Studies well done—Research Aplenty at Jug Bay

Compiled by Chris Swarth

At any one time there are more than 20 research studies taking place in the Jug Bay area. The aerial photograph indicates the location of ten of these current studies. Use the map and the brief descriptions below to learn about the array of fascinating research that is taking place in our marshes and forests. Web sites are provided for each study so you can learn much more.

1. Wetland Plant Studies at Billingsley Marsh

Dr. Andrew Baldwin and his students conduct marsh plant studies that provide insight into climate change as well as revealing new information that aids wetland restoration efforts. His studies involve the experimental manipulation of marsh elevation to simulate different hydroperiods as well as manipulative studies using doses of increased salinity to test the effect on plant growth, seed viability, and sediment dynamics.

In a recent paper on the restoration of tidal freshwater wetlands in urban settings, Dr. Baldwin writes, “At the landscape scale, tidal freshwater marshes occur in depositional areas along coastal rivers, between upland areas and open water, sometimes with tidal freshwater swamps occurring between the uplands and the marsh. While community dominants such as halberd-leaved tear thumb (Polygonum arifolium) or sweet flag (Acorus calamus) may occur across the landscape, many species exist at only a few locations. Diversity can also vary across the tidal freshwater landscape, with some sites having higher species density than others. At a smaller spatial scale, tidal freshwater marshes, like most types of wetlands, exhibit horizontal zonation of vegetation along elevation/hydro period gradients. As in salt marshes, tidal freshwater marsh vegetation is often divided into two zones, high marsh and low marsh. However, the boundary between zones is often less distinct than that which occurs in salt marshes, having greater overlap of species across zones. The indistinct boundaries may be due to an absence of salinity, sulfide, and other gradients that can occur in salt marshes, as well as to the greater number of species that can grow in tidal freshwater marsh habitats because of their low salinity. The low marsh community of Atlantic coast marshes is typically dominated by spatterdock (Nuphar lutea) and arrow-arum (Peltandra virginica) while the high marsh is much more species-rich, containing an assemblage of annual and perennial emergent plants.” For more information, check www.bre.umd.edu/baldwin.htm

2. Estuarine Water Quality

The interactive website Eyes on the Bay is maintained by DNR’s Tidewater Ecosystem Assessment Division. Eyes on the Bay provides easy access to near real-time, mapped and historical Chesapeake and Coastal Bays water quality information and data. Available data includes water temperature, salinity, dissolved oxygen, water clarity, chlorophyll, and pH levels. When visitors arrive at the web site they access a map illustrating the locations and types of monitoring sites throughout the

Our new website has just launched. Visit www.jugbay.org to check it out and give us your feedback!
plots in the cattails and spatterdock near the river’s edge. They study complex biogeochemical processes that take place in the mud, processes mediated by myriad bacteria, which convert molecules from one form to another and gaining energy in the process. Their studies have important implications for both the Bay cleanup effort and for global warming. According to Dr. Megonigal, “Bacteria are the most diverse and versatile creatures on Earth, and they largely control the rates at which elements cycle in the environment. Although they are microscopic, the mass of all microbes is equivalent to that of all plants. Ecologists have long been interested in microbes, but have lacked the proper tools to observe them in detail. That has now changed with the advent of molecular and isotopic techniques.”

“One of our specialty areas is the microbial ecology of rusty roots. Wetland plant roots are often encrusted with rusty-red iron oxide minerals that harbor bacteria capable of using iron to gain energy. We are interested in how plants, iron-eating bacteria and iron minerals interact because it affects methane-producing bacteria, and therefore rates of global warming. A second area of interest is the effect of elevated CO2 on microbial community composition and microbial activity.” For more information, check www.serc.si.edu/labs/biogeochem/.

4. Ecology and Disease Transmission: West Nile Virus and songbirds

D r. Marm Kilpatrick with the University of California at Santa Cruz and Dr.

