

# Sanctuary Has Many Meanings

By Elaine Friebele

For nearly two decades, the land encompassed by Jug Bay Wetlands Sanctuary has been protected from disturbance, except for school children, families, and volunteers wandering the trails. Just as their footsteps have left an imprint in the soil, perhaps this place has left an imprint on the people who've spent time here. We asked some of the volunteers: What does the Sanctuary mean to you?

For many folks, the value of the Sanctuary lies in its protection of wildlife. "All around me, I see Nature give way before humans—it is forced to yield to us and to our purposes," says volunteer Lisa Siciliano. "Many people seem to view 'empty' land as wasted space or only in terms of its potential for building. My neighbors have rushed to replace the 'ugly mess' of more natural forested areas in their yards with 'beautiful' (barren?) [manicured] landscapes. How many animals have lost their homes or lives in the process? How many of the native orchids (there are at least two species in my own yard) have been destroyed without their even having looked before taking action? But, at Jug Bay the flora and fauna come first—it is *their* sanctuary. I am a visitor. I yield to Nature, and in the process learn something of what it means to serve. It is challenging and humbling. But, it is also a profoundly satisfying experience."

"I love the solitude," says volunteer Mary Burton. "I love the experiences of being with the animals when I can feel that I am in their world, not that they are in mine." For Sandy Teliak, participating in the MAPS (Monitoring Avian Productivity and



Survivorship) study "reinforced the notion of the unique, majestic beauty within the avian community and the need to protect these birds for their own sake and for others to be able to enjoy in the future. As a relative novice to birding, imagine my delight in seeing up close for the very first time the rarely observed Worm-eating Warbler and the beautiful Indigo Bunting. Such sightings made my 5:15 a.m. wake-up call worthwhile!"

Many visitors and volunteers find the Sanctuary to be a respite from the pressures of civilization. "Jug

Bay is my sanctuary from the stresses of daily life; after a day at Jug Bay, I feel renewed," says Ramona Sampsell, who tracks box turtles by telemetry. "Coming there is my chance to stay in touch with our human roots in the interdependency of all life; I feel like I did something that might make a difference, even if it is only a small piece of a greater puzzle."

"Whenever I come to the Sanctuary I get to cast off my concerns and observe nature at its simplest," says canoe leader Rogard Ross. "Every time I visit, the marsh is different, from the open waters of the winter, the vibrant green of late spring, the huge white flowers of summer, to the bird migrations of fall."

The Sanctuary provides refuge from the "hectic, urban sprawl environment that the Washington-Baltimore megalopolis has become and that we all try to escape," says Sandy Teliak. "I'm sure my blood pressure drops several points every time I visit."

## Refuge, safety.

"In this day and age, what can be of more importance?" asks volunteer Mary Burton. Maureen Fine, who enjoys hiking to water quality sampling sites, sums up these sentiments: "The land, air, and water within the Sanctuary's protective boundaries have

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Jug Bay Wetlands Sanctuary is operated by the Anne Arundel County Department of Recreation and Parks. It was established in 1985 with the goals of wetlands research and environmental education. The Sanctuary is a limited-use park. Visitors are requested to make a reservation by calling the office before planning a visit.

Jug Bay Wetlands Sanctuary is a member of the Chesapeake Bay - National Estuarine Research Reserve system, which promotes scientific research, public education, resource management and stewardship in estuarine reserves across the nation.

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become as essential for my well being as they are for the diverse flora and fauna..." Now-retired contractor Mickey Taylor tells of a time visiting Jug Bay when he felt troubled from dealing with his work and clients. He hiked into the forest, lay down on the leaves, surrounded by quiet, disturbed only by birdsong, and felt a spirit of calm move over him. He arose, no longer feeling troubled.

Besides being calmed and refreshed, folks often find a connection with other people through their interest in nature. While leading nature programs, volunteer Clint Cosner sees "the wonder in children's faces as they discover new things about the

*"I yield to Nature,  
and in the process  
learn something of what  
it means to serve."*

world that surrounds them, helping me to keep and hold dear that sense of wonder that we adults tend to lose."

There's the sharing of knowledge. "Each volunteer seems to bring a special talent or skill that motivates me to learn and to improve myself," says Lisa Siciliano. "To date this has been the best and most rewarding volunteer experience of many in my life."

And laughter. Canoe leader David Turner recalls one of his most memorable canoe trips in which "an over-enthusiastic visitor (trying to haul our canoe onto the

bank) tipped an 80-year-old lady and me into the river at the landing on the Western Branch. I was truly amazed at how well the lady took it. We all had a great laugh, and food was shared to replace what had been lost."

There's also appreciation. Volunteer Mickey Taylor has applied his building and carpentry skills to many projects around the Sanctuary. "It's been a pleasure to complete much-needed items for the park," he says. "My reward was a warm smile, a nice handshake, and a sincere thank you. After spending the last 40 years as a building contractor, I can say that this is better than money!"

Asked what they might take away from the Sanctuary, folks acknowledged a greater appreciation of nature. "Probably our most important personal gain was an increased love of cold blooded animals," says David Turner. "Thanks to Jug Bay's staff and to knowledgeable volunteers I have become more aware of what lives on my property with me," says Lisa Siciliano. "I hope I am becoming a better steward outside the Sanctuary."

