

 NATIONAL AQUARIUM IN BALTIMORE.

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July 3, 2003

Nancy Castro
CW CESU Office
Appalachian Laboratory, UMCES
301 Braddock Road
Frostburg, MD 21532

Dear Nancy:

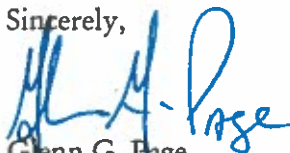
I write to express the National Aquarium in Baltimore's interest in becoming a partner institution in the Chesapeake Watershed Cooperative Ecosystem Studies Unit. (CESU). We have reviewed the general CESU descriptive materials and CW CESU Cooperative and Joint Venture Agreement.

The Aquarium is a world-class 501(c)(3) aquatic science and conservation education museum that has become a role model worldwide for its exhibitry, educational services, animal husbandry, architecture, research and captive breeding of endangered species, and conservation efforts. Committed to serving a diverse constituency, the Aquarium entertains and educates 1.6 million visitors annually. Through live exhibitry, hands-on education programs, and community-based habitat restoration, the Aquarium seeks to instill in both adults and children an appreciation for and an awareness of the earth's most sensitive marine ecosystems. Conservation is an enduring part of the Aquarium's mission, and the Chesapeake Bay has long been a part of Aquarium conservation education efforts. The Conservation Department was formed in 1998, and Chesapeake Bay was chosen as one of three conservation program emphases. The Aquarium's conservation efforts include habitat restoration, maintenance, monitoring, and interpretation of Bay ecology and conservation to the public.

The Aquarium intends to cooperate fully in the CESU and agrees to abide by all of the responsibilities and expectations of partner institutions. We look forward to a productive collaboration with all of the partner agencies and institutions.

If you require additional information, please feel free to contact me at 410-576-3808.

Sincerely,



Glenn G. Page
Director of Conservation



National Aquarium in Baltimore's Application to The Chesapeake Watershed Cooperative Ecosystem Studies Unit

Point of Contact:

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What unique strengths does your university/ research institute bring to the CW CESU that supplement or enhance the present partnership? Identify specific research centers, departments and faculty members, and the capabilities they would bring to the CESU. Also, briefly describe any existing contracts or cooperative agreements between the university and federal agencies.

The National Aquarium in Baltimore is one of Maryland's most popular tourist attractions. Over 1.6 million visitors come to the Aquarium each year to learn about aquatic animals and their habitats. One level of exhibits focuses on the Chesapeake Bay watershed, tracing the flow of water from a stream in the Allegheny Mountains, through a tidal wetland, along a coastal beach, and ending on the continental shelf. This theme is to be expanded in 2005 with the opening of a Chesapeake Bay themed park for over 5 million visitors to the plaza on the Inner Harbor in downtown Baltimore. This park, open free to the public, will be designed to improve the understanding of the Bay and the dynamics of its watershed. In addition to the exhibits, the Aquarium operates a number of research, education, and conservation programs involving the Chesapeake Bay, its watershed, and beyond. Since 1997, when the National Aquarium in Baltimore was designated by Coastal America as the Coastal Ecosystem Learning Center for the Chesapeake region, the Aquarium's Conservation Department has developed action-based programs to foster awareness, inspire leadership, and promote stewardship in conserving the Chesapeake Bay and its watershed. We believe the CESU partnership will be stronger with the National Aquarium's involvement as we can provide expertise and collaboration as well as a platform for message conveyance.

Conservation Research and Education Programs

While the Aquarium has a strong record of research in areas of animal health, life support, husbandry, operant conditioning and animal enrichment, applied conservation biology has been the heart of program expansion. A major focus of the Conservation Department has been applied research on tidal wetland restoration in the Chesapeake Bay. Working in conjunction with partners from Army Corps of Engineers, NOAA Restoration Center, National Wildlife Refuge System and many others, the Aquarium is restoring wetlands at Eastern Neck National Wildlife Refuge, Barren Island, Blackwater National Wildlife Refuge, Webster Field, and Swan Creek. Some sites were suffering from high levels of erosion. To address this, the shorelines were protected with segmented stone riprap breakwaters or geotextile tubes, and then material dredged from nearby shipping lanes was placed to provide substrate for marsh creation. At these sites in the mid and upper Chesapeake Bay, researchers monitor restoration success by measuring faunal habitat utilization, changes in

topography, and vegetative success with different planting patterns. This research has been active at some sites since 1999, with community volunteers conducting much of the periodic monitoring and committed to project participation over several years. By making these restoration projects community-based, the Aquarium's goal is to promote stewardship for the site among volunteers who are involved in planting and long-term monitoring. The collected data and access to the sites will be available to members of CW CESU wishing to conduct research on constructed wetlands. The Aquarium is also eager to share its highly adaptable model with groups who want to conduct similar restoration and research.

