Witnessing Butterfly Phenology

By Darcy L. Herman, FOJB 2013 Research Fellow

Although my fascination with insects started in college, somehow at the beginning of this summer, I had only two butterfly IDs in my arsenal: monarch and cabbage white. Since I was a little girl, I’d been more drawn to undeservedly maligned creatures like snakes, beetles, and toads. I think I saw myself as their champion. So when Lindsay Hollister told me about the opportunity for a phenology internship in the Jug Bay butterfly garden, I was excited, but I felt a little like I was turning my back on my scaly brown comrades. I never imagined myself studying any animal you’d be likely to find embroidered on a pink backpack. Butterflies? Weren’t they a little too pretty? A little too wispy?

Too pretty, certainly; for example, a close-up view of a freshly emerged Common Buckeye, with its peacock-like false eye spots, blue-brown wings, and orange war paint, will take your breath away. But wispy? No. It turns out butterflies are tough. The complexity and diversity of butterfly lives and the incredible challenges they face at each stage of their existence belie their surface beauty. I was fortunate that the length of my internship, which extended from late May through early October, meant that I was available to observe the flight periods for most species that would be expected to visit a garden in our geographic range. This also figured in the objective of my project: to record the flight (and “crawl”) periods of butterfly life stages in the garden, as well as weather conditions over the observation period, with the goal of beginning a long-term butterfly garden phenology study.

What is Phenology?

Phenology is the study of the timing of recurring life cycle stages, or phenophases, of plants and animals; like the timing of leafing and flowering, maturation of agricultural plants, emergence of insects, and migration of birds. Historically, phenological events have been recorded by farmers, gardeners, and other communities dependent on seasonally recurring phenomena for their livelihoods and survival. However, the study of phenology is particularly important as a 21st-century science because phenology records can help us understand ecological responses to climate change.

Alterations in phenological events like flowering and bird migrations are among the most sensitive biological responses to climate change, and when the timing of events like flowering and migrations change, they perturb ecosystems and alter ecological interactions and processes like pollination and carbon cycling. Scientists contributing to the USA National Phenology Network have noticed that across the world, many spring events are occurring earlier and fall events are occurring later. Not all species are changing at the same rate, and some are not changing at all. Phenology data can help scientists identify which species are changing and how to better predict and manage the impact of these changes on natural systems.

Continued on page 2
Enter the Jug Bay butterfly garden...

Butterflies are one group of animals that have been found to be affected by climate change. A 2012 study by researchers at Harvard University of 100 butterfly species in Massachusetts revealed population expansions and declines near species’ range limits. The results suggest that a major shift of North American butterflies is underway, with warm-adapted species shifting north and cold-adapted species retreating. What is particularly notable about this study is that the researchers used data from butterfly surveys conducted by amateur naturalists to estimate population trends—something that could be done at public preserves such as Jug Bay. In fact, Nature’s Notebook, the USA National Phenology Network’s citizen science program, provides a ready scientific framework and extensive resources for amateur observers like myself and other volunteers. By using the Nature’s Notebook protocol, we can collect phenology data and, over a period of years, begin to document the effects of climate change.

Being that 2013 was a pilot year for the study, I have only a baseline report of flight and crawl seasons for the butterfly species I observed in the garden—something that is interesting but not particularly relevant in and of itself. I believe the most interesting results from this pilot year are the things I discovered about the challenges of observation and identification, and I hope they will help to refine the study for the future.

Butterfly Flight Periods

Table 1 lists several notable butterfly observation details from the 2013 season. Forty-four butterfly species were observed in the butterfly garden from June 4 to September 19, 2013. All but one, Southern Broken-dash, had been observed at Jug Bay before.

The highest count day, July 30th, yielded 75 individual butterflies. July 30th was also one of the two peak days for observing Eastern Tiger Swallowtails (the other being August 2nd), a species known to be experiencing an irruption year, with 19 individuals of that species observed. July 26th was the peak day for number of species observed, at 29, and that date included one of the species seen on only a single day, the silvery checkerspot, which was observed at Jug Bay for the first time in 2012 (see Marsh Notes, Winter 2013).

Five butterfly species were seen over the entire observation period: Cabbage White, Eastern Tailed-blue, Eastern Tiger Swallowtail, Orange Sulphur, and Silver-spotted Skipper. Four species were observed on only one day of the season: Northern Cloudywing, Question Mark, Silvery Checkerspot, and Viceroy.
Dear Friends,

It’s been another crisp and beautiful fall at the Sanctuary. We had perfect weather for both the annual Bill Steiner Memorial Canoe Trip on September 29th and our ColorFall event on October 27th. Our new Sanctuary Director, Pati Delgado, led the canoe trip, pointing out both native and invasive wetland vegetation. During our visit to Mount Calvert, we all enjoyed a delicious spread, prepared by Anne Muecke, our Outreach Chair, while Pati gave an informative presentation, *Those Amazing Marsh Plants*. Although the turnout for ColorFall was light, those who attended enjoyed a beautiful and informative day in the woods.