Apparently, when one spends time here, Jug Bay not only leaves an imprint, but gets under the skin and into the blood. According to Maureen Fine, "whether as a participant in research and educational programs, or as a wide-eyed wanderer meandering the trails, you soon become immersed in the rhythms of the tides and the turning of the seasons, and begin to call the Sanctuary "home."



## Picnic success

Our banjo picnic and ice cream social in June was a tasty triumph. A crowd of 117 people got acquainted as they ate sandwiches and watermelon and then made their own ice cream sundaes—with a cherry on top. The highlight of the evening was the live music, provided as a donation by Bud Taylor and his Possum Hollow Boys. They helped us serenade FOJB Secretary Betty Chaney, who was celebrating her birthday among true Friends.

## School field trips

We brought 140 students on school field trips the Sanctuary this spring, paying the cost of their buses. Mills-Parole Elementary School studied wetlands and ponds; Southern High School and South River High School special education classes studied small creatures; Frederick Douglass High School in Prince George's County studied water chemistry and stream assessment; Watkins Peabody Elementary School from Washington, D.C., studied interdependency and plant life cycles; and César Chávez Public Charter School in Washington, D.C., studied water chemistry, watersheds and wetlands. The cost: approximately \$1,500.



**Students from the Cesar Chavez Public Charter School study macroinvertebrates from the stream. FOJB provided funds for their transportation.**



## Summer interns

We sponsored two research interns and one education intern this summer. College students Jennifer Lentz from Arizona and Anna Moyer from North Carolina studied habitat use and diet of Box Turtles. Sandi Gagliardi, a math teacher from Hagerstown, created a high school curriculum, "Math Applications in Nature." FOJB provided stipends of \$2,000 to the students, who presented their results at a picnic August 1. They also have prepared written reports, which will become part of the Sanctuary's research library.

The FOJB is a nonprofit organization that supports and enhances Sanctuary activities. The next board of directors meeting, open to all, is at 7:30 p.m. on September 21.

## Turtle book

We helped publish a book this spring from a conference on turtles. *The Conservation and Ecology of Turtles of the Mid-Atlantic Region*, available for purchase at the Sanctuary, was co-edited by Chris Swarth. The cost to FOJB was \$600.

## E-mail account

We have opened an E-mail account, so that members can reach us through the Internet. The address is: fojbws@yahoo.com.

## Strategic planning

The FOJB board of directors met in special sessions this summer to take a look at the organization: our strengths, weaknesses and ideas for the future. The "strategic planning" issues we tackled included fundraising, recruitment of board members, and our relationships with other environmental groups. Significant conclusions are: We are strong financially and in the size of our membership; we want to continue to support research and educational programs at their current level—which, as the county budget tightens, will mean a modest increase in membership dues in 2005; and we will improve our ability to communicate directly with members and other groups by establishing an FOJB E-mail account.

## Camp scholarship

We brought a fourth grader to a weeklong Sanctuary science camp this summer. Ryan Johnson of Mills-Parole Elementary sent us a letter of thanks. He said, "I like Jug Bay because of the fun things we did and the people and the children there. I liked the frogs and the snake and identifying the fish. I liked the sleepover, and I liked the canoeing even though it was scary at first."

## New motorboat

We bought the Sanctuary a new boat this spring to replace the old one that leaked. The sturdy workboat can carry bulky research equipment as well as passengers. The cost was \$1,050.

## Annapolis youth canoeing

In July, we arranged a canoe trip for young teenagers from Annapolis. The youths, part of a summer camp run by St. Anne's Episcopal Church, spotted toads, snakes, terns and turtles and enjoyed a picnic lunch we provided at Mount Calvert.

—Compiled by Judy Burke, Co-president,  
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# Glendening Preserve a Natural Treasure

By Elaine Friebele

Two years ago, Anne Arundel County acquired the 610-acre Glendening Nature Preserve through the state's Greenprint program and incorporated it to the Sanctuary. Gradually, the land is revealing its forests, wetlands, and ecological communities to visitors and to volunteers and staff, who are carrying out education and research projects there.

In case you aren't familiar with the Preserve, this land extends from Route 4 south to Wrighton Road, and from the Patuxent River east to Plummer Lane. Past owners have reaped commercial gain from the land in a diversity of ways: by farming, logging, gravel mining, hunting, and boarding horses. When you visit, telltale signs indicate that the land is in the process of healing. The acres of Virginia pines reveal that the forests, in the early stages of growth, are recovering from past logging or agriculture. Overgrazed pastureland is slowly returning to meadows with a diversity of plants, insects, reptiles, and amphibians. Volunteers have removed scores of deer stands. Entire dumpsters have been filled with junk from around the horse farm. Nature is slowly reclaiming the Preserve.

The Preserve has an interesting diversity of habitats, some of which may result from past uses. In a unique area dubbed "the desert," sand reflects the shimmering summer heat back into the air, prickly pear cactus grows from the sandy soil, and six-lined racerunners dart from sun to the sparse shade of pine trees. This area was a gravel mine; topsoil was removed perhaps 50 years ago, leaving a dry bed of sand and nutrient-poor soil.

