

# ***GREENovation***

GMU Department of Environmental Science & Policy

***Summer 2011***

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GMU Department of Environmental Science and Policy

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*Cover photo:*

*View from Mason Neck State Park*

*by Samantha Oester*

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## EDITORIAL:

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# The Importance of Conferences: The International Marine Conservation Congress (IMCC)



By Dr. Chris Parsons,  
**GREENovation** Editor

May 12 saw the start of events related to the 2nd International Marine Conservation Congress (IMCC), the largest academic conference on marine conservation in the world. The conference, organized with the help of several ESP students and faculty, was financially sponsored by ESP and the College of Science. The first IMCC was held at GMU in May 2009.

The 2011 meeting had 13 pre-meeting and post-meeting workshops and four focus group meetings on topics such as citizen science, marine outreach and education, Arctic fisheries. After the meeting, there was a two day workshop to develop a list of 100 questions of global importance for marine conservation that was part-funded by ESP and organized and developed by several ESP faculty and students. (See [http://www.conbio.org/imcc2011/program/pre\\_post\\_workshopfocusgroups.cfm](http://www.conbio.org/imcc2011/program/pre_post_workshopfocusgroups.cfm) for details.)

For the meeting itself, there were 50 symposia, covering topics such as CITES and marine species, ocean acidification, indigenous practices in marine conservation, historical marine ecology, open ocean MPAs, economics and marine conservation, shark and ray conservation and the Gulf of Mexico oil spill (<http://www.conbio.org/imcc2011/docs/IMCCSYMPOSIA%20.pdf>). In addition, there were 12 focus groups on topics such as marine wildlife conflict and the human dimensions of marine protected areas (<http://www.conbio.org/imcc2011/docs/Web%20FG%20Summary.pdf>) and 13 lunchtime workshops (<http://www.conbio.org/imcc2011/docs/Web%20wk%20Summary.pdf>).

In total, over a thousand abstracts were presented at the congress, with over 1,200 delegates. IMCC3 is being planned for a UK location in 2014, and again, ESP will be very involved in the organization of this meeting.

- *Dr. Chris Parsons is an associate professor and the undergraduate coordinator in the Department of Environmental Science and Policy. He is the marine section president and a governor of the Society for Conservation Biology, the program co-chair for the 2011 International Marine Conservation Congress and a national delegate to the Scientific and Conservation Committees of the International Whaling Commission*

## Photo Spread:

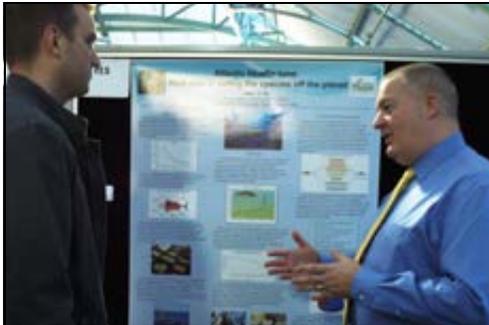
### GMU @ IMCC2 in Victoria, B.C.



*Dr. Chris Parsons, IMCC program chair, and Katheryn Patterson, IMCC student committee chair, between symposia at IMCC2*



*GMU affiliate professor Idelisa Bonnelly giving a plenary speech*



*GMU undergrad Walter Via discusses his poster on the decline of Atlantic bluefin tuna at an IMCC poster session*



*GMU Ph.D. candidate Katheryn Patterson and graduate student Amy Bauer at the IMCC closing party*



*GMU Ph.D. candidates Megan Draheim, Katheryn Patterson and Jason O'Bryhim at the IMCC closing party*



*GMU second-degree undergrad Samantha Oester on an IMCC sea kayaking excursion*

## Around Campus:

### Green Happenings @ Mason

- *The Mason summer course NCLC 395, special topics in experiential learning, explored animal testing, veganism, animals as entertainment and factory farming. Taught by New Century College Adjunct Professor Paul Gorski, the class was titled Animal Rights and Humane Education.*
- *Mason engineering students partnered with the University of Maryland's chapter of Engineers Without Borders to help provide sustainable solutions for clean water in Peru. GMU students assessed the environmental impacts of a water storage system in the community of San Isidro and installed two new water tanks.*
- *Members of national meteorological and hydrological services, climate and agricultural research institutes and universities attended a meeting at Mason in July on national drought policy. The workshop, organized in part by the College of Science, included several GMU professors.*
- *GMU and the Smithsonian Conservation Biology Institute broke ground on the new LEED Gold conservation complex to help expand hands-on learning in environmental science and conservation biology.*

## Graduate Column:

### Are manatees stupid?



By Lorelei Crerar,  
GMU Ph.D. Candidate

If you have ever seen a manatee, you know that they are covered with scars from boats. Even though the boats in Florida are required to maintain a slow speed in areas where manatees may be found, the animals still manage to get injured by boats. Sometimes fatally. Sometimes more than once! So the question is whether or not manatees are stupid.

