A Retrospective:
Chris Swarth, Director, 1989 - 2012

I asked Chris to write about his years at the Sanctuary. Additional comments by his wife Marilyn Fogel, his children Dana and Evan, and from volunteers are also included.

In fact, Chris had an influence on every article in this issue. A master of fresh ideas, Chris always keeps “the big picture” in the forefront of his mind, a trait I greatly admire. And for those of us who got to spend time in the field with him, he is tireless as a naturalist, and endlessly enthusiastic as an interpreter.

Chris, you have left a mark on hundreds—perhaps thousands—of people. Thank you, for making Jug Bay Wetlands Sanctuary what it is today.

Lindsay Hollister, Editor

In January, after 23 years as the Sanctuary Director, I’ll be leaving my job. How can I even begin to describe what working at Jug Bay has meant to me? An amazing ecosystem, a beautiful and quiet (!) place, unique, endlessly fascinating to a naturalist, biologically diverse, wonderful friends and colleagues, ecologically complex… In many ways this has been the perfect job; a place where I could stretch my wings, seeing ideas take shape and actually materialize into something concrete.

Jug Bay Wetlands Sanctuary was a modest organization when I started here in 1989. Little was known about the local ecology and biodiversity, and studies of wetland processes were just beginning. In the early 1990s, the first PhD was completed by Humaira Khan on paleoecology, sedimentation rates, and nutrient burial in the marshes. By 2012 many dissertations and theses had been completed on a wide variety of topics. The freshwater tidal wetlands are now among the best studied wetlands of their kind in the country. The Jug Bay ecosystem has become known to estuarine scientists, herpetologists, and ornithologists up and down the Atlantic coast and even across the country.

The staff, volunteers, and our scientific advisory committee, along with the financial support of the Friends of Jug Bay and CBNERR, have combined to a partnership that places the Sanctuary prominently on the “scientific map!”

Some of my favorite research projects have been the MAPS study of breeding landbirds and the box turtle population study. It’s been exciting to study the lives, movements and year-to-year survival of marked animals. We have reams of amazing data on individually marked box turtles; data that need to make their way into the scientific literature.

The Sanctuary has grown and changed in many other ways. Acreage expanded from 178 to 1,600 acres, as willing neighbors sold their land to the county to be protected in perpetuity, translating into a healthier river and bay. The education and research programs

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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. Groups 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 Maryland system, which promotes scientific research, public education, resource management and stewardship in estuarine reserves across the nation.

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Marsh Notes is produced quarterly by Jug Bay Wetlands Sanctuary. Comments and suggestions are welcome.
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A GREAT BENEFIT OF STICKING WITH THE SAME JOB for a long time is that one gets the satisfaction of seeing projects completed. It may take many months or even years, but eventually projects do reach a point where one can announce, “finished!” I’ve learned and re-learned the rule, “estimate the time it’ll take and then double it.” The rule applies well to the following projects:

• Designing and building the Observation Deck overlooking the marsh
• Designing the Wetland Center exhibits focusing on the Patuxent River estuary and Jug Bay wetlands
• Watching the Two Run Branch footbridge go up, erected by a crew of hard-working volunteers dubbed “Mickey’s Mud Marines”
• Renovating Plummer House for office and meeting space
• Building the new boardwalk in the wetlands at the Glendening Preserve

have evolved and diversified. The staff are one of the greatest assets for this success and their dedication is evident to all who visit. The volunteer corps and the Friends of Jug Bay are strong and vibrant—critical to everything that takes place here. However, the growth in staff and the budget have not kept pace with the growth in acreage. A better balance needs to be achieved in the near future.

Jug Bay is a sanctuary for people just as it is for wildlife. It provides a peaceful, beautiful place to spend quiet hours hiking and observing nature. But Jug Bay is also a place to educate and energize our visitors. People learn about ecological relationships, biodiversity, the lives of plants and animals; and armed with this knowledge they become more effective advocates for the environment. When volunteers participate in long term studies they learn first-hand, for example, why animals require healthy aquatic habitats for reproduction and growth, how dissolved oxygen levels relate to over-enrichment and why this matters for fish eggs, and a multitude of other concepts. Few places provide these experiences for the public. It is my hope that the people who have been involved, and who will be involved in the future can help us make progress towards the major challenges that exist right now: how to keep the Sanctuary relevant to changing societal values; how to succeed under tight budget constraints; and how to plan for global climate change.

I appreciate, and will sorely miss, the camaraderie of the staff, the FOJB, my scientific colleagues, and the patience and dedication of the volunteers. And so much more—the amazing wetlands, the ebb and flow of the tides, the red sun setting over the river, the frog chorus in July, the many unexpected discoveries, the excited cries of kids on the trail—there is no other place like this! I’ve been very fortunate to have worked, learned and discovered at Jug Bay.

I’ve taken a job at the University of California, Merced, in the northern San Joaquin Valley where I’ll teach environmental science and work to set up a new vernal pool research reserve. My wife Marilyn will also teach at the university and run a biogeochemistry lab. California is my home, so I’m returning to the place I grew up exploring as a child and young man. I will make good use of all that I’ve learned at Jug Bay.
FOJB President’s letter
Farewell to a Friend and Colleague

AS THIS SUMMER DREW TO A CLOSE, CHANGE WAS IN THE AIR—Chris Swarth as Director of the Jug Bay Wetlands Sanctuary was ending. My first knowledge of the Sanctuary came when our daughter, Kathy, was a student at Lothian Elementary and Mrs. Stoll’s class came to visit in 1989! When I transferred to the Patuxent Wildlife Research Center, I got to know some of the scientists that conducted studies at Jug Bay. But it was not until I retired in 2005 and began volunteering at the Sanctuary, that I really got to know Chris. We had a lot in common, both receiving our biological education in California.

