The First 25 Years: Monitoring Avian Productivity & Survivorship (MAPS) at Jug Bay

by Sandy Teliak, volunteer contributor

This past summer, the Sanctuary completed our 25th year as a participant in the California-based Institute for Bird Populations (IBP) MAPS Program. Operating continuously since 1990, we are one of the longest-operating stations on the East Coast and currently one of only two operating in Maryland (the other being at the Patuxent Wildlife Research Center in Laurel, MD). The objective of the MAPS Program is to gather data on the population size, survival rates, and productivity rates of over 100 target migrant and resident species. Jug Bay, along with hundreds of other MAPS stations across the continent, collects data during the breeding season. The IBP analyzes this data using sophisticated statistical modeling to determine how these rates relate to environmental factors such as habitat structure, forest composition, and global climate change. Once they have evaluated this data to determine the causes of avian population change, the IBP is better able to suggest management actions on a regional level to enhance survivorship and/or productivity, evaluate the effectiveness of management actions, and make the most out of limited conservation dollars.

Happy 2015, and Happy 30th Anniversary to Jug Bay Wetlands Sanctuary! This year, Marsh Notes quarterly issues will be themed to cover the width and breadth of the Sanctuary’s accomplishments over the years. Our timeline starts in 1985 with our humble 171-acre beginnings, and covers milestone events through 2015.

This spring, our theme is research and monitoring. Enjoy learning about the results of decades of data collecting with the MAPS bird banding project and wetland water chemistry monitoring.

In addition, we are including “throw back” photos of some of the staff and volunteers who have helped shape this organization over the years.

Happy reading!

- Your former Editor, Lindsay Hollister

Figure 1. Percent of migrant (A) and resident (B) species banded at Jug Bay from 1990 to 2014.

Continued on page 2
Dear Friends,

This year of the Sanctuary’s 30th anniversary is also turning out to be a year of new beginnings. While Jug bay staff and volunteers continue to offer education programs, and engage in research projects and stewardship activities that have been the hallmark of Jug Bay for years, things never stand still here.

Scientists, resource managers, and planners will come together for the first Patuxent Watershed Conference (PatCon) in June 12 and 13. Shortly after coming to the Sanctuary, Director Pati Delgado had the marvellous idea of organizing a conference focused on research, management, monitoring, and restoration efforts in the Patuxent River watershed. We are pleased to support this conference for this program. Friends of Jug Bay (FOJB) Board members Colin Rees and Siobhan Percy are serving on the organizing committee, along with representatives of the University of Maryland, the Smithsonian Environmental Research Center, Maryland Sea Grant, Morgan State University, and, of course, the Patuxent Riverkeeper.

Conference participants will share information about ongoing research, management, monitoring and restoration efforts in the watershed and seek to identify and reach consensus on gaps in, and appropriate priorities for, these efforts. A workshop will follow the conference to draft the first Patuxent Research Plan.

On another front, Friede Jacobsen, Coordinator of the newly established Maryland Bird Conservation Initiative (MBCI), is off to a strong start. MBCI, funded by the Maryland Department of Natural Resources, was created in November 2014. Thanks to the efforts of FOJB Board members Colin Rees and Pati Delgado, Jug Bay already home to numerous bird-focused research projects and educational programs, was chosen as the headquarters for this program.

Friede has already established a web presence for MBCI on social media, such as Facebook and Instagram, and is developing a website that will promote its work, illustrate information and news stories, and share resources. He initiated a Poyntedaty citizens science research project last year, and has ideas for a number of other bird-focused research projects. In addition, Friede and Sanctuary staff member Lindsay Hollister have planned a Spring Birding workshop series on bird identification and reporting skills. See program description on page 6.

Finally, I am pleased to welcome to our new Marsh Notes editor, Chris Patrick. Chris is a talented, budding science writer, pursuing an M.A. in science writing at Johns Hopkins. She will take over editing this newsletter, and we are pleased to have her on a contract basis by the FOJB.