While hiking at the Preserve during the winter or spring, you might see what appears to be a lake in the middle of the forest. It's not a lake, but rather, a giant vernal pool—a temporary pond where amphibians such as wood frogs, spotted and marbled salamanders, and spadefoot toads breed. In the spring, spotted salamander egg masses the size of tennis balls float in the water, while a chorus of frogs serenades from the edges. Several staff members were even

surprised by a large snapping turtle lurking beneath the surface! As the pool shrank in size and depth last summer, spadefoot tadpoles, ready to emerge as adults, swarmed so thickly that they could be scooped by the handfuls. In 2005, a new research project monitoring spotted salamander breeding migrations to the pool will be initiated.



Another watery habitat, a small, moss-edged creek that winds through a deep ravine, is home to a great variety of stream animals—including insects and fish that are sensitive to pollution and require high levels of dissolved oxygen, thus demonstrating the good health of the stream. Salamanders and frogs abound.

The forests are substantial and varied. Two teams of habitat survey volunteers are cataloging the Preserve's vegetation, using the GIS-based grid system installed throughout the Sanctuary. At each grid intersection, volunteers set up a plot, identifying and measuring the trees, shrubs, and understory plants. Going off-trail, they find surprising variety, whether it's mature open forests with large trees or deep ravines. The tidal wetlands are still unexamined because access is a barrier. Kayak and canoe trips up the tidal portion of Galloway Creek have been curtailed in the summer by an underwater meadow of thick submerged aquatic vegetation—

**Prickly pear cactus grows next to spent shotgun shell in the "desert" at Glendening Preserve**

where small fish and other aquatic animals hide and feed. Someday, perhaps, visitors could observe plant and animal life of the marsh from a boardwalk like the one near the Wetlands Center.

We have only begun to catalogue the wildlife living in the varied habitats of the Glendening Nature Preserve. As the land heals from its previous uses (and abuses), the distribution of plants and animals may change and perhaps become more diverse. New life may colonize suitable areas, while some of the present (alien, invasive) species may be eliminated. A part-time Maryland Volunteer Coordinator at the Preserve could support the advancement of our knowledge through new education and research programs, making valuable use of this land, so fortunately saved from development.

# For Box Turtles, Marsh Habitat Is Complete

By Anna Moyer,  
Jug Bay Research Fellow

Skeptical of an ecology internship located right outside of Washington, D.C., I came to Jug Bay Wetlands Sanctuary scared that I had signed myself up for an internship at a little urban park. I was quite relieved to see my summer unfold in a very different direction. The variety of habitats and the variety of people at Jug Bay created for me an expansive amount of information and experiences. I never became bored! Going to school in the Southern Appalachian Mountains, I got a real kick out of living along a river that had a tide and enjoyed learning about this different, estuarine environment. My time at Jug Bay gave me a greater understanding of how ecosystems work together and prevented me from having a narrow view of the environmental world. The most academically important part of my summer experience was the strong emphasis on field research. I enjoyed bird banding and monitoring turtle nests, trapping turtles, tracking Box Turtles, meeting other professionals and students doing



**Ana Moyer and Jen Lentz head out to track box turtles.**

research, and most demanding of all, developing and executing my own research on the use of the tidal wetland habitat by the Eastern Box Turtle.

It is known that the Eastern Box Turtle, (*Terrapene carolina carolina*), inhabits forests and can also be found in creeks and ponds within these forests. The past nine years of research done on the Box Turtle home range at Jug Bay shows that many of the turtles also spend time in the fresh water tidal wetlands found on the property. I did research to see how Box Turtles utilize their time in the tidal wetlands. For

this, I used a Tid-bit thermometer to record temperature fluctuations, studied the contents of Box Turtle fecal samples, and analyzed the ratios of heavy to light stable isotopes of nitrogen and carbon via a mass spectrometer. I found that while most turtles feed very little in the tidal marsh, there are turtles that, through telemetry tracking, are often found in the marsh. The research showed that Box Turtles that spend time in the tidal wetlands use it for feeding and have a diet largely made of organisms from the tidal wetlands. The significant difference in temperature fluctuations between the tidal and non-tidal wetlands shows that the Box Turtles may also use the tidal wetlands as a preferred way of regulating their body temperatures. The tidal wetlands provide adequate if not ideal temperatures and diet items for the Box Turtles at the Sanctuary.

I enjoyed my summer at the Sanctuary, and feel that there is still so much more exploring and knowledge I can gain from this place. I hope to return to visit, to see how the Sanctuary and its research grow.

## Box Turtles: Females Are Travelers

By Jennifer Lentz,  
Jug Bay Research Fellow

Born and raised in the southern Arizona desert, I have spent the past three years trying to immerse myself in as many types of ecosystems as possible. My journey began when I moved 3,000 miles away from home to go to school at Hamilton College in upstate New York. Needing a break from the six-month winters (often consisting of wind-chill temperatures of -30° F!), I decided to go abroad to the Turks and Caicos Islands for Spring 2004. I spent the semester studying coralline diseases and marine resource management. Having spent extensive time in the southwestern deserts, the seemingly frozen tundra of the North East, and the warm Caribbean tropics, it seemed my next logical step was to experience an estuarine environment. Thus, the summer fellowship at Jug Bay Wetlands Sanctuary seemed a perfect fit.