Chris introduced me to the staff and I shared my enjoyment for doing field biology; most of my professional career was as a facilitator of others doing hands-on science. As a volunteer, Lindsay got me involved leading scout programs and assisting research projects. Elaine soon recruited me as a canoe trip guide, and to lead educational programs. Al Tucker recruited me to the FOJB Board in 2009. That got me involved with Chris’s Scientific Advisory Committee, where we collaborated on deer management. But the winds of change blew strongly in September!

Just as Chris and Marilyn announced their departure for the newest University of California campus in Merced, we bought our retirement house near Raleigh, NC! So we both are leaving the wonderful people and the unique habitats and its wildlife. Chris is gone after December, and sometime next year for my family. The major challenge for all of us who treasure the Sanctuary and its future will be to ensure the tradition of excellence that its current leader leaves as his legacy.

We have pursued the factors that should be considered in the selection of a Director. Here are the attributes and professional experience sent to the Recreation and Parks Department:

REQUIRED:
1. An advanced degree in biology, ecology, natural resource management or similar field. BS required; MS or higher preferred.
2. Experience developing, conducting and leading research projects in wetland and estuarine ecosystems, and with the study of ecological relationships, processes, and structure.
3. Specific research experience or special knowledge of organisms such as fish, mammals, birds, herps or with plants.
4. Demonstrated accomplishments in writing, publishing, or preparing technical reports.
5. Teaching experience at the K-12 or college level.
7. Natural park, refuge or sanctuary resource management experience.
8. Experience supervising, training, and mentoring volunteers of all ages.
9. Established record of service on professional committees, non-profit boards, research teams, and citizen science involvement.

DESIRED:
1. Experience with the NOAA National Estuarine Research Reserves program [NERR] (as incumbent serves as a Chesapeake Bay NERR Site Manager).
2. Keen interest in networking, forming alliances and developing partnerships with science/education/natural history groups of all types.

I know I will miss the knowledge, energy and humor Chris has brought to this job. And I wish him well in his new role at UC Merced, as I know he will make his mark back in his home state! For more on his future challenge, see http://www.ucmerced.edu/news/inaugural-managers-lead-new-vernal-pool-reserve

Qua-harini, Chris! (“Go well” in Swahili)

Harry Coulombe, President

Upcoming FOJB Events

Soup & Science Lecture Series
Sunday, Jan 13; noon – 3:00 pm (Horseshoe Crabs)
Sunday, Feb 10; noon – 3:00 pm (Invasive Snakehead Fish)
Enjoy a variety of hearty home-made soups and fresh bread with fellow nature lovers. Then sit back with a cup of coffee or tea and dessert and enjoy listening to our guest speakers discuss their research projects. Free.
Please RSVP to http://www.friendsofjugbay.org/events.html

Annual Meeting
Sunday, Mar 17

Spring Festival Donations
In preparation for our May 4th festival, we will be accepting donations of lightly used nature-related items to be part of a fund raising sale. Please contact Marty Barron at woody_marty@verizon.net to schedule a donation.
Everything I Know About Skunk Cabbage, I Learned at Jug Bay

By Siobhan C. Percey, volunteer

Many thanks to Susan Lamont at Anne Arundel Community College, the key, and to Chris Swarth at Jug Bay Wetlands Sanctuary, the momentum, who opened the door and gave life to the closet Skunk Cabbage enthusiast in me.

Almost everything I know about Skunk Cabbage, I really did learn at Jug Bay. It was a crisp February day when I met with Chris Swarth to discuss a project for my Botany course at Anne Arundel Community College. He had two ideas foremost in mind. One was to investigate heat production by the only plant blooming at that time of year, and the other was to count species of fallen leaves around particular trees. The choice was not difficult.

His enthusiasm, as always, was infectious. I hastened to keep up as he strode down to the seep at the north end of the Marsh Boardwalk—dodging under branches, sinking in mud to the tops of my boots, and nearly leaving one of them behind. There, as I slid to a stop in the icy swamp, he introduced me to Skunk Cabbage, and it was love at first sight.

Eastern Skunk Cabbage (Symplocarpus foetidus), is purported to be over 72 million years old, having first evolved in the Cretaceous period, and changing little since that time. It is a very unusual plant, possessing peculiarities found in few others. It is said to live 50 to 100 years or even more, not common in an herbaceous plant, especially a wetland plant. Such an enduring lifespan and a stable, unvarying form over millions of years, suggests that Skunk Cabbage is doing something right.

Skunk Cabbage is one of the very first flowers to emerge in the spring… or rather, the late winter, popping up in January, even through the cover of snow. The flower emerges first, weeks before the foliage appears. It is comprised of a spadix, a knob of flowers, surrounded by the spathe, a modified leaf that looks like a little hood enveloping the spadix. It doesn’t look like any other flower you’ve seen, and you may not even recognize it as one if you are not familiar with this plant. After all, it arose long before the angiosperms (flowering plants) became popular, perhaps in some part explaining its odd pinecone-like appearance.

