HABITAT HOTLINE *Atlantic*

2011 Annual Issue

HEALTHY FISHERIES NEED HEALTHY HABITAT

SPOTLIGHT ON HABITAT RESTORATION PROJECTS:
OYSTER REEFS AND MOSQUITO DITCHES

Oyster Reef Restoration Projects

The Eastern oyster (*Crassostrea virginica)* once a dominant feature of most Atlantic and Gulf coast estuaries, has drastically declined in many areas across the U.S., due to a variety of causes, including over-harvesting, oyster pathogens, impacts of coastal development and habitat disturbance. Once valued primarily as a fisheries resource, oysters are now recognized more broadly for their value as important habitat for numerous finfish, invertebrates, wading birds, and mammals. Oysters also improve water clarity and quality by filtering large quantities of water in conjunction with feeding, and transfer nutrients from the water column to the bottom dwelling communities. In South Carolina and Georgia, more than 95% of the oyster resources are intertidal providing a natural breakwater which protects adjacent salt marsh.

Natural oyster bed forms a buffer between waterways and the saltmarsh as well as critical habitat for many other species/SCDNR

In the Southeast, and particularly in South Carolina and Georgia, efforts are underway to restore intertidal shellfish grounds both in harvestable areas where the beds have been depleted, and in non-harvestable areas to provide both habitat for other estuarine fauna and to serve as a living shoreline that can protect marsh and uplands from erosion. Many of these projects are completed using volunteers that participate in the "South Carolina Oyster Restoration and Enhancement Program" (SCORE) which is coordinated by the South Carolina Department of Natural Resources (SCDNR), Marine Resources Division (*score.dnr.sc.gov/*) and the Generating Enhanced Oyster Reefs in Georgia's Inshore Areas (GEORGIA) that is coordinated *(continued on next page)*

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Healthy, self-sustaining populations for all Atlantic coast fish species or successful restoration well in progress by the year 2015.

Spotlight on Habitat Restoration

by the University of Georgia's Marine Extension Service. (*www.marex.uga.edu/shellfish/oysterrest.html*).

Natural populations of oysters provide abundant larvae in both South Carolina and Georgia, but populations are limited by lack of hard substrate. Both of the volunteer programs utilize recycled oyster shells to create and enhance oyster habitats. Community volunteers provide most of the labor involved, filling bags with recycled shells and later transporting these via human chain to the vulnerable shorelines. This community effort creates small but sturdy reefs in high energy areas where loose shell might quickly wash away. The community restoration program has the added values of fostering environmental stewardship and educating the public.

Staff of the Georgia Department of Natural Resources' (GADNR) Coastal Resources Division and personnel from the University of Georgia's Marine Extension Service recently completed their largest partnered oyster restoration project to date (0.4 of an acre) at Skidaway Island, Georgia. Approximately 150 volunteers donated nearly 1,900 hours toward bagging oyster shell and then "planting" the bags in the inter-tidal zone of Skidaway Island. AmeriCorps volunteers from around the US provided much of the heavy lifting of the project. The Georgia Coastal Conservation Association assisted with advertising public bagging and planting events as well as donating a laptop to be used in monitoring oyster reef restoration projects. Funding for this project was provided by the Southeast Aquatic Resources Partnership and the Fish America Foundation.

In South Carolina, SCDNR staff collaborated with the City of Charleston to create fish habitat and stabilize shorelines at two municipal parks as part of a larger shoreline restoration project funded by American Recovery and Reinvestment Acts (ARRA) through NOAA.

One of the projects was located on Daniel Island in the Charleston Harbor estuary. Volunteers constructed a reef in front of a badly eroding shoreline adjacent to a popular jogging path. *(continued on next page)*

As oysters begin to recruit, the bagged oyster shell will come to look like the natural oyster reefs found scattered along the shoreline of our estuaries. These oyster reefs will help prevent shoreline erosion caused by waves and boat wakes while also providing great fish habitat and fishing opportunities.

Gabe Gaddis
(GADNR Constituent Services Program Manager)

Oyster bags being deployed along a shoreline on Skidaway Island in Georgia/Gabe Gaddis, GADNR

The path and adjacent archaeological remnants of a former "Freedman's Village" were being compromised by erosion of the shoreline. A 250 foot long reef was constructed in the summer of 2010. The reef has trapped considerable silt, altering the shoreline slope and preparing the way for marsh grass recovery. This spring, school groups will deploy marsh grass plugs behind the reefs as part of the Seeds to Shorelines Program sponsored by COSEE-Southeast. The Daniel Island site is being used as a living classroom for area schools to study the diversity of finfish utilizing the restored areas. School groups sample fish using seine and gill nets.

One of the great aspects of these volunteer programs is the educational value they provide to school children and the general public who learn about the value of these reefs and can watch the reefs being colonized by oysters and other animals as they turn into productive reef habitats that look very similar to existing natural shellfish beds.

Nancy Hadley
(Manager of the SCDNR Shellfish Management Section and Lead for the SCORE Program)

The other project completed with the City of Charleston was located at Plymouth Park, near the Stono River. The shoreline of this park was being severely eroded due to strong tidal currents and boat traffic in the Intracoastal Waterway. The City of Charleston first constructed a rock sill and regraded the badly eroded shoreline, planting suitable vegetation to stabilize the new fill. SCDNR staff and volunteers are now constructing an oyster reef between the sill and the new vegetation, providing fish habitat and acting as an additional living sill to protect against undermining of the shoreline stabilization elements. With the assistance of more than 100 community volunteers, the Plymouth Park reef should be completed by July 2011.

As with the Georgia project, both of the South Carolina projects utilize mesh bags filled by volunteers with recycled oyster shells. Oyster shells are procured from restaurants and caterers through the SCDNR shell recycling program. More than 700 volunteers have participated in shoveling more than 97 tons of oyster shells to fill almost 6000 bags to use as reef building blocks. Approximately 200 volunteers have helped SCDNR deploy the filled bags on the shorelines, using human chains to move the bags. Fifteen local schools and several colleges both local and nationwide have participated in the project, learning valuable conservation lessons while helping restore degraded shorelines and protect urban public spaces.

A youth group from Summerville YMCA helps construct oyster reefs at Daniel Island/SCDNR

For more information on South Carolina projects, please contact Nancy Hadley (*HadleyN@dnr.sc.gov*) and for more information on Georgia projects, please contact Pat Geer (*Pat.Geer@dnr.state.ga.us*).

Gabe Gaddis passed away in August 2011. The Commission's Habitat Committee honors his life, kind character, and contributions to fish habitat conservation.