As a member of CW CESU, the Aquarium can provide associated researchers with access to Fort McHenry Field Station. Adjacent to Fort McHenry National Monument and Historic Shrine, this site provides a research station for the long-term functional assessment of created tidal wetlands in an urban setting. The wetland is home to continuously active weather and water quality stations, providing almost real-time data to the Aquarium through a remote link. A tremendous amount of information about the site has been collected in partnership with the Baltimore Bird Club, who, through efforts led by Jim Peters, have been active in identifying avifauna utilization of the site since August 1999. The site is also occupied by invasive Phragmites, allowing research on control methods to be conducted. Due to regular clean up events of this wetland, the Aquarium has collected over five years of data on trash and debris from urban sources.

The educational programs of the Aquarium fit well with the strategic plan of the CW CESU. Education has always been a primary focus of the Aquarium's exhibits and programs, but this does not stop at the buildings walls. Outreach, as well as on-site, education programs are conducted regularly for K-12 students, topics include introducing the watershed concept and teaching the students how their actions impact the Chesapeake Bay. In addition, workshops are conducted for K-12 teachers to help them improve their ability to convey watershed themes to their students.

The Aquarium has also nurtured relationships with local primary and secondary schools, as well as universities, through on-site wetland plant nursery research. Using nursery ponds built on school property; students at 8 schools in Baltimore City, on Maryland's Eastern Shore, and in Washington, DC are active in determining factors that influence wetland plant growth. The education component of the program encourages students to learn about watershed and wetland dynamics and the scientific process to design experiments to improve plant-growing methods. Lessons learned benefit the students, as well as restoration projects and larger nurseries venturing into the field of growing wetland plants.

Part of the Aquarium's education mission is accomplished through its website. The sites are currently being upgraded with part of the resulting changes aimed at improving public access to information about the Chesapeake Bay and its watershed in conjunction with the EPA EMPACT (Environmental Monitoring for Public Access and Community Tracking) program. Data collected from the Fort McHenry Field Station will be combined with that of other sites monitored by the Maryland Department of Natural Resources to provide an overview of health of the upper Chesapeake Bay. Also included will be ways for the public to get involved in restoration and monitoring projects in which the Aquarium and partners are involved. In addition to the web presence, the Aquarium developed *Living Waters of the Chesapeake*, an interactive CD-Rom for free distribution to schools and stakeholders. This product provides Chesapeake Bay watershed information for schools that lack Internet access, especially important in Baltimore and other urban school systems.

Environmental fields are often lacking in minority participation. In an effort to change this, the Aquarium has initiated a job-training program with nearby minority serving institutions (MSIs) and federal government agencies. Originally involving Morgan State University, the program has expanded to include other colleges and universities in Maryland, Delaware, Pennsylvania, Virginia, and the District of Columbia. Our goal is to engage a broad number of students in tidal marsh restoration and raise awareness of watershed issues in the effort to restore them. Students focus on tidal marsh ecology and learn techniques for and participate in field sampling and marsh plantings, and are trained in various environmental monitoring techniques, including wetland functional assessment and water quality and weather monitoring. This program supports the education mission statement of CW CESU, and could be expanded or the model shared with partner institutions.

Staff and Facilities:

The staff of the Biological Programs Department of the Aquarium includes a number of biologists; among them are avid birders, herpetologists, botanists, and ichthyologists. Many staff members are regularly in the field for collection or just observation and are familiar with natural areas throughout Maryland and the Chesapeake watershed. A large number of the staff eagerly participates in Aquarium conservation projects as volunteers. This expertise will be shared with members of CW CESU

The Aquarium is also able to provide volunteer support for CW CESU partner projects. The Aquarium staff includes over 700 active volunteers, 350 of which are directly involved with Biological Programs Department activities. Among these is also a trained corps of 35 volunteer Aquarium Conservation Team (ACT!) members. This group is excited to participate in conservation and field research opportunities, and provide a variety of expertise including habitat delineation, first aid, engineering, surveying, and GIS. In addition, through its community-based wetland restoration events, the Aquarium has gained significant experience in recruiting large numbers of volunteers for field projects. Each of these resources will be available to CW CESU associates.