In other news, I am happy to share the outcome of recent hearings concerning a proposal to move the Renaissance Festival to a property, not far from the Sanctuary, on Pinell Road. Ren Fest will NOT be coming to South County In late December, the Board of Appeals issued its opinion denying the Festival’s request for a special exception to the Rural Agricultural zoning prevalent in southern Anne Arundel County. The Board based its opinion on several grounds and relied upon abundant evidence introduced at the hearing in support of its decision. The owners of Ren Fest had 30 days to appeal, but chose not to do so.

We opposed the Festival’s proposed move to southern Anne Arundel County due to concerns about the likely effects on local ecosystems of such an intense use, effects caused by the attendant destruction of the forest understory and compaction and degradation of soil near a stream on the property. We also shared the concerns of local homeowners about heavy traffic. Moving traffic on fall weekends, a time when many Sanctuary educational programs are scheduled. We wish the Festival luck in finding an appropriate new site, or perhaps a way to expand at its current site.

The Friends of Jug Bay’s 2015 Annual Meeting is scheduled for April 12. I hope to see you there!

Nora Terres, President

January and February Soup and Science Recap

We welcome the following members to the Friends of Jug Bay members:

Dr Linda Kohlschat
Cheri & Andy Worner
Joy Adams & John Cook
Esther Woodworth
Jan Doggett & Van Schuck
Cay Ellis & Jeff A. Gordon
Stephen Heisel & Karen Moose
Morgan State University, and, of course, the Patuxent

Margaret Barker-Franked discusses how the bluebird house design of Lawrence Zeleny led to the resurgence of the bluebird population in Maryland and elsewhere.

Friends of Jug Bay Events

Soup and Science
Sunday, Mar 8, 2015, 12:00 - 3:00 pm
FOJB Annual Meeting
Sunday, Apr 12, 2015, 2:30 - 5:00 pm

Visit www.fRIENDsofjugbay.org for more information and to register.

Ergin Crosby
Should we worry about salinity changes in Jug Bay’s tidal freshwater marshes? by Patricia Delgado, Sanctuary Director

Out of the things that makes Jug Bay a really special place is its freshwater marsh is characterized by a salinity of 0.5 ppt and lower. Our tidal freshwater marsh is dynamic, diverse, and full of life! The marshes are continuous stations (data is collected every 15 minutes). Thirty years of data from Western Branch and Railroad Bed stations and eleven years of data from Iron Pot Landing and Mataponi Creek stations show an increase in the number of salinity spikes occurring during the last decade (Figure 2). In addition to how often, it also matters how long each salinity spike event lasts. The longer an event last, the more potential it has to trigger impacts in the marsh. According to our data, between 45-60% of the events at Iron Pot Landing, Railroad Bed, and Mataponi Creek lasted between one to four days, but about 11-12% of the events at Railroad Bed and Mataponi Creek persisted between 20 to 60 days. In 2008 at Railroad Bed, for example, 88 days out of a year had salinities equal or greater than 0.5 ppt. The number of days per year when salinity reached values equal or greater than 0.5 ppt was lower at the stations located upriver (Western Branch and Iron Pot Landing), increasing as we move downriver. At the upriver stations 75% of all salinity spikes occurred during the winter, while at the Railroad Bed, Mataponi, and Nottingham stations most of the spikes occurred during the summer and fall. There are many factors that could lead to salinity spikes, including runoff, low precipitation or drought, low river discharge, added salt during snow days, and groundwater recharge and discharge. It is not clear which of these factors are causing salinity spikes, as some may be acting together and in different ways along different portions of the river. We will conduct more detailed data analyses in an attempt to tease out these relationships. Even though impacts on the marsh plant community are not currently evident, if the occurrence of salinity spikes continues to increase and persist for longer periods of time, the Jug Bay wetlands may see a decrease and eventual loss of some of its keystone species, like spatterdock and wild rice, as well as the wildlife communities that rely on them.

Table 1. Salinity tolerance of different marsh plants found at Jug Bay. A tidal freshwater marsh is characterized by a salinity of 0.5 ppt and lower.