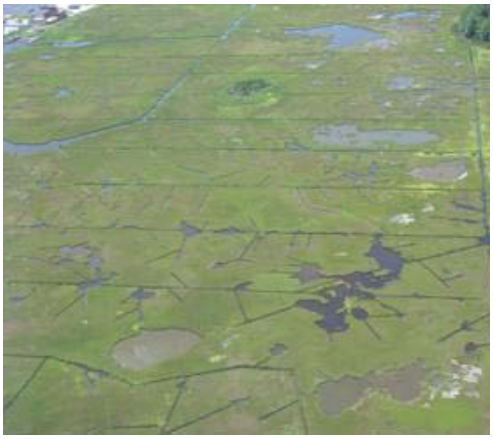
Spotlight on Habitat Restoration

Mosquito Ditch Restoration Projects

Historically, coastal wetland ditching was a common practice in the attempt to control mosquito populations. Ditching efforts were greatly enhanced during the Great Depression with Civilian Conservation Crew labor. Over 90% of salt marshes from Maine to Virginia were ditched during the 1930s and 1940s. Coastal wetland dewatering projects extend southward to lower Florida's tidal mangrove salt marsh wetlands. By the 1960s, the majority of tidal wetlands throughout Atlantic coast states had been altered for mosquito control. In Florida dikes were constructed along shorelines to separate mangroves from the main lagoon. In the mid-Atlantic, networks of ditches were dug through coastal salt marshes to drain ponds and depressions, lower the water table, reduce shallow water habitat during low tide, and increase tidal flushing. Dewatering wetlands was intended to reduce mosquito abundance by eliminating standing water. Ironically, dewatering was only moderately effective in reducing mosquito breeding and abundance.

By the early 1970s, many Florida wetlands were impounded and separated from adjacent lagoons for the purpose of flooding them for mosquito control. Flooding proved to be more effective for controlling mosquitoes than dewatering. However, the change in hydrology caused significant changes to wetland systems. Many wetlands transitioned from high marsh mixed black mangrove (*Avicennia germinans*) and salt marsh to a mixed red mangrove (*Rhizophora mangle*) and non-native plant dominated freshwater swamp. The lack of tidal connection to adjacent lagoons resulted in the loss of wetland ecosystem functions, including those supporting important fisheries.

Wetland habitats serve as links and buffers between terrestrial and aquatic ecosystems. Eroded sediments are distributed on the marsh surface enabling accretion of the marsh surface. Nutrients from uplands are trapped and transformed into plant biomass. Wetlands provide feeding and nursery habitats for a diverse array of animals, particularly fish and birds (see Habitat Hotline Atlantic 2009 v16 n2 p6, *www.asmfc.org/publications/habitatHotline/2009/hha_SummerIssue_2009.pdf*). Wetlands are a source of particulate and dissolved organic materials for adjacent lagoons and creeks. Organic materials in both the water column and sediment are necessary to support estuarine fisheries production, and are especially important for blue crabs, shrimp, and fish such as flounder, weakfish, and red drum. Wetlands provide a physical buffer that moderates storm/flood damage to upland areas. Where present, they are an effective first line of defense for protection of the mainland against rising sea levels and storm surge. A wetland's ability to sustain these critically important functions is highly dependent on local hydrology including water exchange with the adjacent estuary and flow of sediment-bearing waters through marsh systems.



Civilian Conservation Crew grid ditches in a mid-Atlantic salt marsh/Donald Webster, MD DNR Wildlife & Heritage

Harbor Branch Mangrove Marsh Restoration Project in St. Lucie County, Florida

The Harbor Branch mangrove marsh is located in St. Lucie County on the southeast Atlantic coast of Florida. The marsh was isolated from the 156 mile long Indian River Lagoon (IRL) in 1963. A 178-acre portion of the wetland was chosen for restoration. The project site was historically high marsh habitat that included black and red mangroves. Currently, the restoration area includes 0.33 acres of non-vegetated tidal flats, 138.49 acres of red and black mangroves, and 39.18 acres of exotic Brazilian pepper (*Schinus terebinthifolia*). *(continued on next page)*

Location of the Harbor Branch Mangrove Marsh Restoration Project/FWC

A 10,880 linear foot dike bordering the project site has effectively blocked the natural tidal exchange between existing sub-tidal habitat in the lagoon and the mangrove/marsh habitat. Products of primary production and detritus are no longer being transported among the mangroves, marsh, and lagoon. The dike has blocked passage between the marsh and the lagoon preventing fish and other marine organisms from accessing important foraging, spawning, and nursery habitat. Changes to marsh hydrology have favored spread of invasive flora like the exotic Brazilian pepper tree. Brazilian pepper trees create an impenetrable barrier to wading birds and reduce their access to the marsh interior.

Restoration methods to be implemented for this project have been used successfully to restore numerous impounded mangrove/marsh wetlands in Florida. Hydrologic restoration involves stabilization of the perimeter dike and restoration of tidal flow through the installation of culverts. Dike reconstruction will require a series of steps. First, vegetation and debris will be removed from the perimeter ditch by hand and ground up. This material will be placed on the dike and mulched over. Next, a portable hydraulic pump with associated piping will suction dredge the ditch and the dredge material will be used to fill geotextile tubes forming the base of the reconstructed dike. The perimeter ditch will be dredged to re-establish its original width of 10 feet. Culverts through the dike will be installed to restore water exchange between the IRL and Harbor Branch wetland. The geotextile tubes stabilize the dike between each of the culverts. A second channel will be dredged to connect the southern culverts to a pump station.

The pumps will allow the seasonal hydro-period to be managed so as not to allow mosquito breeding. The dike will be further stabilized by (1) placing a layer of fill onto and between the geotextile tubes, (2) overlaying the fill with geotextile material, (3) covering the geotextile material with additional fill and coquina rock, and (4) seeding the dike with grass. Blocks of 6-12 inch diameter clean rip-rap will be installed along the exterior bank of the dike to protect against erosion from wave action and increase the dike's resistance to rising sea levels. Red mangrove propagules will naturally recruit to these rip-rap features increasing their resistance to erosion. The dike will be reconstructed to an appropriate height for each section. The dike will be used as a service road for maintenance of the wetland, and as an educational and recreational trail for Florida Atlantic University-led activities.

Tidal exchange between the IRL and Harbor Branch wetland will be achieved with a series of culverts that pass through the dike. Twenty 30-inch diameter corrugated aluminum culverts will be placed approximately 500 feet apart. Culvert placements along the dike have been *(continued on next page)*

Current degraded condition within the existing marsh impoundment/FWC

identified to minimize resource disturbance, provide for optimal water quality and water circulation, provide a diversity of estuarine access opportunities, and to optimize fish exchange between open IRL waters and the wetland habitat. Culverts will be installed at an elevation to allow two-thirds submergence of the full pipe opening during periods of mean high water. This placement will maximize flow capacity during mean high water, allow the number of culverts installed to provide 90% natural tidal exchange, and provide close approximation of the estuarine tidal range within the wetland. The culverts will generate a smoothing of tidal energy entering and leaving the wetland. A smooth tidal cycle will restore the marshes natural accretion mechanisms and retain its capacity to steadily respond to sea level rise. The culverts are large enough to allow ingress and egress of virtually all life stages of fish and other marine species between the wetland and the IRL. Culvert dimensions were selected to ensure juvenile fish movement was not compromised. During 8-month-long open periods, the culverts will convey tidal water between the IRL and the wetland naturally. During the remaining four months, operation of a pump station will ensure that 80% of the natural estuarine water exchange is maintained.