For my summer research project, I looked at the home range and habitat preferences of Eastern Box Turtles (*Terrapene carolina carolina*) at the Sanctuary. I also compared the two data collection techniques that the Sanctuary uses to study the box turtles: mark-recapture and telemetry. To examine the mark-recapture method, I chose study turtles from the database that had more than 10 sightings (29 on average), which made our home range estimates considerably more accurate when compared to an older study done at Patuxent Research Wildlife Refuge, in which turtles with more than 6 sightings were used (8 on average). Home range estimation by telemetry is more accurate than the mark-recapture method because turtles are located more often, and they are found in off-trail areas, as well as near areas frequented by people. Based on telemetry, I found that male box turtles had a

significantly smaller home range size than females, which directly contradicted the common belief that males are the big travelers.

I also found that females use each of the seven habitat types (tidal wetland, *Phragmites*, scrub- shrub, open forest, dense forest, and flood plain) at Jug Bay, and they show no significant preference; males use most of the habitats with similar frequency to the females. However, males used the meadow appreciably less often and were never found in the *Phragmites* stands in the marshes. Unless the significant size and diversity of female home ranges are recognized, critical nesting habitats—such as the meadow—are likely to be overlooked by conservation plans, which will put box turtle populations at risk.

I had an amazing summer here, and hope that I will be able to continue the work I did here in the future; my only regret is that my summer flew by too quickly.

# Fall 2004 Education Programs

- Reservations and entrance fees are required for all events. Call (410)741-9330 or e-mail [jugbay@toad.net](mailto:jugbay@toad.net).
  - Check our website [www.jugbay.org](http://www.jugbay.org) for additional information, directions and updates to our schedule.
  - Open to the public 9 am-5 pm Wed, Sat, and Sun. Programs are open to families and individuals. Please note age limits for each program. An adult must accompany children under 13. Scouts and other groups must call to arrange a program designed for their group.
- Entrance Fees: Adults \$3; Children under 18 \$2; Over 60 \$2; FOJB family membership \$20.

## Autumnal Equinox

*Saturday, September 25; 5:30-7:30 pm*

Take a leisurely hike through the autumn woods to experience the changing of the seasons. We'll end the hike watching the sunset and enjoying juice and cookies. All ages welcome.

## Halloween Hike: Creatures of the Night

*Sunday, October 24; 4-6 pm*

Join us in carving and decorating pumpkins for Halloween. Then, we'll take a hike through the Sanctuary to discover nature's sounds and creatures. All ages welcome. Please bring a pumpkin to decorate.

## Life of a Dead Tree

*Sunday, November 7; 1-3 pm*

Take a closer look at a dead tree to learn about its history. We'll explore its rings and scars to learn more about what kind of life it lived. We'll also discover how useful a dead tree can be. All ages welcome.

## Animal Tracks

*Saturday, November 13; 10 am-noon*

Animal tracks are easy to find if you know where to look and what to look for. We'll explore the field, forest and marsh, searching for tracks and other animal signs. Dress warmly. We'll end the evening with hot chocolate. All ages welcome.

## Preparing for Winter

*Sunday, November 14; 1-3 pm*

Winter is on its way! We'll explore how animals and plants deal with the challenges of winter and how they survive the cold weather. All ages welcome.

## Beaver Pond Hike

*Saturday, December 11; 3-5 pm*

Join us to learn about the beaver adaptations and then take a hike to the beaver ponds. Dress warmly. We'll end the evening with hot chocolate. Children should be at least 6 years old.

## Winter Solstice Hike

*Saturday, December 18; 3-5 pm*

The Winter Solstice marks the shortest day of the year and the start of winter. Celebrate the season while hiking the winter woods. We'll end the day watching the sun set and sipping hot chocolate. All ages welcome.

## Linking Landscape Condition to Stream and Estuarine Conditions

*Wednesday, October 27; 7:30 p.m.*

Learn just how sensitive the estuary is to development. Join wetlands ecologist Dennis Whigham, of the Smithsonian Institution Environmental Research Center, for a review of his ongoing work demonstrating the response of physical and biological indicators in watersheds and estuaries to land-use, especially development.



## Birding at Jug Bay

*Saturday, September 4; 8-11am*

*Saturday, October 2; 8-11am*

*Saturday, November 6; 8-11am*

*Saturday, December 4; 8-11am*

*Saturday, January 8; 8-11am*

Learn the skills of identifying birds by sight and sound. Binoculars and field guides will be available to borrow. Not appropriate for children under 12.

## Field Fantasia

*Saturday, September 11; 1-3 pm*

The field is an exciting place to explore the smaller things in life. Join in a search for insects, birds, rabbits, lizards, seeds and wildflowers. All ages welcome.

## Jug Bay Wetlands

Sanctuary

410-741-9330

[www.jugbay.org](http://www.jugbay.org)

## Marsh Ecology by Canoe

*Sunday, September 12; 12:30-4:30 pm*

*Saturday, September 25; 12:30-4:30 pm*

*Saturday, October 9; 12:30-4:30 pm*

*Saturday, October 23; 12:30-4:30 pm*

*Fee: \$5.00 per person*

Come learn about wetland ecology through our popular canoe explorations of the wetlands along the Patuxent River. Experienced volunteers or staff naturalists lead trips. Canoe instruction and all equipment is provided. To reserve a space, mail your payment of \$5 per person (including FOJB) in advance to the Sanctuary. Please include your names, address, daytime phone number, number of people in your party and the ages of children as well as a first and second choice of dates. Children must be at least 7 years old.

