# Research

**Research** is the key to all of the Maryland Reserve's programs. The component sites were chosen for their unique attributes which make them ideal for research. There are several different avenues for funding and conducting research in the Maryland Reserve: Cooperative Institute for Coastal Estuarine Environmental Technology (CICEET), NOAA's Graduate Research Fellowship program and projects conducted at the components by component staff.

**Site Specific Research** allows component staff to conduct quality projects at their sites to address issues of concern.

**Jug Bay**

♦ Chris Swarth continued his study of the patterns of wetland use by Eastern box turtles. Ten adult female box turtles were outfitted with radio transmitters and tracked throughout the summer. A major nesting occurred in early to mid-June in a meadow. Eight of ten females used tidal or non-tidal wetlands during the summer. Five females used tidal wetlands exclusively. Clearly, wetlands are critical habitat for box turtles. Go to *www.jugbay.org* for more information.

♦ Karyn Molines studied Marbled salamander breeding migrations and the influence of weather patterns on these movements.

♦ Greg Kearns, Patuxent River Park, and Michael Haramis, Patuxent Wildlife Research Center, continued their long term study of Sora rail migration patterns. They fitted 30 Soras with transmitters and followed their flight from Jug Bay. However, volunteers in North Carolina failed to pick up the expected signals.

♦ Greg Kearns, Patuxent River Park, and Michael Haramis, Patuxent Wildlife Research Center, harvested wild rice seeds for propagation and investigated the best methods to restore the wild rice. This included the establishment of fencing around the wild rice beds to prevent grazing by Canada geese. They also examined a variety of seed collection methods to maximize harvest. For more information, please contact Greg Kearns at 301-627-6074

♦ Chris Swarth and Elaine Freible also monitored eleven Red-bellied turtles. Environmental variables such as soil moisture and temperature were measured for 5 days a week. Half the hatchlings emerged in the fall and the other half overwintered and emerged in the spring. For more information, contact *www.jugbay.org*

**Monie Bay**

♦ Ben Alder studied the use of habitat types by black ducks and widgeon and if the behavioral characteristics of these ducks differ within observed habitat types. He also analyzed food depletion over the wintering period for the two types of ducks, looking especially at the availability of submerged aquatic vegetation.

**Otter Point Creek**

♦ Julia Brant, a student at Dartmouth College, worked with Julie Bortz, the Reserve's recently hired Research Coordinator, to design an experiment in which they placed three species of SAV (wild celery, redhead grass and water stargrass) in Otter Point Creek. Some 2060 individual plants were deployed in floats. Over the next eight weeks, water quality samples were collected and growth data from the plants were measured. Results are being compiled.

**At the Jug Bay Wetlands Sanctuary the following research projects were conducted:**

♦ Lora Wondolowske, Bard College, completed her master's thesis on wetland habitat used by Ring-billed and Herring gulls during the non-breeding season.

♦ Terri Rafig, University of Pennsylvania, continued her graduate research on the ecology of Northern cardinals.

♦ Jennifer Anderson, Johns Hopkins University, studied the enzootic cycles of Lyme Disease among deer ticks and White footed mice.

♦ Dr. Beth McGee, US Fish & Wildlife, used the Sanctuary as a control site for research on "Evaluating the impact of confined animal feeding operations on National Wildlife Refuges on the Delmarva Peninsula."

♦ Ginger Bolen and Russell Greenberg, Smithsonian Conservation and Research Center, conducted research on "Neophobia and ecological plasticity: A Comparative Field Study of Mallards and Black ducks."

**Graduate Research Fellows** are funded by NOAA to conduct a variety of projects in the Reserves. Maryland has been fortunate to have two fellows, Jude Apple and Kitty Fielding, who are both working in Monie Bay.

♦ **Jude Apple** is a PhD candidate through the University of Maryland, Center for Environmental Sciences and in his second year of the GRF program. Results from his first year revealed a striking relationship between land use, ambient nutrient concentrations and microbial metabolism. Reference sites located in the open bay and an unimpacted tidal creek have shown consistently lower levels of nutrients, bacterial production and single cell activity. The microbial communities in the agriculturally impacted creeks exhibit elevated metabolism relative to the reference sites. Differences in microbial metabolism in these systems indicate that agricultural nutrient loading may have a direct effect on the gain and loss of carbon in coastal systems. For more information, please contact Jude at japple@hpl.umces.edu.

♦ **Kitty Fielding** is a PhD candidate through the University of Maryland, Center for Environmental Sciences. Her project is looking at the effects of different nutrient loadings on phytoplankton biomass and composition in three contrasting creeks of Monie Bay. For more information, please email Kitty at kfielding@hpl.umces.edu.