Humans tend to assume that an animal like the manatee, which is slow moving and preys on plants, is not all that intelligent. In fact, the manatee brain breaks some of the well known facts about intelligence in brains in general. Most really intelligent animals, like humans and dolphins, have brains that are highly convoluted. A theory was that if the brain is folded, there is more surface area, thus more area for neurons and greater intelligence. However, the link between brain convolution and intelligence is disputed. Birds have a very convoluted brain and many birds are not all that intelligent.

Then there are manatees. Manatees have a very small brain when it is compared with their body size. The brain is also almost totally smooth. This led researchers to originally state that manatees must not be all that intelligent. Elliot Smith (1902) stated that manatee and dugong brains were so strange that they could only be compared to the brains found in humans of very low intelligence. However, this turns out not to be true.

It is fostered, however, by the fact that Johnson (1875) made an observation of two manatees that died at the Zoological Garden of Philadelphia and made mention of the fact that the brain of both of the animals he dissected was quite smooth. Johnson also stated that the keepers for the animals found that the manatees responded mainly to smell in order to locate food placed

## Graduate Essay:

# The Great Impacts of Graduate Work: Sustainable Tourism Research in Bayahibe



By Megan Draheim,  
GMU Ph.D. Student

At the Second International Marine Conservation Conference, held May in Victoria, B.C., I was reminded that the work we do as graduate students in this department has real-world conservation impacts. It's something that's easy to lose sight of when we're struggling to meet a deadline for our committee or worrying about getting a paper published. But ultimately, it's what makes our work worthwhile.

Several years ago I did an independent credit project for Dr. Chris Parsons in Bayahibe, a small town in the Dominican Republic. Bayahibe is situated near a major resort area and a docking port for cruise ships. It is also close to a large national park, the *Parque Nacional del Este* (PNE). PNE is a peninsula, and so the area is very closely connected to the water and marine life around it, including a local dolphin population. In 2002, eight bottlenose dolphins were captured off the coast of Bayahibe for Manati Park, a dolphinarium in the Dominican Republic. Although Manati Park bills itself as an ecotourism destination, its actions contradict this claim – no conservation-related activities have been undertaken by the park and, in fact, Manati Park has had a negative impact on the Bayahibe dolphin population through its live capture activities.

In the aftermath of the captures, a coalition of conservation groups, universities, government officials, tourism organizations and local community groups formed *El Proyecto Amigos de los Delfine* (the Amigos Project), which supports the conservation of cetaceans in the Dominican Republic through research, education and the promotion of policies geared towards sustainable tourism and conservation. To this end, we were asked to conduct a survey of tourists visiting the Bayahibe area. The survey focused on the potential for sustainable marine mammal tourism in Bayahibe – sustainable both for the wildlife (e.g. regulated dolphin-watching trips instead of the captive dolphin trade) and the town's population (e.g. more money being spent in the town and less tourism dollar "leakage" out of the community).

Our results found that there was quite a bit of interest by tourists in sustainable marine mammal watching trips in Bayahibe; for example, people wanted to support locally owned and operated companies, wanted to learn about marine mammal conservation on dolphin-watching trip



***Universities and conservation groups are promoting sustainable tourism in Bayahibe, Dominican Republic, with the help of research done by graduate students on the potential for ecotourism***

*Graduate Essay (continued from page 7)*

and would rather watch dolphins in their native environment than in a dolphinarium. Our results have been used by the Amigos Project to promote their cause on multiple occasions, like when working with the government, the tourism board and funding agencies. Our work has been published in two journal articles.

Idelisa Bonnelly, often called the godmother of marine mammal research in the Dominican Republic and a founder of the Amigos Project, was a plenary speaker at the International Marine Conservation Congress, so I was able to speak with her again. It was gratifying to hear her talk about how she's used our research results in the past few years, and how helpful she thinks it has been. My take-home message from the Congress is that we're lucky to be in an academic field where our research results can have an almost instant impact on the world around us.

