to track these projects until they all have been successfully completed. For more information, please contact Mark Rousseau at mark.rousseau@state.ma.us.

Marine Fisheries Study: Shading Impacts of Docks and Piers on Salt Marsh

This spring, MA DMF initiated a field study examining shading impacts of docks and piers on salt marsh vegetation by installing a network of 24 wooden docks set at three heights: 2.5, 4.5, and 5.5 feet in a Massachusetts salt marsh. All other dock design components were standardized to allow the effects of dock height to be experimentally tested. Half of the docks were installed over the *Spartina alterniflora*-dominated low marsh and half were placed over the *S. patens*-dominated high marsh. Shading effects were quantified by monthly visual surveys and an end of season clip plot survey. The clip plot samples are currently still being processed but the visual survey estimates showed an average reduction of *S. alterniflora* density of 75% under 2.5 foot docks relative to control, unshaded plots in the low marsh region. Experimental docks will be removed for the winter then reinstalled next spring for a second field season of observation. For more information, please contact John Logan at john.logan@state.ma.us.



Experimental dockage on salt marsh. Source: Dr. John Logan, MADMF

Assessing the Vulnerability of Marine Benthos to Fishing Gear Impacts

Staff from MADMF along with scientists from North-eastern University, the New England Fishery Management Council, NOAA Fisheries, Gulf of Maine Research Institute, and Alaska Pacific University participated in a study assessing the vulnerability of marine benthos to fishing gear impacts. The study developed a framework to quantify and assess gear impacts to benthic communities and fish habitats from the six most common fishing gears in New England: otter trawls, scallop and hydraulic clam dredges, gillnets, longlines, and traps. Study results collectively highlight the importance of considering the resilience of specific components of habitat such as emergent epifauna or geological formations that serve as essential fish habitat. The results are intended to provide fisheries resource managers with a framework to assess gear specific spatial impacts on benthic substrates and identify habitat vulnerability hotspots. The study has recently been accepted for publication by *Reviews in Fisheries Science*. For more information please contact Vin Malkoski at vincent.malkoski@state.ma.us.

Application of the Coastal and Marine Ecological Classification Standards to the Northeast

Classifying estuarine and marine habitats has been identified as a priority need in the Northeast for several reasons: to identify conservation needs and restoration priorities, address mandates under the Clean Water Act for protection of certain habitats, and conduct marine spatial planning. Through a grant funded by the North Atlantic Landscape Conservation Cooperative (NALCC), scientists from The Nature Conservancy, University of Rhode

Island, and MA DMF collaborated on a project utilizing the national Coastal and Marine Ecological Classification Standard (CMECS) to classify estuarine and marine environments in the Northwest Atlantic region (Maine

to Virginia). Project partners employed existing datasets from different habitat classification schemes and habitat mapping efforts and crosswalked existing data into CMECS units at regional scales: large (1:5,000,000), intermediate (1:250,000), small (1:50,000). The crosswalking at different scales enabled CMECS to convey consistent ecological data across several relevant scales. Project partners worked closely with the CMECS Implementation Group to ensure the classification standards were appropriately applied at all scales and to discuss lessons learned through the crosswalking process.

For more information please contact Kathryn Ford at kathryn.ford@state.ma.us.

RHODE ISLAND

Steven Brown, Coastal Restoration Scientist, The Nature Conservancy, Eric Schneider, Principal Marine Biologist, Rhode Island Department of Environmental Management, Div. of Fish and Wildlife, Marine Fisheries

Oyster Reef Habitat Enhancement

The spatial extent of oyster reefs in Rhode Island (RI) has decreased by over 97% in the last century. To address declines in important marine habitat, RI Department of Environmental Management has teamed up with The Nature Conservancy to restore reef habitat to improve ecological functions and services. Over the last three years, the team has established reef baselines (area, extent, and biomass) and implemented a strategy focused on improving oyster habitat in optimal restoration areas. In the summer of 2013, over one mile of intertidal reef habitat was constructed utilizing a variety of substrate enhancement practices (e.g., loose shell, concrete modules) in Ninigret Pond. In addition to deploying reef materials, over one million oyster seed-on-



Oyster castles on shell in Ninigret Pond, Charlestown, Rhode Island.

Source: Jeanne Parente, The Nature Conservancy

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shell was deployed in two coastal ponds in partnership with the aquaculture industry. This is an on-going collaborative effort that is science-based and seeks to identify best management practices for estuarine restoration in RI.



In situ incubation chamber to measure gas flux of restored oyster reefs and suspended oyster aquaculture during EPA-TNC-BU collaborative study. Source: Steven Brown, The Nature Conservancy

Collaborative Study on Nitrogen Removal Processes of Oysters

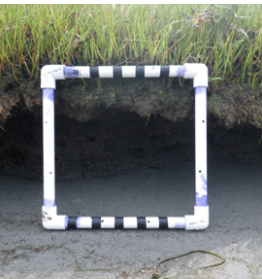
Steven Brown, Coastal Restoration Scientist, The Nature Conservancy, and Suzanne Ayvazian, Research Ecologist, Environmental Protection Agency, Atlantic Ecology Division

Two poorly quantified benefits of oyster reef restoration are removal of nitrogen via enhanced denitrification and assimilation of nutrients into tissues and shells of reef organisms. Oysters, along with other reef-associated filter-feeding organisms, modify biogeochemical

cycles by filtering large quantities of organic matter from the water column, most of which is either used directly for growth and maintenance or is deposited on the sediment surface as biodeposits. The Environmental Protection Agency's Atlantic Ecology Division is leading a study in partnership with The Nature Conservancy and Boston University to evaluate differences in denitrification in restored oyster reef and oyster aquaculture (rack and bag). The team has completed their first year of seasonal in-situ gas flux measurements which will continue into 2014.