Continued on page 9
Dear Friends,

By the time you read these comments, the Sanctuary will be well into the task of managing the deer population. Ironically, we will be overtly intervening in the natural order of the local ecosystem in the hopes of preserving it. The number of deer has exceeded its carrying capacity. Therefore, managing the number of deer is an attempt to achieve a level of stability within the Sanctuary’s ecosystem in a manner that allows the inflow of energy and water to sustain the critical functions of the wetlands—to clean water and sequester carbon. The deer, however, are a metaphor for a much larger issue facing society, namely, how do we preserve global ecosystems in a manner that is sustainable?

An article in American Scientist reminded me of a book I had wanted to read in 1972. It is entitled “The Limits to Growth” (LTG) when it first appeared, it was vilified by what we call the usual sources, particularly the energy companies, agro-industry, etc. Its model predicted that the “business as usual approach” would lead to economic and global collapse in the mid-twenty first century. Of course, technology and free markets would (will?) solve the problem. In the meantime, a twenty-year update (1992) was issued and now the thirty-year update (2002) has been published. The American Scientist article pointed out that what were assumptions and predictions in 1972 have now become supported by data and observation.

The main cause of the portending collapse is the exponential growth of human population. The model in LTG indicates that the carrying capacity of the planet was exceeded in 1980 and overshot it by 20% in 1999. Without direct intervention to stabilize and reduce the exponential population growth, we are on a collision course with an uncertain future of world shortages, particularly of energy and food. Models of course do not predict the future; they usually indicate a range of likely outcomes, based on current knowledge (or uncertainty) of parameters (causes). We, the citizens, have the option to change the parameters and, hence, the likely outcomes. Yet, since 1972 the discovery of new fossil energy reserves has not matched population growth. Renewable resources are just not as energy dense as fossil fuels and will never be sufficient to sustain the current level of population. In two or three decades, our children will be faced with moral and ethical dilemmas on how to allocate food among lesser-privileged people. It is the familiar “tragedy of the commons”, where taking a little extra now seems to affect no one, but at some point in the future the commons collapse.

There is another factor though; models do not tell us how to proceed. They tell us the parameters that can be controlled, not how, why or what in particular. In “Life in the Balance”, Eldredge points out that we are headed toward the “sixth extinction”. Past extinctions were caused by abrupt climatic changes or collisions with asteroids. In each of these only 5% of the species survived to repopulate life. The sixth though is different; it is directly related to humans co-opting the wild, clearing trees for houses, cutting off mountain tops for energy, depleting stored fossil fuels for fertilizer, overfishing ocean stocks for food, changing climate, and on and on. With each encroachment we remove species from the planet without any idea of the roles they are playing for us. Many of the species eliminated are unknown and unseen to us; yet they may perform critical and essential functions needed to undergird life.

The deer didn’t exceed the carrying capacity of the Sanctuary by themselves; they were encouraged to do so by us, namely by misguided hunting policies and the ignorance of previous generations about the role of top-level predators. We are about to embark on an experiment in our local ecosystem. We do not have the certainty that the consequences of our actions will return us to the former state. The hope is that we can make the Sanctuary ecosystem sustainable. Thus, I leave you with the following thought,

“We must strike a balance, and learn to live in equilibrium with the natural world”.

Al Tucker, President

4. Ibid., p.181
Six species of turtle are found regularly in the Patuxent River marshes: Snapping Turtle, Eastern Painted Turtle, Red-bellied Turtle, Eastern Box Turtle, Musk Turtle and the Eastern Mud Turtle. In 2008 we initiated an ecological study of the inconspicuous mud turtle in an effort to gather new scientific information about this little-known species. With funding support from the Friends of Jug Bay, Antonio Cordero (University of Oregon) was awarded the annual Jug Bay Fellowship and he began in April 2008 to trap and track (via radio telemetry) a total of 10 turtles. His work revealed that mud turtles had much larger home ranges than we would have predicted.