<table>
<thead>
<tr>
<th>Species</th>
<th>Common Name</th>
<th>Salinity Tolerance</th>
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<tbody>
<tr>
<td>Salicornia virginica</td>
<td>Black Saltwort</td>
<td>0.25 - 2.00 ppt</td>
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<tr>
<td>Suaeda marina</td>
<td>Saltwort</td>
<td>0.25 - 2.00 ppt</td>
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<tr>
<td>Spartina patens</td>
<td>Saltmarsh Greenweed</td>
<td>0.25 - 2.00 ppt</td>
</tr>
<tr>
<td>Sarcocornia segetalis</td>
<td>Saltgrass</td>
<td>0.25 - 2.00 ppt</td>
</tr>
</tbody>
</table>

Figure 1. Water quality monitoring stations along the Patuxent River. Salinity values in parenthesis correspond to average and maximum values are continuous stations (data is collected every 15 minutes). Thirty years of data from Western Branch and Railroad Bed stations and eleven years of data from Iron Pot Landing and Mataponi Creek stations show an increase in the number of salinity spikes occurring during the last decade (Figure 2).

Figure 2. Occurrence of salinity spikes (0.5 ppt and above) at different locations along the Patuxent River.

30 Years of Water Quality Monitoring Data: Should we worry about salinity changes in Jug Bay’s tidal freshwater marshes? by Patricia Delgado, Sanctuary Director

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30 Years of Water Quality Monitoring Data: Should we worry about salinity changes in Jug Bay’s tidal freshwater marshes? by Patricia Delgado, Sanctuary Director
PUBLIC PROGRAMS AT JUG BAY CONT.

Paws and Poop
Sunday, Apr 19; 1:30 – 3:30 pm
Ages: Families
Fee: $4 per plaster track
We can learn a lot from the clues animals leave behind. Learn to identify common animal tracks and scat, then join a naturalist on the trail to test your nature detective skills. Make a plaster track to take home! All materials provided.
Registration Required: Call 410-741-9330 or e-mail programs@jugbay.org

International Migratory Bird Day
Saturday, May 9; 8:30 am – noon
Ages: all ages
Fee: FREE, vehicle entrance fee waived
Join ornithologist Frode Jacobsen for a guided birdwalk & fun bird-themed games and quizzes for all ages to celebrate our migratory birds.
Registration Required: Call 410-741-9330 or e-mail programs@jugbay.org

Eat the Weeds: Gourmet Cooking with Invasive Plants
Saturday, Apr 25; 9:30 am - 1:30 pm
Ages: 21 and up
Fee: $8/person (payable to FOJB)
Seeking enthusiastic (and hungry) participants to help our forest and butterflies. We’ll learn about the impacts caused by the non-native invasive garlic mustard plant, then go remove it from our forest. After our removal, Chef Irene will walk us through the preparation of several recipes that you can use the mustard greens for, as we prepare our gourmet lunch! Wear shoes and clothes that can get dirty, and bring work gloves. Meets at Plummer House, 5702 Plummer Lane, Bristol-Lothian, 20711
Registration Required: Call 410-741-9330 or e-mail programs@jugbay.org to check availability.
Your reservation will be secured when payment is received. Checks should be made payable to Friends of Jug Bay.
Registration Form is required and can be downloaded at http://www.jugbay.org/education

Spring Birding Series
Saturday, Mar 21; 1:00 – 4:00 pm
(Workshop on Using eBird with Matt Hafner, $10)
Saturday, Apr 18, 7:30 am – 3:30 pm (The Warbler Guide: a book signing and field trip with author Tom Stephenson, $30)
Fee: $10 per abode, vehicle entrance fee included
You can help us provide food and shelter to animals and native plants for your garden. Native plants provide food and shelter to animals and add beauty to your yard. View the butterfly garden and talk with volunteer gardeners for native gardening advice.
Location: 5702 Plummer Lane, Bristol-Lothian, MD 20711