Following stabilization of the dike and culvert installation, salt-water inundation of the wetland will naturally eradicate the established non-salt-tolerant invasive plants such as the Brazilian pepper trees. Saltwater inundation will also prevent re-establishment of such invasive plants. Several thousand mangroves will be replanted throughout the wetland. Project partners will collect mangrove propagules and seedlings from existing on-site mangroves. Propagules will be "planted" by hand broadcasting them onto the impoundment substrate and into areas of decomposing exotic vegetation over a period of two to three years.

The restored mangrove marsh system will be accessible for public recreation, education, and research. St. Lucie County conducts environmental education programs within its managed wetlands for students from local schools. Thousands of secondary school children visit St. Lucie County's marsh wetlands annually to study the importance of the wetlands to the health of the IRL. Scientists at Florida Atlantic University at Harbor Branch Oceanographic Institute (FAU-HBOI) intend to use the site for graduate research studies. Such studies will incorporate wetland plant recovery dynamics and possibly the genetics of successful plant recovery. These efforts will be operated from the FAU Harbor Branch Campus. Because of its significant biodiversity and proximity to the Florida Atlantic Harbor Branch campus, the project area will become an integral part of this education program.

Restored mangrove/marsh system, St. Lucie County, FL/FWC

Monitoring project results is important to any aquatic habitat restoration effort. This hydrology reconnection project will be monitored prior to construction and for a minimum of five years post-construction with fish passage and water quality assessments. Quantifiable restoration goals include improved water quality and increases in mangrove marsh habitat for estuarine faunal species. Species counts will be conducted before and immediately after restoration is complete. Monitoring program components include examining fish and macro-crustacean utilization of the restored marsh by targeting 35 fish and invertebrate species, and 20 species of wading/migratory birds. For example, adult spotted seatrout (*Cynoscion nebulosus*), a species of great economic importance to the region and managed by the Atlantic States Marine Fisheries Commission (ASMFC), have been observed to move from unrestored, non-culvert areas to restored areas with culverts due *(continued on next page)*

to feeding preferences, prey availability, and/or movement up current gradients. Mature spotted seatrout feed adjacent to their spawning grounds, which is in close proximity to the restoration area. This will be monitored to examine their response to the restoration effort.

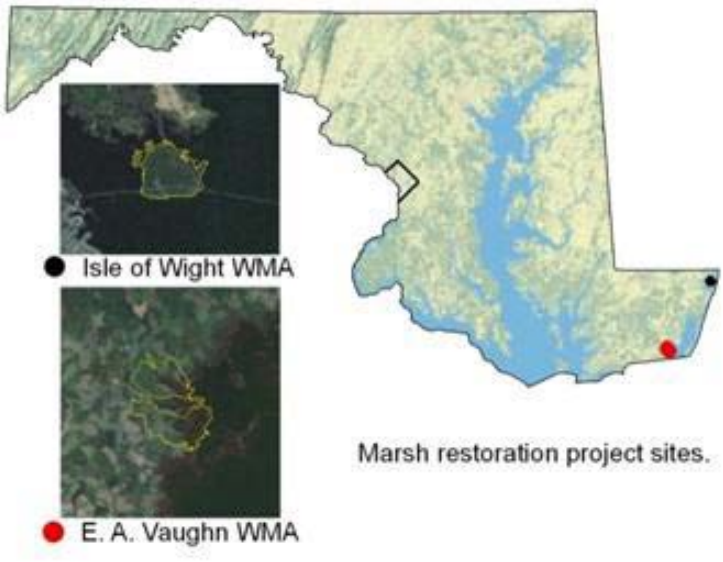
Additionally, marsh-wide exotic invasive species control will be monitored from annual aerial photography and ground observations. Brazilian pepper currently occupies 40-50% of the canopy. The project goal is to achieve 80% canopy coverage with native mangrove species after five years post restoration. Based on previous experience in adjacent marshes this should be achievable. Canopy expansion should begin after the exotic plants have been eradicated by reintroduction of estuarine waters into the marsh and their debris begins to degrade. This should occur within 2 years post-construction in the warm Florida climate.

This restoration effort is an example of a broad partnership partially funded by a $1 million grant from the U.S. Fish and Wildlife Service-National Coastal Wetlands Conservation Grant Program. The partnership includes the Florida Fish and Wildlife Conservation Commission, St. Lucie County, the Florida Inland Navigation District, FAU-HBOI, and the South Florida Water Management District. This is a fine example of collaboration to achieve fishery habitat restoration on a regional scale. For more information on this project, please contact Kent Smith (*kent.smith@myfwc.com*).

E.A. Vaughn Wildlife Management Area and Isle of Wight Wildlife Management Area Salt Marsh Restoration Projects in Worcester County, Maryland

Two coastal wetland restoration projects have been initiated in Worcester County, Maryland: E.A. Vaughn Wildlife Management Area (2008) and Isle of Wight Wildlife Management Area (2009). Both projects are part of Maryland Department of Natural Resources' (MD DNR) Coastal Wetland Initiative. These salt marsh restoration projects are intended to address significant changes to marsh hydrology that resulted from Civilian Conservation Crew mosquito control marsh ditching projects in the 1930s and 1940s.

Grid ditching of coastal salt marshes was intended to increase the frequency of tidal inundation to the high marsh and give mosquito fish further access to the marsh during high tide. A secondary result of the ditching was to increase the rate of runoff from uplands, particularly agricultural land, into and through the marshes. Several marsh habitat types were degraded or lost when the marshes were ditched. Of particular concern are the changes to vegetation communities, lowered marsh surface, and drained high marsh ponds where waterfowl prefer to forage. Plugging the ditches is intended to slow runoff rates thereby allowing more time for water infiltration and residence time within marshes. Reduction of runoff rates will also allow more time for filtering of non-point source pollutants from agriculture and development. *(continued on next page)*



Vaughn Wildlife Management Area and Isle of Wight Wildlife Management Area restoration sites in Worcester County, MD.

Spotlight on Habitat Restoration

Grid ditching has reduced the water retention capacity of affected marshes. Hydrologic changes caused by ditching resulted in the shift of marsh vegetation composition from predominantly smooth cordgrass (*Spartina alterniflora*) to species that are less flood-tolerant. Interior salt marsh habitat includes numerous salt ponds and pannes. These ponds and pannes retain water within the marsh during low tide thereby providing habitat for mollusks, crustaceans, and fish. Grid ditching causes water to drain from ponds and pannes as the tide recedes. Sun and air exposure during low tide further reduces the amount of water within the marsh. Reduced pond depth has led to the extirpation of submerged aquatic vegetation (SAV), and the draining of pool and panne habitats has decreased the abundance of mollusk and crustacean prey. Surface and pond water within salt marshes is important spawning and nursery habitat for prey fish such as Atlantic silverside (*Menidia menidia*) and mumichog (*Fundulus herteroclitus*). As a whole, grid ditching has decreased access to and abundance of important fish habitat and decreased marsh utilization by many bird species such as aerial insectivores, herons, shorebirds, terns, and ibises.