Since joining us in July, Pati, has been examining every aspect of the Sanctuary’s operations and programs, from top to bottom, with fresh eyes. She brings tremendous energy and a host of ideas to her position. As one of her first official acts, Pati obtained the county’s approval to open the Sanctuary on Fridays, a fourth public day. Whereas in the past, both the Sanctuary and the Glendening Preserve have only been open from 9 to 5, our new Friday hours are 7 a.m. to sunset. The public is now invited to enjoy the beauty of the Sanctuary during the early morning hours, when birds and other wildlife are particularly active, and to watch the sun set over the water.

Wasting no time, Pati has also proposed two substantial construction projects, an educational pavilion, to be located near the McCann Wetlands Center, and a new building for the Glendening Preserve. Pati envisions the new educational pavilion serving as auxiliary classroom space for field trips. In the past, groups of over fifty students have been asked to divide the group and come on two different days. This facility would give us the capacity to host larger groups all on one day, freeing up space on the calendar for more groups to come to the Sanctuary. As an interim measure, Pati plans to accommodate larger groups using space at Plummer House.

Also on Pati’s wish list is a larger project – a multi-purpose building, to be built near Plummer House – which would house dorms, additional labs and meeting space, and other facilities. At one time, Jug Bay had an intern house, with dorm space, on the River Farm property. The house was used not only by interns, but also by visiting researchers and volunteers working on projects. In 2004, this building was determined to be structurally unsound. The Sanctuary’s 2005 Management Plan called for replacing this facility, but due to a lack of funding and other priorities, that hasn’t happened.

Just in time, two Jug Bay volunteers are spearheading a new Grants Committee that will seek funding to bring Pati’s ideas to fruition. Although the Friends have pursued grant funding in the past, we had not done so in recent years. Earlier this year, Louise Lawrence, a Jug Bay member, contacted the Board to volunteer to assist with grant writing. Louise manages a substantial grant program for the Maryland Department of Agriculture, and has experience writing winning grant proposals. Our 2013 research intern, Darcy Herman, has also joined our grant committee, and agreed to serve as Chair. Darcy came to us from a background as an editor, technical writer and proposal developer. We are very fortunate to have these two talented and experienced people working on the Friends behalf.

Those of you who have taken part in Jug Bay’s MAPS [Monitoring Avian Productivity and Survivorship] research will be pleased to hear that the Friends are funding technical assistance with analysis of this rich data set. Many volunteers have been netting, identifying, banding, and releasing birds here since 1990. Our former Director Chris Swarth, now living and working in California, has contacted the Institute for Bird Populations, of Point Reyes Station. They have agreed to provide detailed analysis of our MAPS data for the years from 1992 through 2013, including estimates of population trends, apparent survival, and productivity. It will be exciting to see the end result of many years of consistent and skillful effort by so many of you!

Looking ahead, outreach events coming up this winter include our ever popular Soup & Science series, and a new and improved Holiday Wreath Making Workshop. I look forward to seeing you at one of these programs!

Nora Terres, President

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**Save the Date**

For more information and to RSVP, visit [www.friendsofjugbay.org/events.html](http://www.friendsofjugbay.org/events.html)

**Soup & Science Series**

- **Sundays, 1:00 – 3:00 pm**
  - **January 12** Blue Catfish
  - **February 9** TBD
  - **Mar 9** TBD

Enjoy hearty home-made soup and fresh bread with fellow nature lovers at the Jug Bay Wetlands Sanctuary. Then sit back with a cup of coffee or tea and dessert and enjoy listening to our guest speaker. Free.

**FOJB Annual Meeting**

- **Sunday, Apr 6; 2:30 – 5:00 pm**

Please join us for our annual meeting, to be held at the Sanctuary’s McCann Wetlands Center. Preceding the business meeting, there will be a variety of sweet and savory finger foods to enjoy with fellow Friends and Sanctuary supporters. Activities include a keynote speaker and the presentation of the Jug Bay Award to a leader in Patuxent River conservation.
Training Produces New Crop of Master Naturalists

By Elaine Friebele

Volunteers who are intrigued by nature always want to learn more and eventually, to share it with others. That’s why volunteers Mike Quinlan, Diane Goebes, Lynette Fullerton, Jeff Campbell, and Office Manager Debra Gage have recently become certified Master Naturalists.

Trained through state extension service agencies, certified Master Naturalists help preserve and share the regional environmental wealth through science-based education and volunteer service in their communities.