Spring in the Marsh Canoe Trip
Sunday, Apr 26; 11:00 am – 3:00 pm
Ages: 7 & up, with adult
Fee: $20/person, vehicle entrance fee included
The marsh is waking up! We’ll look for early spring plants, migratory birds, and more. Please arrive promptly at the starting time. Bring plenty of water, sunscreen, a lunch, and shoes that can get wet.
Registration Required: Call 410-741-9330 or e-mail programs@jugbay.org to check availability.
Your reservation will be secured when payment is received. Checks should be made payable to Friends of Jug Bay.
Registration Form is required and can be downloaded at http://www.jugbay.org/education

Build a Bluebird Box with Mom
Sunday, May 10; 1:00 – 3:00 pm
Ages: All, Families
Fee: $20 per bluebird box kit, vehicle entrance fee included with purchase of kit
Join Mom on her special day and help bluebird Moms raise their young. Learn about Eastern Bluebirds and check nest boxes for young with Master Naturalist Mike Quinnian. Using precut kits, assemble nest boxes which you can take home and put in your yard. Some drilling and screwdriving involved. Bring battery powered drills and screwdrivers, if you have them. We will have some available for use.
Registration Required: Call 410-741-9330 or e-mail programs@jugbay.org

International Migratory Bird Day
Saturday, May 9; 8:30 am – noon
Ages: all ages
Fee: FREE, vehicle entrance fee waived
Join ornithologist Frode Jacobsen for a guided birdwalk & fun bird-themed games and quizzes for all ages to celebrate our migratory birds.
Registration Required: Call 410-741-9330 or e-mail programs@jugbay.org

Mother’s Day Canoe Trip & Gourmet Lunch
Sunday, May 10; 9:00 am – 1:30 pm
Ages: 16 & up
Fee: $100/person, vehicle entrance fee included
Pamper Mom on her special day. Discover wildlife in the marsh while we leisurely paddle, and enjoy our picnic lunch at historic Mt. Calvert. Please arrive promptly at the starting time. Bring plenty of water, sunscreen, a lunch, and shoes that can get wet.
Registration Required: Call 410-741-9330 or e-mail programs@jugbay.org to check availability.
Your reservation will be secured when payment is received. Checks should be made payable to Friends of Jug Bay.
Registration Form is required and can be downloaded at http://www.jugbay.org/education/canogroup-trips/public-trips

Marsh Ecology by Canoe
Sunday, May 31; noon – 4:00 pm
Ages: 7 & up, with adult
Fee: $20/person, vehicle entrance fee included
Discover the abundant wildlife in the Patuxent River wetlands. We’ll paddle up some of the smaller branches of the river to look for beavers, birds, and flowering wetland plants. Please arrive promptly at the starting time. Bring plenty of water, sunscreen, a lunch, and shoes that can get wet.
Registration Required: Call 410-741-9330 or e-mail programs@jugbay.org to check availability.
Your reservation will be secured when payment is received. Checks should be made payable to Friends of Jug Bay.
Registration Form is required and can be downloaded at http://www.jugbay.org/education/canogroup-trips/public-trips

Native Plant Sale
Saturday, June 6th; 10:00 am – 2:00 pm
Ages: All
Fee: FREE, no vehicle admission for Glendening Preserve
Support the Friends of Jug Bay by buying native plants for your garden. Native plants provide food and shelter to animals and add beauty to your yard. View the butterfly garden and talk with volunteer gardeners for native gardening advice.
Location: 5702 Plummer Lane, Bristol-Lothian, MD 20711

Women on the Water
Saturday, June 6; 10:00 am – 3:00 pm
Ages: Adults only
Fee: $10 per person, vehicle entrance fee included
Tap into the serenity offered by our wetlands with a leisurely canoe trip up the Patuxent River. We’ll look for wildlife and emerging spring plants, then pause for a gourmet lunch. The day will conclude with a relaxing yoga session lead by certified instructor Kelly Fisher of Wildflower Yoga. Fee includes gourmet lunch, park admission, and all canoe equipment. Bring water, sunscreen, and shoes that can get wet.
No experience necessary.
Registration Required: Call 410-741-9330 or e-mail programs@jugbay.org to check availability.
Your reservation will be secured when payment is received. Checks should be made payable to Friends of Jug Bay.
Registration Form is required and can be downloaded at http://www.jugbay.org/education/canogroup-trips/public-trips