Realizing we needed more data on this species, in 2009 I selected University of Maryland senior Rebecca Reeves to continue the fieldwork for a second season. Becca tracked 10 adult turtles that we’d tagged with 5 gram radio transmitters. The transmitters emit a signal that she could detect on a receiver that she carried over her shoulder or stowed in her kayak. The transmitters are tiny but powerful—we can detect a turtle that may be up to one mile away!

As the summer proceeded, Becca became “one” with her kayak as she logged 100s of hours in the marsh and river —paddle in one hand and a radio antenna in the other. Her work confirmed and expanded the 2008 fieldwork. She also found females nesting in two sunny areas not far from the marsh. For the first time ever to our knowledge, Becca observed and tracked a single male hour by hour as he moved from low marsh spatterdock into higher areas of wild rice as high tide waters inundated foraging areas. The turtles feed on aquatic insects and other invertebrates such as crayfish, as well as fish.

—Chris Swarth
New Book on the Science of Freshwater Tidal Wetlands

The first synthesis of our knowledge of freshwater tidal wetlands (FTW) was published in 1978 by Dr. William Odum and his colleagues and graduate students at the University of Virginia. This US Fish and Wildlife Service publication contains a wealth of useful information and it sits dog-eared and well worn on many a wetland ecologist’s bookshelf—including my own! While it remains an indispensable resource, Odum’s book is over 30 years old and long since out of print.

In the intervening decades much new scientific information on FTW has slowly accumulated. Several years ago wetland scientists Aat Barandregt, Dennis Whigham and Andrew Baldwin concluded that there were enough new studies on freshwater tidal wetlands to warrant a comprehensive reference book that would summarize the state of the knowledge of both North American and European wetlands. They solicited the help of 41 other scientists to author specialty chapters, and in June the book was published by Backhuys Press (Leiden, Netherlands). The book includes 24 chapters on such topics as human activities in European FTW, FTW of Alaska, and invasive plants in east coast FTW. Jug Bay is predominantly featured throughout the book as dozens of studies are described. Jug Bay is perhaps the center of the universe for FTW research! And you can see that the front book cover shows Jug Bay in all its beauty. Chris Swarth and Erik Kiviat authored one chapter on animals of North American FTW, and the chapter on conservation describes Jug Bay long-term water quality study as well as the value of the National Estuarine Research Reserve system in terms of wetland protection. The book is aimed at the serious student of FTW, but should be an indispensable reference for anyone with a deep interest in wetlands and how they work. We have two copies of the book in our library, but if you wish to purchase a copy, go to http://www.euronet.nl/users/backhuys/.

Stream Watershed Investigations

Three small streams flow through the Sanctuary. Each has its origins outside the Sanctuary. In order to better monitor and understand water quality and other creek conditions, this fall we are shifting our water quality studies away from the tidal wetlands so that we can concentrate on the creeks and their watersheds.

University of Maryland student Andreas Moshogianis spent the summer collecting information on the Galloway, Two-run and Pindell Creek watersheds. He visited with county land use planners in Annapolis, spoke with the company that operates the only wastewater treatment plant in our area (Boones Mobile Estates), and learned how to make and interpret digitized watershed land use maps. He also inspected each stream from mouth to headwaters to take documentary photos, to measure stream flow, and to document signs of environmental damage. Using the baseline information gathered by Andreas, we are in good shape to launch new investigations of our three streams.

On August 15 Becca and Andreas spoke to an audience of 50 about their summer studies. Parents and siblings were on hand, along with a host of volunteers and others. Thanks to the Friends of Jug Bay for organizing this annual event and for the delicious grilled foods.

—Chris Swarth

The Sanctuary’s Education Intern this summer was environmental teacher Jonathan Fletcher. Jonathan was well versed in wetland ecology, having just taught at Tybee Island, Georgia, in the University of Georgia Extension Center. Sponsored by CBNERR, Jonathan co-led the three Sanctuary summer camps and a variety of summer programs, including many canoe trips. He also developed an independent education project with activities and instruction on pollution. Jonathan is a graduate of Hamline University in St. Paul, Minnesota. He also worked as a naturalist at the Conejo Valley Unified School District Outdoor School in California.