It is one of the few plants capable of thermoregulation. Many plants are thermogenic, meaning that they produce heat, but only nine of a total of 400+ families of plants thermoregulate, meaning that they alter their heat production so as to maintain a constant heat, rather like a “warm-blooded plant”. It is said that Skunk Cabbage produces as much heat as a small mammal of the same size. It is the flower, or inflorescence, that produces heat for approximately two weeks after it emerges. Over the years there have been a number of ideas proposed as to why Skunk Cabbage thermoregulates. One thought suggests that it produces heat to melt its way through the frozen ground and snow. Others propose that producing heat volatilizes odors—you guessed it, skunky odors—to attract its pollinators, beetles and flies. This odor mimics that of rotting meat, a prime appeal to its insect companions. However, the most recent conjecture is that this is a heat reward for those same pollinators.

As mentioned, the spadix produces heat, and the spathe surrounds the spadix helping to retain that heat. The whole affair has been described as an “insects’ nightclub”. The prospective pollinator enters the den of ill-repute, rolls around in the pollen, does what is often done in such places in the company of other insects, and then, after spending the entire night, flies off to the next nightclub where it exchanges the pollen from the previous night’s adventures. The heat provided by the Skunk Cabbage spares the insect from having to expend energy of its own during those chilly January and February days, thereby encouraging insects to visit the spathe, facilitating the transfer of pollen from plant to plant.

The flower itself is protogynous meaning it produces both male and female flowers, and that the female flower is fertile before the male flower. In the plant world, that is unusual. Staging the blossoming of flowers of different sexes in this manner helps to prevent self-fertilization, a process that would drastically limit the plants’ ability to adapt to changing environments. Only by creating new combinations of genes through cross-fertilization do individuals stand a chance of developing new tactics for survival that might out-adapt a competitor and give their own offspring an advantage.

Continued on page 12
Water Access Enhanced

After years in the making, we are proud to announce the completion of two new water access features. In the Glendening Preserve, a boardwalk now extends out to Old Galloway Creek, making it a new destination for paddlers and hikers alike. At Wootons Landing Wetland Park we installed a floating pier for fishing and hand carry boat launching. Located on either side of Patuxent Wetland Park (where Route 4 crosses the river) these features provide new and alternative access points for recreational users of the Patuxent river and Jug Bay area.

On October 17, we celebrated the new floating pier at Wootons Landing Wetland Park with a ribbon cutting ceremony. Ribbon cutters, from left: Chris Swarth, Chris Carroll (Rec & Parks), Bea Poulin (assistant to County Executive Leopold), Rick Anthony (Director, Rec & Parks), Jan Lehman and Mike Lofton are key citizens that helped make this project happen.

Our maintenance staff, Richard Chaney and Donald Smith (pictured), got the boardwalk started, and supplemental money from the FOJB allowed us to hire contractors.

Marilyn Fogel tests the new boardwalk during a flood tide on October 30, the day after Hurricane Sandy roared through.

The Wootons Pier ceremony was capped with an inaugural kayaking trip. We had great weather for the event.
• Open to the public 9:00 am – 5:00 pm Wednesday and Saturday. (Closed on Sundays Dec – Feb)
• Glendening Preserve open daily at Wrighton Road entrance. (Closed on Sundays Dec – Feb and holidays)
• Reservations and entrance fees are required for all events, unless noted.
• Programs are open to families and individuals. Please note age limits for each program, and that an adult must accompany children under 13. Groups must arrange a private event.
• Call 410-741-9330 or e-mail programs@jugbay.org to sign up.
• Check www.jugbay.org for information, directions and updates to our schedule.
• FOJB family membership: $25; Families: $10; Over 60 or under 18: $3; Adults: $5; Active Duty Military: free

White-throated Sparrow

Birdwalk
First Saturday of each month; 8:00 - 11:00 am
Learn the skills of identifying birds by sight and sound. Experience the amazing bird diversity of the Sanctuary. Binoculars and field guides are available to borrow. Not appropriate for children younger than 12.

Winter Solstice Hike
Saturday, Dec 22, 3:00 – 5:00 pm
Take a break from Christmas shopping to enjoy the change of seasons and shortest day of the year. We’ll explore the Glendening Preserve, looking for signs of winter. We’ll also visit the recently completed boardwalk off the Cliff Trail. Cameras and binoculars recommended. Meet at the Plummer House. Ages 6 and up.

Children’s Discovery Series:
Winter Wonderland
Saturday, Jan 12; 1:00 – 2:30 pm
Saturday, Feb 16; 1:00 – 2:30 pm
Explore the winter woods on a naturalist-led hike. Animal tracks, tree holes, beaver chew and much more can be found if you know what to look for. Bundle up for an outdoor adventure. For families with children 6 years and older.