The Aquarium currently maintains a fleet of two small research vessels; one is a 35-foot catamaran customized for stability in the Chesapeake Bay and up to three miles offshore, the other is a 22-foot Carolina skiff with a flat hull, allowing easy approach to Bay islands and travel through shallow channels. With coordination, it is possible that these boats will be accessible to staff of CW CESU members at a discounted daily rate.

Conservation Staff

Glenn G. Page:

Glenn Page directs the Conservation Program at the National Aquarium in Baltimore, which features initiatives on ocean health, global biodiversity and the Chesapeake Bay. With each of these programs, public involvement in the conservation process is the keystone. As part of the ocean health initiative, he directs a team of 60 volunteers who rescue, rehabilitate and release stranded animals through the Aquarium's Marine Animal Rescue Program. As part of the Chesapeake Bay initiative, hundreds of people participate in ongoing shallow water habitat restoration projects at several locations in the Chesapeake Bay.

In 2000, the Aquarium's work at Ft. McHenry received a national award from Coastal America for excellence in habitat restoration, and during Earth Day 2000, NOAA and Vice President Gore presented Glenn with a national Environmental Hero award.

Glenn has over 15 years of experience in the field of conservation biology with expertise in applied restoration ecology. He's been involved in numerous habitat restoration projects involving tidal and non-tidal wetlands, coastal dunes, shallow water habitats, and streams in the Chesapeake Bay watershed. Glenn is a certified wetland scientist with a master's degree in environmental science from Johns Hopkins University, and has served on several working groups of the Chesapeake Bay Program's Living Resources Subcommittee related to public involvement in watershed restoration. Glenn is also the President of the Board of Directors for the award winning Center for Watershed Protection.

Angie L. Ashley:

Angie Ashley is the Chesapeake Bay Program Manager at the National Aquarium in Baltimore. Angie manages staff, volunteers, and interns in conjunction with the Conservation Department's Chesapeake Bay initiative, which features public involvement in the restoration and preservation of the Bay. As part of the Chesapeake Bay initiative, she directs a team of 35 volunteers that comprise the Aquarium Conservation Team (ACT!), who participate in ongoing shallow water habitat restoration projects at several locations in the Chesapeake Bay, educate the public about the need to restore the Bay, and oversee hundreds of people who are involved in the restoration activities. She has managed numerous restoration projects involving tidal wetlands and other shallow water habitats in the Chesapeake Bay watershed as well as the Aquarium's wetland nursery program.

With a master's degree in environmental chemistry from the University of Maryland's Marine Estuarine Environmental Sciences (MEES) Program, Angie is very familiar with the environmental challenges that currently face the Chesapeake Bay. She is a gubernatorial appointee to the Patapsco-Back River Tributary Strategy Team, which works to support and promote actions and policies to ensure healthy watersheds, heighten awareness of each individual's impact on water quality, and facilitate communication and coordination among governments, landowners, businesses, and all other citizens toward this common goal.

David Nemerson:

In 2001, David received a PhD from Rutgers University where he worked on evaluating a very large salt marsh restoration project undertaken by Public Service Electric and Gas Company as off-site mitigation for fish mortality occurring at their Salem Point nuclear power plant on Delaware Bay. In 1994, he received an MES (Masters of Environmental Studies) from the Yale University School of Forestry and Environmental Studies. He received a BA in English from Columbia University in 1983.

After graduating from college and before embarking on an environmental science career, he first worked on Capitol Hill and in Connecticut for the congressman representing New Haven, CT, the district where he grew up. After that, he ran a small, family real estate development company specializing in low and moderate cost urban in-fill housing. In 1992, he shifted gears and entered the Masters program at Yale. David worked in marine conservation for a year after Yale and before starting a PhD at Rutgers. He started at the National Aquarium in Baltimore shortly after finishing his PhD. David is a Conservation Biologist and Project Manager at the Aquarium, focusing on bringing a strong scientific foundation to our innovative and growing Chesapeake Bay restoration initiative.