—Elaine Friebele

Education Intern Jonathan Fletcher during the summer camp marsh walk.
Join volunteer naturalists for nature programs.

- Reservations and entrance fees are required for all events, unless noted.
- Call 410-741-9330 or e-mail programs@jugbay.org
- Check www.jugbay.org for information, directions and updates to our schedule.
- Open to the public 9 am-5 pm Wednesday, Saturday, and Sunday.
- Glendening Preserve open every day at Wrighton Road entrance.
- Programs are open to families and individuals. An adult must accompany children under 13.
- Please note age limits for each program.

Entrance Fees: Adults $5; Children under 18 $3; Over 60 $3; FOJB family membership $25.

Fall 2009 Public Programs at Jug Bay

Birding at Jug Bay
Saturday, Sep 5; 8:00-11:00 am
Saturday, Oct 3; 8:00-11:00 am
Saturday, Nov 7; 8:00-11:00 am
Learn the skills of identifying birds by sight and sound. Binoculars and field guides will be available to borrow. Not appropriate for children younger than 12.

National Estuaries Day
Saturday, September 26, 1:00-2:00 pm
Celebrate our amazing Patuxent estuary with a hands-on tour of the freshwater wetlands. Learn about the importance of estuaries and experience how they function. All ages.

Discover Wetlands by Canoe
Saturday, Sep 26; 12:30-3:00 pm
Discover the abundance of wildlife in the Patuxent River wetlands while celebrating National Estuaries Day. We’ll paddle up some of the smaller branches of the river to look for beavers, birds, and flowering wetland plants. Please arrive promptly at the starting time. Bring plenty of water, sunscreen, a lunch, and shoes that can get wet. Children must be at least 10 years old and accompanied by an adult.
To reserve a space, mail your payment of $10 per person (including FOJB) in advance to the Sanctuary. Please include your names, address, daytime phone number, the number of people in your party and the ages of children as well as a first and second choice of dates.

Trees
Saturday Nov 7; 1:00-4:00 pm
These beneficial giants are putting on their annual colorful display. We’ll take a tree hike and discover the many types of trees in our forests. Learn the many ways that trees help us in addition to bringing beauty to our lives. We’ll finish with a craft. Ages 8 and up.

New NOAA Administrator Visits

On April 22, 2009 Dr. Jane Lubchenco, the new NOAA Administrator (National Oceanic and Atmospheric Administration), visited to celebrate Earth Day and to discuss NOAA’s commitment to protecting our nation’s estuaries. On hand to meet with her were Dr. Al Tucker (President, Friends of Jug Bay), Greg Kearns (Senior Naturalist with Patuxent River Park), Beth Ebersole (Manager of the Chesapeake Bay National Estuarine Research Reserve), Dr. Fredrika Moser (Research Coordinator for Maryland’s Sea Grant) and Greg Lewis (Director at Patuxent River Park), as well as a number of other local, state and federal partners.

Under gloomy skies filled with rain clouds, John Griffin, Secretary of the Maryland Department of Natural Resources, explained to the audience the importance of the Chesapeake Bay National Estuarine Research Reserve.

Dr. Lubchenco described NOAA’s commitment to protecting our nation’s estuaries and to dealing with the many challenges posed by global climate change:

“With America’s estuaries at serious risk, Jug Bay provides a model for tackling accelerating water quality issues and nutrient pollution. The Omnibus Public Land Management Act of 2009 signed recently by President Obama enables us to continue acquiring and protecting critical coastal and estuarine habitats.”

“Scientists are helping to lay the groundwork for a new national network of sentinel sites for climate change research that will provide the valuable climate data essential to providing the sound science on which sound policy must be built,” said Lubchenco.

This first visit ever by the NOAA Administrator points to the increasingly important role that Jug Bay is playing on the national scene in terms of estuarine habitat protection, research and environmental stewardship. Our partnership in CBNERR continues to pay big dividends that benefit county citizens, our wetlands and the Patuxent River.
Most of our projects require no experience, come to learn!