## Falling Leaves

*Wednesday, September 15; 10 am-noon*

*Sunday, October 17; 10 am-noon*

Come look for colorful leaves and other signs of fall. Learn how to identify some common trees by their leaves and discover how important leaves are for plants and animals. We'll make a leaf craft to take home. All ages welcome.

## Fall Flowers

*Saturday, September 25; 10 am-2 pm*

Asters, goldenrods, and bonesets should be plentiful in our open meadows. These "confusing composites" can be a challenge to identify. Learn some field identification techniques while enjoying the beauty of the fall fields. Co-sponsored with the Maryland Native Plant Society. Children should be at least 12 years old.



## Parris N. Glendening Nature Preserve at Jug Bay

Join us for a program at the Glendening Preserve, one of Anne Arundel County's newest parks, encompassing over 620 acres. The Preserve's Wrighton Road entrance is open on Saturdays from 9 am-5 pm.

Wear sturdy shoes and be prepared to walk at a moderate pace (approximately three miles), on natural surface paths, with some short, steep sections. There is no entrance fee for programs held at the Preserve.

*Note: There are no restroom or water facilities at the Preserve.*

*Participants are encouraged to use facilities at the Sanctuary's Wetland Center prior to the start of the program. Often the program starts at the Sanctuary's Wetlands Center, and participants car pool to the site. See descriptions for meeting location.*

**Habitat Surveys** *Tuesdays and Wednesdays through October.* Volunteers team up to survey the habitats at the Glendening Preserve and identify and measure the trees in 10-m plots using an easy to learn method. Regardless of your plant knowledge, there's a job for everyone! Please call for exact dates and times of the weekday trainings. An great project for home school families. Meet at the Sanctuary's Wetlands Center and car pool to the site. Children should be at least 10.

### **Bugs 101**

*Saturday, September 18; 2-4 pm*

Here's your chance to learn about the cool critters found crawling in fields and under logs at the Glendening Preserve. We'll also look for some late season butterflies. Meet at the Sanctuary's Wetlands Center and car pool to the site. All ages welcome.

### **Fall Birding**

*Saturday, October 23; 8-11am*

Explore the fields and adjacent woods along Plummer's Corner for sparrows, fall migrants, and other wintering birds. Binoculars and field guides will be available. Meet at the Plummer Lane entrance of the Glendening Preserve. Note that there are no restrooms at the Preserve. Children should be at least 12 years old.

### **Beaver Moon: Full Moon Hike**

*Saturday, November 27; 5:30-7:30 pm*

Native Americans gave each of the full moons a special name. November's full moon is the Beaver Moon, suggesting that the beavers are now actively preparing for winter. We'll hike to the beaver pond in hopes of spying these nocturnal mammals. Meet at the Sanctuary's Wetlands Center and car pool to the site. Children should be at least 6 years old.

## Volunteer Opportunities

### **Stream Monitoring**

*Friday, September 17; 9:30 am-noon*

Volunteers are needed to help collect, identify, and count stream invertebrates that are used to evaluate stream health. Not appropriate for children under 12.

### **Fish Survey**

*Saturday, September 18; 9:30-noon (Two Run Creek)*

*Saturday, October 9; 1-4 pm (River Farm)*

Once a month we monitor the fish populations living in shallow water and wetlands. Volunteers willing to get wet are needed to help catch, identify and measure (and then release) fish. Not appropriate for children under 12.

### **Wild Rice Restoration**

*Saturday, September 18; 9 a.m. - 12:30 p.m.*

Bags have been placed over wild rice seedheads in the marsh to preserve the seeds. From a boat or canoe, we'll collect the bags and empty the seeds, which will later be distributed inside fenced-in areas--protected from grazing by resident Canada geese in the spring.

### **Water Chemistry and Nutrient Dynamics Training Workshop**

*Saturday, October 16; 1-4 pm*

Since 1988, volunteers have monitored nutrient pollution, dissolved oxygen levels, pH and water clarity in Jug Bay's waters. We will refresh those skills and train new volunteers. Additional training is provided during the sampling dates. The workshop is recommended for all volunteers, new and experienced. For adults or teens.

### **Naturalist Training: Tips and Tricks**

*Saturday, November 20; 12-4 pm*

Volunteers are needed to lead a variety of weekend programs for families. This workshop will focus on the "fun"-damentals of creating programs that introduce families to the wonders of nature. Educational and engaging activities along with tips for creating successful trips will enable volunteers to lead a variety of hands-on programs. Some natural history knowledge is useful. For adults or older teens.



This summer, Wild Rice stands grew as lush and as dense as they did ten years ago, thanks to restoration efforts over the past several years. Grazing by the burgeoning population of resident Canada Geese in the spring had devastated the Wild Rice stands at Jug Bay. Protecting the stands from resident Canada Geese with fencing, collecting and distributing seeds, and eliminating substantial numbers of resident geese through a summer hunting season at Patuxent River Park has helped the plants come back. This is good news for fall migrating marsh birds such as the Sora.