- *Megan Draheim is a Ph.D. student at GMU. Her research interests include exploring the attitudes of the public about predatory species and the potential for marine mammal-based ecotourism, as well as assessing the effectiveness of outreach programs with aims to reduce human-predator conflict.*

*Graduate Column (continued from page 6)*

into their environment. Reep, Johnson, Switzer and Welker (1989) report that there are areas of the manatee brain that are very well developed, most especially the nerves that control facial bristles. Manatees are the only animals known to have prehensile whiskers. They can move each bristle independently and frequently use this technique to move food into their mouths as they are quite clumsy with their forelimbs. This fact, however, will not help them avoid boats.

Gerstein et al. (1999) examined the hearing of the manatees. It was found that the animals do not hear in the same range as humans or even in the same range as boat engines. In fact, engines that are slowed down, which is the law in areas of Florida where manatees are located, the animals cannot hear the engines at all. It is easy to see from the examinations made of the manatee brain to date that manatees are not stupid. They can learn complex behaviors and respond well to such training. However, they are not able to hear boats and that is the reason why they are frequently injured by surfacing into propellers.

- *Lorelei Crerar, interested in sirenian population genetics, has been analyzing ancient bone samples of an extinct relative of the Florida manatee to learn to effectively preserve remaining numbers of extant manatees.*



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## Personal Experience:

### Giving Back: Mason's Alternative Breaks



*By Adam Carpenter,  
Former GMU Ph.D. Student*

Imagine waking up each morning at the crack of dawn in a beautiful Florida state park to work on conservation projects, build camaraderie with other Mason students, break a sweat, get your hands dirty and have some time in out in the sun. Last spring break, I had the pleasure of having just such an experience. I went on an alternative spring break through Mason's Center for Leadership and Community Engagement to Stuart, Florida.

Our group consisted of students interested in conservation issues. We planted hundreds of trees in a land restoration project, built the substrate for an artificial oyster reef, painted cabins in the state park where future volunteers would stay and learned about the area's rich natural history. Although I'd characterize our trip as anything but typical, a "typical" day started early. We would cook breakfast on our propane stove, or if we were running short on time, pull out some bagels and cream cheese from our cooler.

We'd all douse ourselves with sunscreen and head to the day's worksite. After a few hours of work, we would lay out a dozen or more ingredients for lunch and have a free for all, some people coming up with crazy combinations. (I never imagined that a turkey, pepperoni and sun chips sandwich would taste so good.) A few more hours of work, and we would call it a day, coming back mid-afternoon to relax for a few hours, talk, read and reflect on what we had accomplished. Later, we took turns cooking dinner and talked around our campfire, usually calling it a night early as we were tired and sore from all the hard work. I'd like to give a big shout out to Charles Coats and Pujita Venkat, the trip's leaders, for putting together and leading such a great experience, and to all the AB staff for their support in making the program possible.

On the lighter side, we did find some time to relax on the beach. We also kayaked through mangrove forests taking in amazing sights. Although we had a lot of work to do, the trip also respected the fact that it was everyone's spring break and there was a need for some time to rest and recuperate. Even as a working professional with only a few weeks of vacation per year, I can think of few better ways to spend a week in March.

As an undergraduate student at nearby George Washington University, I was vaguely aware of the existence of this type of program but was not fortunate enough to know anyone who participated in them.



***Mason students on an Alternative Spring Break in Stuart, Fl. Students planted trees, built the substrate for an artificial oyster reef and painted cabins in a local state park***

*Personal Experience (continued from page 9)*

Retrospectively, I definitely wish I had been involved in these programs both for the service and for the opportunity to meet and bond with like-minded students. So here is the charge I'll leave you with: If you are an undergraduate student, look into going on one of these trips.

They aren't for everybody, but I personally believe that most students would agree that a week or two of community service, fun and getting to know new friends is a worthy endeavor. In winter and spring of 2011, the AB program sponsored eight trips, with over 100 participants. This included not only the conservation trip, but also trips focused on teaching and literacy, fighting poverty and other social causes.

If you're well organized and being a leader excites you, you can even propose a trip. If you're a graduate student or an interested faculty member, get in touch with the AB program and ask how you can be a part of it. They're always planning future trips and sometimes need learning partners, for now or for the future.