Living Shoreline Strategies in the Narrow River, RI

Salt marshes provide a variety of ecosystem services that include primary production, filtration of land runoff, sediment stabilization, and nursery habitat for many commercially important fish species. The U.S. Fish and Wildlife Service in partnership with The Nature Conservancy are studying the feasibility of protecting critical salt marsh habitat within the John H. Chafee National Wildlife Refuge in the Narrow River, RI. Shoaling and erosion in the river along with high anthropogenic nutrient concentrations have contributed to declines in low salt marsh and shellfish habitat in this estuary. This study proposes use of



Undercutting of the Narrow River salt marsh, Narragansett, RI. Source: Jeanne Parente, The Nature Conservancy

non-structural practices, including biodegradable coir logs and matting and bagged shell substrate, to enhance sediment stabilization, and facilitate the growth of marsh grass and shellfish populations.



Narrow River salt marsh and site of living shoreline work, Narragansett, RI. Source: Jeanne Parente, The Nature Conservancy

CONNECTICUT

Restoration Projects on the Housatonic River Continue

Connecticut Department of Energy and Environmental Protection

Seven more fish habitat and marsh restoration projects were chosen for funding with two million dollars from the 1999 Housatonic River settlement with General Electric (GE). An initial \$7.75 million grew to more than nine million dollars in an interest-bearing fund for projects in Connecticut aimed at restoring, rehabilitating, or acquiring the equivalent of the natural resources and recreational uses of the Housatonic River that were injured by the release of PCBs from the GE facility in Pittsfield, Massachusetts. The projects were evaluated by biologists from Connecticut Department of Energy & Environmental Protection (CTDEEP), the U.S. Fish and Wildlife Service, and the National Oceanic and Atmospheric Administration. These documents can be viewed on the CTDEEP website or the federal Environmental Protection Agency's GE/Housatonic River website.

Previous projects have successfully restored natural resources and provided new recreational opportunities in the Housatonic



Figure 1. In this architect's rendition of the Tingue Dam Fishway By-pass in Seymour, the Naugatuck River flows from top to bottom, over the dam (gray line to left). As migrating fish approach the dam from below, they will by-pass the dam by swimming up the channel to the right, and re-enter the river further upstream. Source: Milone & Macbroom Engineering, Landscape Architecture, and Environmental Science

watershed in Connecticut. Several of the new projects will increase habitat for migratory fish, such as river herring, through dam removal and construction of a bypass channel to facilitate fish movement (e.g. the Tingue Dam project – Figure 1). Several marsh restoration projects in Milford and Stratford are expected to improve estuarine wildlife habitat. Finally, an analysis of barriers to fish passage at road crossings will be conducted in the upper watershed to identify opportunities to improve stream connectivity through culvert replacement. These projects to improve wildlife habitat in the watershed are made possible through collaboration with the Housatonic Valley Association, the Ousatonic Fish and Game Club, state and federal agencies, and a local business.

NEW YORK

Marine Artificial Reef Update

*Chris LaPorta, Biologist,
New York State Department
of Environmental Conservation*

The New York Artificial Reef Program (Program) recycles a variety of materials to enhance the marine habitat on its reef sites. The Program's use of dredge rock has documented that it is both a durable and stable material for the creation of patch reefs. Rock is found naturally in the coastal marine district and is more readily colonized and converted into habitat.

Newly deployed rock is quickly fouled by opportunistic marine organisms (e.g., bryozoans, corals, sponges, etc.) and then successively inhabited by structure associated species (e.g., tautog, black sea bass, lobster). Patch reefs created by quality rock possess many interstitial spaces which provide shelter and forage for a variety of marine finfish and crustaceans. Local benthic communities may also partially benefit from rock reefs because certain gear types (surf clam dredges) are not used in the area due to potential gear loss or damage.

Left Photo: *The Atlantic Beach Reef showing corals, bryozoans and sponges colonizing deployed rock with a grouping of tautog and cunner.*

Right Photo: *A pair of tautog cruising the Hempstead Reef among blue mussels, northern coral, bryozoans, sponges, and anemones colonizing the reef structure. Source: Chris LaPorta, New York State Department of Environmental Conservation*



*US Army Corps of Engineers harbor deepening project dredge rock.
Source: US Army Corps of Engineers*

The dredge rock patch reefs are a result of an ongoing partnership between the New York State Department of Environmental Conservation (NYSDEC) Reef Program and the New York District US Army Corps of Engineers (ACOE). Ongoing ACOE harbor deepening projects have produced millions of cubic yards of rock much of which has been reused to create artificial reefs.