**Cooperative Institute for Coastal Estuarine Environmental Technology (CICEET):** For more details on these and other projects at the Reserves nationally, please go to: *www.ciceet.unh.edu*

♦ **Dr. Allen Davis** of the University of Maryland, College Park, continued his work on "Engineering Bioretention for Treatment of Stormwater Runoff." After examining a range of performance data for different soil mixes in the first year, Dr. Davis looked at the differences in filtering materials. *Jug Bay*

♦ **Dr. Charles Sarabun**, et al of Johns Hopkins University and W. Banks, US Coast Guard, developed the instrumental and logistical foundation for a comprehensive and rapid capability to detect, map and localize ground inflow into rivers and estuaries. Groundwater is capable of transporting contaminants into estuaries, and therefore the ability to detect, survey and localize ground water inputs is essential for managing contaminant inputs to coastal waters. *Otter Point Creek*

♦ **Dr. Roger Newell** and his colleagues at the University of Maryland Center for Environmental Science studied the impact of bivalves on SAV restoration in estuaries and are developing a model to enable coastal managers to predict the effects that bivalves have on SAV distribution in estuaries. *Monie Bay*

♦ **Dr. Robert Costanza** and **R. Boumans** at the Chesapeake Biological Laboratory of the University of Maryland Center for Environmental Science finished a three year project to look at using an existing technology, Sediment Elevation Tables, to develop a standardized method to obtain, analyze and interpret changes in wetland elevation nationally. *Jug Bay*

# Monitoring

Monitoring in the Reserve components helps us assess the overall health of our estuary. The Maryland Reserve participates in a national System Wide Monitoring Program for water quality. Volunteers play a key role in providing information to staff and researchers at each of the components and provide comparison data between the sites.

**The System Wide Monitoring Project (SWMP)** provides standards for detecting changes in the status, integrity and biological diversity of estuaries on a national scale. All Reserves monitor physical and chemical parameters to assess water quality and the impacts of weather. In the Maryland Reserve there are two dataloggers deployed in the Jug Bay area of the Patuxent River for nine months of the year. Parameters include temperature, salinity, depth, pH, dissolved oxygen and turbidity. The data are reviewed for quality assurance and control and submitted to NOAA. For more details on this program and to review the data, go to *http://inlet.geol.sc.edu/cdmohome.html*.

A weather station, deployed at Jug Bay in August 2000, directly feeds current information to the Visitor Center at the Wetlands Sanctuary. The station tracks temperature, wind speed, relative humidity and precipitation.

**The volunteer monitoring program** is coordinated between the components and data is collected using similar protocol and can be shared.

♦ Volunteers at Jug Bay are heavily involved in monitoring turtle, fish, amphibian and bird populations. They also monitor water quality in the tributaries of the Patuxent.

♦ Harford Technical High School students monitor SAV beds during the growing season at Otter Point Creek. These students also monitor for water quality.

♦ Volunteers at Otter Point Creek conduct water quality monitoring on tributaries of the Bush River.

♦ Fish populations at Otter Point Creek are studied by local high school students and a group of volunteers monitors the numbers of fish, size of fish and species diversity.

♦ "Herp" Searches are conducted regularly by volunteers at Otter Point Creek to assess the amphibian and reptile populations in the component.

# Education

Reserve and component staff work together to deliver a wide array of educational programs for students, environmental professionals, teachers and the public.

**Over the past year the Reserve hosted three Coastal Decision Maker workshop targeted at coastal resource professionals:**

♦ "Personal Watercraft: Fact, Fiction and the Future on the Chesapeake Bay" brought together industry representatives, researchers, public safety specialists and area managers to look at the impacts of jet skis on shallow water habitats.

♦ Working with Harford County government Reserve staff conducted an information sharing workshop called the "Bush River Forum." Various environmental professionals shared information and data as they initiated work on a Watershed Restoration Action Strategy for the Bush River. A second workshop for the public is scheduled for later in 2002.

♦ "The Green Advantage: Making Green Development Work" was jointly sponsored by the Reserve and the Coastal Zone Management program in Maryland. Planning and zoning officials, developers and builders learned how to overcome the financial, regulatory and institutional obstacles which impede "green development."

**Other highlights from the past year include:**

♦ 8th Annual wetlands & Wildlife Field Days for 250 4th grade students at Monie Bay.

♦ Production of an Estuaries Day video which highlighted the marshes at Jug Bay.