Winter Hike Series
Saturday, Jan 12  River Farm
Saturday, Feb 16  Wooton’s Landing
Saturday, Mar 9  Rigglemans Preserve
10:00 am – 1:00 pm
Despite the cold temperatures, nature is still out there waiting to be explored. Bundle up and join us for a winter hike; there are always surprises! As we explore, we’ll discuss winter survival strategies of the Sanctuary’s plants and animals. Adults and children ages 8 and older

Wicked Big Puddles – Where Wood Frogs, Toads & Salamanders Grow
Sunday, Jan 13; 3:30 – 4:30 pm
When is a puddle, not just a puddle? Every spring, pools appear as if by magic in the woods. Learn about some of the creatures that breed and grow in these vernal pools. Lindsay Hollister will show pictures and share stories about the work volunteers do to track the kinds of wildlife growing in vernal pools in the Sanctuary. We’ll learn about the lifecycles of different vernal pool creatures and visit with live amphibians too!
Meets at the Carrie Weedon Science Center, 911 Galesville Road, Galesville, MD

FOJB Soup & Science Lecture Series
Sunday, Jan 13; noon – 3:00 pm
(Horseshoe Crabs)
Sunday, Feb 10; noon – 3:00 pm
(Invasive Snakehead Fish)
Enjoy a variety of hearty home-made soups and fresh bread with fellow nature lovers. Then sit back with a cup of coffee or tea and dessert and enjoy listening to our guest speakers discuss their research projects. Free. Please RSVP to http://www.friendsofjugbay.org/events.html
Interns in Iowa Publish Jug Bay Turtle Work

Two former research interns, Antonio Cordero (2008) and Becca Reeves (2009) are both now in graduate school at Iowa State University. During their time at Jug Bay they studied the movements of the Eastern Mud Turtle under Chris Swarth’s guidance. Together, the three of them have published a paper in Chelonian Conservation and Biology, Long Distance Aquatic Movement and Home-Range Size of an Eastern Mud Turtle, Kinosternon subrubrum, Population in the Mid-Atlantic Region of the United States. The report can be downloaded from our website at: www.jugbay.org/research/reports

Former Intern Antonio Cordero (center) with Chris Swarth showing participants a mud turtle during an educational canoe trip.

Bald Eagles are opportunistic feeders. This one just caught a sunfish.

Skunk Cabbage Swamp Stomp
Saturday, Jan 19; 1:00 – 3:00 pm
Volunteer Siobhan Percey has been studying skunk cabbage at Jug Bay and has learned a lot about this unusual wetland inhabitant. Join her for an off-trail adventure to visit this fascinating plant, in bloom, along the swamp edges. Wear boots that can get wet. For adults and families with children 8 years and older. (Rain/Snow Date: Saturday, Feb 9)

Children’s Discovery Series:
Skulls and Bones
Saturday, Feb 23; 1:00 – 3:00 pm
Have you examined animal bones or a skull and wondered about the creature that they came from? Skulls and bones hold important clues about an animal’s lifestyle and habits. Learn more about identifying mammals through their skeletal system. We’ll also take a hike to look for tracks and other signs of animals. For adults and families with children 8 years and older.

Great Backyard Bird Count
Saturday, Feb 16; 10:00 am – noon
Become a citizen scientist! People of all ages can join the fun of the annual Great Backyard Bird Count (GBBC). Learn about common backyard birds, how the GBBC collects data, then take a stroll with us to see some live wild birds. All ages welcome.

A Bald Eagle is opportunistic feeders. This one just caught a sunfish.

The Fascinating World of Fairy Shrimp
Saturday, Mar 9; 2:00 – 3:30 pm
Yes fairy shrimp are real, but they can only be seen for a brief time in the spring, in special temporary ponds called vernal pools. We’ll learn about the vernal pool habitat, then take a hike to visit with some fairy shrimp where they call home. Meets at the Plummer House. For adults and families with children 6 years and older.

Spring at the Sanctuary
Saturday, Mar 23, 5:30 – 8:00 pm
There should be a lot happening at the Sanctuary on this early spring evening. We’ll wander the trails and visit some prime amphibian breeding sites to experience the sights and sounds of the season. This program will extend past sunset, so bring a flashlight. We go rain or shine; dress appropriately. Meet at the Wetlands Center.

Birds and Winter Food Sources
Saturday, Jan 19; 8:00 am - noon
Saturday, Jan 26; 8:00 am - noon
Have you ever wondered what food sources birds find for themselves in the winter woods? Join us for an exploration of winter birds and the foods they eat. Participants will hike our trails documenting bird species and the plants they use throughout their foraging day. For adults.
Upcoming Volunteer Events

- Most of our projects require no experience,come to learn!
- To sign up or for more information, call 410-741-9330
- Groups must arrange a separate event, unless otherwise noted.
- Please note age limits for each event.

Research:
Winter Waterbird Survey
December 6, 20
January 10, 24
February 7, 21
Thursdays; 7:30 – 9:30 am
Enjoy the beauty of an early winter morning on the Patuxent while counting waterbirds: Canada geese, harriers, eagles, herons, and many different kinds of ducks. Dress for the weather and wear comfortable walking shoes. Bring binoculars, a field guide, and a spotting scope if you have them, also available to borrow. For adults. No experience necessary.

Stewardship:
Trail Monitors Potluck Meeting
Saturday, Jan 5; noon – 3:00 pm
This workshop is for existing Trail Monitors and new volunteers interested in joining the program. Existing Trail Monitors will have a chance to share their experiences, and renew their adopted trail for another year. New volunteers will have a chance to learn about the program and adopt available trails of their own. Bring a favorite dish to share. We’ll also take a hike, weather permitting. For teens and adults. No experience necessary.

Winter Stewardship Work Days
Saturday, Jan 12; 10:00 am – 3:00 pm
Saturday, Feb 23; 10:00 am – 3:00 pm
Spend a day with us in the peaceful winter woods removing invasive evergreen plants such as Japanese Honeysuckle and English Ivy. Dress for the weather and wear sturdy shoes. For teens and adults.