- To sign up or for more information, call 410-741-9330
- Scouts and other groups must call to arrange a separate event.
- Please note age limits for each event.

**Save Our Forests!**
*Saturday, Sep 12; 10:00 am-2:00 pm*
Want to do something good for the Earth? Join our team to remove the non-native invasive plants before they spread and threaten the Sanctuary's special habitats and rare plants. If you’re interested in continuing this effort throughout the year, you can adopt your own plot to monitor, map and manage invasives. Wear long sleeves, long pants, and sturdy work shoes. Bring water, and if you have them, work gloves and hand pruners. Free. Children should be at least 8 years old.

**Watershed Advocates Tour**
*Saturday, Sep 19; 10:00 am-3:00 pm*
Hop on the bus with Watershed Steward Lindsay Hollister to see how stormwater is affecting the Bay and how area land owners are taking responsibility for their runoff and beautifying their grounds in the process. We will drive to Arlington Echo Outdoor Education Center to see their rainscaping demonstration site and native plant sale. Call 410 741-9330 to reserve a space. Meet at the Park & Ride at Routes 424 and 50. Look for the white van.

**Become a Volunteer Workshop**
*Saturday, October 3, 10:00 am-noon*
Learn how you can become a volunteer at the Sanctuary and participate in education programs, conservation projects, and ecological research. Research projects include stream monitoring, bird studies, water testing, and turtle surveys. Volunteers lead our morning birdwalks and other education programs and they assist in the Wetlands Center on weekends. Trail maintenance and clean-ups are done throughout the year. For adults and teens.

**Stewardship Day**
*Saturday, November 14, 10:00 am-3:00 pm*
Spend a day volunteering for the good of our biodiversity. Volunteers are needed to pull invasive plants, prepare our native gardens for winter and remove debris. Community service volunteers and scout groups are encouraged to participate. For teens, adults, and families with children at least 7 years old.

**Winter Waterbird Survey**
*Thursdays, 7:30-9:30 am*
- **October 8 and 22**
- **November 5 and 19**
- **December 3 and 17**
Help identify and count waterbirds for our biweekly census, which has been carried out for more than 15 years. Observe the flocks of waterfowl that winter in the Patuxent wetlands, including diving and dabbling ducks, coots, geese, swans, herons, and raptors. For adults. No experience necessary.

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**Thank you Gretchen Quast**
Back before the economic woes settled onto our country, we were able to create a new position on our staff, Weekend Naturalist. Our first hire, Gretchen Quast worked here for several months. Those of you who visited on weekends would have seen her smiling face and red curls from behind the office window. Though new to the world of Outdoor Education, Gretchen was able to jump into the Scout program and led hikes throughout the winter for us in addition to keeping the Wetlands Center running on Saturdays and Sundays.

Gretchen’s position had to be eliminated when our budget was reduced. Thank you for enriching our weekend visitors’ experience during your time with us.

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**Upcoming Volunteer Events**

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**VOLUNTEER STATISTICS:**

**Summer Volunteers**

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**Volunteers logged**
1465.5 hours

**During the summer volunteers logged**

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**Thanks to all!**
If you hike on our Marsh Boardwalk on a warm humid day (especially after a rain) in summer you may see a small light brown snail crawling on a cattail stalk or on the leaf of an Arrow Arum. *Oxyloma effusa*, otherwise known as the amber marsh snail, is interesting for a number of reasons. For one, this “aquatic” snail is not aquatic at all. Lacking gills (it has lungs) it will drown if held underwater. Yet it lives and thrives in our wet marshes. Its daily meanderings take it down to the mud during low tide and up the plant stalks as the tide rises. Studiously avoiding getting covered by the slowly rising waters, *Oxyloma* feeds by using its radula to scrape pollen and detritus off the plant stems on which it lives. To add to its unusual nature, this snail manages to survive winter by burrowing into the mud where it survives just fine under water in spite of the lack of atmospheric oxygen.