Amphibious excavator used to install ditch plugs/Donald Webster, MD DNR Wildlife & Heritage

Restoration of grid ditches involves the installation of "plugs" across ditches to restore high marsh hydrology. MD DNR purchased an amphibious excavator having very low ground pressure (3.63 psi) allowing MD DNR to access the grid ditches with minimal compaction to the marsh surface. Each ditch plug consists of polymer sheeting reinforced with sediment. The excavator was used to press the polymer sheeting vertically into the marsh surface. Ditch plugs span the ditches (which average 3 ft wide by 3 ft deep) and continue approximately 3 feet into the marsh on both sides of the ditch. After the polymer sheeting is installed across the ditch, sediment is excavated from the ditch upstream of the plug and backfilled around the polymer sheeting. The plug is then planted with marsh vegetation for further reinforcement.

The project goal is to restore the natural salt marsh hydrology, including shallow pools, ponds, and pannes. Plugging the ditches will raise the water table allowing natural vegetation communities to reestablish. Restoration of each salt marsh will increase their capacity to perform natural filtering functions. Marshes with previously installed ditch plugs are retaining high marsh pond habitat during low tide. Prey such as crabs and fish have been observed in the restored high marsh ponds and plugged ditches throughout the tidal cycle. Within two years of restoration, widgeon grass (*Ruppia maritime*) was observed in a few pools at both E.A. Vaughn and Isle of Wight Wildlife Management Areas. Widgeon grass is an important SAV species for ducks and other migratory waterfowl. Continued hydrologic, water quality, and habitat improvements are anticipated to increase the diversity of marsh invertebrates, fish, birds, and other wildlife.

The marsh restoration projects were monitored prior to *(continued on next page)*

Insertion of the polymer sheets to form a ditch plug/Kevin Smith, MD DNR Watershed Services

restoration and several years of post-restoration monitoring are planned. Both water quality and biological responses are monitored. Water quality is periodically sampled upstream and downstream of the ditch plugs and in the high marsh ponds during the growing season. Parameters measured include salinity, temperature, dissolved oxygen, and specific conductance. Secchi depth for the high marsh ponds is measured. Vegetative, fish, and macroinvertebrate communities are also monitored. Surveys of marsh vegetation record species composition and percent cover. The lack of tidal fluctuation in high marsh ponds has resulted in improved water clarity. SAV reestablishment has been observed in these ponds. A before/after, control/impact (BACI) monitoring design is being used document fish and mosquito response to hydrology restoration. MD DNR is responsible for all monitoring except mosquitoes, which is being lead by Dr. Paul Leisnham with University of Maryland. For more information on these projects, please contact Kevin Smith (*kmsmith@dnr.state.md.us*).

Restored marsh ditch plug, Worcester County, MD/ Erin McLaughlin, MD DNR Watershed Services

Atlantic Coastal Fish Habitat Partnership Update

ACFHP and USFWS Fund 2nd Round of Habitat Conservation Projects

The U.S. Fish and Wildlife Service (USFWS) has announced National Fish Habitat Action Plan (NFHAP) projects approved to receive USFWS-NFHAP FY2011 funding. The following two project proposals submitted to the Atlantic Coastal Fish Habitat Partnership (ACFHP) were approved to receive funding: Restoring Diadromous Fish Passage and Habitat to Shoreys Brook, Maine and Shoreline and *Spartina* Marsh stabilization along the Atlantic Intracoastal Waterway, South Carolina. More information is available at: *www.atlanticfishhabitat.org/fundedProjects.cfm.*

ACFHP Completes Conservation Strategic Plan

In October 2011 ACFHP announced the completion of its 5-yr Conservation Strategic Plan. The ACFHP Conservation Strategic Plan proposes objectives and key conservation strategies to confront pervasive threats to fish habitat along the Atlantic coast. ACFHP will work to address these threats with a broad coordinated approach, and to leverage resources from many agencies, organizations, and others to make a difference for fish habitat. Subregional Priority Habitats are identified in the Plan as well, to attend to more localized issues and to focus the efforts of the Partnership so that it, together with partners, can make a measurable difference for fish habitat. The plan is available at: *www.atlanticfishhabitat.org/publications.cfm.*

Let the Rivers Run Again

Author Sandy Burk entitled her award-winning 2005 book on restoration of American shad in the Potomac River "Let the River Run Silver Again." That title embodies the essence of Atlantic States Marine Fisheries Commission (ASMFC) efforts to restore diadromous species along the east coast, with perhaps a little blue, brown and green thrown in, to reflect restoring passage for blueback herring, and for American eels to reach and use their inland nursery habitats. The "run" in the title could also be taken to refer to maintaining and/or restoring the flows within the rivers themselves, to provide appropriate habitat for adult fish staging and spawning and juvenile nursery use. Diadromous species presently under ASMFC management include alewife, American eel, American shad, Atlantic sturgeon, blueback herring, hickory shad and striped bass. Additional diadromous species managed under other authorities, or not presently under ASMFC management, which will benefit from flow and passage provision include Atlantic salmon, coaster brook trout, rainbow smelt, sea lamprey, and shortnose sturgeon. All of these species depend on unimpeded access to all the habitats required by all their life stages, to remain viable and sustainable at optimal levels.

Researcher tags a striped bass during the 2010 Cooperative Winter Tagging Cruise/Kate Taylor, ASMFC

ASMFC and Habitat Committee Mission Regarding Fish Passage

Reconnecting fragmented aquatic habitats through provision of appropriate flows and passage is critical for restoration of diadromous species populations and is a key component of both the ASMFC and Habitat Committee missions. The ASMFC mission is: To promote the better utilization of the fisheries, marine, shell and anadromous, of the Atlantic seaboard by the development of a joint program for the promotion and protection of such fisheries, and by the prevention of physical waste of the fisheries from any cause. The mission of the ASMFC's Habitat Program is: 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. Fish passage specifically is addressed through Goal 7 of the ASMFC Habitat Program Five-Year Strategic and Management Plan (2009-2013), which is: Promote development of effective fish passage approaches and projects through state and federal collaboration. In partial furtherance of the goal, ASMFC held a Fish Passage Workshop in April, 2008, and subsequently formed a Fish Passage Working Group to address the workshop recommendations. In addition, each of the ASMFC diadromous species Fishery Management Plans contains appropriate measures encouraging jurisdictions to work with partners to provide passage for these species.

Challenges to Achieving the Fish Passage Mission Component

Multiple challenges exist to restoring access for diadromous species to their historic ranges. These include inadequate resources in terms of agency staff (lack of passage structure planning and design capability) and cost (passage may be expensive); competing management objectives from different agencies or harvest sectors (i.e., favoring reservoir fisheries over migratory ones, or nonnative species over natives, e.g., the current blue catfish controversy regarding Chesapeake Bay and other systems); competing social objectives (i.e. retaining historic structures versus restoring biodiversity and diadromous fisheries); overt public opposition due to competing values (preference for lacustrine reservoirs, versus free-flowing rivers); and failure to maintain aquatic habitat quality due to changes in the surrounding terrestrial landscape (i.e., insufficient upstream water quality). An additional challenge is the *(continued on next page)*

compartmentalization and fragmentation of fishery and aquatic habitat management responsibilities among and between jurisdictions. Fishery management, conservation and protection functions often reside in separate management agencies than those responsible for habitat protection, conservation and restoration, and also may change across the aquatic continuum.