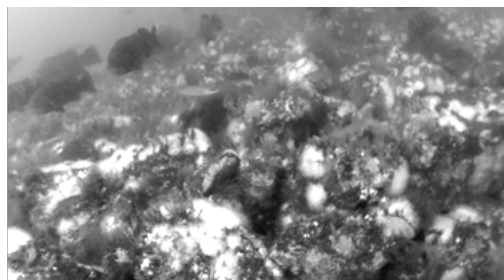
Reef Program monitoring has documented a variety of marine species inhabiting the rock patch reefs with some populations changing seasonally through inshore and offshore migrations. Using New York State Environmental Protection Funds, the Program has partnered with the Stony Brook University School of Marine and Atmospheric Sciences to design a monitoring study that will investigate rock as a reefing material and determine how productive this material is for building reefs. Prior reef monitoring has documented the popularity of rock reefs throughout the year for local anglers and divers. Rock reefs hold both cold and warm water structure associated species.

The New York Reef Program recently received dredge rock on the Hempstead Reef to create new patch reefs. The Hempstead Reef is one of the Program's largest sites encompassing 744 acres. In 2013, the New York Reef Program received dredge rock on the Hempstead Reef to create new patch reefs.

Soundview Park Oyster Restoration Project

*Dawn McReynolds, Marine Habitat Section Head, NYSDEC
Thanks to Dr. Allison Mass Fitzgerald, Department of Biology, College of Staten Island, and Meredith Comi, Oyster Restoration Program Director, NY/NJ Baykeeper for contributing information.*

Oyster restoration has been of growing interest in and around the New York Harbor area as a means to improve water quality and provide habitat benefits associated with hard bottom structure. Multiple organizations have spearheaded small scale oyster restoration efforts; however issues such as turbidity, unsuitable currents, lack of recruitment of juvenile oysters and concerns for human health have thwarted many of these projects. One of the few exceptions seems to be Soundview Park. The one acre Soundview Park Oyster reef has been successful, however not without a lot of effort from many organizations to find the right place, supplement the site with spat on shell, and conduct a lot of monitoring.



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A view of the new subtidal oyster reef built off of Soundview Park, NY in June 2013. Source: A. Mars Fitzgerald

In 2006, studies examining the feasibility of future oyster restoration began at Soundview Park, located at the confluence of the Bronx and East Rivers. Early work was spearheaded by New York City Department of Parks along with several local volunteer organizations (including Rocking the Boat and the Bronx River Alliance). This project has grown over the last decade, leading to the current project; a one acre subtidal reef that was built at the site. The current project is the largest oyster restoration project in the Hudson-Raritan Estuary, with a clam-shell base and live oysters (spat-on-shell) being placed on the reef, as well as possible recruitment from local broodstock. From 2009-2012, a group of scientists, NGOs, and community groups from New York and New Jersey organized a large scale project to determine site suitability around the Hudson-Raritan Estuary for future oyster work (Oyster Restoration and Research Partnership, led by Hudson River Foundation and NY/NJ Baykeeper). This project found that the site located in Soundview Park was the best option for future work, and a generous grant from Wildlife Conservation Society-NOAA to the Hudson River Foundation, NY/NJ Baykeeper, and the Harbor School have allowed for a new project to thoroughly examine oyster restoration feasibility at the site.

NEW JERSEY

*Russell Babb, Acting Chief,
New Jersey Marine Fisheries Administration - Shellfisheries*

State Plan for Coastal Shoreline Resiliency

As New Jersey (NJ) continues to recover from the impacts of Hurricane Sandy, it has become apparent that there is a need to increase resiliency along our coastal shorelines. In order to assist in the establishment of a resilient coastal shoreline program, the NJ Department of Environmental Protection (NJDEP) will be creating a professional and informational network to bring together the various agencies that are conducting work relating to living shorelines and resilient coastlines. Input and data will be collected from public stakeholder meetings, followed by the establishment of a steering committee, consisting of members that are proven leaders in the field of living shorelines and resilient coastal shorelines. Members will act as an advisory board to the

State of NJ in the development of a statewide strategic plan for resilient coastal shorelines.

To further inform an assessment of exposure to coastal inundation and flooding of NJ's coastal zone, a GIS-based assessment of the coastal areas most vulnerable to chronic flooding, storm surge, and sea level rise will be undertaken and will consider both current and future risks. A characterization of the suitability of coastal shoreline areas for green infrastructure approaches such as salt marsh restoration and 'living shorelines' will also be developed in potentially attenuating wave action and minimizing shoreline erosion. Discussions will also touch on what a living shoreline is and where they are appropriate. Upon completion of the GIS analysis, two coastal watershed study areas will be selected for more detailed characterization and consideration based on input from the NJDEP and other outside experts. These areas will be within the Barnegat Bay and Delaware Bay to capture a broad range of conditions.

The compilation of all the data collected will result in an overall plan for the establishment of a Living Shoreline Statewide Strategic Plan for Resilient Shorelines. All of the data and research collected by the stakeholder group and the steering committee will be posted on a technical network in the form of a website, which will enable a "one-stop" source for information relating to living shorelines and resiliency.


River Herring Assessment & Restoration

NJ recently completed year two of a three year population assessment of river herring (alewife and blueback herring) in two Delaware River tributaries. The main objective of this effort is to assess the current status of river herring populations and to assess the potential for restoration activities on these two major watersheds. Year one research focused on sampling methods and verifying possible sampling locations. Years two and three include collection of juvenile and adult fish which will allow the Division to develop indices of relative adult stock status and juvenile production. A number of sampling methods are being used such as electrofishing (boat and backpack systems), gill nets and seine nets. The primary objective is that this program will be funded in the future to allow long term assessment of river herring production in these watersheds to ultimately assist in identifying primary restoration sites.