Lecture: The Old-Growth Forest Network: For Maryland, For the Nation
Saturday, May 2; 10:00 am - 12:30 pm
Ages: 11 & up
Fee: $5 per person, vehicle admission fee waived
What is the state of the planet’s forests? Dr. Joan Maloof, author, ecologist and environmental advocate will summarize the condition of our forests from global and national perspectives. She will focus particularly on forests that have never been logged -- “old-growth forests.” How many of these forests are left? Where are they? And why do they matter? Maloof has traveled the nation inspecting the remaining old-growth forests; in her book, Among the Ancients: Adventures in the Eastern Old-Growth Forests, she includes reflections on these questions as well as detailed directions to one old-growth forest in each of the twenty-six states east of the Mississippi River. Going beyond mere documentation, in this lecture Maloof will describe her vision of an Old-Growth Forest Network – a nationwide attempt to reverse past destruction and reconnect average families with the beauty and biological abundance found only in the ancient forests.
Stay after the talk for a guided hike with Joan (11:15-12:30).
Registration Required: Call 410-741-9330 or e-mail programs@jugbay.org to check availability.
Your reservation will be secured when payment is received. Checks should be made payable to Friends of Jug Bay.
**Volunteer News**

Thank you, Volunteers, for 30 Amazing Years of Service!

In January, we kicked off our 30th anniversary events with our annual Volunteer Appreciation Social. We started with a beautiful, brisk hike along Otter Point and Taw Kumm trail enjoying evergreens, bird fly-by's, and distinguishing the buds of deciduous trees. After socializing and having our soup and sandwich lunch, we got to the business of volunteer recognition. As it is our tradition, we brought up new volunteers, MudMuckers, 5-, 10-, 15-, 20-, and 25-year volunteers.

This year was an extra special Social because we had the privilege of acknowledging volunteers who have been with us for the entire 30 years of the Sanctuary's existence. The dedication of any volunteer who stays for more than 10 years has impressed me, and many other volunteer coordinators I've met over the years, but 30 years, wow! As we announced the names of our three 30-year volunteers, Marty Barron, Sue Ricciardi, and Dotty Mumford, they received a much-deserved, long-standing ovation. Many, many thanks to all our volunteers, past, present, and future, for making the Jug Bay volunteer community such a vibrant and welcoming group!

- Lindsay Hollister, Volunteer Coordinator

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**Volunteer Statistics**

Winter 2015

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<th>Hours</th>
<th>Notes</th>
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<td>Susan Nagurs</td>
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**Thank You!**

A contribution worth over $15,700 from Annapolis

**Donations:**

- Alicia Moore: books on birding
- Lynn & Peter Kenny: butterfly nets
- Kirsten Enzinger: large raffle
- Mike & Carol Quinnlan: field guides and educational supplies

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**Volunteer Opportunities**

- Most of our projects require no experience, come to learn!
- Vehicle entrance fee waived for volunteer events.
- To sign up or for more information, call 410-741-9330, or e-mail Volunteer Coordinator, Lindsay Hollister at rpholl27@aacounty.org

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College student Laura Perry stands along a wetland plant transect to study succession and species diversity. Approximately 1993.

Fred Rose and Doug Willins (right) at a Woolen’s Landscaping clean up. Approximately 1997.

Vernal Pool Research

Wednesday, Mar 4; 9:30 am – 3:30 pm
Wednesday, Mar 18; 9:30 am – 3:30 pm
Wednesday, Apr 1; 9:30 am – 3:30 pm
Saturday, Apr 4; 9:30 am – 3:30 pm
Wednesday, Apr 15; 9:30 am – 3:30 pm
Wednesday, Apr 29; 9:30 am – 3:30 pm
Wednesday, May 13; 9:30 am – 3:30 pm
Saturday, May 16; 9:30 am – 3:30 pm
Wednesday, May 27; 9:30 am – 3:30 pm

Ages: adults and families with children ages 8 and up

Fee: FREE, entrance fee waived for volunteers

Volunteers are needed to help survey the vernal pools of the Sanctuary and Glendingen Preserve. These special temporary ponds are critical breeding habitat for many amphibian species. Prior experience is preferred but not necessary.