Potential Master Naturalists are required to commit a substantial amount of time. The training, held at various environmental education centers, involves 52 hours of classroom instruction and eight hours of hands-on experience outdoors (60 hours total training). “Each host site seems to take a different approach in terms of class schedule and content,” said Mike Quinlan. His training at Adkins Arboretum in Ridgely, MD, on the Eastern Shore, spanned a shorter time on the calendar but involved more hours on Saturdays, while many MN programs, taught on weekday evenings, last over a 3-month span.

After the initial training, participants provide a minimum of 40 hours of volunteer service to their host site in the first year in order to receive Master Naturalist certification. To maintain certification, Master Naturalists continue to provide at least 40 hours of approved service in their region along with a minimum of eight hours of approved advanced training. A wide variety of volunteer opportunities are possible, including environmental restoration projects, education, public awareness campaigns, and field research.

“Although I’ve learned so much at Jug Bay, I wanted a more systematic naturalist education, encompassing basic ecology and biology,” said Diane Goebes, who leads canoe trips and public programs and regularly assists with school field trips and summer camp. Associating with new people in the class exposed veteran volunteer Mike to new knowledge and different approaches to doing things, “Getting to know a different venue from the Sanctuary, including introduction to additional new areas through field trips, is always a useful experience,” Mike said.

Debra Gage and Jeff Campbell took their training at Masonville Cove in Baltimore City. “It was a great program, and I learned a lot,” said Debra. “The instructors packed so much information in. I would like to have an opportunity to explore some of the topics in greater depth in the future.” Debra set up an oyster reef tank and created an educational booklet to accompany it as her project. To research the topic, she visited Horn Point Lab and spoke with oyster scientists.

“The instructors were first rate, very experienced and proficient in their fields,” said Mike. “Some covered topics I was already familiar with but imparted new information. Others covered topics of which I had little knowledge and therefore I learned a lot.” Speakers usually provided a lecture, followed by hands-on activities, which demonstrated teaching techniques in the field.

At Long Branch Nature Center in Arlington, Virginia, Diane enjoyed one training session in particular: “How to Lead a Program,” which demonstrated the use of stories, humor, and props such as different silly hats to make it fun.

While the new Master Naturalists are committed to providing service to the centers where their training took place, they are also applying their new skills to share nature with the public at Jug Bay.

To learn more about the Master Naturalist program, visit http://extension.umd.edu/masternaturalist
New Kayak Program Made Possible by Northrop Grumman ECHO Grant

By Elaine Friebele

As 2013 began, the Sanctuary staff dreamt about leading kayak trips in the summer. Their dream came true thanks to a generous $5,000 grant from the Employees Charity Organization (ECHO) of Northrop Grumman, which was established to provide a means for employees to support communities in which they live and work. Last November the Friends of Jug Bay received a wonderful surprise in its email box from a representative of ECHO, inviting us to apply for a grant. After consulting with the Sanctuary staff, Board members proposed the purchase of a fleet of kayaks that would enable the Sanctuary to expand its educational marsh ecology programs, to enhance the public’s appreciation of our watery surroundings from an intimate, close-up view. In April we purchased nine new kayaks, adding to our small fleet of five previously donated ones, for a total of 14.

The county’s Department of Recreation and Parks matched the grant with the purchase of a trailer and paddles, and provided American Canoe Association training and certification for kayak leaders. Staff members Elaine Friebele and Debra Gage became certified. Lindsay Hollister and Heather Baden had already been certified through CBNERR. The kayaks will be housed in a new shelter currently being constructed at the Sanctuary.

In the spring, we tested the waters with two round trips between the Patuxent Wetlands Park and the new Chris Swarth boardwalk at Glendening Preserve. Throughout the summer, paddlers enjoyed trips offered by the Department of Recreation and Parks at Galesville on the West River, at Quiet Waters Park on Harness Creek, at Carr’s Wharf on the Rhode River, and two longer trips on the Patuxent – from Wootons Landing to the River Pier at the Sanctuary.

We are extremely grateful to the folks at the Northrop Grumman ECHO program – and not least to the still anonymous employee there who nominated the Friends and the Sanctuary for this windfall -- and to the county, for their generosity in making these exciting new outdoor adventures possible. This winter we will dream of expanding the possibilities along the Patuxent and elsewhere next season. Do come join us!

Kayakers paddle the Rhode River

Eat Well, Live Well: Passport to Family Wellness Program

By Nicki Fiocco, Recreation and Parks Community Outreach Coordinator

The Department of Recreation and Parks and The Friends of Anne Arundel County Trails launched the Wegmans Eat Well, Live Well Passport to Family Wellness Program at an outdoor reception last May at Jonas Green Park in Annapolis.

The Anne Arundel County Department of Recreation and Parks Trails, Regional Parks and Friends groups have partnered with Wegmans Food Markets to participate in this unique program. Recreation and Parks staff and representatives of the Friends groups have worked together to select 25 historic locations and areas of interest along County running and biking trails. These locations are indicated with numbered trail markers.