# Eagle Scout Projects Improve Function and Aesthetics

By Lindsay D. Funk

When Bob Sands and Terek Cope came to begin their Eagle Scout projects, they were no strangers to the Sanctuary. Both Bob and Terek have helped friends work here on their Eagle Scout projects and found this to be the place they would like to complete their own project.

Bob Sands, of Severn Boy Scout Troop 712, has also been a participant of our Teen Adventure Program and chose Jug Bay as the site for his project because of his familiarity with the Sanctuary. Bob worked meticulously to install the erosion walls along the path leading to the north end of the Marsh Boardwalk. The large, heavy pieces of wood used in the construction needed to be placed very carefully for the walls to come together, and Bob worked in the cold of winter, through the spring, and finished just in time to beat the dog days of summer. Bob is grateful for the help provided by our staff, especially Doug Willis, and would certainly recommend Jug Bay to other Scouts. Bob learned how to delegate assignments, work efficiently, and now

has a solid grasp on the importance of pre-planning. When asked if pleased with his project results, Bob modestly replied that it turned out "better than I expected." This finely crafted erosion wall compliments our refinished Marsh Boardwalk quite well.

Terek Cope, a Bowie resident from Boy Scout Troop 1660, chose to do his Eagle Scout project here partly because of his familiarity with the Sanctuary but also because of our assistance. Terek enthusiastically recommends Jug Bay because of the variety of projects offered and the flexibility to "do what you want" to make a project work. Terek brought in his crew of helpers and in a mere three Saturdays refinished the whole length of both railings along the River Pier. Terek said he was very pleased with the project and thought everything went well. He found the staff to be very helpful and appreciated all the materials that Doug made available to him.

On behalf of the Sanctuary, we would like to acknowledge Bob's and Terek's hard work and thank them for choosing to complete their projects here at Jug Bay. Congratulations on jobs very well done.

## Thanks for Your Donations

Bob Christman for donating the proceeds from the Safe Boating Course he taught at Jug Bay to the Sanctuary.

David Carson's Johns Hopkins University Ecology Course, for insect sweep nets, Pesola scales, diameter tapes, bug boxes, forceps, and bird weighing cones.

Snead's Ace Home Center in Owings, Maryland, for donating the wooden slats for repairing the weather station.

Mike Quinlan for *The Bird Almanac* by David M. Bird, PhD.

Joe Friebele for a computer USB extension cable.

**Nora and Jim O'Reilly display potatoes they have brought from the Sanctuary's South County Community Garden as a donation to the South County Senior Citizens Center in Edgewater. Garden members this summer donated many bushels of fresh vegetables to the center and to the Anne Arundel County Food Bank.**



**Visitors can once again walk among the cattails (without getting their feet muddy!) after reconstruction of the Marsh Boardwalk, which was destroyed by Hurricane Isabel last fall.**

# Nature By the Numbers

By Sandi Gagliardi,  
Summer Education Intern

Maryland Educators' Summer Research Program (MESRP) is a wonderful opportunity for math and science teachers from the state of Maryland to take part in independent study at one of approximately a dozen participating science-oriented locations throughout the area. State-of-the-art technology and research techniques combined with a network of resource people and materials enable each teacher to create new and exciting lessons for their classroom. Mentors at each facility graciously devote their time and expertise to enabling teachers to develop a rewarding research project. Karyn Molines is one such mentor. I am one such intern!

As a high school math teacher in the Hagerstown, Maryland, area, my first and most overwhelming impression of Jug Bay was ironically the thought of uncountability! How funny! There are trees, water plants, fish, reptiles and amphibians beyond measure. The beautiful Patuxent River stretches off to the horizon in two directions. At night, thousands of bullfrogs across the river create a deafening nightly symphony. And yet, the many dedicated people who work at Jug Bay attempt to count, to measure, and to chart how and why animals and plants inhabit this beautiful wetland tract. One cannot help but be amazed and impressed by their level of commitment. At the same time, it is also obvious that Jug Bay gives back to each visitor at least as much attention as it receives. It is a humbling, therapeutic, and indeed a spiritual experience to be here. No wonder they call it a sanctuary!

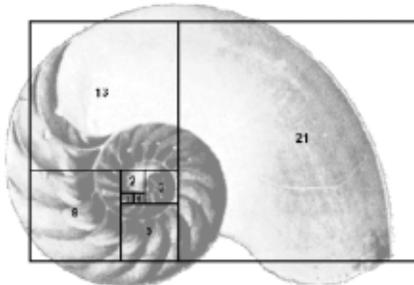
My summer project focuses on three separate applications of mathematical theory and technique in nature. One particularly intriguing application is the Fibonacci Sequence, which is a topic that I already cover briefly in the algebra 1 chapter on patterns and predictions. After having read *The DaVinci Code* by Dan Brown, I became most interested in expanding this lesson. The Fibonacci sequence is very simple. One

begins with ANY number and finds the next term by combining the two terms before it (zero is understood as the primary starting point). An example of the sequence, as developed by Fibonacci in the 12th century might be:

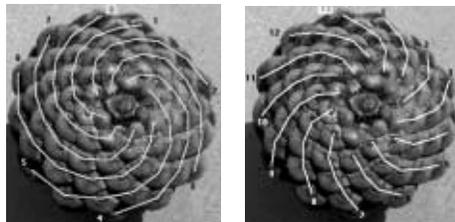
1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89...