Volunteer Appreciation Social
Sunday, Jan 27; 1:00 – 4:00 pm
Volunteers, please join us for the annual celebration of you! Volunteers receive a catered meal, enjoy a slideshow presentation, and awards. We will also be offering a hike at noon for those interested. Snow date: Feb 3

Research:
Biological Stream Monitoring
Saturday, Feb 2; 10:00 am – 3:00 pm
Join us to learn about stream ecology and assist with our research, focused on three streams flowing through the Sanctuary. We’ll hike to the stream, sample for stream insects, then bring them back to the Wetlands Center by noon for the afternoon sorting and identification session. For teens and adults. No experience necessary.

Research: Vernal Pool Survey
Saturday, Mar 9; 9:30 am – 12:30 pm
Volunteers are needed to help survey the vernal pools of the Sanctuary and Glendening Preserve. These special temporary ponds are critical breeding habitat for several amphibian species. Prior experience is preferred but not necessary. For adults and families with children 10 years and older.

Volunteer Statistics
Fall 2012
Joe Acton
Nate Allen
Colin Barnett
Marty Barron
Jimmy Beadenkopf
Brianna Beauchamp
Katherine Bibi
Mike Blackstone
Susan Blackstone
Dick Blass
Cynthia Bravo
Sharon Brewer
Judy Burke
Jeff Campbell
AmandaCarlucci
Sam Carter
Linda Coty
Harry Coulombe
David Davis
Cathryn Dippo
Ben Doody
Linda Ebersole
Kim Elliott
Diane Embrey
Kirsten Enzinger
Dave Farr
Jack Filigenzi
Jean Filigenzi
Lee Fisher
Bobby Francisco
Robert Frezza
Lynette Fullerton
Joyce Gillespie
Diane Goebes
Ernie Guins
Shirley Grace
Jill Greaney
Ronald Griffin
Ardith Harle
Jim Harle
Darcy Herman
Ben Hollister
Michelle Horn
Chris Howard
Michael Keener
Lynn Kenny
Amanda Knickamp
Dave Larrabee
Daniel Lind
Eric Lind
Matthew Lind
Cliff Loudenmilk
Rick Malmgren
John Mandapat
Gene Meyer
Karyn Molines

Volunteer Groups:
UMBC Students for Environmental Awareness
UMBC Pre-Med Society

During the fall, volunteers logged 1084 hours, a contribution worth over $24,000.

Thank You!
The Buzz at Plummer House

New Butterflies in the Garden

This autumn, the investment in the Butterfly Garden really paid off. On September 3rd, Danny Bystrak announced the first sighting of a Long-tailed Skipper. The next day, science writer Rick Borchelt, visited and photographed the Long-tailed Skipper and added the Silvery Checkerspot, both new records for the garden. A week later, after hearing reports from neighboring counties, Sue Ricciardi and Dave Perry documented the Dainty Sulphur nectaring and resting in the garden. The Dainty Sulphur was widely distributed this fall in places farther north than normally observed and is a county record. Our diligent Garden Club volunteers got to observe the stunning Long-tailed Skipper; perhaps as Nature’s way of thanking them for all their good work!

Butterflies sighted in the Butterfly Garden from top: Dainty Sulphur, Long-tailed Skipper, Silvery Checkerspot

Earth Friendly Workshop Series

This year the staff organized and hosted a series of earth friendly workshops at the Plummer House to highlight the choices we’ve made to turn the area into a Bay-friendly demonstration site. Participants learned about butterfly gardening, living sustainably, and creating backyard habitat. A thank you to the event sponsors, the Friends of Jug Bay, and to the many supporting local organizations. The participant fees will be reinvested in the education work of FOJB. As a tie in, our Garden Club volunteers organized a plant sale utilizing “extras” from our gardens. It was a bigger success than any of us envisioned.

A hearty thank you to our Garden Club volunteers for making our first plant sale a huge success. We made $388 for the Friends of Jug Bay! Pictured at the sale from left, Kirsten Enzinger (organizer), Marty Barron, and Lee Fisher. Dave Perry and Cynthia Bravo were also instrumental during the planning stages.
Messages from Chris’ Family

MARILYN

Though the Sanctuary sometimes meant challenges that Chris faced, we often retreated there for drinking in the beauty that Maryland has to offer in its open wetlands and quiet forests. We’re going to miss having a personal sanctuary where we were able to raise our young children, enjoy a full four seasons of nature, and forge our careers. Jug Bay has also been a frequent site for my research and can’t easily be replaced anywhere that I know of in California. I’m going to miss all of the different people that we’ve known over the years; volunteers, FOJB board members, past assistants and interns, former naturalists, and staff who contribute to the homey and comfortable, yet vibrant atmosphere that is Jug Bay Wetlands Sanctuary. Thanks to all of you for a great run and come out to see us in California!

DANA

Jug Bay was my second home as a kid. It was my indoctrination to the wonderful world of mud: mud pies, mud treks, marsh cleanups, leeches, and spatterdock. I remember getting bitten by my first snake, learning to ride a bike, falling out of canoes, jumping out of canoes, turtle tracking, bird netting, and so much more. The Sanctuary played a vital role in nurturing my deep appreciation and connection to the wild world of nature. I wouldn’t be the same without it and am so grateful for the times I got to work beside my dad out in the field. I’ve grown a deep appreciation for the place and the experiences it gave me.