Wegmans Eat Well Live Well Passport to Family Wellness Program consists of a pocket-sized trail “passport” with easy-to-read maps, fitness tips, and motivation in the form of prizes for trails hiked and recorded in booklets. Participants are encouraged to visit 12 markers and document visits by rubbing a raised trail marker in their passport. Upon completion they are eligible to receive a discount coupon provided by Wegmans. After visiting and documenting 25 trail markers, participants are entered to win a picnic pack from Wegmans (valued at $100) and a free pavilion rental in one of Anne Arundel County’s regional parks. Winners will be chosen annually.

The passports can be picked up at Wegmans’ Customer Service Desk in the Waugh Chapel Towne Center store (1413 South Main Chapel Way, Gambrills, MD 21054) or at one of Anne Arundel County Department of Recreation and Parks regional parks and trails visitor centers. Please visit www.aacounty.org/RecParks/ for park locations and hours. Prize redemptions take place at the Department of Recreation and Parks.

Editor’s Note: For our role, we selected four locations in the Glendening Nature Preserve to be a part of the Passport to Wellness program. Join volunteer naturalist Mike Quinlan on Saturday, December 21 for the “Off Trail Adventures at the Preserve” hike that includes a visit to all four markers.
Winter 2014 Public Programs at Jug Bay

Our hours and fees have changed, please make note of the details below...

- Registration is required for all programs. Please register online at www.aacounty.org/recparks, and meet at the Wetlands Center (1361 Wrighton Road) unless noted otherwise. Fees are listed for each program. Programs are open to families and individuals. An adult must accompany children under 13. Please note age limits for each program. Visit www.jugbay.org for directions, information, and updates to our schedule.
- New fee schedule: visiting the Sanctuary with no participation in a program: $6.00 per vehicle; free for active volunteers and FOJB members.
- The Sanctuary is open to the public 9:00 am - 5:00 pm Wednesday and Saturday (Closed on Sundays, Dec - Feb). New public day and expanded hours: Fridays 7:00 am - dusk.
- The Glendening Preserve Wrighton Road entrance is open to the public daily from 9:00 am - 5:00 pm, Plummer House entrance closed Sundays.
- We are closed on government holidays.

Birdwalk
First Saturday of each month; 8:00 - 11:00 am
Fee: $5 for adults; $3 for seniors
Learn the skills of identifying birds by sight and sound. Experience the amazing bird diversity of the Sanctuary. Binoculars and field guides available to borrow. Not appropriate for children younger than 12.

Holiday Wreath Making Class
Saturday, Dec 7; 1:00 - 3:00 pm
Fee: $30/person or $25 for active volunteers and FOJB members
We will supply everything you need to make a beautiful wreath for the holidays using greens from the Glendening Preserve and areas around Jug Bay. Whether you are a novice or an expert, we will help you make a wreath for your front door or a centerpiece for your table. Space is limited. To register, download public registration form at www.jugbay.org/education, complete, and send with your check made out to Friends of Jug Bay, to the Sanctuary. If you want to help with the habitat improvement project in the morning, just let us know and you can receive the active volunteer price.

Off Trail Adventures at the Preserve
Saturday, Dec 21; 2:00 - 4:30 pm
Fee: Free
Take a break from shopping for fresh air and exercise on the shortest day of the year. On this off-trail hike around the perimeter of the Glendening Preserve with volunteer naturalist Mike Quinlan, you'll visit the largest tree, the Galloway Creek floodplain, and the new boardwalk to view the marsh on the first day of Winter. For those participating in the Wegmans Passport to Family Wellness program, you'll pass all four of the trail markers on the Sanctuary. For ages 12 and up.

Preschool Nature Craft
Fridays; 10:00 - 11:00 am
January 3: Owls
February 7: Bald Eagles
March 7: Salamanders
Fee: $2 per child
Children enjoy sensory activities and learn about nature through an interactive game, story and craft. For ages 3-5.

People with Pups
Saturday, Jan 4; 10:00 am – noon
Fee: Free
Join a naturalist for a doggy hike in the Glendening Preserve! Dogs must be well behaved around other dogs and remain on a leash while on the property. Please call 410 741-9330 or e-mail programs@jugbay.org to make a reservation. Meets at the Plummer House.

Soup and Science: Blue Catfish
Sunday, Jan 12; noon – 3:00 pm
Fee: Free for FOJB members and active volunteers; $5 donation for all others
SERC Scientist Matthew Ogburn will present his research on the blue catfish (Ictalurus furcatus). The non-native Blue Catfish have recently been found in the Patuxent River. They can live longer than 20 years and can grow to be greater than 100 pounds. The Blue Catfish threaten the river’s ecosystems because of their increasing populations, rapid range expansion, and capacity to consume large amounts of native species. Please RSVP to http://www.friendsofjugbay.org/events.html

Researchers with DNR weigh a large blue catfish caught at our River Pier; a non-native species now being studied in the Patuxent.
Recycle for the Birds  
Saturday, Jan 11; 2:00 – 3:30 pm  
Fee: $3 per person or $10 per family  
Learn about common backyard birds and how they survive in the winter while you create your own bird feeder from recycled materials. All materials are provided but participants are encouraged to bring a few small items to personalize your feeder. For all ages.