Superstorm Sandy

Post-Evaluation of Shellfish and Submerged Aquatic Vegetation Resources in Barnegat and Little Egg Harbor Bays

The NJDEP completed its post-Superstorm Sandy evaluation of shellfish and Submerged Aquatic Vegetation (SAV) habitats in Barnegat and Little Egg Harbor bays. Full resource surveys of Little Egg Harbor and Barnegat bays were conducted in 2011 and 2012, respectively. This repeat survey subsampled 25% of stations (138 total stations) within the Barnegat Bay-Little Egg



Harbor complex. Sampling stratification differed between stations with known SAV prior to the storm and a variety of shellfish densities. This information will be incorporated in the final report of the 2012 Barnegat Bay Estuarine Inventory. Preliminary data initially indicates there is no discernible difference on shellfish and SAV resources pre- and post storm. This field sampling was the first formal survey on the recently transferred and retrofitted 42' research vessel (RV) *Zephyrus*, formerly stationed at the Delaware Bay regional office. RV *Zephyrus* was transferred to the Coastal Office following the much anticipated arrival of the new 46' RV *James W. Joseph* at the Delaware Bay Office.

Barnegat Bay Initiative

Since late 2010, NJ Governor Chris Christie has continued to make progress on a comprehensive action plan to address the health of Barnegat Bay. The ecological health of Barnegat Bay is in decline, threatening the economic health of the region. The Christie Administration has made addressing the degradation of Barnegat Bay as one of its top environmental priorities. Highlights of the plan include: a negotiated agreement with Exelon Corporation to cease electric generation operations at the Oyster Creek Generating Station within nine years, funding numerous stormwater mitigations projects, new rules reducing nutrient pollution from fertilizers and standards for post-construction soil restoration, land acquisition, special or sensitive area plans, shellfish enhancement, increased water quality standards and reducing the impacts of personal watercrafts on sensitive habitats.

Barnegat Bay Shellfish Restoration

As part of the Department's shellfish enhancement efforts in Barnegat Bay, NJDEP staff coordinated the planting of over one million hard clam seed to enhance shellfish habitat. This hard clam seeding effort was the second largest in recent years and confirms the NJDEP's commitment to shellfish enhancement in Barnegat Bay. NJDEP staff will also be coordinating the planting of 1.5 million oyster seed and shell plantings on a former oyster bed, as well as the planting of another 1.5 million hard clam seed on numerous sites throughout the bay.

Streamlined Aquaculture Permitting

Building on the momentum of 2012 and the establishment of the NJ's first structural Aquaculture Development Zones in Delaware Bay, the NJDEP recently adopted a streamlined set of coastal aquaculture permitting rules for grow-out gear and related structures. Shellfish aquaculture has long been identified as one of the fastest growing segments of fisheries/agriculture and one that could relieve pressure on our wild stocks while providing economic opportunities. Like many other coastal states, this growth was constrained by a lack of a predictable permitting structure. The NJDEP has also drafted a full guidance document that will provide a step-by-step navigation tool for prospective aquaculturists or commercial waterman. This document includes descriptions of what permits are available, what permits are required for certain activities and areas, guidance on site selection, identi-

fies protected or managed habitat considerations, and how the permit's environmental review will work. Considerable progress has been made over the past 18 months to develop and foster sustainable aquaculture in NJ's coastal waters with the goal of encouraging economic growth while protecting coastal habitats.

PENNSYLVANIA

Benjamin D. Lorson, Fisheries Biologist, Pennsylvania Fish and Boat Commission, Division of Habitat Management

Fish Passage Restoration

Darby Creek Dam Removals

Instream and riparian restoration has been completed in the lower portion of Darby Creek, a tributary to the lower Delaware River, at the Colwyn piers site, Kent Park Dam, Darby Borough Dam, and Hoffman Park Dam, all of which were removed in 2012. This project restores migratory and resident fish passage to the lower 9.7 miles of Darby Creek, Delaware County, PA. Riparian vegetation monitoring was completed this fall and fishery and physical habitat assessments will commence in 2014.

Lehigh River Fish Passage Improvement Feasibility Study

The Lehigh River Fish Passage Improvement Feasibility Study was completed in 2013 and assessed the engineering feasibility of improving fish passage at Easton (RM 0.0) and Chain (RM 3.0) Dams. Full and partial dam removal options were explored that would aim to meet American shad restoration goals for the Lehigh River, the second largest drainage in the Delaware Basin. The Pennsylvania Fish and Boat Commission have established a restoration goal of 165,000 to 465,000 American shad entering the Lehigh River annually to maintain a self-sustaining population. To date, the greatest number of shad entering the Lehigh River in any year was 4,740. Dam removal was determined to be the only feasible option from an engineering perspective to achieve adequate fish passage at both dams. Cost for the projects was approximated to be between \$6.5 - \$8.7 million at Easton Dam and \$5 - \$6.5 million at Chain Dam. In addition, \$200,000-\$450,000 in annual operation and maintenance costs would be necessary to run pumping facilities to maintain water in the Delaware and Lehigh Canals. At this time, the dam removal option will not be advanced beyond this point due to a lack of support from the dam owners.

Pennypack Creek

The City of Philadelphia and project partners are exploring the continuation of restoration efforts at remaining blockages on Pennypack Creek in the lower Delaware River basin. To date, four dams have been removed and a rock ramp fishway has been constructed over a sewer line crossing. Project partners are exploring removal options at Roosevelt Boulevard Dam (RM 5.8) and the potential of a bypass fishway at Verree Road Dam (RM 9.2). These efforts would restore migratory and resident fish passage to the entire mainstem of Pennypack Creek and eliminate hazards to public safety.