But the most unusual thing about *Oxyloma* is that it plays host to a type of parasitic trematode flatworm (*Leucochloridium*) that requires this particular snail to complete part of its life cycle. Here is how this strange host:parasite cycle works.

**Step 1.** While scraping food off a cattail stalk a snail will on occasion ingest some bird feces. These could be the feces of a Red-winged Blackbird, a Marsh Wren or a Common Yellowthroat. Normally this is not a problem (at least to a snail!). However if the feces contain the embryonic eggs of *Leucochloridium*, the snail has had a fatal meal. But not immediately fatal.

**Step 2.** In the hepatopancreas of the snail, the trematode eggs develop into several hundred cercaria that become encased within a brood sac.

**Step 3.** The brood sac moves! Containing its brood of future flukes, the brood sac behaves like a single organism and with a purpose. The brood sac moves with its “offspring” from the snail gut out to the tip of one of the snail’s two antennae. By now the brood sac is brightly colored with alternating bands of light and dark and green encircling it. And once in the antenna it begins to pulsate at the rate of about 100 pulses per minute.

**Step 4.** The brood sac completely fills the snail antennae, creating a striking appearance. Whereas a normal snail is light brown and rather well camouflaged, a parasitized snail sports a brightly colored pulsating parasite that is anything but subtle. The brood sac has one job: catch the eye of a passing songbird. The brood sac is doing its best to mimic a lively worm or caterpillar in the hopes that it will catch the eye of a hungry bird—and the cycle will be complete.

On the BioBlitz on June 14, Rebecca Reeves was working with the marsh plant survey team on the boardwalk when she

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**Second Sanctuary BioBlitz In June**

We held our second BioBlitz over the June 13–14 weekend. We concentrated on different groups of organisms than we did in 2007. This time experts searched for mosses, bats, small mammals, wetland plants, beetles, and marsh insects. Leaders also led teams that tallied ants, flowering plants, breeding songbirds and amphibians. We are still analyzing the data and hope to have our report finished this fall. To see results of the 2007 BioBlitz go to our web page, www.jubay.org.

**Right above:** Expert field botanist Cris Fleming (with pencil) leads her team in a search for marsh plants along the Marsh Boardwalk. Helping her are Rebecca Reeves (L) and in the back Jeff Campbell (L) and Dave Perry (rear). They found more than 85 wetland species!

**Right below:** Dr. Harry Coulombe, chair of the Research Committee of the Friends of Jug Bay, examines a white-footed mouse as Susan Matthews records the data on a clipboard. Susan and Harry had set out dozens of live traps the night before. Most unusual find? A possum in a trap that had been set for flying squirrels!

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**A.** An infected Marsh Wren.

**B.** Bird feces (with trematode eggs) are deposited on a cattail stalk.

**C.** An uninfected Amber Marsh Snail (*Oxyloma*) ingests the trematode (*Leucochloridium*) eggs accidentally while feeding. The egg parasites develop into a brood sac within the snail.

**D.** The brood sac moves into an antenna and begins pulsating to attract another bird predator and the cycle starts again.

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**Dr. Jeff Campbell, a member of the Scientific Advisory Committee, is decked out head to toe as he searches through a scrub wetland trying to find new plant species for our BioBlitz.**
cried out, “Hey look at this weird snail.” Much to my delight she had found an infected *Oxyloma* with a huge pulsating bright green brood sac in its antenna.

I learned of the existence of these trematodes from parasitologist Dr. Paul Lewis of Lethbridge University (Alberta) when he visited here to do field work on *Oxyloma* in 1991. He delighted naturalists when he described the system to us at that time. Yet as the years passed I searched and searched without finding a single infected snail—and I’ve looked at hundreds of snails over the years. What an amazing sight when Rebecca walked up and held out her hand. We brought the snail back to the lab, took close up photos and even captured video. Chances are that if we’d been ten minutes later on our plant survey one of the Yellowthroats that were in the bushes nearby would have gobbled up the snail and we’d never had our amazing encounter with this poor snail and its strange pulsating parasite. How many other fascinating ecological and evolutionary plays take place in the marshes at Jug Bay?