EVAN

Jug Bay has been a second home to me for 21 years and it is safe to say that the Sanctuary is always a guaranteed good time. It instilled a feeling of deep admiration of nature in me. It taught me to respect Mother Nature and all she has to offer; whether it was a box turtle crossing the trail, a black rat snake slithering through a tree, or Maryland’s largest pumpkin ash. It is a place that holds the inherent value of offering something magnificent and astonishing to whoever is there to witness it. And for that reason, I am truly grateful to have been able to grow up in the Sanctuary, but also to be able to return and appreciate Jug Bay for all its worth.

Messages from Volunteers

SUE RICCIARDI (research volunteer since 1985)

Chris was a wonderful director from the start: always friendly, infectiously enthusiastic, supportive, and sporting that beautiful smile. He oversaw a tremendous growth in the volunteer base and park acreage and judiciously maintained a proper balance of conservation and research. I was lucky to be able to work with him on several significant projects. Twenty lashes with a wet wild rice plant for leaving us, but all the best to him and his family in California!

TOM PETSKA (FOJB board member and volunteer since 1991)

In the 1990’s, when the state and county started adding tracts of land to Jug Bay, the County decided to do a comprehensive review of all county zoning. While this was unfolding, it became very clear that the area in and around Wayson’s Corner was being targeted for more intensive commercial development. Chris and I discussed our concerns about this. As Vice President of FOJB I was in a position to raise an objection. I told Chris I would be willing to testify but needed support. Chris thoughtfully explained that, while the County has been good to Jug Bay, it was counterproductive to intensively develop the watershed especially just upstream.

I was something like the 40th speaker at the hearing that night at Southern High School. I only had five minutes but thought that my presentation went well. The county council chair was receptive and seemed to agree that the development plans didn’t make a lot of sense. About a month later, I received a very long letter from the Chair of the County Ethics Commission. The letter included pages of regulations about testifying at public hearings and questioned whether I needed to register as a paid lobbyist. I mentioned this to Chris and he just smiled and shook his head. Eventually, the plan to re-zone Wayson’s Corner was withdrawn.

KATHY CHOW (FOJB board member and education volunteer since 2000)

In 2005 I was selected to do an NSF “Teacher in the Field” internship. The internship was to be Eastern Box Turtle research at JBWS under the mentorship of Chris Swarth. At first I was disappointed at my placement, as I had known Chris and Jug Bay for 10 years and was hoping for some new and exciting internship. I had no idea that the summer of 2005 would probably be the most significant influence on my teaching career and an experience that I hold near and dear.
While I did learn a tremendous amount about turtles, I have to say that I learned a lot more about teaching. I came out of that internship with a whole new energy and enthusiasm for teaching. Chris was a wonderful and most enthusiastic role model; a natural born teacher. I hope that I have been able to pass along some of that enthusiasm and love for teaching to my students.

SATOSHI & YUKA TASUMI
(Japanese volunteers 2005-2008)
When we first joined Jug Bay’s volunteer program, we didn’t have any birding experience. But Chris is a great birder, so programs that he conducted like MAPS bird banding and the winter waterbird survey were so exciting and wonderful. We learned a lot about birds in the U.S. in a short time. He is an open-minded person and always welcomed us and treated us like family, so we were so happy to volunteer at Jug Bay and spent a lot of time with him. We greatly miss him but we hope we’ll see him again in California or Jug Bay some time. Best Wishes for a wonderful and exciting new life in California.

JACK & JEAN FILIGENZI
(stewardship volunteers since 2009)
Chris seems to be everywhere doing whatever it takes to keep the Sanctuary moving forward. We are at the Sanctuary one or two times a month. It always amazed us how often Chris would appear…

• Driving into the Sanctuary early one morning there is Chris with loppers clearing the Wrighton Road entrance to the Glendening Preserve
• Taking a hike on the Marsh Boardwalk there is Chris sitting in a kayak in the thick marsh grasses studying mud turtles
• Working on a stilt grass project by the farm road here comes Chris around the corner checking on how the project is going
• Walking down to Mickey’s footbridge there is Chris cleaning out a significant blockage from a recent storm
• Hiking towards the Railroad Bed trail here comes an excited Chris in a pickup to tell us about spotting an American Bittern – only the second one he has seen at the Sanctuary
• Standing on the dock at Otter Point all of a sudden we hear Chris’s voice, “hello there!” Is it coming from the sky? No, it’s Chris in the tree line across the creek conducting research

Most of all we’ll remember his enthusiasm for birding trips and that we were fortunate enough to attend two of them with him.

Under Chris’ Leadership…
1990: Sanctuary joined National Estuarine Research Reserve System (CBNERR)
Established Scientific Advisory Committee
Helped organize first Eastern Box Turtle Conferences
2009: Volunteer-led Research Symposium
2010: Started Deer Management Program
JBWS became the first county facility with solar panels in 2010
Property expanded by 900%
Personally mentored 46 summer research interns
Staff, interns, and visiting scientists produced over 250 journal publications, technical reports, and newsletter articles
Volunteer corps grew to 250 people and now serves as a model to other organizations
Placed the UTM research grid poles across the property
Strategic Plan (2000) and Management Plans (2005) written and approved

photo Jack & Jean Filigenzi

Chris (third from right) surrounded by participants during the January 2012 Chincoteague birding field trip.

photo Jack & Jean Filigenzi

A young Chris Swarth with CBNERR staff Laura Younger and Patuxent River Park Director Greg Lewis after we joined the Reserve in 1990.
 emerge from between the fleshy bracts of the female flower and the male stamens covered with pollen and fully emerged between petals that have now turned a brilliant yellow.