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DELAWARE

Jeff Tinsman, Reef Program Manager, Delaware Department of Natural Resources and Environmental Control, Division of Fish and Wildlife

Oyster Shell Planting: From 2005-2011, Delaware was part of the Delaware Bay Oyster Restoration Task Force, a joint effort with New Jersey and other partners to provide shell cultch for attachment of oyster spat. During this period, more than a million bushels of shell were planted on 518 acres of eight oyster seed beds in Delaware waters. Federal, state, oil spill remediation, and shell tax funds were used in this effort. These efforts have enhanced oyster populations and the resulting oyster beds provide fish habitat for Atlantic States Marine Fisheries Commission managed species.

Shad Hatchery: Since 2005, the Delaware Division of Fish and Wildlife has operated a hatchery and culture effort for American shad on the Nanticoke River, a Chesapeake Bay tributary. Several hundred native female shad are spawned and the juveniles are raised in tanks for about four days. To preserve genetic integrity of the Nanticoke stock, the hatchery spawns adult American shad that are native to the Nanticoke River. During this period they are marked, so that later identification is possible. Seine surveys confirm that hatchery fish make up more than 20% of the young-of-year population and that returning spawners include hatchery produced females.

Dam Removal: The University of Delaware's Water Resources Agency is heading up efforts to remove Dam #1 (Byrnes Mill Dam) on White Clay Creek in northern Delaware. The White Clay Creek, which flows from southeastern Pennsylvania to northern Delaware, is the only National Wild and Scenic River protected in its entirety. This will open up over 3.5 miles of spawning habitat for American shad and will mark the first dam removal for fish passage in the entire state of Delaware. Access to this stretch of the creek has been blocked since 1777. Funded by a NOAA grant and American Rivers, this is part of a larger effort to remove six additional dams, allowing access to 14 miles of fish habitat reaching all the way to the Pennsylvania line.

MARYLAND

Marek Topolski, Maryland Department of Natural Resources, Fisheries Service

Engineering design for removal of Bloede Dam, located on the Patapsco River, continues as sewer line relocation options are being reviewed. Bloede Dam is the third of four dams being removed. The fourth and final dam (Daniels Dam) is in the early removal design phase. Together, removal of these dams will restore more than 65 miles of river herring and shad spawning habitat and more than 183 miles of American eel habitat.

Removal of these dams is due to a partnership among American Rivers, state, federal, and county agencies to restore fish habitat in the Patapsco River.

Dominion has proposed to construct a facility for liquefaction of natural gas (LNG) and export at its Cove Point LNG terminal on the Chesapeake Bay in Lusby, MD. A temporary (three to five years) construction staging pier has been proposed that would cross a natural oyster bar. Proposed mitigation includes oyster reef restoration and the dismantled pier for an artificial reef.

Calvert Cliffs Nuclear Power Plant presented three years of data evaluating the effectiveness of a horseshoe crab exclusion device for the intake pipes. Data indicates a significant reduction of horseshoe crab mortality.

A large scale (~300 acres) oyster restoration project is underway in Harris Creek, Chesapeake Bay. Similar restoration projects are planned for the Little Choptank and Tred Avon Rivers. Small scale restoration projects continue as part of the Marylanders Grow Oyster program which engages waterfront homeowners in resource conservation. A comparable oyster gardening program is run by the Chesapeake Bay Foundation.

VIRGINIA

Jay Odell, Director, The Nature Conservancy's Mid-Atlantic Marine Program; Tony Watkinson, Chief, Habitat Management Division, Virginia Marine Resources Commission

Submerged Aquatic Vegetation Restoration in the Seaside Bays on Virginia's Eastern Shore (*Bo Lusk, Marine Steward, The Nature Conservancy*)

Eelgrass restoration in Virginia's seaside bays is a success story due to the Virginia Seaside Heritage Program and diverse public and private funders. Restoration efforts are coordinated by the Virginia Seaside Partnership which includes the Virginia Marine Resources Commission, Virginia Institute of Marine Science (VIMS), Virginia Coastal Zone Management Program and The Nature Conservancy. Using methods developed at VIMS, seeds are broadcasted by hand instead of transplanting whole plants and this has proven to be an extremely effective method of restoration. Since 2001, over 53 million seeds have been broadcast into 416 acres in South, Spider Crab, Cobb, and Hog Island bays. Eelgrass has spread considerably in South Bay. Aerial photography has shown that seagrass now occupies an area on the seaside of approximately 5,000 acres. As noted by David Malmquist of VIMS, "this has become the largest and most successful example of seagrass restoration in the world... 75% of the world's restored seagrass beds now reside in these seaside bays." Water quality monitoring shows the parameters necessary for seagrass survival (light, turbidity, and chlorophyll) remain within the habitat requirement established for seagrass. The Partnership's pilot scale

efforts to reintroduce bay scallops have shown that these restored seagrass meadows have developed into functional bay scallop habitat. Hatchery-reared scallops have successfully reproduced in these meadows, and their offspring have recruited into restored eelgrass throughout the coastal bays. For more information, please contact Tony Watkinson at Tony.Watkinson@mrc.virginia.gov.