Pete Marra, Smithsonian Migratory Bird Center at the National Zoo, have studied the ecology and transmission of West Nile Virus to songbirds here for about 8 years. Their study site is in the forest in near Pindell Creek. Every year they catch thousands of mosquitoes and dozens of songbirds. Many species of songbirds suffer from WNV while others are hosts that can re-infect mosquitoes with the disease, thus amplifying and spreading the disease.

Avian disease ecologist Dr. Kilpatrick writes, “Continued globalization (e.g., intercontinental trade and movement of people and goods), human population growth, and ongoing climate change all ensure that each disease population stressor will only intensify, and we will very likely find even greater disease emergence in human and animal populations over the next century. We can learn a great deal from WNV emergence and its consequences for North American ecology that may help us to be better prepared for future threats.” For more information, check http://bio.research.ucsc.edu/people/kilpatrick/

**5. Mud Turtle Movements and Habitat Use**

Mud turtles are small omnivorous turtles that divide their time between the marsh in summer and the forest in the winter. From April to September, the dull covered reptiles traverse the shallow wetlands searching for aquatic insects, fish and other animal matter. On occasion you can see one basking on a log, but more often they’re out of sight beneath the surface. Females leave the wetlands in June to lay eggs in sunny open patches of dry ground. By late summer both males and females exit the water to search for upland sites where they will burrow down 6–8 inches and spend the winter under in the soil. For two years we have tracked the movements of mud turtles by using small radio transmitters attached to their shells. The marshes to the north and south of the Railroad Bed are key areas used by mud turtles. Sanctuary naturalists along with summer interns Antonio Cordero and Rebecca Reeves have tracked 12 turtles from overwintering sites to marsh foraging areas and back again. Visit www.jugbay.org to learn more about this study.

**6. Breeding Songbird Study**

This year marked the 20th of this songbird study. You may have noticed the mist net poles along the Otter Point Trail. From May through early August we suspend nearly-invisible mist nets between these poles. When the nets are opened songbirds such as vireos, warblers, wrens and flycatchers will fly into them and become entangled. Our study has documented long term trends in breeding productivity, highlighting important differences between the year round residents such as Carolina Wrens and Northern Cardinals, and such neotropical migrants as Red-eyed Vireos and Wood Thrushes. Residents can produce more young in a season because they can produce multiple

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Indian wigwam. Some serrated arrow heads date back 8,000 years. They also found the shells of large mussels, which are no longer found in Jug Bay waters. The abundance of the Pig Point artifacts suggest that this spot may have been a distribution point for trade among a number of different Indian groups. To learn more about this amazing project and others carried out by the County's archeological department, visit www.losttownsproject.org.

9. Archeology at Mt. Calvert, Patuxent River Park

Almost every weekend a crew of amateur and professional archeologists works a dig site on the hill at Mt. Calvert. The public is welcome to drop in. Mt. Calvert is a destination for many of our organized canoe trips. Park staff have provided this summary of the history of the Mt. Calvert area:

“Mount Calvert is one of the most significant historical and archaeological sites in Prince George’s County. Its rich archaeological and historical resources represent over 8,000 years of human culture. Archaeological evidence shows that American Indians were present from the Archaic Period (7,500-1,000 BC) through the Woodland Period (1,000 BC-1,600 AD). Early Archaic hunters and gatherers visited the Upper Patuxent River to harvest the river’s natural resources. Later, Woodland Indians farmed the land and lived in permanent villages along the river until the 1600’s when European Settlers arrived.