Laura Bankey:

Laura Bankey currently holds the position of Conservation Fellow in the Conservation Department of the National Aquarium in Baltimore. She is primarily responsible for the acquisition and quality control of real-time water quality and weather data taken from the Aquarium's field site located at Ft. McHenry National Monument and Historic Shrine. This data is used by the Aquarium and the Maryland Department of Natural Resources to help educate the public on the importance of improved water quality throughout the Chesapeake Bay watershed. She has also been responsible for the coordination for several of the wetland restoration field activities that the Aquarium has sponsored in order to teach the public the importance of tidal wetlands in the Bay and to help them become better stewards of this national treasure.

Laura earned her graduate degree at the Virginia Institute of Marine Science, School of Marine Science at the College of William and Mary where she studied the effects of chronic doses of industrial chemicals on fish. She is a member of both the Patapsco/Back River Tributary Team for the State of Maryland and the Baltimore Harbor Watershed Association.

Kathy Dalton:

Kathy Dalton is a Conservation Technician at the National Aquarium in Baltimore. Kathy is responsible for technical and clerical assistance with the Conservation Department's Chesapeake Bay initiative, which features public involvement in the restoration and preservation of the Bay. She works on technical aspects of ongoing shallow water habitat restoration projects at several locations in the Chesapeake Bay, helps to train and coordinate volunteers for projects, and assists with the Aquarium's internal conservation initiative.

Kathy graduated from the University of Maryland, College Park with a Bachelor of Science in Zoology.

Jennifer Dopkowski:

Jen Dopkowski is a Conservation Technician at the National Aquarium in Baltimore. Jen is responsible for the technical and clerical support of the Wetland Nursery Program including pond maintenance, educational programming, and native plant propagation. She works with various community and school groups within the Wetland Nursery Program. Currently she is involved in assisting with habitat restoration projects in the Chesapeake Bay watershed.

Jen graduated from Towson University with degrees in Mass Communications and Biology.

Nathan Yates:

Nathan Yates, Special Project Assistant for Biological Programs, splits his time supporting the missions of the Science Resources and Conservation offices of the National Aquarium in Baltimore. He earned Bachelor of Science degrees in Biology and Environmental Science from the College of William and Mary before joining the Aquarium to take part in a manatee research project. Currently, he is involved in habitat restoration projects in the Chesapeake Bay and the preparation of a second edition of a manual for use by marine mammal stranding responders.

Other Staff Expertise:

Among Aquarium staff are a number of experts in many disciplines. Many have extensive knowledge and experience with fieldwork in the Chesapeake watershed or are recognized around the world for advances they have made in their field of study. Among the examples are:

Joseph R. Geraci:

Joseph R. Geraci holds a degree in veterinary medicine from the University of Pennsylvania and a Doctorate in marine sciences from McGill University. He is currently Deputy Executive Director for Biological Programs at the National Aquarium in Baltimore (Baltimore, Maryland), and Research Professor of Pathology and Comparative Medicine at the University of Maryland School of Medicine. He has been conducting research on marine mammal health for more than 30 years, has authored over 140 scientific works, including five books, and has earned numerous fellowships and awards. In addition, he was the founding editor of *Marine Mammal Science*, the journal of the Society for Marine Mammalogy.

Dr. Geraci's research activities have focused on biological and environmental factors underlying the health of marine animal populations. These projects have been supported by agencies including the National Research Council and Fisheries Research Board of Canada, the U.S. Department of the Interior, National Marine Fisheries Service, U.S. Navy, Marine Mammal Commission, and the National Institutes of Health. He has directed laboratory and field investigations on health issues including marine mammal adaptive physiology, infectious and metabolic diseases, pollution by oil and other contaminants, and effects of dinoflagellate toxins.

Dr. Geraci has served as marine mammal health advisor to the: U.S. Department of Agriculture; Department of Justice; Marine Mammal Commission; National Marine Fisheries Service; Canadian Department of Fisheries and Oceans; Department of Fisheries, Brazil; Ministry of Fisheries, Spain; International Whaling Commission; and aquariums in North America and abroad. He has led government teams in evaluations of marine mammal health care programs throughout North America, and investigations into unusual mortality events.