After the flower progresses through this part of its reproductive cycle, the spadix either disintegrates into the mud if it was not successfully pollinated, or it goes on to become a fruit (Figure 4). However, this fruit is not necessarily one you want to send in your child’s lunch bag! It retains the shape and segmented appearance of the flower, but it grows larger, darker and firmer, bigger than a golf ball. And surprise! The whole plant, including the fruit and the seeds, contains calcium oxalate crystals. These are not only distasteful, but they also cause a sensation of stinging or burning (to which I can personally attest, all in the name of science of course), and are toxic, causing kidney failure if consumed in any appreciable amount. For this reason, an apple is a better choice for that bag lunch. This is a clever technique with which to prevent herbivory, but it makes seed dispersal a bit more difficult.

Seed dispersal enables a plant’s genes to be perpetuated into the future through its offspring, but also prevents competition of those offspring with the parent plant for the same resources (water, nutrients, sunlight and space). Seeds are dispersed in many ways: dandelion seeds are carried by the wind, water lily seeds float away on the water and apple tree seeds are eaten and deposited (with fertilizer) elsewhere by small mammals if the fruit doesn’t get sidetracked into that lunch bag. But the calcium oxalate crystals in Skunk Cabbage put a damper on any animal’s enthusiasm to eat the fruit, hampering the spread of young plants to other areas of the swamp.

The seeds of the Skunk Cabbage plant are fairly large, nearly the size of a chick pea. It appears that gravity might be the only seed dispersal mechanism Skunk Cabbage has at its disposal. This means that if a fruit successfully produces seeds, those 10–20 seeds simply scatter around the base of the parent plant. If those seeds go on to germinate successfully, the new root anchors...
Itself into the ground and the shoot appears. You can imagine that it can get crowded pretty quickly in the Skunk Cabbage patch. In fact, one plant in my study plots had 17 first year plants at its base.

Perhaps the scramble for room on the sides of ravines is one reason why the Skunk Cabbage has contractile roots. While most plants grow up toward the sky, it is said that Skunk Cabbage grows down into the ground. Contractile roots have a wrinkled appearance, rather like socks that have fallen down around one’s ankles (Figure 5). Over the years these roots expand radially and contract longitudinally, pulling the plant further and further into the mud so that its toes become firmly entrenched. This means that a mature Skunk Cabbage plant can never, ever be dug from the ground in its entirety.

All this and we still haven’t mentioned the plant itself! As you can imagine, a Skunk Cabbage swamp is a beautiful sight—chartreuse foliage overlain on the sepias of pungent mud. The adult Skunk Cabbage plant itself is the epitome of botanical ingenuity, luxuriant in its spring growth, more reminiscent of collards than of cabbage (Figure 1). Mature plants can be over three feet wide and two feet tall. They rise from the mud in March, after the flowers have bloomed and are just a memory, but well before other plants are even stirring. They seem to like free-flowing fresh water, so not just any swamp will do. Early in the season you can see the outline of springs as they emerge from the earth because the shoots of the Skunk Cabbage crowd as close to the rivulets as possible, gripping the fringes without actually submerging their toes completely. The adult plants stand sentry over the few fruits that remain following those fertile days in January and February. Then, in August, as the scant remaining fruits decompose releasing their seeds back to the earth, the foliage melts into the mud again, long before other plants have made their departure.

So what did I learn from my Skunk Cabbage project? Well, first and foremost, I learned where Chris keeps his jalopy—south on the Utility Trail, right on Two Run, across Mickey’s Bridge, left on Railroad Bed, and a quick right on Farm Trail. Then, just as you are running out of steam, you’ll see the turquoise-colored truck remains on the right side of the Farm Trail, at the top of the ravine. From here, heading south along the bottom and east side of the ravine, nearly all the way to the River Farm entrance road, is Skunk Cabbage Paradise.

I also learned that my blood pressure is unchanged. That’s it. What else emerges in January and February? Nothing—that’s why Skunk Cabbage does. Natural selection made something that worked, and Skunk Cabbage successfully exploits a niche that no other plant has. There was a hole, Symplocarpus foetidus filled it, and it is wallowing in the swamp today, largely unchanged.

Finally, not to be forgotten, the last gem in Skunk Cabbage’s crown is that it is an Obligate Wetland Indicator Plant. This means that when you run across one, you know you are in one of those magical places we call a wetland.

“…What blazing the trail is not necessarily pretty.”

Figure 5. Skunk Cabbage, contractile roots

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Join Siobhan in the field on Saturday, January 19th to see Skunk Cabbage in bloom.

See page 7 for program details.

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“I also learned that my blood pressure is unchanged. That’s it. What else emerges in January and February? Nothing—that’s why Skunk Cabbage does. Natural selection made something that worked, and Skunk Cabbage successfully exploits a niche that no other plant has. There was a hole, *Symplocarpus foetidus* filled it, and it is wallowing in the swamp today, largely unchanged.”