Nature Detective: Owls  
Saturday, Jan 18; 3:00 - 5:00 pm  
Fee: $3 per person or $10 per family  
Be a nature detective as you piece together a skeleton from inside an owl pellet. Identify the skeleton to discover what owls eat! Learn about these amazing birds and their role in the food web. Toward the end of the program, we’ll go outside to listen for owls. For families with children ages 6 and up.

Winter Hike  
Saturday, Jan 25; 10:00 am - noon  
Fee: $5 for adults; $3 for seniors and children  
Enjoy a 90-minute circuit hike through one of the less visited areas of the Sanctuary. We’ll explore the Pindell Bluff Trail, then return to the Wetlands Center for some hot cider. All ages.

Volunteer Siobhan Percey shows Swamp Stomp participants a cross-section of a Skunk Cabbage flower.”

Skunk Cabbage Swamp Stomp  
Sunday, Feb 2; 1:00 - 3:00 pm  
Fee: $5 for adults; $3 for seniors and children  
Volunteer Siobhan Percey has been studying skunk cabbage 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.

Preparing for Bluebirds  
Saturday, Feb 8; 10:00 am – noon  
Fee: Free  
Birder David Gillum will provide a slide presentation of the many plants that Bluebirds can use as food sources to get through the winter. He will also discuss nest boxes and monitoring, and lead a short walk to look for Bluebirds. For adults and children ages 8 and up.

Great Backyard Bird Count Training  
Saturday, Feb 15; 10:00 - 11:30 am  
Fee: Free  
Become a citizen scientist! People of all ages can join the fun of the annual Great Backyard Bird Count (GBBC). Learn about our common backyard birds, how the GBBC collects data, then take a stroll with us to see some live wild birds. Stick around to make your own bird feeder too! For school-aged children through adults. No registration required.  
Meets at South County Library, 5940 Deale-Churchton Rd., Deale, Md. 20751

Nature Detective: Paws and Poop  
Saturday, Feb 22; 1:00 – 2:30 pm  
Fee: $3 per person or $10 per family  
We can learn a lot from the clues animals leave behind. Learn to identify common animal tracks and scat through a take home craft. Then bundle up and join a naturalist on the trail to test your nature detective skills. All ages.

Open House for Teachers  
Sunday, Mar 2; 2:00 - 4:00 pm  
Fee: Free  
If you are a teacher, bring your family for hands-on crafts and activities. Find answers to field trip questions and book a trip if you desire. Admission for you and your family complimentary with teacher verification.
Volunteer Statistics

**Fall 2013**

Joe Acton  
Blythe Alexander  
Tere Baranano  
Colin Barnett  
Sandy Barnett  
Brianna Benchamp  
Susan Blackstone  
Dick Bliss  
Allison Bokac  
Bill Boyer  
Cynthia Bravo  
Mari Bromber  
Judy Burke  
Mary Burton  
Jeff Campbell  
Karen Caruso  
Kathy Chow  
Alan Christian  
Rebecca Christopher  
Regan Christian  
Chris Condit  
Erica Cook  
David Davis  
Cathryn Dippo  
Ben Doody  
Linda Eberole  
Kim Elliott  
Kirsten Enzinger  
Jack Filzenzi  
Jean Filzenzi  
Lee Fisher  
Bob Ford  
Julie Fryberger  
Henderson Fryer  
Lynette Fullerton  
David Gilliam  
Joyce Gillespie  
Diane Goebes  
Christine Gordon  
Sara Guan  
Jim Harle  
Patch Hicks  
Ben Hollister  
Stan Hopkins  
Amy Hudson  
Dave Larrabee  
David Linthicum  
Andrea Loundermilk  
Cliff Loundermilk  
Bonwyn Maceo  
David McDowell  
Rob McCaughn  
Sean McGuinn  
Pat Melville  
Natalia Miller  
Dave Mozurkewicz  
Anne Muecke  
Manfred Muecke  
Dotty Muenford  
Jennifer Munro  
John Norris  
Susan Nugent  
Dusty Orr III  
Starr Orr  
Siobhan Percey  
Dave Perry  
Bryan Peterson  
Tom Petska  
Ashleigh Piccoli  
Michael Qulinan  
Allison Redington  
Gordon Reynolds  
Doris Schmidt  
Anna Schollenberger  
Kevin Seaman  
Pat Seaman  
Boris Senatorov  
Katie Shanley  
Jeff Shenot  
Anthony Simonetta  
Tim Skelton  
Bobby Slater  
Sam Spellman  
Nora Terres  
Matthew Tomatz  
Joe Torsani  
Denny Townend  
Angela Trenkle  
Al Tucker  
Peter Uimonen  
Sara Van Schaik  
Michael Van Wie  
Ben Ward  
Randy Watson  
Jason Webb  
Bruce Weidele  
Bob Williams III  
Sea Williams  
Bill Wilson  
Michaela Zabel  
Lane Zegowitz and  
Ruby Zegowitz