You might say "well, so what?" This sequence has incredibly fascinating properties! These properties take a student well beyond simple arithmetic into a much larger world of high mathematics, art, architecture, music as well as nature.

When you take any term and divide it by the term before it, you will begin to approach a limit called "phi" or the irrational number of approximately 1.618. This is often referred to as the golden ratio or the golden section. The ratio of your height to the height of your navel is phi. The ratio of your whole arm to your forearm is phi. Phi is in the ratio of the segments of your knuckles as well.



The beautiful sea mollusk known as the nautilus is one animal that follows the Fibonacci pattern. If one begins with a 1x1 square and expands to 2x2, then 3x3, 5x5, 8x8, 13x13, and 21x21 growing from each adjacent side, one can generate the nautilus spiral.



Pinecone bracts grow in spirals both clockwise and counter-clockwise. The number of spirals in both directions is a sequence of Fibonacci numbers. Pineapples, broccoli and cauliflower also contain

Fibonacci spirals in their knobbles and florets. An apple or banana cut sideways also reveals a Fibonacci number. The sneezewort plant grows in a Fibonacci sequence. The stem branches from 1 stem over the first two months to 2 stems, then 3 stems, 5 stems and so on.



The coneflower has 34 and 55 spirals in both directions (consecutive Fibonacci numbers). The hibiscus has 2 sets of 3 petals.

Fibonacci numbers, the golden ratio, and the golden rectangle can also be found in the shape of credit cards, the face of the Mona Lisa, the columns of the Parthenon, symphonies, poetry, sunflowers, and the pattern of leaf growth around a stem known as phyllotaxis.

There is an amusing fact about the Fibonacci sequence. If you add any ten terms of the sequence, your sum will always be equal to 11 times the seventh term. For example: {4, 4, 8, 12, 20, 32, 52, 84, 136, 220...} are the first ten terms of a Fibonacci sequence. The sum of these numbers is 572. This is 11 x 52!

Biodiversity and tree surveying is another topic that I explored during my internship. It was great fun to trek out to the middle of the Glendening Preserve, locate markers, and identify the trees that were present. A way of expanding this to the classroom is to incorporate calculations such as Diameter (Circumference/Pi), Relative Abundance (# of one species/ total number of trees in the quadrant), bar graphing, coordinate plotting, compass reading, pie charts, percentages and degrees. Students need to be made aware of the benefits of and threats to biodiversity. We can never take our precious resources for granted.

I have truly enjoyed being a part of Jug Bay for the summer. I know I leave a much richer person for the experience. My sincere thanks to the many kind people who taught me all so much

# Scenes from Summer Science Camp



This summer, campers studied animals from insects to frogs to turtles, measured trees, played games, and got muddy during the Marsh Walk. Most of all they had FUN!

# The Seining Days of Summer

By Andrea Hardy Campo, Stewardship Coordinator, NERR

These hot summer days conjure images of swimming in the river, family barbecues, beach days and fish seining. Fish seining? While I realize not everyone daydreams about fish, there are the rare few who sit on their porch at night pining for the next opportunity to get wet, dirty and even stinky—all in the name of science. Okay, so maybe I'm the only one pining; however, the fish seining survey has been part of volunteer activities for over 10 years at two reserve sites: Jug Bay and Otter Point Creek.

Volunteers spend their time hiking through the woods, wading in chest-high water

while drag-

ging a

100-

foot

seine in

hopes of

catching ten,

twenty, or possibly a few

hundred fish. But the fun does not stop

there! Once the nets are landed, each indi-

vidual fish is identified and counted, and

some species are measured. Just last week the

Otter Point Creek crew caught a whopping

549 fish consisting of fourteen different

species, such as Gizzard Shad and White

Perch, and this was just one of the sites

surveyed that day!

Although it may seem that these surveys

were designed just for fun, they actually

provide important baseline data for studies

concerning the health of the Bay. Many

species of fish, including migratory fish and

year-round residents, use the wetlands at Jug

Bay and Otter Point Creek for spawning,

feeding, and shelter. In the freshwater tidal

region of the Patuxent and Bush Rivers,

volunteers monitor both tidal and non-tidal

creeks and document the differences in fish

species diversity and abundance, as well as

seasonal and annual changes in fish

populations.

Collecting baseline data in an attempt

to develop an index of biotic integrity (IBI)

for freshwater tidal fish species has been the

main goal of the Otter Point Creek Fish

Seining Program over the past five years.

The IBI is essentially a ranking of a system's

"capability of supporting and maintaining a

balanced, integrated, adaptive community of

organisms having a species composition,

diversity, and functional organization

comparable to that of the natural habitat of

the region." Therefore, a site with high

biological integrity will have had little or

no influence from human society. This past

year, Karyn Molines used Maryland's

standard index of biotic integrity (IBI) for

freshwater tidal fish species to

interpret 14 years of

fish data

gathered at

Jug Bay.

This

year, the

program at

Otter Point Creek

has been enhanced to include a

focus on habitat use by migratory fishes

and the effects of impervious surfaces in the

watershed on the overall fish community.