Habitat Benefits

Fish passage is an essential component of reconnecting presently fragmented aquatic habitats and pathways. Restoration of access for both resident and migratory fish species reestablishes genetic linkages (for resident populations which were separated by blockages), and reestablishes access to spawning habitats for anadromous and resident species, and access to important inland nursery areas for the catadromous American eel.

Alewife at Damariscotta Mills/Margaret Pizer

Restoration of connectivity also reestablishes important nutrient pathways, allowing for the transfer of marine nutrients into inland freshwaters, and the transfer of nutrients derived from inland sources, to the sea. Blockages generally sequester nutrients, sediments, contaminants (toxic substances, and endocrine-disrupting compounds, etc.) on the upstream side and removal of barriers allows for the systems to become cleaner as these substances are transported downstream to coastal estuaries and eventually to the ocean. Restoration of access to the entire system, for anadromous and catadromous species, should result in the increase in population sizes, and ultimately to increased economic value for fisheries, restoration of the historic prey base, and restoration of culturally significant amenities, such and river herring and shad festivals which were once more widespread and heralded the arrival of spring in many riverine communities.

Definition of Fish Passage and Fishways

The ASMFC has adopted the definition of "fish passage" from: Stock Assessment Report No. 07-01 (Supplement) of the Atlantic States Marine Fisheries Commission, *American Shad Stock Assessment Report For Peer Review,* August 2007, List of Terms. "Fish passage" is therefore defined as: The movement of fish above or below an river obstruction, usually by fish-lifts or fishways. "Fishway" has not been defined by the ASMFC; however, a very comprehensive definition was proposed by the National Marine Fisheries Service and U.S. Fish and Wildlife Service as follows: "any facility, structure, device, measure, or project operation, or any combination thereof, necessary for safe, timely, and effective movement of fish, regardless of life stage, whether upstream or downsteam through, over, or around a reach affected by a hydropower project, including, but not limited to: (1) fish ladders, locks, lifts, bypasses, barriers, and screens; (2) breaches, notches, spillways, gates, tunnels, flumes, pipes, or other conveyances, and channel modifications; and (3) water spill, flow, temperature, and level; (4) operating schedules; and (5) any other facilities, structures, devices, measures, or project operations necessary to attract, guide, pass, repel, exclude, transport, or trap fish, or provide information - by monitoring, modeling, evaluating, and studying, to ensure safe, timely and effective passage of fish. Fishways may also be designed and operated to benefit other aquatic organisms in addition to fish, and may be used to pass aquatic organisms around barriers other than those designed solely for hydropower use.

Fish Passage Progress Updates

Although as yet no ASMFC fishery management plans have contained place-specific goals and objectives for provision of fish passage, ASMFC jurisdictions and their partners have often collaborated in the development of plans for individual river basins which do contain such goals and objectives. Partners *(continued on next page)*

Let the Rivers Run Again

and jurisdictions have accomplished numerous passage projects and we provide a brief sample of recent regional case histories for review.

Damariscotta Mills Fish Ladder Restoration, Maine

The Damariscotta Mills fish ladder, located at the head of the Damariscotta River in Nobleboro and Newcastle, Maine, helps maintain the state's oldest and historically the most productive alewife fishery. The Towns have jointly harvested alewives since the 1700s and, by balancing conservation and economic goals, have carefully tended the Damariscotta River alewife stocks. Today, all funds received for harvested alewives are spent to maintain and restore the fish ladder and harvesting area. The fish ladder was originally built in dry laid stone on a seasonal overflow that was probably never an effective fishway because it followed the natural lay of the land, which is often steep and narrow. The fish ladder has undergone many repairs and renovations in its long history but none have been comprehensive or specifically designed for efficient fish passage.

Alewife/Jim Turek, NOAA Restoration Center

Recognizing the need for comprehensive repairs, the Towns and the Nobleboro Historical Society, backed by a solid community-based initiative, embarked on an ambitious rebuilding project in 2007. During the first phase, a deteriorated section of wall was removed and rebuilt. In 2008, an aggressive effort to rebuild one hundred and fifty feet of the run at the top of the ladder was initiated. The U.S. Fish and Wildlife Service and the Maine Department of Marine Resources provided design services and technical support. Using new plans by Fish Ladder Engineer Curtis Orvis, the second phase of the project was completed in time for the spring (2009) alewife run. In 2010, the entire middle section of the fish ladder was cleared and twenty-two new pools were formed in concrete. During the winter and spring of 2011-2012, the new pools will be stone faced to achieve the desired flow patterns and to restore the historic character of the fish ladder.

All funds for the fish ladder restoration, more than $400,000 to date, have been raised by community volunteers. The results of the restoration have been promising—the number of river herring reaching their spawning grounds in Damariscotta Lake has more than doubled and, once the restoration is complete, it is anticipated that the run will increase dramatically and stabilize for years to come. Text for this article was taken from Damariscotta Mills Fish Ladder Restoration website. For additional information please contact Deb Wilson (*deb.wilson@roadrunner.com*) or visit: *damariscottamills.org/index.html.*

Winnicut River Restoration Project, New Hampshire

The Winnicut River Restoration Project initiated in 2009 will be completed in 2011. The project involves: 1) removing the last dam (head-of-tide) on the main stem of this river flowing into Great Bay to restore downstream and upstream access to habitat for diadromous and resident fish, 2) installing a run-of-river fish pass under the Rt. 33 Bridge that, without the dam, becomes an anthropogenic velocity barrier to upstream and downstream fish passage, 3) restoring the natural riverine process such as sediment transportation, etc., to improve both upstream and downstream degraded habitat, 4) planting native wetland and riparian vegetation and eradicating an invasive plant species to improve habitat for fish and wildlife, water quality, etc., and 4) providing a dry hydrant for the local town.

Peconic River Fishways Project, New York

At 17 miles long, the Peconic River is the longest river on Long Island and the major tributary of the Peconic Estuary. In the late 1800s and early *(continued on next page)*

1900s, dams were built on the tributaries of the Peconic Estuary for grist mills, cranberry bogs, other industrial uses, and even as property line demarcations. There are four main dams on the Peconic River. The dams going upriver are as follows: Grangebel Park, Upper Mills, Forge Road, and Edwards Avenue. Diadromous fish in the Peconic watershed affected by the dams are alewife and American eel. Alewife and eels are critical components of the estuarine food web as prey for predators, including fish, birds and mammals. They also constitute an important economic component of commercial and recreational fisheries, either for food or bait.

In 1996, a group of concerned citizens led by Bob Conklin, a retired Riverhead school teacher, got together to discuss strategies for restoring upstream fish passage on the Peconic River. Soon the Peconic River Fish Restoration Commission was formed. The 90-member Peconic River Fish Restoration Commission is citizen-driven and is largely to credit for this exciting initiative. The Town of Riverhead, NYS Department of Environmental Conservation, U.S. Fish and Wildlife Service, American Rivers, FishAmerica, National Oceanic and Atmospheric Administration, and the Corporate Wetlands Restoration Partnership are also major players. The Peconic Estuary Program has found a niche in fundraising for the fishway efforts.