♦ Development of a pontoon boat program for 7th graders at Otter Point Creek which provides the students an opportunity to experience environmental field and lab work with applications to real world situations.

♦ Reserve staff assisted Harford Technical High School students in transplanting Wild celery and Water stargrass which were grown in the classroom. The plants were set in floats and deployed. The students routinely monitor water quality in conjunction with their SAV monitoring efforts.

♦ Development of a four day chemistry program in conjunction with staff from Aberdeen Proving Ground.

♦ Assisted Jug Bay Wetlands Sanctuary staff in providing a weekly field experience for high school students in the summer.

♦ "Grasses to the Masses" workshops were held at Otter Point Creek and Jug Bay in partnership with the Chesapeake Bay Foundation. Participants learned the value of submerged aquatic vegetation for water quality and habitat, learned to identify key species and learned how to culture various plants. They also received a kit so that they could grow the plants at home for later transplantation.

♦ An illustrated instruction guide for building SAV propagation tanks and Taylor floats was created.


**Reserve Staff**

Carol Towle, Reserve Manager

Andrea Hardy Campo, Volunteer Coordinator

Bob Finton, Education Coordinator

Julie Bortz, Research Coordinator

Susan Engel, Fiscal Officer

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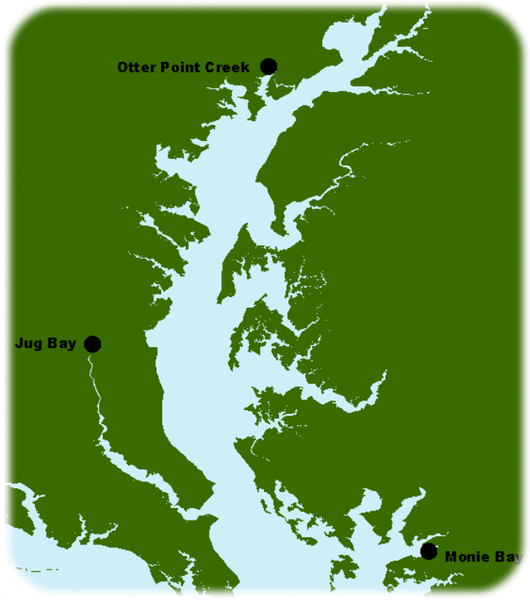
Kathleen Kennedy Townsend, Lt. Governor




Chesapeake Bay National Estuarine Research Reserve MARYLAND

# Chesapeake Bay National Estuarine Research Reserve in Maryland
## Annual Report, 2001

The National Estuarine Research Reserve System is funded by the National Oceanic and Atmospheric Administration. The purpose of the Chesapeake Bay NERR-MD is to manage protected estuarine areas as natural field laboratories and to develop a coordinated program of research and education. A cooperative management approach is used involving the Maryland Department of Natural Resources, Maryland-National Capital Park and Planning Commission, Anne Arundel County Recreation and Parks, Harford County Parks and Recreation, and Harford County Chapter of the Izaak Walton League of America.




# Volunteers

**We could not do it without them!** Volunteers play a vital role in the Reserve's education, outreach, monitoring and restoration projects at all components. Over 6,700 hours were donated by volunteers at the Otter Point Creek component alone. Jug Bay Wetlands Sanctuary volunteers donated over 5,200 hours.

**Highlights include:**

♦ Submerged Aquatic Vegetation restoration activities took place at both Jug Bay and Otter Point Creek. Participants from a previous workshop transplanted their SAV species into areas identified for restoration.

♦ Fish Seining and Identification held at Otter Point Creek for volunteers participating in the IBI study in conjunction with the MD Department of Natural Resources.

♦ SAV planting at the Bosley Conservancy property in conjunction with the Izaak Walton League. Five species of SAV were planted in two locations.

♦ Volunteer appreciation trips were arranged, including a trip to Lily Pons and a wildflower walk at Soldier's Delight State Park.

♦ Workshops introduced participants to the study of amphibians and reptiles.

♦ Developed and built four outdoor SAV grow out stations at Jug Bay modeled on the tanks at Otter Point Creek. Four Taylor floats and exclosures were built by volunteers and staff for additional experimentation. 2 volunteers donated 84 hours to make this happen.

♦ Volunteers and staff collected and transplanted seed stock for the new grow out tanks at Jug Bay

♦ Volunteer Appreciation dinners were hosted by Jug Bay Wetlands Sanctuary and the Anita C. Leight Estuary Center with support from the Reserve. We appreciate the dedication of our wonderful volunteers.