**Thank You!**

Donations:

**Darcy Herman:** remote control for slide presentations  
**Jeff Campbell:** Amazing X-Rays Wild Animals book  
**Pete Givan** of Wild Bird Center  
Rockville: bird seed for feeders

Upcoming Volunteer Events

Most of our projects require no experience, come to learn!

To register for an event, call 410-741-9330 or e-mail volunteers@jugbay.org Volunteer events are free. Please note age limits. Groups must call to arrange a separate event, unless otherwise noted.

Events meet at the Wetlands Center (1361 Whiteon Road) unless noted otherwise. For more information, visit www.jugbay.org/volunteer

**Volunteer Appreciation Social**  
**Sunday, Jan 26; 12:00 - 4:00 pm**  
12-1: Hike, 1-2 Social Hour, 2-3 Dinner, 3-4 Awards  

Volunteers, please join us for the annual celebration of you! Volunteers receive a catered meal, enjoy a slideshow presentation, and awards presented for milestone achievements. Please call 410 741-9330, or e-mail volunteers@jugbay.org to RSVP.

**Research:**  
**Butterfly Phenology Training**  
**Thursday, Feb 13; 10:00 am - noon**  
Seeking volunteers for the butterfly phenology research project. Participants will learn from 2013 Research Fellow, Darcy Herman, about the pilot year project and how you can help us collect data for this 10-year study. Species identification and research protocol will be discussed. Must be available for weekday field work during the 2014 season. Meets at Plummer House.

**Education:**  
**Volunteer Scout Naturalist Training**  
**Sunday, Mar 23; 2:00 - 4:00 pm**  
Remember the excitement of exploring a new park and earning a badge as a young scout? We are seeking responsible and enthusiastic adults to guide scout programs. This training will give you the knowledge and confidence to independently lead a scout program at Jug Bay. Volunteers must be available on Sundays as all scout programs are offered on the third Sunday of the month. For ages 18 and up.

**Research:**  
**Winter Waterbird Survey**  
**Thursdays, 7:30 - 9:30 am; check website for dates**  
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.

**Research:**  
**Phytoplankton Monitoring**  
**Fridays, 1:30 - 4:00 pm; check website for dates**  
Phytoplankton—the microscopic algae on which the entire aquatic food web depends—are also indicators of water quality. Volunteers are needed to help collect a sample from the river’s edge, then identify and count the phytoplankton back in the lab. For teens and adults. No experience necessary.
Remembering Nancy Weber

By Lindsay Hollister

In September, one of our volunteers, Nancy Weber, passed away. Though she mostly kept to herself, she was a model volunteer. Nancy first joined our volunteer community in 2006 when she signed up as a trail monitor. She diligently visited each month, and enthusiastically shared any wildlife sightings she had with me, or would ask a question about something she saw or heard along the trail.

Several years ago, Nancy’s curiosity led her to discover a feather field guide before any of our staff naturalists had heard about it. She purchased one for herself, and one for the Sanctuary. It has been a great resource for us, and it warms my heart to think of her every time I use it.

You may not have interacted with Nancy directly, however, as a dedicated trail monitor and generous supporter of the Friends of Jug Bay, she leaves a positive impact here; at this place she loved so much.

Guess I’ll always think of Bech Trail as her trail. - Cynthia Bravo, trail volunteer

Touching to hear that in her last days, one of the things Nancy wanted to do was visit Jug Bay.
- Nora Terres, FOJB President

Snakeheads in the Patuxent

In 2013, we initiated a Snakehead Monitoring project to document the spread of this non-native invasive fish. The yellow marks on the map show the areas surveyed between May and July. We ranged up to Back Channel north of the Route 4 bridge, down to Mataponi Creek on the lower end of the Jug Bay area. Our primary objective was to map nests and capture any adults or larvae seen at the nests. No nests were found in the shallow wetland channels in 2013. This research will continue for 10-years to look for trends in distribution.