Grangebel Park Rock Ramp/Charles Guthrie, NYSDEC

Their efforts were rewarded in 2000 when Miller Environmental installed a steep pass fish ladder at the North Spillway in Grangebel Park. Once the ladder was in place, alewife started up the structure. That spring, alewife successfully migrated upriver of the dam for the first time in 100 years. Although the fish ladder has been successful at passing fish, it is a significant maintenance burden due to its required seasonal installation and tendency to get clogged with debris in the busy park. As a result of over 10 years of dedicated planning and persistence and nearly $1 million of funding, a new permanent rock ramp was finally constructed at the South Spillway in Grangebel Park in 2010. The rock ramp, which will now pass American eels as well as alewife (steep passes only pass alewife) and looks like natural rapids rather than something manmade, opens 24 acres and 1.5 miles of diadromous fish habitat.

Future goal of the partnership is to make all the insurmountable dams in the Peconic Estuary surmountable. Over 300 acres of critical fish habitat will be restored once the entire Peconic River is re-opened to fish migration. This project was awarded the *2011 Coastal America Partnership Award*. This award recognizes partnership efforts with outstanding collaborative, multi-agency and multi-stakeholder efforts that leverage and combine resources to accomplish coastal restoration, preservation, protection, and education projects. Text taken from Peconic Estuary Program website. For additional information please contact Julie Nace (*jsnace@gw.dec.state.ny.us*) or visit: *www.peconicestuary.org/Fishways.html.*

Lower Ten Mile River System, Rhode Island

The Rhode Island Department of Environmental Management, Division of Fish and Wildlife (RI F&W) is partnering with local, state and federal government agencies, as well as private and non-profit organizations to restore diadromous fish passage to the lower Ten Mile River system in Rhode Island. This project will establish Denil fishways and eel ramps at the first 3 obstructions in the Ten Mile system (Omega Pond Dam, Hunts Mill Dam, and Turner Reservoir Dam) *(continued on page 19)*

Updates from Around the Coast

MAINE

Passage in the Penobscot River

The Penobscot River Restoration Project is a collaborative effort among hydropower companies, the Penobscot Indian Nation, seven conservation groups, and state and federal agencies. The Penobscot River Restoration Trust now owns three dams; the two lowermost dams on the Penobscot River, Veazie and Great Works, will be removed. Removal of the Great Works Dam is expected to begin in 2012. The third, Howland Dam, will be decommissioned and a fish bypass will be constructed. Specifically, the project will reestablish access to nearly 1,000 miles of river habitat to 11 species of sea-run fish, including American shad, alewife, blue back herring, American eel and Atlantic salmon. The restoration effort allows for energy production to be maintained and possibly increase at six dams that will remain under hydropower company ownership. For more information please contact Cheryl Daigle (*cheryl@penobscotriver.org*) or visit: *www.penobscotriver.org*.

Endangered Atlantic salmon being measured at the Veazie fish trap/Cheryl Daigle, Penobscot River Restoration Trust

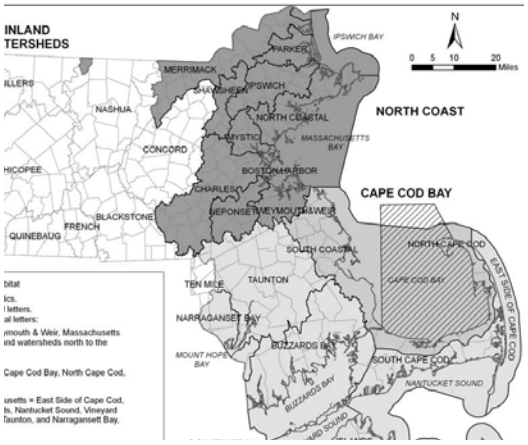
Passage and Habitat Restoration in Downeast

Project Share is focused on restoring and conserving Atlantic salmon in downeast Maine. Projects focus on restoring habitat connectivity and providing fish passage at road crossings by installing properly sized bottomless arches and bridges. Stream habitat complexity is also addressed through the addition of large woody debris to select river reaches. For more information please contact Steve Koenig (*skoenig@salmonhabitat.org*) or visit: *home.salmonhabitat.org*.

MASSACHUSETTS

Time of Year Restrictions for Coastal Alteration Projects Report

In May, the Division of Marine Fisheries published "Marine Fisheries Time of Year Restrictions (TOYs) for Coastal Alteration Projects" as part of the Division's technical report series. This report specifies time of year work restrictions for in-water construction work impacting managed marine, diadromous and shellfish species in watersheds and coastal regions of Massachusetts. The report uses a watershed approach to delineate species presence based on an extensive literature search and documentation of species presence throughout all coastal regions of Massachusetts. The report is available on the Division of Marine Fisheries Website at: *www.mass.gov/dfwele/dmf/publications/tr_47.pdf*. For more information contact Tay Evans (*tay.evans@state.ma.us*).



Watersheds and coastal regions of Massachusetts used for TOY delineations /MA DMF

Report Addressing Affects of Climate Change and Ocean Acidification on Fisheries and Ecosystems

In 2011, the Division of Marine Fisheries developed "Marine Fisheries strategies and priorities to address ecosystem changes and fisheries impacts resulting from climate change and ocean acidification". The publication identifies the Division's *(continued on next page)*

work related to collecting, maintaining and using time-series information and provides recommendations for addressing climate effects on fishery resources and habitats, stock assessments, fisheries performance and fisheries management. The report highlights key climate related fisheries management challenges, emphasizes the benefits of using fisheries data to address potential climate related impacts on commercial and recreational fisheries, and identifies collaborative efforts and partnerships with other government and research entities as an agency priority. For more information contact Mark Rousseau (*mark.rousseau@state.ma.us*). The report is available on the Division of Marine Fisheries website at: *www.mass.gov/dfwele/dmf/programsandprojects/climate_change_policy_statement_final_2011.pdf*.

RHODE ISLAND

Shellfish Restoration in Narragansett Bay

RI Department of Environmental Management Fish and Wildlife is partnering in a collaborative shellfish restoration project dedicated to restoring and enhancing shellfish populations in Narragansett Bay and the coastal ponds. These efforts include participants from several state and federal agencies, universities, and non-profits. The most extensive work is a NRCS funded oyster restoration project that builds on work from the North Cape Oil Spill Restoration that seeded 24 million oysters. The current project expects to seed an additional 12 million oysters by 2012 using an adaptive approach driven by a monitoring program that measures and assesses growth rates, recruitment, mortality, and disease prevalence. For more information on this project please contact *Justin.Tuthill@ri.usda.gov* or *Dennis.Erkan@dem.ri.gov*.