- *Adam Carpenter is a former Ph.D. student at GMU now studying at Johns Hopkins University*
- **CLCE Alternative Break Programs:** [http://clce.gmu.edu/alt\\_break/](http://clce.gmu.edu/alt_break/)

Leadership  
and  
Community  
Engagement



## Book Review:

### Listening to Whales



By Lorelei Crerar,

**GREENovation** Book Reviewer

How could a book called "Listening to Whales" be a bad book? This is coming from a Marine Mammalogist, however. The book describes the life and work of Alexandra Morton, a wildlife Biologist, whale activist and protector of the great beauty that is the northwestern Canadian coast.

Any long time reader of books like myself cannot help but be impressed by the wonderfully lyric quality of Ms. Morton's writing style. Her grammar is wonderful, the reading level of the book is very suitable for high school or college students, and more importantly for students the book is interesting.

Ms. Morton basically describes her life's work in this wonderful book. She began her career listening to dolphins at Marineland in California. She was involved in the study of animals, and the painting of hallways for the infamous John C. Lilly. Her descriptions of his work are fascinating to read. At Marineland, Ms. Morton eventually moved to study the language of the killer whale, *Orcinus orca*. She states that these animals are much easier to listen to since they do not talk over each other like the dolphins do.

One of the things I like best about this book is how much real Biology is worked into the text. In between her stories about the whales, famous whale watchers like Mike Biggs and Paul Spong, Ms. Morton adds real facts about whales. "Whales, dolphins and porpoises branched out from a group of animals called ungulates during the Paleocene period (about 57-67 million years ago) and returned to the aquatic environment about 50 million years ago (pg. 44-45)." This is a nice way to incorporate hard science into a very readable and enjoyable form.

I could see this book inspiring many readers, just as it inspired me.

- ♦ ***Listening to Whales.*** Alexandra Morton. Ballantine Publishing Co. (ISBN 0-345-43794-2). \$26.95 309 pages.

## News Story:

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# The significant consequences of ocean acidification



By *Samantha Oester*,  
**GREENovation** Editor

VICTORIA, B.C. – Since the beginning of the Industrial Revolution, atmospheric carbon dioxide concentrations have increased by approximately 35 percent, according to the U.S. Environmental Protection Agency. The Intergovernmental Panel on Climate Change reported approximately 32 billion tons of carbon dioxide are emitted from human activities every year. “About half of the carbon dioxide we produce is going into the ocean, where it dissolves,” said Dr. Andrew Dickson, professor of marine chemistry at the University of Liverpool, U.K., at an International Marine Conservation Congress (IMCC) press conference in May. “This is changing the composition of the ocean, and marine organisms are not doing as well.”