Jack Cover:

As General Curator of Fishes and Rain Forest Exhibits, Jack Cover is responsible for the overall administration and direction of exhibits that showcase thousands of fishes, reptiles, birds, insects and plants. Jack has wide field and collection experience in the Mid-Atlantic area, the West Indies, Central America, and South America. Jack has overseen the breeding and care of the largest and most successful collection of poison dart frogs in the nation. Under his direction, the Aquarium has bred 23 species of poison dart frogs—some of them as firsts in this country. Jack holds a Bachelor of Science degree in Biology from Towson University.

Current Partnerships

The Aquarium currently has partnerships with many federal and state government entities and private corporations and foundations. It is hoped that membership to CW CESU will nurture these existing partnerships as well as aid in culturing new ones for the Aquarium and fellow members. Existing grants, memoranda of agreement, and memoranda of understanding exist with many partners. The Aquarium currently has memorandums of agreement with Villa Julie College, Towson University, National Park Service, Steinweg Baltimore, Inc., and Parks and People Foundation. The Aquarium currently has grant agreements with the Chesapeake Bay Trust, National Fish and Wildlife Foundation, NOAA Restoration Center, NOAA Fisheries, and NOAA Chesapeake Bay Program.

Contracts currently exist with USDA NRCS, Army Corps of Engineers and Maryland Port Administration

The Aquarium has also fostered relationships with Jones Falls, Gwynns Falls, Herring Run, and Baltimore Harbor watershed associations and the Patapsco-Back River Tributary Team; these groups cover the three major tributaries in the area, as well as and the Baltimore Harbor.

The National Aquarium in Baltimore is excited about the prospect of joining the Chesapeake Watershed CESU. We believe we can offer new aspects to the partnership that are not provided by the current university and governmental members. Our facilities and programs will help the unit reach its mission goals.

Current Projects:

See attached project list.

CHESAPEAKE BAY CONSERVATION AT THE NATIONAL AQUARIUM IN BALTIMORE

By connecting people with aquatic life, we make a better world for both. Human impact on the world's ecosystems is profound. As habitats are destroyed or degraded, the diversity of species and the complex relationships among them are threatened, with consequences for all living things – including humans. Zoos and aquariums have both the capacity and the responsibility to increase public awareness of these issues and to implement conservation action programs.

The National Aquarium in Baltimore promotes conservation through:

- conservation education focused on environmental issues and actions that the public and our staff and volunteers can undertake to effect change;
- conservation research and action projects designed to restore, protect, and manage critical species or ecosystems;
- captive breeding of threatened or endangered species and monitoring of wild populations.



Chesapeake Bay Initiative

Through exhibits and educational programs, the Aquarium has been teaching people about the Chesapeake Bay for years. To foster awareness, inspire leadership, and promote stewardship of aquatic habitats, the Aquarium is providing opportunities for volunteers to help restore habitats and increase environmental awareness in Bay communities through the Chesapeake Bay Initiative. The goal of this action-based program is. Located on the shores of the Chesapeake Bay, each year the National Aquarium in Baltimore attracts 1.6 million visitors, most of who reside in the Chesapeake Bay watershed. The institution is well equipped through strengths in education, exhibits, programs, and information tools to promote a greater understanding of the Chesapeake Bay watershed. By communicating the problems facing the watershed and the programs and policies designed to help it, we are in a better position to foster individual responsibility and promote stewardship to improve this shared natural resource.

As the cornerstone of an initiative to develop community programs in habitat restoration, the Chesapeake Bay Initiative focuses on tidal wetlands. Tidal wetlands of the Chesapeake Bay are fragile and vital to the existence of marine life that makes the Bay famous. Yet, thousands of acres have been destroyed and continue to be lost every year. The lesson of protecting and preserving marine habitats is taught every day to the thousands of people who visit the National Aquarium in Baltimore. With these efforts, the Aquarium is taking that message outside of its walls and into the field.

Fort McHenry Field Station: Restoration Field Days

The Aquarium is taking a leadership role in restoring a ten-acre tidal wetland bordering Fort McHenry National Monument and Historic Shrine. The Fort McHenry site was created from dredged material to mitigate the impact of constructing the Fort McHenry Tunnel and this habitat now serves as a refuge for many species of wildlife including sea ducks, heron, muskrats,

and red-winged blackbirds. However, scientific studies on its ecological role were never conducted, and years of neglect left the site choked with debris.

In partnership with the National Park Service, the Aquarium maintains and monitors the site's biological functions, tracks its progress, and interprets this information for Aquarium volunteers, visitors to Fort McHenry, and the general public. Such public support is vital to successful restoration programs. Since 1998 the Aquarium has hosted 15 field days, attracting volunteers from around the community who have removed over 210,000 pieces of debris.