First Living Shoreline Demonstration Project Installed on Virginia's Eastern Shore in Accomack County on Occohannock Creek (*Gwynn Crichton, Senior Conservation Project Manager, The Nature Conservancy, Virginia Chapter*)

In October 2013, The Nature Conservancy and the Eastern Shore Resource Conservation & Development Council (RC&D) completed construction and fall planting of a living shoreline along 1,000-feet of Occohannock Creek next to the Bay Camp and Retreat Center, an Eastern Shore tributary of the Chesapeake Bay in Virginia's Accomack County. The Camp Occohannock Living Shoreline Project involved a combination of treatments including multiple low rock sills, extensive bank grading, creation of a marsh terrace using sand, and planting of marsh vegetation. The completed shoreline project is designed to withstand a 25-year storm event or a storm surge that is five feet higher above mean low water, while maintaining the land-sea connection so critical for coastal fish and wildlife.

The resulting hybrid approach of green and gray infrastructure should both effectively protect property and infrastructure from coastal storms and erosion, while also ensuring that a healthy and productive coastal ecosystem remains resilient over time. The larger goal of this project is to demonstrate that employing natural defenses like living shorelines can help protect people and nature from climate hazards such as storms and coastal flooding. Toward this end, the Nature Conservancy and RC&D will host a series of community outreach and education workshops for local landowners this spring, which will explore the benefits, permitting procedures, and costs associated with living shorelines compared to conventional methods. For more information, please contact Gwynn Crichton at gcrichton@tnc.org.



Volunteers planting marsh grasses along newly constructed living shoreline that includes low rock sills protecting a newly graded marsh terrace. Source: Gwynn Crichton

NORTH CAROLINA

Jimmy Johnson, Coastal Habitats Coordinator, North Carolina Department of Environment and Natural Resources

The Albemarle-Pamlico National Estuary Partnership (APNEP) completed and adopted a new Comprehensive Conservation and Management Plan (CCMP) this past year. APNEP has also published a newly completed Ecosystem Assessment for the Albemarle-Pamlico region.

The 2013-2014 Coastal Recreational Fishing License (CRFL) grant cycle funded three projects related to habitat outreach. They are: 1) "There's Something Fishy About Salt Marsh, Oyster Reef, and Seagrass Habitats," a grant designed to enhance the North Carolina Division of Marine Fisheries (NCDMF) outreach by developing multimedia lesson plans and web content; 2) a grant incorporating stakeholder knowledge of the status and value of coastal habitats into education, outreach, and conservation initiatives; and 3) a grant promoting responsible boating practices and boater awareness of submerged aquatic vegetation (SAV). A CRFL project entitled "Development of Submerged Aquatic Vegetation Monitoring Protocol" was completed in 2012 and provides a framework for long-term monitoring of SAV to assess change.

APNEP, in partnership with the North Carolina Department of Transportation, has funded aerial photography of the region to determine the presence of SAV and compare the current extent of coverage with the 2007-2008 results. The final flights will be in the spring of 2014 as the weather did not allow for several of the flight paths to be flown in 2013.

The Division of Coastal Management (DCM) has completed mapping of the estuarine shoreline, resulting in a digital representation of the shoreline by type, modifications, and an inventory of structures. DCM contracted with East Carolina University to accomplish spatial analysis of shoreline and coastal structures. The DCM undertook detailed internal analysis of shoreline and coastal structures created by the Estuarine Shoreline Mapping Project (ESMP). In order to make shoreline data more functional for resource agencies and various stakeholders, ESMP data was associated with municipality and with water body or Hydrologic Unit Code (HUC) boundaries. The initial mapping effort utilized aerial photos spanning six years, but DCM is updating the recently completed Estuarine Shoreline Mapping effort using 2012 aerial photography.

This new effort will result in a current snapshot of the state's estuarine shorelines and associated structures. The final report is available at this web address along with a link to an interactive mapping tool: <http://dcm2.enr.state.nc.us/estuarineshoreline/ESMP%20Analysis%20Report%20Final%2020130117.pdf>.

UPDATES FROM AROUND THE COAST

A rock ramp fish passage, funded through the U.S. Army Corps of Engineers, has been constructed adjacent to Lock and Dam 1 on the Cape Fear River to allow anadromous fish passage upstream. NCDMF had participated in the planning of this project. NCDMF, Wildlife Resources Commission, N.C. State University (NCSU), and Cape Fear Riverwatch are tagging fish to monitor movement upstream through the fish passage. Building on the momentum of the newly constructed fish passage, the Cape Fear River Partnership of key federal, state, local, academic, and other organizations in the region worked together on a multi-year action plan. Using a broad range of tools and capabilities, they seek to provide long-term, habitat-based solutions for the most pressing challenges for migratory fish in the Cape Fear River Basin.

On August 1, 2013, the NC Division of Water Quality merged into the Division of Water Resources (NCDWR). In addition, the Stormwater Permitting Program was moved into the Division of Energy, Mineral, and Land Resources. These organizational and programmatic changes have resulted in the shifting of a number of positions and job responsibilities. However, outreach and educational efforts for engineers, developers, local jurisdictions, and the general public on stormwater rules and techniques are continuing through NCDWR. Several stakeholder meetings have occurred to develop guidance, procedures and tools for the purpose of advancing low impact development (LID) statewide. A workshop will be held in Raleigh in March 2014 for the purpose of sharing these tools which promote LID. There is a strong promotional effort underway to encourage green infrastructure and LID techniques in new development, as well as remediation efforts in existing development, to reduce adverse impacts to water quality through DWR and its partners.