We would like to thank and welcome the following new members to the Friends of Jug Bay:

Sambath Chung
Brenda & Thomas Dixon
The Eason Family
The Kasovic Family
Karen Klinedinst & Dan Pfisterer
James & Cynthia Mathwick
Alan & Sue Young
Cory Zauker

Harry Coulombe Becomes a Grandfather

On October 21st, our former Friends of Jug Bay president welcomed his first grandchild into the world, Evan James Stempel. Harry and his wife Linda moved to North Carolina this spring to be near their daughter and her husband (shown holding Evan). Congratulations!
What would compel two high school students to brave heat, humidity, ticks, and chiggers to follow box turtles throughout the summer? Internships! For the first time, Jug Bay hosted two STEM high school students, Duncan Squires and Sean Smith, as summer interns. STEM, which stands for Science, Technology, Engineering, Mathematics, is a selective high school magnet program that accepts only 100 Anne Arundel County students. To graduate high school with a STEM diploma, students must complete a 135-hour internship and shadow an employee at a business or organization.

Duncan and Sean, who are seniors at South County High School and North County High, respectively, enthusiastically tracked box turtles this past summer, then mapped their data and drew conclusions about the turtles’ home ranges and movement. Volunteers Mike Quinlan and Susan Blackstone shared their turtle telemetry expertise with the students, while FOJB Board Member and high school teacher Kathy Chow coached them on GIS programming and data analysis. Elaine Friebele served as overall mentor.

“I felt that the internship was very rewarding,” said Duncan. “I don’t think there was a day that I didn’t learn something that I enjoyed, whether it was about turtles or phytoplankton or SAV’s. I was always interested.”

Sean and Duncan gained valuable public speaking experience by presenting their findings to 60 attendees at the Summer Volunteer Picnic in August. They also had fun helping out with summer camps, assisting with the fish survey, building campfires, canoeing, and even sleeping out overnight.

With its emphasis on research, the Sanctuary is a perfect match for STEM student interns looking to gain experience in a scientific field. We hope to continue this relationship with the STEM program in Anne Arundel County in the future.
The figure to the right depicts the flight periods for each of the 44 adult butterfly species observed in the garden. The left end of each bar represents the first date on which a species was observed, and the right end the last date.

Caterpillar Crawl Periods

Five species of caterpillars were observed in the garden in 2013, as shown in the figure below. Their crawl periods ranged from one week (American Lady) to almost four months (Black Swallowtail).

Weather Interactions

Of course to see what’s going on with climate change and butterflies it’s necessary to look at weather parameters. But what’s the essential difference between weather and climate? Weather and climate differ by their measures of time: weather is concerned with atmospheric conditions over a short period of time, whereas climate is concerned with long-term averages in daily weather. It can be said that climate is all the clothes in your closet; and weather is what you wear today.

Continued from page 2
For this baseline year, an $R^2$ test was performed to examine the relationship between overall butterfly abundance in the garden and the individual weather parameters: air temperature, relative humidity, barometric pressure, wind speed, photosynthetically active radiation, and precipitation. The data were downloaded from a NOAA weather station located at the South Marsh Observation Blind. Relationships were insignificant in all cases. Although weather conditions such as temperature and wind may affect butterfly activity in the short term, researchers have found that climate likely has a greater influence on butterfly abundance and geographic range—something that may be observed over a period of years in the Jug Bay garden.

**Challenges of Observation**

For caterpillars, both identifying and recording abundance on a given day was easy and straightforward. For example, unrolling curled-up Spicebush leaves during an area search of the garden often yielded several Spicebush Swallowtail caterpillars. Finding, identifying, and counting the other four species of caterpillar were similarly straightforward.

Identifying and estimating the abundance of flying adult butterflies, however, was more difficult:

- **Adult butterflies are often in motion.**
- **Many species are too small and/or similar to one another to be positively identified with the naked eye.**
- **Using identification tools such as binoculars or a camera limits the number of individuals that can be observed at one time.**

This meant that the precision and confidence of counts varied from species to species. For example, it was relatively easy to identify a Great Spangled Fritillary, a relatively large butterfly with unique field marks, with the naked eye, even at a distance of five feet or more. This combination of attributes allowed me to identify and count several Great Spangled Fritillaries at one time with a naked-eye scan of the garden from a single vantage point.

In contrast, identification and counting is much harder to do for a group of butterflies like the grass skippers, which are small, numerous, and very similar in appearance. In order to positively identify grass skippers to species, I had to look at them through binoculars, which limited the number of individuals that I could see at a given time. As a result, my abundance counts of grass skipper species are less precise than those of the larger butterfly species. Therefore, to estimate the abundance of individual butterfly species, I had to strike a compromise between accurate identification and accurate counting. A good field guide and a combination of other tools shown in Table 2 helped maximize my effectiveness.

<table>
<thead>
<tr>
<th>Identification Tool</th>
<th>Strengths</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Close-focused binoculars</td>
<td>Allows close-up observation of field marks, binoculars' wide field of vision makes it easier to track moving animals</td>
<td>Identification must be made on the spot, no voucher for ID</td>
</tr>
<tr>
<td>Photography</td>
<td>Allows ID to be made later using photo viewing/editing software, photos serve as vouchers for species on a given date</td>
<td>Camera's narrow field of vision makes it difficult to track moving animals, skill is needed to take good photos that are in focus and show the relevant field marks</td>
</tr>
<tr>
<td>Jar capture and refrigeration</td>
<td>Allows close-up observation of field marks, manipulation of the immobilized animal, and photography for vouchers</td>
<td>Method is time consuming and can be difficult, animals may suffer damage in capture and enclosure</td>
</tr>
</tbody>
</table>

Table 2. Strengths and limitations of butterfly identification tools (used in conjunction with field guides).