The Aquarium regularly sponsors public field days at Fort McHenry, where participants learn how to restore tidal wetlands.



The 2003 dates are:

Saturday April 12

Saturday June 7

Saturday September 27

Saturday December 6

Project Duration: 1998-2007

Level of Funding: \$450,000

Funding Source: Multiple federal and state government agencies, private foundations and corporate partners.

Fort McHenry Field Station: Marsh Grass Planting

In addition to the Aquarium's regularly scheduled restoration field days, we will also be working with the Maryland Port Administration, the National Oceanic and Atmospheric Administration, and the US Geological Survey to reconstruct and replant the Fort McHenry salt marsh site. When constructed in 1982 the 10-acre wetland had three small culverts through the riprap encircling the site that allowed tidal exchange with adjacent harbor waters. These culverts have since mostly silted in, preventing tidal exchange and resulting in the degradation of natural salt marsh function. As a result, reconstruction will take place during winter of 2004 in order to promote regular, natural tidal flooding of the site, control debris accumulation, and enhance its habitat value to plant and animal species; creating a fully functioning marsh. After the construction is complete, the Aquarium will work with community volunteers to plant three acres of land with 55,000 units of *Spartina cynosuroides*, giant cordgrass, *S. alterniflora*, smooth cordgrass, and *S. patens*, salt meadow hay.

The marsh grass planting event will take place in the fall of 2003.

Project Duration: 2002-2005

Level of Funding: \$300,00

Funding Source: Maryland Port Administration

Blackwater National Wildlife Refuge: Tidal Marsh Restoration

Established in 1933, Blackwater National Wildlife Refuge (NWR) is a 26,000-acre waterfowl sanctuary located along the Atlantic Flyway. The refuge is near the town of Cambridge on Maryland's Eastern Shore. Habitats include forests, open fields, freshwater impoundments, and estuarine tidal wetlands. Over 250 bird species, including the American bald eagle and peregrine falcon, as well as the endangered Delmarva fox squirrel, can be found at Blackwater during the year. The area also hosts a large commercial and sport fin and crab fishing industry on nearby Hooper's Island.



Blackwater NWR is rapidly losing marsh habitat, with an estimated 8,000 acres of 17,000 being severely impacted. The Blackwater marsh system would not benefit from traditional dredged material projects; as a result a demonstration project is being conducted by the Army Corps of Engineers to help answer important questions about the feasibility of large-scale marsh restoration projects in the Blackwater Area. One component being tested includes a relatively new and innovative technology called thin layer spraying, which will be used to restore approximately 20 acres of marsh. The Aquarium is partnering with the Army Corps of Engineers, the US Fish and Wildlife Service and Friends of Blackwater to help plant and monitor 15 acres of this site with 70,000 units of *S. alterniflora* and *Scirpus americanus*, Olney three square. Aquarium staff and Friends of Blackwater, a volunteer refuge support group, will return to the site quarterly to monitor the success of the project.

The marsh grass planting event took place May 13-18, 2003. Monitoring will be conducted in late summer and fall of 2003 and spring of 2004.

Project Duration: 2003-2004

Level of Funding: \$90,000

Funding Source: Chesapeake Bay Trust, Army Corps of Engineers, National Fish and Wildlife Foundation

Webster Field Annex - Naval Air Station Patuxent River

Webster Field Annex is located on the St. Mary's River in St. Mary's Co., Maryland. Sills and breakwaters have been established to dissipate wave energy and promote the accretion of sediment along a 3,500 ft. stretch of eroding shoreline that threatened historic sites. The Aquarium is working with the Naval Air Station—Patuxent River, Maryland Conservation Corps and community volunteers to restore 1.5 acres of salt marsh by planting *S. alterniflora* and *S. patens*.

The marsh restoration event occurred May 2-3, 2003.

Project Duration: 2002-2004

Level of Funding: \$29,000

Funding Source: USDA NRCS

Swan Creek Tidal Restoration

The Port of Baltimore is creating and restoring 11 acres of the Swan Creek Tidal Wetland, which is located on Cox Creek in Anne Arundel County, Maryland. The Aquarium is joining with the Port of Baltimore, the North County Land Trust, the Cox Creek Citizen Oversight Committee, and community volunteers to restore one acre of salt marsh by planting several species of native salt marsh plants.