North Carolina's Wildlife Resources Commission (NCWRC) is funding a study on endocrine-disrupting chemicals and intersex fish in North Carolina waters, including the Roanoke River. Also on the Roanoke River, the WRC is a partner in funding a series of U.S. Geological Survey gauging stations which will monitor ambient water quality conditions.

As part of their study regarding the feasibility and benefits of dam and barrier removal, the NCWRC is conducting a study on the effects of small dams with regards to fish and mussels in the Chowan, Neuse, Roanoke and Tar River basins. NCWRC and DMF staff are working together to determine definitive minimum habitat criteria and culvert design needed for river herring to successfully migrate upstream to traditional spawning habitats. When this information has been determined, a revision to the Anadromous Fish Stream-Crossing Guidelines will be written in order to enhance fish passage and access. The NCWRC also fully supports NCDMF and NCSU in hiring a Sea Grant fellow, in the Fall of 2013, to analyze an existing spawning survey and obstruction data to specifically address these issues.

SOUTH CAROLINA


Bob Van Dolah, Retired, Marine Resources Research Institute

The South Carolina Department of Natural Resources (SCDNR) continued its development of living shorelines using a variety of materials. The South Carolina Oyster Restoration and Enhancement (SCORE) program will have planted 2,115 linear feet (0.45 acres) of shell bags using volunteer community groups that assist in this popular program. The Shellfish Management Section of the SCDNR will also have completed planting of loose oyster shell along 13,207 feet (8.05 acres) of estuarine shoreline, primarily in the Charleston Harbor estuary. Additionally, the Department's Shellfish Research Section will have constructed 400 linear feet (0.29 acres) of experimental crab trap reefs and 275 linear feet (0.02 acres) of oyster castles for oyster settlement in 2013.

The South Island Dredging Association had recently received a permit to begin one of the largest open water disposal projects ever conducted in South Carolina waters. The planned disposal operation will remove more than 300,000 yd³ of predominantly fine grained sediments from about 50 acres of intertidal and shallow subtidal creek bottoms, approach channels and marina basins. The sediments will be pumped to an open water site near the entrance of Calibogue Sound. Disposal will occur near the bottom over approximately six months. The physical and ecological consequences of this project are uncertain, although applicant models indicate that the material will not remain at the site. A monitoring study of the project impacts has been requested by several agencies and pre-impact assessments are currently being conducted. Dredging operations are expected to begin late 2013.

The U.S. Army Corps of Engineers is preparing to initiate another major beach renourishment project at Folly Beach, South Carolina. This project, scheduled to begin late 2013, will pump sand on approximately 4.9 miles of shoreline along the majority of the island, but excluding undeveloped portions on the north and south ends of the island. Approximately 1.4 million yd³ of sand will be pumped from multiple offshore borrow sites, some of which were partially mined in a previous nourishment project of the island. The collective total area of borrow sites used in the previous and proposed project is 550 acres. Dredging impacts from the previous nourishment project identified accumulation of muddy sediments in the borrow site holes, that make those areas unsuitable for use in subsequent projects. The planned dredging of the remaining borrow site areas will primarily mine sand to a lesser depth below grade, which will hopefully avoid this problem.

The Charleston Harbor Deepening Project (Post 45) Study is continuing on an accelerated schedule. The planned project will both widen and deepen existing channels to a minimum of 45



feet maintained, which can include up to two feet of advanced maintenance dredging and two feet of overdepth dredging (e.g. $45+2+2 = 49$ ft). The District has initiated modeling Environmental Fluid Dynamics Code and HarborSym model runs using various depths dependent on the harbor segment being considered. Model results will be used to make additional decisions related to alternatives, environmental impacts, costs and benefits based on preliminary economic, environmental, and engineering considerations. Environmental assessments (of interest to habitat effects and protection) include assessments of hard bottom habitats, benthic surveys, wetland assessments habitat suitability indices, sediment testing, and air quality analysis. Updates on the Charleston Harbor Post 45 Project are provided at <http://www.sac.usace.army.mil/Missions/CivilWorks/CharlestonHarborPost45.aspx>.

GEORGIA

January Murray, Constituent Services Unit Leader,
Georgia Department of Natural Resources

Management of Artificial Reefs

Georgia's Department of Natural Resources (GADNR) is in consultation with the Department of Navy and the U.S. Army Corps of Engineers on decommissioning eight Tactical Aircrew Training System Towers to create fish habitat located in federal waters along the Georgia coast.

From August 2012 to June 2013, the offshore artificial reef program enhanced three reef sites through deployments of a barge (130 feet long x 30 feet wide x 7 feet high) loaded with 72 concrete transmission line poles, 274 pallet balls, and a 39 foot steel hulled vessel.

A programmatic general permit for the enhancement of fifteen inshore artificial reefs at multiple locations throughout coastal Georgia was developed. A State Coastal Marshland Protection Act permit was approved in June 2013 and a federal U.S. Army Corps of Engineers Programmatic General Permit was approved in July 2013.