Ninigret Pond oysters on culch/ Chris Mortimer, RI F&W

Combined Sewage Overflow in Narragansett Bay

In November 2008, the Narragansett Bay Commission completed phase I of their three phase combined sewage overflow (CSO) project. The objective is to reduce the discharge of untreated sewage combined with storm water runoff. Phase I of the CSO project was a giant tunnel that captures combined sewage during rain events so that it can be pumped back for treatment at the Fields Point wastewater treatment facility. Monitoring data has documented decreased bacteria levels in upper Narragansett Bay. In response, RI Department of Environmental Management revised the rainfall related shellfishing closure criteria in 2011 to allow greater access to fertile shellfishing grounds. More information regarding the change in shellfishing closure criteria can be found at *www.dem.ri.gov/news/2011/pr/0526111.htm*. Information regarding the Narragansett Bay commissions CSO program can be found at *www.narrabay.com/About%20Us/Facilities/MajorInitiatives/CSO.aspx*.

NEW YORK

Coastal Marine Spatial Plan for Long Island Sound (Seafloor Mapping)

Long Island Sound Study Policy Committee has committed $7 million of Cross Sound cable settlement money to support steps toward marine spatial planning for Long Island Sound. The priority of this plan will be to proactively address conflicts arising from proposals for energy-related infrastructure, including but not limited to LNG platforms, cable crossings, and tidal energy turbines. The Cross Sound Cable Fund Steering Committee, made up of multiple stakeholder groups, has developed the necessary cooperative partnerships with NOAA and two university based consortia to assist in forwarding a detailed implementation strategy. The emphasis will be on mapping the bathymetry, surficial geology, and benthic habitats in Long Island Sound to help increase the understanding of seafloor habitats and improve resource management.

Updates from Around the Coast

Long Island, New York

New York State Ocean Action Plan

In 2009, the New York Ocean and Great Lakes Ecosystem Conservation Council produced a report establishing ecosystem-based management (EBM) as the framework to better manage New York's ocean and Great Lake ecosystems. The report required that the New York Department of Conservation (DEC) create an Ocean Action Plan (OAP), guiding implementation of EBM in New York's ocean waters. The OAP will establish long-term and short-term ecosystem goals with corresponding action steps to be taken by government agencies. DEC has hired a new Ocean Coordinator to facilitate the OAP process, Matt Gove (*mtgove@gw.dec.state.ny.us).*

MARYLAND

Fish Habitat Restoration in MD Tidal Waters: Bishopville Dam Removal and Stream Channel Enhancement (Fall 2011)

The project site is located on Buntings Branch in Bishopville (Worcester County). Buntings Branch is a tributary of St. Martins River; a tributary of Maryland's coastal bays. Bishopville Dam is a 4 ft high sheet pile coffer dam structure. Dam removal and stream channel enhancement are designed to address historic high nutrient loads and associated low dissolved oxygen levels in the St. Martins River that results in annual fish kills and water pollution in Isle of Wight Bay. The dam removal will provide access to approximately 7 miles of upstream fish habitat. Alewife and blueback herring will benefit from access to this previously unavailable habitat and American eel passage will be greatly enhanced.

Bishopville Dam/MD DNR

Freshwater fish and turtle species will also benefit from a restored salinity gradient and restored access to upstream freshwater. For more information please contact Erin McLaughlin (*emclaughlin@dnr.state.md.us*).

Reef Development: Oyster Reef Creation and Restoration

Marylanders Grow Oysters program works with waterfront property owners to grow oysters in cages suspended from private piers. A primary program goal is to foster environmental stewardship of Maryland's aquatic natural resources. After one year, the oysters are collected from property owners and planted in sanctuaries closed to harvest at no charge to the property owner. These oysters create live bottom that supports fish and other aquatic life on sanctuaries closed to harvesting. Eight thousand oyster cages were deployed in 2010. MD DNR in conjunction with the Oyster Recovery Partnership, the University of Maryland Center for Environmental Science, and local organizations distribute cages built by Maryland Department of Public Safety and Corrections inmates. For more information please contact Chris Judy (*cjudy@dnr.state.md.us*).

VIRGINIA

Marine Debris Removal

Since the Virginia Marine Debris Removal Program began in December 2008, more than 28,000 lost or abandoned crab pots have been removed from the water, as well as 150 lost fishing nets and 1,300 pieces of assorted metal junk. More than 27,000 animals, many already dead, were found in crab pots retrieved since 2008. The program, funded by NOAA through the Virginia Marine Resources Commission (VMRC) and administered by the Virginia Institute of Marine Science (VIMS), pays commercial watermen to use side-imaging *(continued on next page)*

Abandoned crab pot / Center for Coastal Resources Management, VIMS

sonar units to detect and retrieve lost or abandoned crab pots and other marine debris that litter the Bay floor. This targeted retrieval method minimizes disturbance to the bottom and, as a result, is environmentally friendly. For more information on the program, please visit: *ccrm.vims.edu/marine_debris_removal/index_temp.html* or contact Kirk Havens (*kirk@vims.edu*).

Submerged Aquatic Vegetation Restoration in the Seaside Bays on Virginia's Eastern Shore

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 VMRC, 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 40 million seeds have been broadcast into 350 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 5000 acres. Water quality monitoring shows the parameters necessary for seagrass survival - light, turbidity, chlorophyll - remain within the habitat requirement established for seagrass. Partnership efforts have recently expanded to include pilot scale efforts to reintroduce bay scallops to restored seagrass meadows. For more information please contact Tony Watkinson (*Tony.Watkinson@mrc.virginia.gov*).

Going Paperless

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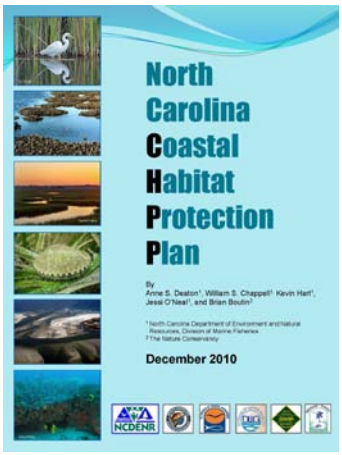
NORTH CAROLINA
Coastal Habitat Protection Plan (2010 Revision)

The Coastal Habitat Protection Plan (CHPP) has been reviewed and revised. The 2010 version includes new habitat research, effects of climate change on the identified coastal habitats, updated maps, and new recommendations for management and research. For more information please contact Jimmy Johnson (*jimmy.johnson@ncdenr.gov*). The 2010 CHPP can be accessed online at: *www.onencnaturally.org/pages/CHPP_Chapters.html.*



2010 CHPP/NCDNR

Coastwide Submerged Aquatic Vegetation Map

North Carolina now has a coastwide map of Submerged Aquatic Vegetation (SAV) based on aerial photography taken in 2008. This mapping effort was undertaken in order to determine a baseline for SAV coverage with the hope of flying the coast every 5 years to determine any change in coverage. For more information please contact Dean Carpenter (*dean.carpenter@ncdenr.gov*). The map can be viewed at: *portal.ncdenr.org/web/apnep/resources/maps*.