When stormwater hits impervious surfaces

such as roofs and pavement, the

temperature of water entering a creek can

be significantly increased. The stormwater

that runs off these surfaces instead of

soaking into the ground can also cause

erosion, adding loads of sediment to a

stream or river.

By increasing the sampling frequency

and the number of sites sampled, we will

build a more robust dataset. The additional

data gathered should provide a better

picture of how the migratory and resident

fishes are using the habitat throughout the

critical summer season. Once we have a

more complete picture of the sentinel

species, how they are using the habitat and

what age classes are represented, we can

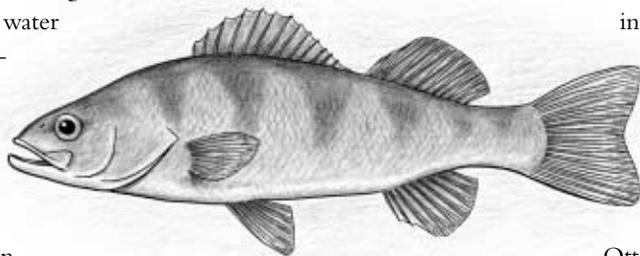
then begin to explore any limiting factors

for specific species as well as any effects

impervious surfaces project on the overall

fish community. The enhanced program is

being implemented at Otter Point Creek



**Jug Bay is one of the three components in the Chesapeake Bay National Estuarine Research Reserve, Maryland. The purpose of CB-NERR is to manage protected estuarine areas as natural field laboratories and to develop a coordinated program of research and education as part of a national program administered by National Oceanic and Atmospheric Administration (NOAA)**

#### STAFF

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during the 2004 field season; it will be evaluated in the winter of 2005 with the hope that the project will be put into action at Jug Bay during the 2005 field season.

The next time you find yourself daydreaming on your porch on a hot summer day, consider how it would feel to be standing in a cool stream counting fish. Better yet, join us for a day in the field! The increase in mission and frequency of sampling means we are always grateful for new volunteers. After completing our training program and getting your feet wet, you too may long for the seining days of summer.



DEPARTMENT OF RECREATION AND PARKS

**Jug Bay Wetlands Sanctuary**  
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**Lothian, MD 20711**  
**410-741-9330**



## Summer Volunteers May - July

Morgan Angus	Kate Cinelli	Rosemary Frezza	Anthony Rubino
Ramona Sampsell	Clint Cosner	Carolyn Fulton	Jeff Shenot
Peg Benton	Andrew Cronin	Tawanna Glover	Lisa Siciliano
Mike Blackstone	Terry Crowe	Jim Harle	Bob Smith
Susan Blackstone	Terry Crowe III	Ami Hazell	Anthony Spano
Suzanne Brander	Jim Cunningham	Ben Hollister	Jeannie Sproesser
Cynthia Bravo	David Davis	Dave Linthicum	Bill Steiner
Peggy Brosnan	Richard Del Giudice	Rick Malmgren	Mickey Taylor
Judy Burke	Margie Dowsett	Ben Matics	Sandy Teliak
Gordon Burton	Dennis Duke	Louise Miles	Steve Tew
Mary Burton	Lindsay Duke	Dotty Mumford	David Turner
Rachel Busin	Shannon Easton	Jennifer Muro	Martha Turner
Danny Bystrak	Kim Elliott	Katie Ogden	Peter Uimonen
Erika Camargo	Tom Englar	Gary Pendleton	Don West
Betty Chaney	Maureen Fine	Dave Perry	Susan Wheatley
Ginger Chaney	Bob Ford	Rod Perry	
Kathy Chow	Megan Franasiak	Mike Quinlan	
Bob Churi	Robert Frezza	Rogard Ross	

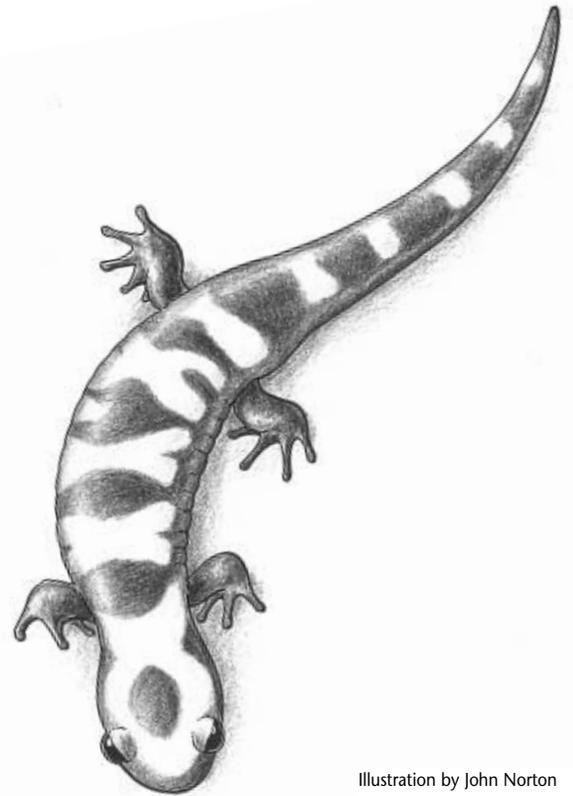


Illustration by John Norton