Registration Required: Call 410-741-9330 or e-mail programs@jugbay.org

Stream Waders Macroinvertebrate Sampling

Saturday, Mar 14; 10:00 am - 4:00 pm

Ages: 16 and up

Fee: FREE, entrance fee waived for volunteers

Seeking volunteers to receive in-field training on how to sample aquatic macroinvertebrates the Stream Waders way with Department of Natural Resources. Be prepared to wade into streams with water up to waist deep. A limited supply of boots are available to borrow.

Registration Required: Call 410-741-9330 or e-mail programs@jugbay.org

Paxtunt River Cleanup

Saturday, Apr 11; 9:00 am – noon

Ages: All

Fee: FREE, no admission for Paxtunt Wetland Park

Hill's bridge at Route 4 is a popular location for fishing and paddlers to put-in. It is also full of trash from misuse. Help us send a positive message to users of the area by cleaning up the riverfront. Wear shoes that can get muddy. Bring thick work gloves if you have them.

Meets at Paxtunt Wetland Park 1426 Mt. Zion Marlboro Road, Bristol-Lothian MD 20711

Registration Required: Call 410-741-9330 or e-mail programs@jugbay.org

Turtle Caretaker Training

Wednesday, May 6; 10:00 - 11:30 am

Friday, May 29; 10:00 - 11:30 am

Saturday, Jun 27; 10:00 - 11:30 am

Ages: Individuals and Families, 6 & up

Fee: FREE, entrance fee waived for volunteers

Seeking dedicated volunteers to provide weekly care for the season for the three box turtles that live in our educational enclosure. Box turtle natural history, feeding, and enclosure maintenance will be discussed.

Registration Required: Call 410-741-9330 or e-mail programs@jugbay.org

Canoe Guide Training & Trash Pick-up

Saturday, May 23; 9:00 am – 3:00 pm

Ages: 18 & up

Fee: FREE, entrance fee waived for volunteers

Learn how to lead canoe trips at Jug Bay! On land, we will review volunteer responsibilities, canoe safety, paddling techniques, canoe routes, and Sanctuary policies. On the water, a session on canoe paddling skills and rescue taught by American Canoe Association certified instructors will be followed by a trip up river and through some of the marsh channels to see the varied habitats. Dress for the weather and bring lunch and snack. Canoeing experience required.

Registration Required: Call 410-741-9330 or e-mail programs@jugbay.org

From left, Chris Swarth, Clint Conner, and Mary Burton pause while installing fencing to protect Wild Rice from resident Canada Geese. Approximately 2000.


Volunteer Groups:

- St Anne’s School of Annapolis

During the winter, volunteers logged 621 hours.

A contribution worth over $15,700 from Annapolis
A Brief History of NERRS

by Chris Snow, CBNErr Stewardship Coordinator

The early 1970s were flush with new environmental legislation, beginning in January 1970 with the National Environmental Policy Act (NEPA). Following the establishment of NEPA, Congress created the Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA). Congress then enacted the Clean Water Act (CWA), the Marine Mammal Protection Act (MMMPA), and the Coastal Zone Management Act (CZMA). Congress signed the CZMA into law in 1972 to protect rich coastal areas from growing development pressure, stating it “recognized the importance of meeting the challenge of continued growth in the coastal zone.”

With the collective power of citizens spearheading the environmental movement of the late 20th century, the United States got serious about protecting its water resources. In coastal areas this process was facilitated by the CWA and the CZMA. 

Here’s one other interesting Red-eyed Vireo story: On 21 May 1997, these same two Red-eyed Vireos were recaptured on the same round near adjacent nets West, talk about longevity, site loyalty and probably mate loyalty.

These are but a few key findings from our study. We have a lot of data, but to repeat the common refrain once again, more study is needed. Our 26th season will commence in late May 2015. Stay tuned.