Oyster Reef Restoration

In spring of 2013, GADNR in partnership with the Izaak Walton League of America and the Coastal Conservation Association of Georgia planted natural cultch materials at three locations to enhance substrate for oyster restoration. A total of 51 tons of recycled oyster shells donated from restaurants, roasts, and the local community were planted to restore 0.22 acres of oyster reef. Funds donated from the Georgia Natural Resources Foundation were used to fabricate an oyster shell conveyor system which aided in reducing time, effort, and labor costs associated to bag recycled shell for restoration projects. See GADNR's oyster restoration article on page 3 for further detail.

In addition to these oyster restoration sites providing bank stabilization, essential fish habitat, and improved water quality they also serve as excellent locations for education and outreach projects showcasing restoration of shellfish in Georgia's estuarine waters.

FLORIDA

Kent Smith, Florida Fish and Wildlife Commission, Biological Administrator, Division of Habitat and Species Conservation

Port Everglades Harbor Navigational Improvements

The Army Corps of Engineers (ACOE), NOAA Fisheries, Environmental Protection Agency, Florida Department of Environmental Protection, and Fish and Wildlife Conservation Commission (FL FWC) met to discuss outstanding issues regarding the monitoring and mitigation plan for improvements to navigation in the Port Everglades Harbor project. Discussions primarily dealt with coral and seagrass habitat impact assessment and mitigation. Currently, the ACOE is still working on the mitigation plan with scheduled completion of the final Environmental Impacts and Mitigation Report by the end of November 2013. Completing the revised EIS will occur subsequent the completion of the Environmental Impacts and Mitigation Report.

Jacksonville Harbor Deepening

The ACOE developed a draft Supplemental EIS for the Jacksonville Harbor Deepening project in the summer of 2013. The ACOE has also released a revised Monitoring and Adaptive Management Plan, which included the results of the Tributary/Saltmarsh modeling for the proposed project. The ACOE took public comments on this information until October 24, 2013. The signing of the Chief of Engineer's report is scheduled for April 2014.

Indian River Lagoon Algae Blooms

A long-term, non-toxic phytoplankton bloom affected the waters of the Indian River Lagoon north of the Sebastian Inlet, Banana River, and lower Mosquito Lagoon from March 2011 until March 2012. This bloom led to a dramatic reduction of seagrass in affected waters of the systems. A bloom of brown tide algae (*Aureocymbra lagunensis*) has been documented since early April 2013 in the northern Indian River Lagoon and Mosquito Lagoon. State agencies investigating this event also documented a bloom of this species in the Indian River Lagoon from mid-Summer to fall of 2012. From July 25, 2012 to October 18, 2013, the FWC have documented 279 manatee deaths in Indian River Lagoon waters of Brevard County. FL FWC biologists suspect that these manatee deaths are related to a dietary change resulting from localized environmental changes, including reduced availability of seagrass, the manatee's primary food in the area. Approximately 250 dead brown pelicans have also been found

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in the same county waters from mid-February to mid-April (2013). Localized algal blooms in the Brevard County portion of the Indian River Lagoon have led to reported fish kills affecting multiple species.

NE Florida Estuarine Habitat Restoration

The Northeast Florida Estuarine Habitat Restoration Team (NERT) was established to develop and coordinate estuarine habitat restoration from the St. Marys River border to Sebastian Inlet in Florida. This team is developing a prioritized estuarine habitat restoration project list as part of a Coastal Zone Management program (NOAA and the Florida Department of Environmental Protection) grant, and is comprised of local, state, federal and NGO partners. This regional coordination is envisioned as being the foundation of and model for development of a series of estuarine restoration plans that will provide estuarine restoration planning coverage for the state of Florida as a whole. To date, NERT's efforts have resulted in a successful proposal to NOAA's habitat restoration program for direct restoration of over 100 acres of mangrove, oyster reef and coastal marsh habitats with enhancement of over 2,000 acres of these habitats on public lands.

HABITAT PROGRAM MISSION

To work through the Commission, in cooperation with appropriate agencies and organizations, to enhance and cooperatively manage vital fish habitat for conservation, restoration, and protection, and to support the cooperative management of Commission managed species.

REPRODUCTIONS

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Partner Contributors:

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HABITAT HOTLINE *Atlantic*

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MAFMC Amendment 16: www.mafmc.org/actions/msb/am16

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www.necca.stormsmart.org/municipal-grants/
NROC: www.northeastoceanCouncil.org

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MARCO website: www.midatlanticocean.org
Mid-Atlantic Regional Planning Body:
www.boem.gov/Mid-Atlantic-Regional-Planning-Body
Ocean Data Portal: www.portal.midatlanticocean.org
Recreational Boater Survey:
www.monmouth.edu/uciboatersurvey/default.asp
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Habitat and Ecosystem Atlas: www.ocean.floridamarine.org/safmc_atlas/
SAFMC Digital Dashboard: www.ocean.floridamarine.org/safmc_dashboard/
Fishery independent data: www.ocean.floridamarine.org/SA_Fisheries/

Essential Fish Habitat and Essential Fish Habitat Areas of Particular Concern:
www.ocean.floridamarine.org/sa_efh/
Managed Areas: www.ocean.floridamarine.org/safmc_managedareas/
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www.southeastaquatics.net/groups/seacap
South Atlantic Landscape Conservation Cooperative:
www.southatlanticlcc.org/#

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www.maine.gov/dmr/searunfish/ or www.penobscotriver.org

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Atlantic States Marine Fisheries Commission

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1050 North Highland Street, Suite 200 A-N • Arlington, Virginia 22201 • 703.844.0740 • www.ASMFC.org