For me, as an ecologist and writer, there’s never been a clear separation between the allure of science and the allure of… documentation. Although it’s a word that’s usually saved for dusty boxes of papers and electronic databases, for me it’s something much more elegant: it involves seeing in a deliberate way and using precise language to describe what you’re seeing. Documenting the presence or absence of a butterfly in the garden under specific weather conditions on a specific date is serving as a witness—which is something far more profound and significant in a culture that aspires to promote science-based decision making. Citizen science phenology programs such as Nature’s Notebook offer everyone a chance to directly increase the sample size from which conclusions are drawn and decisions made. Very few people (especially among the regular readers of *Marsh Notes*) need to be convinced of the pleasure of observing butterflies. But what if we could at the same time document that pleasure and thereby increase its power? That would really be something.

I hope that you’ll consider attending a training session and being a witness for subsequent seasons of butterfly phenology. Our first training day will be held on Thursday, February 13th from 10:00 am – noon. For those of you who, like me, enjoy some scaly brown with your powdery chartreuse, I promise a generous helping of grass skippers. They’re an acquired appreciation.

**Question Mark (Polygonia interrogationis), a species that was observed visiting the butterfly garden on only one day during the 2013 observation period.**

**The Importance of Witnessing**

For me, as an ecologist and writer,
Sittin’ Off the Docks of Our Bay: Clams, Mussels, and Oysters are Working Hard to Clean our Waters

By Jenn Raulin, Reserve Manager

How to you enjoy your bivalves? Steamed with butter, tossed in a hearty stew or pasta, or simply raw on the half shell? Well, if you’re in the Chesapeake Bay and the streams and rivers which flow into it, you enjoy them right where they are, sittin’ in the water and cleaning it.

Clams, mussels, and oysters are part of a community of benthic organisms, meaning they live at the bottom of the water. These creatures can be found throughout Maryland. Oysters and clams require saltier water, so you are more likely to find them in the middle and lower part of the Bay. Freshwater mussels need (you guessed it!) fresh water, such as rivers and streams. The Maryland Department of Natural Resources Maryland Biological Stream Survey Team (MBSS) has mapped watersheds based on mussel diversity. Mussel presence is one sign of a healthy stream.

These creatures play an important role in the health of the Bay ecosystem. All three of these shellfish are filter feeders. Filter feeders “catch” their food by straining the water around them, finding algae, plankton, and sediments to eat. This action clarifies the water and removes pollutants, helping other species of plants and animals to thrive. Although it looks like they just sit there, these little guys are doing hard work. It is said that the Eastern Oyster can filter up to 50 gallons of water a day! Shellfish play an important role in the food web. Raccoons, Blue Crabs, Horseshoe Crabs, diving ducks, and Cownose Rays chow down on clams, while Muskrats, River Otters, and Great Blue Herons find freshwater mussels a delicacy. Shellfish also are important contributors to our research in watersheds. Because they don’t move around and live for a long time, they are good gauges of water quality and health.

Although their sedentary lifestyle is useful for our research, it also leaves them vulnerable to threats. Polluted runoff from developed and agricultural areas can overwhelm benthic animals; excess sediment can smother them and pollution leaves them susceptible to disease. Scientists are also keeping a close eye on the effects of climate change as changes in salinity will alter their habitat ranges.

So what can we do to help protect these fascinating species? Simple changes at home such as reducing fertilizer on your lawn, or disposing of materials properly instead of down a storm drain can help reduce polluted runoff into your local rivers and streams. If you live far enough south in Maryland, you can participate in oyster shell recycling (www.oysterrecovery.org) or even help to grow oysters off of your dock (www.oysters.maryland.gov). If you happen to discover some while you’re out exploring, please leave them be. They are working hard to keep our waters clean and healthy!
Holiday Wreath Making Class

Saturday, Dec 7; 1:00 - 3:00 pm

We will supply everything you need to make a beautiful wreath for the holidays using greens from the Glendening Preserve and areas around Jug Bay. Whether you are a novice or an expert, we will help you make a wreath for your front door or a centerpiece for your table. Space is limited. Fee: $30/person or $25 for active volunteers and FOJB members.

To register, download the public registration form at www.jugbay.org/education, complete, and send with your check, made out to Friends of Jug Bay, to the Sanctuary. Meet at the Wetlands Center.

If you want to help with the habitat improvement project in the morning, just let us know and you can receive the active volunteer price.