Thanks to Danny Bytkor and former Jug Bay Warschand Sanctuary Director Chris Svarth for having the vision and tenacity to establish this effort and oversee its growth, thanks to the Staff at Jug Bay for their support and letting it continue; thanks to the Friends of Jug Bay for providing financial support and thanks to the many volunteers who provided a conservatively estimated 5,000+ volunteer hours to sustain it.

Research Matching Game

Answer Key (don’t peek!)

1) 4236
   6j 46
2) 2990
   3j 193
3) 589
   3j 47
4) 284
   4j 576
5) 2j 28

New Editor of Marsh Notes

Meet Chris Patrick, the new editor of Marsh Notes. Chris graduated in May 2014 from the College of William and Mary as a neuroscience major. She is now a student in Johns Hopkins University’s Master of Arts in Science Writing program. Chris wants to spend as much time outside as possible, because nature is the best. Most of her days include writing, reading, running, and art making.

Bigger Doesn’t Always Mean More Resilient

Jug Bay’s 25 years of continuous MAPS operations makes it uniquely qualified to provide highly valuable survivorship data on our species. On 23 May 2013, we recaptured a Red-eyed Vireo that we had banded on 3 June 2003 as an adult bird. This recapture meant that this particular bird was at least 10 years 11 months old, which set a new North American longevity record for this species. The only other near record from our MAPS effort is an Ovenbird that was banded and, when last recaptured, was at least 11 months old. The North American record is 11 years.

Our data also reflects another interesting point. The Wood Thrush overwinters in Central America; the Red-eyed Vireo overwinters in the more distant Amazon Basin. The Wood Thrush is also much larger (average weight 48.6 grams, wing chord 104 millimeters) than the Red-eyed Vireo (17.4 grams, wing chord 78 millimeters). Intuitively, we might expect Wood Thrush to live longer than Red-eyed Vireos—they don’t have to migrate as far and they are larger in size. Our data totally contradicts that expectation. The oldest Wood Thrush to live longer than Red-eyed Vireos—there they don’t have to migrate as far and they are larger in size. Our data totally contradicts that expectation. The oldest Wood Thrush to live longer than Red-eyed Vireos—there they don’t have to migrate as far and they are larger in size. Our data totally contradicts that expectation.

Chris Svarth, Laura Younger, and Greg Lewis at the designation ceremony of Jug Bay as a NERRS site, 1990.

These laws were not the first attempts to protect our water resources. The CWA was actually an amendment to the Federal Water Pollution Control Act of 1948. The Federal Water Pollution Control Act had three amendments prior to the CWA. This new legislation, however, differed in its enforcement. It was clear that change was necessary. One could argue that American outrage over environmental policy reached its peak in the 1960s, with voices such as Rachel Carson, the author of Silent Spring, and events like the burning of the Cuyahoga River. Backed by the ever-increasing environmental awareness of the American public, these new agencies finally had teeth in setting and enforcing national policy.

Table 1. Percentage of Hatch Year Bandings from 1990 to 2004. Hatch year banding rates vary for resident and migrant species.

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These are but a few key findings from our study. We have a lot of data, but to repeat the common refrain once again, more study is needed. Our 26th season will commence in late May 2015. Stay tuned.

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30 Years by the Numbers:
A Research Matching Game

1) Water chemistry testing is our longest running research project. Since 1988, staff and volunteers have sampled wetland and stream water ___ times.

2) The Monitoring Avian Productivity and Survivorship study is a national program and great example of our local research having far-reaching implications. Since 1990, staff and volunteers have banded ___ birds.

3) The work of listing species has been ongoing since our founding. Working together, staff and volunteers have discovered:
   3a) ___ plants
   3b) ___ birds
   3c) ___ mammals
   3d) ___ fish
   3e) ___ invertebrates
   3f) ___ reptiles and amphibians

4) The Eastern Box Turtle has become a signature study reptile for us. With our large tracts of forest, we have a robust population and have contributed greatly to the pool of knowledge on this charismatic species. Since 1995, staff and volunteers have identified and marked ___ individuals.

Fill in the blanks with the numbers in this box.
(answers on page 10)
a) 46
b) 47
c) 284
d) 576
e) 4236
f) 589
g) 193
h) 28
i) 2990