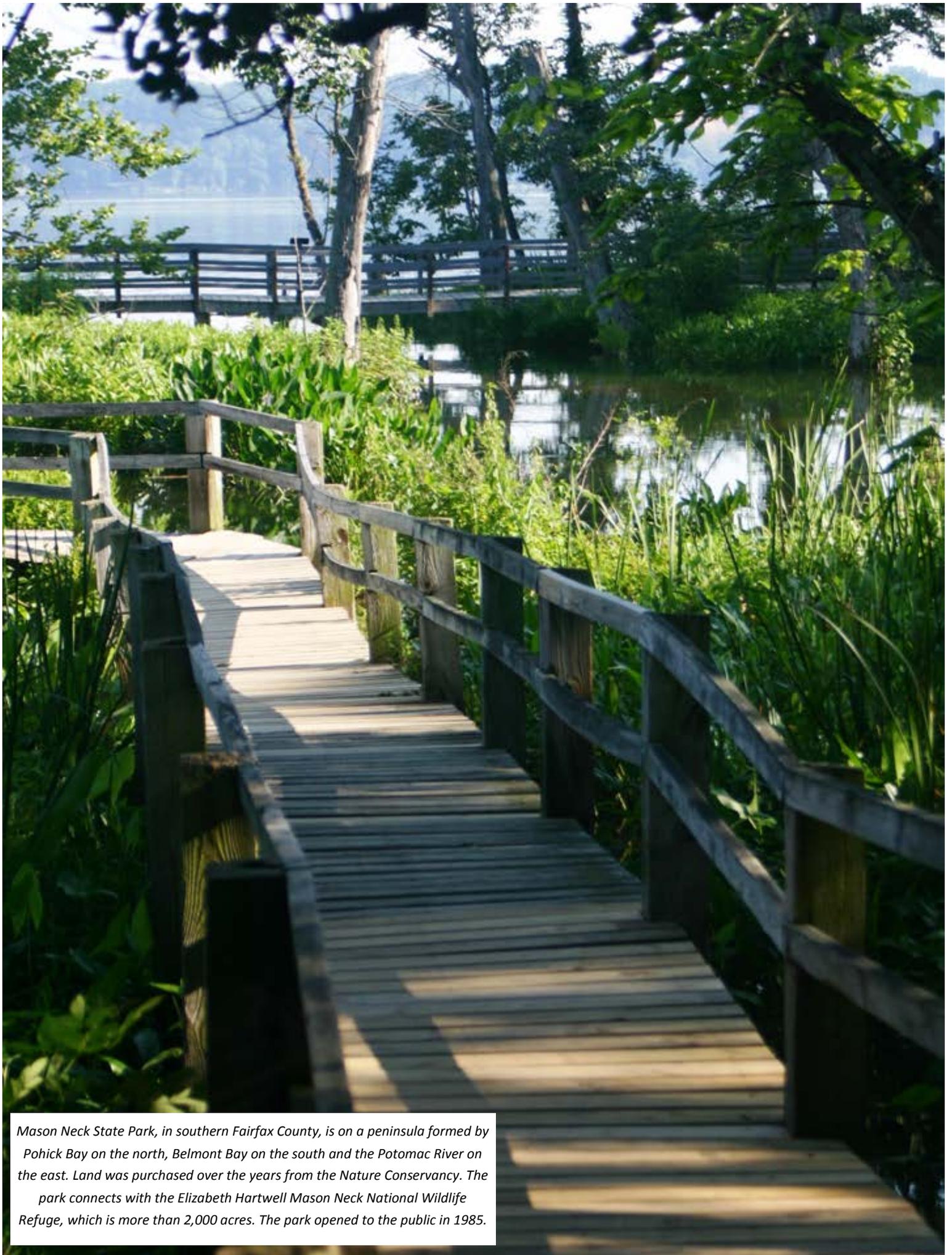
Dickson, a member of the Scripps Institute of Oceanography Marine Physical Laboratory, explained that the increased levels of carbon dioxide in the ocean is decreasing the pH. “The carbonate ion levels of the ocean have decreased by about 20 percent since the Industrial Revolution,” Dickson stated. The overall result of this amount of anthropogenic carbon dioxide entering the ocean and decreasing carbonate ions is worldwide ocean acidification. “[Ocean acidification] has big consequences,” asserted James Berry of the Scripps Institute of Oceanography. “In the long-term history of the Earth, ocean chemistry has changed, but it is changing very rapidly now.”

According to Berry, marine organisms are suffering major metabolic consequences as a result of ocean acidification. “They are smaller, there are less of them and they are having shorter lives,” Berry affirmed. “It’s causing a reduction in biodiversity and the ecosystem services we depend on to live.” For example, oceans are a main source of oxygen, as per Scripps, producing nearly 50 percent of oxygen available for humans. “Fisheries are an important part of current and future protein sources,” Berry stated. “The fish we like can’t live well in an acidic environment.”

Coral reefs are experiencing substantial loss, explained Miyoko Sakashita, oceans director for the Center for Biological Diversity. “Oceans are the lungs of the planet, and coral reefs are a big part of that,” she maintained. Coral is vulnerable to changes in ocean temperatures and pH. Some of the world’s largest coral reefs are being decimated due to ocean acidification and climate change. Coral reefs produce oxygen, sequester carbon and are home to scores of marine organisms. “Reefs taking a big hit means we take a big hit,” Sakashita stated. According to Sakashita, the Earth is experiencing more severe and frequent tropical surge storms as a result of increased carbon dioxide production, which are predicted to increase in size and frequency if emissions are not controlled. Shellfish are negatively affected by ocean acidification as well.

“These are only the early effects of climate change and ocean acidification,” Sakashita asserted. “It is here and now. It will get worse if we don’t put policy and practices in place to lower emissions and confront ocean acidification.”

- *Samantha Oester is a second-degree undergraduate student at GMU, majoring in conservation biology.*



*Mason Neck State Park, in southern Fairfax County, is on a peninsula formed by Pohick Bay on the north, Belmont Bay on the south and the Potomac River on the east. Land was purchased over the years from the Nature Conservancy. The park connects with the Elizabeth Hartwell Mason Neck National Wildlife Refuge, which is more than 2,000 acres. The park opened to the public in 1985.*