The English colonial town at Mount Calvert was established by the 1684 Act for the Advancement of trade. It became the county seat when Prince George’s County was organized in 1696 and was renamed Charles Town. By 1710, an Anglican Church, courthouse and jail had been built. At the riverfront wharf ships brought goods from Europe in exchange for tobacco. Ordinaries (taverns) provided food, drink, and lodging to planters and merchants. In 1721, the county seat was moved to Upper Marlboro. Charles Town gradually disappeared and Mount Calvert became a ferry landing.”

For more information, check www.pgarks.com/Things_To_Do/Nature/Mount_Calvert_Historical_and_Archeological_Park.htm.

10. Sedimentation and Wetland Plant Dynamics

At the mouth of Two-run Creek and at other Jug Bay wetland sites, Professor Lora Harris of the Chesapeake Biological Lab (Univ. of MD) has initiated studies of emergent plants (spatterdock and cattails) and the effectiveness of these plants in retaining sediment that settles on leaf surfaces during the high tide period. These aquatic plants capture suspended materials on their leaves and stems, augmenting the ability of the wetland to hold on to sediments. Wetlands require a steady supply of sediments in order to persist through time. A positive feedback loop becomes established where soft sediments provide the perfect conditions for wetland plant growth, and the plants in turn trap sediment on their leaves and stems which increases the rate of sediment deposition in the marsh. Dr. Harris and her National Science Foundation students Keala Cummings and Laura Acevedo are investigating how marsh plants vary in their sediment trapping abilities. To learn more about her work, and that of other scientists at CBL, visit their web site at www.cbl.umces.edu/.

MARSH NOTES
Teachers Learn About “Data and the Estuary”  By Elaine Friebele

Just after waving goodbye to their students and closing their classrooms for the summer, 14 environmental science teachers attended a five-day professional development workshop sponsored by the Chesapeake Bay National Estuarine Research Reserve. The June workshop, entitled “Data and the Estuary,” enabled teachers to bring estuaries, notably the Chesapeake Bay, into their curriculum through hands-on investigations in the field. This teaching approach included developing appropriate and answerable research question, collecting data, and analyzing the data. The workshop was led by CBNERR education coordinator Bart Merrick, Elaine Friebele of the Sanctuary, and Kristi Garman, Senior Naturalist at Otter Point Creek.

During the week, which began at Jug Bay, the teachers became accustomed to getting wet and muddy as they ventured out to sample stream insects, water chemistry, fish, and wetland plants. They also traveled to the Anita C. Leight Estuary Center at Otter Point Creek, Point Creek and to the computer lab at DNR. By the end of the week, they were well versed in teaching their students about estuaries through field investigations and in online resources for exploring estuarine data.

Meet the New Stewardship Coordinator

I’d like to take this opportunity to introduce myself. I am the new stewardship coordinator for the Chesapeake Bay National Estuarine Research Reserve. I have worked in the environmental field for over a decade and as a field biologist for the last seven years. I have just come from Texas where I conducted research on scaled quail in the Chihuahuan Desert. Prior to that I worked as a fisheries biologist in Florida and before that as a land manager here in Maryland. As you can see I’ve done a little traveling.

I am very excited to get back to Maryland where I grew up and attended college. As the stewardship coordinator I will be working with land acquisitions, GIS mapping of the sites, restoration projects and volunteers on all three Maryland CBNERR sites. I will also be recruiting volunteers to help with restoration and management activities. Please contact me for information on the Stewardship program, and I look forward to seeing you out at Jug Bay.

—Chris Snow (csnow@dnr.state.md.us)
Donations:

- Mark Delfs for a Sibley Field Guide to Birds and Birds of Maryland & Delaware field guide and audio CDs by Stan Tekiela.
- Amethyst Shepherd & family for a set of gardening tools.
- Karen Caruso for Let’s Go Outside by Jennifer Ward.
- Peggy Brooks for Why Birds Sing by David Rothenberg and The Singing Life of Birds by Donald Kroodsma.

Thank you!

Friends of Jug Bay enjoy a July sunset on the Observation Deck at an event organized by FOJB vice president Sandy Barnett and other board members.