Hardened Structures on Ocean Front Beaches Policy

Both the House and the Senate have approved bills allowing for the potential building of terminal groins along the coast. The House version limits the number to three "pilot" projects, two funded with public money and one funded privately, while the Senate's bill would allow two groins at each inlet. A compromise was reached between the House and the Senate which allows the permitting of up to four groins on a first come, first serve basis. The Governor did not sign the Bill and it became law in early July ending a long-standing state ban against hardened structures on the ocean beaches of NC. For more information please contact Jimmy Johnson (*jimmy.johnson@ncdenr.gov*). *(continued on next page)*

Updates from Around the Coast

SOUTH CAROLINA
Shoreline Report Available

For the past three years, the South Carolina Department of Ocean and Coastal Resource Management (OCRM) has led a major effort to re-evaluate the state's Beachfront Management Act and identify potential research and policy needs related to beachfront and estuarine shoreline management for the coming decades. The Shoreline Change Committee consisted of 23 scientists agency researchers municipal officials and various stakeholders. The Final Report is available at: *www.scdhec.gov/administration/library/CR-009823.pdf*. This effort is now being followed up by a Blue Ribbon Committee on Shoreline management that represents a broad range of stakeholder interests and includes elected officials in the state legislature, City and Town mayors, development, business and real estate professionals, environmental professionals, and legal professionals. This Committee will review the recommendations made in the above report and will consider adopting the recommendations through the legislative process.

Isle of Palms, South Carolina/ SC DHEC

Stimulus Funded Projects Nearing Completion

SCDNR staff in the Oyster Management Section have recently completed or are nearing completion of two habitat restoration projects using stimulus funding that was provided to the City of Charleston. One involved enhancing an eroding shoreline in the Wando River, in Charleston Harbor using a large deployment of oyster reef bags (mesh bags filled with dead oyster shell) to create a living shoreline protection system. The other project (still in progress) involves a similar approach in another erosional spot of the AIWW, and includes marsh planting, and shoreline armoring using living shoreline approaches behind the planted oyster reef bags.

GEORGIA
Georgia First in Nation to Complete Coastal Inventory Using New National Wetlands Mapping Standard

In 2010, the U.S. Fish and Wildlife Service announced that the state of Georgia was the first to complete mapping updates to the National Wetland Inventory (NWI) using the newly adopted federal standards. The new standard is designed to guide current and future wetlands digital mapping projects and enhance the overall quality and consistency of wetlands data. Quality data on wetlands are considered critical for planning effective conservation strategies to benefit fish and wildlife resources now and in the future. The state of Georgia, research institutions, local governments and private organizations will now be able to use these updates in conservation planning, local ordinance development, wetland assessments, regulatory and restoration programs and other resource based needs. Text for this article is courtesy of Georgia Sound, Spring 2010. For more information please contact Jan Mackinnon (*jan_mackinnon@dnr.state.ga.us*).

Satilla River/GA DNR

Brantley County Adopts Ordinances to Protect Natural Resources

Brantley County is home to a 97 mile stretch of the Satilla River that winds its way through the lower coastal plain of southeast Georgia. The river supports numerous plants, fishes, amphibians, reptiles, birds, and mammals, among them some rare, threatened, and endangered species. However, *(continued on next page)*

both historical land use patterns and new development pressures combine to threaten the health of the Satilla River. Through combined efforts of the Georgia Coastal Management Program and representatives of the County, the Brantley County Commission applied for and received a grant to develop a suite of ordinances and land planning regulations to guide the county's future development. The County completed work on a Future Land Use Plan, Subdivision Ordinance and Storm-water Management Ordinance and, in the fall of 2010, the ordinances were unanimously adopted by the Brantley County Commission. Text and photo for this article are courtesy of Georgia Sound, Winter 2011. For more information please contact Jennifer Kline (*Jennifer.Kline@dnr.state.ga.us*).

FLORIDA

Overview of Dredging Projects

Red mangrove in IRL/ Sarah Lardizabal, MarinePhotobank

Post Panamax dredging projects for nearly all ports in Florida are being forwarded by port authorities and the Army Corps of Engeniers is acting on each. Port of Miami is in expedited permitting with 7 acres coral reef and equal seagrass acreage in direct impacts (permits are anticipated by September, 2011).

Overview of Coastal Habitat Restoration Projects

In the 2010 cycle of the National Coastal Wetlands Conservation Grant Program, the Florida Fish and Wildlife Commission received $2.5 million for marsh and mangrove restoration projects totaling about 500 acres on the south east coast of Florida, along with a Big Bend (Gulf of Mexico) marsh land purchase project near the Steinhatchee River.

Overview of Deep Water Horizon Efforts

Large scale effects to marine and estuarine habitats in Florida panhandle waters are not showing up in samples associated with the Deep Water Horizon oil spill. Boom damage assessments show most damage is from propeller scarring. A primary restoration plan is being developed in response to aerial imagery and field assessment results. For more information on the Florida projects highlighted in this section, please contact Kent Smith (*kent.smith@myfwc.com*).

(LET THE RIVERS RUN AGAIN - continued from page 13) to provide access to over 300 acres of nursery and spawning habitat for American shad, alewife, and blue back herring, as well as for the maturation of American eel. The Ten Mile River supports a remnant run of river herring and for over 30 years volunteer groups have lifted fish over the Omega Pond Dam during spring runs and stocked river herring above the dam. Similarly, starting in 2003 RI F&W and Massachusetts Division of Marine Fisheries began stocking the upper portion of Turners Reservoir with river herring in preparation for the fish passage restoration project. Based on the resiliency of the remnant runs and previous stocking activities, RI F&W anticipates the return of a strong run of river herring when the three Denil fishways are complete. For more information on this project please contact Phillip Edwards (*Phillip.Edwards@dem.ri.gov*).

Roanoke Rapids Dam Eelways Project, North Carolina and Virginia

North Carolina/Virginia Power doing business as Dominion completed the construction of two eelways located on Roanoke Rapids Dam, in Roanoke Rapids, North Carolina, in 2010, as part of an effort to restoring access to American eel nursery habitats located upstream. The dam is one component of Dominion's Roanoke Rapids and Gaston Hydropower Project, which is located on the Roanoke River along the NC/VA border and consists of Gaston and Roanoke Rapids dams. Under the terms of their (*continued on next page*)

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1050 N. Highland Street
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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.

HABITAT PROGRAM VISION

Protected, revitalized habitat for all Atlantic coastal fish species or successful habitat restoration well in progress by 2015.

REPRODUCTIONS

HABITAT HOTLINE FUNDING

SPORT FISH RESTORATION

Banner photo by Mary Hollinger, NOAA

(LET THE RIVERS RUN AGAIN continued from page 19)

new hydropower licence from the Federal Energy Regulatory Commission (FERC) and a settlement agreement with multiple stakeholders, Dominion first sampled American eels arriving at the base of Roanoke Rapids Dam in the Bypass Reach, for four years, to determine the temporal and spatial migration patterns and the best location(s) for future eelway construction. Based on the data generated by the sampling using conventional elver traps, and structural characteristics of the dam, eelways were constructed on the north and south ends of the dam. The structures have been highly successful, so much so that the design capacity of the eelways was exceeded and modifications were required to increase water flows and eel holding capacity. Eels were transported upstream to several sites within the Roanoke Rapids Reservoir watershed, beginning in 2009, and studies continue to examine their dispersion, growth and habitat selection. For more information on the eelways, visit the following site: *www.dom.com/about/stations/hydro/roanoke-rapids-power-station.jsp*.