The marsh planting event took place June 19-21, 2003.

Project Duration: 2002-2003

Level of Funding: \$160,000

Funding Source: Maryland port Administration

Barren Island, Blackwater National Wildlife Refuge

Barren Island, which is part of Blackwater National Wildlife Refuge, is one of only a few uninhabited islands remaining in the Chesapeake Bay. Barren, like other islands, supports a number of species and makes a unique ecosystem component of the nation's largest estuary. The US Army Corps of Engineers has worked with the Aquarium and the US Fish and Wildlife Service to demonstrate beneficial use of dredge material and reduce erosion rates on the northwestern portion of the island from 10-15 feet landward per year. Since 2001, 150,000 units of *S. alterniflora* and *S. patens* were planted over 7 acres of land. Aquarium staff and Friends of Blackwater will return twice to the site during 2003 to monitor the success of this restoration project. Initial monitoring from 2002 indicates that the project has been successful as wave energy is being absorbed and sediment is being accreted. Plans for the expansion of the site continue. Several acres of dredge material will be used to create a marsh to reduce erosion and prevent the island from splitting into two.



Project Duration: 2003-2004

Level of Funding: \$40,000

Funding Source: National Fish and Wildlife Foundation

Eastern Neck National Wildlife Refuge



Eastern Neck National Wildlife Refuge is a 2,285-acre stopover area for migratory and wintering waterfowl at the mouth of the Chester River on Maryland's Eastern Shore. In April 2002, the Conservation Department worked with volunteers to restore a salt marsh by planting 60,000 units of *S. alterniflora* and *S. patens* over a 4-acre site demonstrating the beneficial use of dredge material. At this site, the U.S. Fish and Wildlife Service and the US

Army Corps of Engineers had established barriers to dissipate wave energy and promote the accretion of sediment along a 300m stretch of the eroding island. These grasses will create a

marsh habitat, stabilize the sediment, reduce the rate of erosion, and provide habitat for marsh birds and fish. During 2003 Aquarium staff members and Friends of Eastern Neck will return to the site twice to monitor the success of this restoration work. Topographic, vegetative, and fish usage data will be collected, as well as photographs from established locations, documenting the site's progress.

Project Duration: 1998-2004

Level of Funding: \$170,000

Funding Source: NOAA, Multiple Foundations

Submerged Aquatic Vegetation Project



As part of the *Seahorses: Beyond Imagination* exhibit, the Aquarium is leading an effort to restore seagrass beds in the lower Chesapeake Bay. The importance of submerged aquatic vegetation (SAV) to estuarine and coastal fisheries productivity has long been recognized. In recent decades, dramatic losses of SAV have been documented throughout its range and attributed to a variety of causes. As part of a commitment by the Department of Defense, Langley Air Force Base in Virginia strengthened its pollution

prevention programs and resulting water quality improvements allowed the Aquarium to begin planting eelgrass (a type of SAV) there in 1998. Each subsequent year, the Aquarium has returned to plant more grass and extend the beds.

The SAV planting event will take place September 26-October 2, 2003.

Project Duration: 1998-2003

Level of Funding: \$ 120,000

Funding Source: NOAA, Department of Defense, National Fish and Wildlife Foundation, FishAmerica Foundation and other private foundations

Schoolyard Spartina: Wetland Nursery Program

The Conservation Department's new *Schoolyard Spartina* wetland nursery program teams the Aquarium with local schools and engages the students in wetland restoration activities. Through this program students build brackish water ponds to propagate *S. alterniflora*. After filling the ponds, the students continually monitor the water quality and plant growth in their ponds. In addition, Education staff from the Aquarium visits the schools and engage the students in activities aimed at teaching them about the



Chesapeake Bay, its watershed, and the importance of wetland habitats. This program was initiated in summer of 2002 at two Baltimore City schools and in the spring of 2003, Aquarium staff assisted the students in transplanting their marsh grasses to tidal wetland restoration sites. With continued funding from the National Fish and Wildlife Foundation and NOAA, the

program will expand in spring 2003 to include more schools in the Chesapeake Bay watershed, including Maryland's Eastern Shore and Washington, DC.

Project Duration: 2002-2004

Level of Funding: \$85,245

Funding Source: NOAA, National Fish and Wildlife Foundation