— excerpts from *Skunk Cabbage* by Mary Oliver
Impacts of Hurricane Sandy on the Chesapeake Bay Reserves

By Lindsay Carroll, CBNERR-MD Research Assistant

As you ran into friends and colleagues after Hurricane Sandy, the main question was, “how did you fare during the storm?” Staff of the Chesapeake Bay Reserve found themselves asking our partners at each of three components the same thing; and being especially concerned for our Eastern Shore counterparts in the low-lying Monie Bay region. The impacts of Hurricane Sandy between each of the Reserve components were quite different.

Sandy’s impacts presented an opportunity to analyze and compare the weather and water quality data collected from continuous monitoring stations at each of our Reserve components. Otter Point Creek and Jug Bay both have weather and water quality stations that collect data every 15 minutes. Weather data for Monie Bay was downloaded from a nearby station administered by NOAA. For the story on the impacts of Hurricane Sandy on each Reserve component, we analyzed water depth, precipitation, wind speed, and turbidity. Maximum wind speeds are based on measurements made at 15 minute intervals and may not capture the highest wind gusts that occurred during the storm.

When Hurricane Sandy made land-fall in New Jersey, the location of the storm resulted in water of the Chesapeake Bay being pushed out to sea. As the storm continued into Ohio, its rotation pushed water into the Bay causing severe flooding in low lying areas. The recently acquired Drawbridge Farm at the Monie Bay component was the only property to report coastal flooding. The maximum storm depth (2.2 meters or 7.2 feet) was nearly four feet greater than the depth recorded in October 2011 (Graph 1, Table 1). Coastal flooding damaged research equipment and the pier that allows access to the continuous water quality monitoring station. Water also accumulated in the crawlspace beneath the house.

<table>
<thead>
<tr>
<th>Reserve Site</th>
<th>Max Depth (feet)</th>
<th>Max Wind Speed (mph)</th>
<th>Total Precipitation (inches)</th>
<th>Max Turbidity (NTU)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Otter Point Creek</td>
<td>5 (3.7)</td>
<td>21</td>
<td>16.6</td>
<td>451 (44)</td>
</tr>
<tr>
<td>Jug Bay</td>
<td>5.7 (5)</td>
<td>23</td>
<td>7.4</td>
<td>876 (49)</td>
</tr>
<tr>
<td>Monie Bay</td>
<td>(3.6)</td>
<td>34</td>
<td>7.6</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Graph 1. Total Depth of Little Monie Creek within the Monie Bay component during Hurricane Sandy. Sources: CBNERR-MD Continuous Monitoring Station and EyesOnTheBay.net.

Table 1. The Impacts of Hurricane Sandy on Water Depth, Wind Speed, Precipitation and Water Turbidity at the three Chesapeake Bay Reserve components. Data Source: Three CBNERR-MD Continuous Monitoring Stations, Central Data Management Office and Eyesonthebay.net. Note For Maximum Depth and Turbidity Values: Top value = maximum during storm in October 2012; (Bottom value) = comparative value from same time period in October 2011.
While there was little coastal flooding at other Reserve sites, Jug Bay and Otter Point Creek experienced flooding from excessive precipitation. The total precipitation during Hurricane Sandy at Otter Point Creek was over double the amounts at the other components (Table 1). It was also triple the amount of any rainfall event since January of 2012 (Graph 2). Jug Bay also received significantly more rainfall during Hurricane Sandy than any other rain event since January. These extreme amounts of rainfall affect river depths, storm drain functionality, and turbidity (water clarity). Turbidity values spiked during Hurricane Sandy, causing the water to turn a murky brown. In October of 2011, turbidity did not exceed 50 Nephelometric Turbidity Units (NTU) for both Otter Point Creek and Jug Bay (Table 1). But, after Hurricane Sandy, Jug Bay experienced an 876 NTU turbidity maximum, far exceeding the 15 NTU threshold for plants to receive light penetration for successful photosynthesis (Graph 3).

The impacts of Hurricane Sandy have increased our awareness of how the severity and frequency of storms will affect the estuarine habitats of the Chesapeake Bay Reserve system. According to the website Hurricanes and the Middle Atlantic States, of the 20 major tropical cyclones/hurricanes impacting the Chesapeake Bay since 1876, five have occurred in the last decade. Hurricane Irene, Tropical Storm Lee, and Hurricane Sandy all hit within the last 14 months. After events like these, we appreciate the massive datasets of continuous monitoring stations and the quick graphing tools of the Central Data Management Office (http://cdmo.baruch.sc.edu) and EyesOnTheBay.net who make the Chesapeake Bay Reserve datasets available for public use. These datasets will be the tools that allow us to quantify the vulnerability of the Reserve estuarine habitats and to predict the resilience of these precious ecosystems against extreme storm events.
Chris Swarth Going Away Party

Saturday, Dec 15; 4:00 – 7:00 pm

We will be having a big send off for Chris Swarth. Chris has been the director of Jug Bay Wetlands Sanctuary for 23 years, and now will be starting fresh in his home state of California. He will be working for the University of California in Merced. Please join us for a fun-filled party to relive the past two decades of Sanctuary comings and goings!

4:00 – 5:00 enjoy food, a slideshow, and socializing
5:00 – 6:00 speeches and gift-giving
6:00 – 7:00 more socializing, food, and live music!

Donations
- Anne Muecke: Canon digital camera
- Peter Givan of Wild Bird Center, Rockville: sunflower chips
- Karen Caruso: kayak, paddle, and carrier

For full details follow this link: http://www.jugbay.org/ChrisSwarth-party