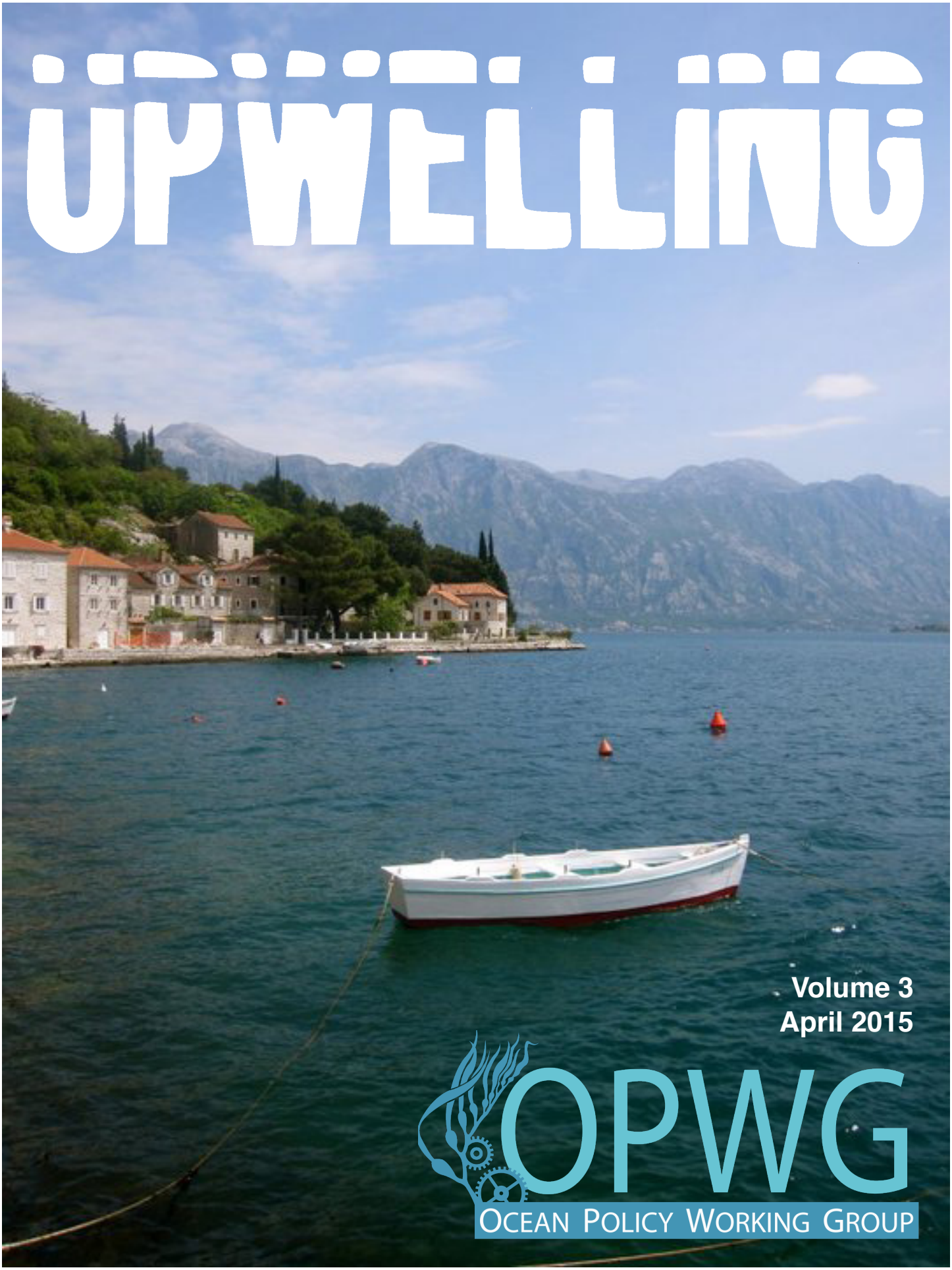
UPWELLING



Volume 3
April 2015

OPWG

OCEAN POLICY WORKING GROUP

OPWG
Ocean Policy Working Group

The Ocean Policy Working Group (OPWG) is a student organization at Duke University designed to facilitate cross disciplinary discussions on human interactions with the ocean.Throughout the academic year, the OPWG hosts a variety of events with the purpose of exposing the Duke community to pertinent issues in our oceans. This working group strives to be a hub for ocean resources.

Welcome to the third volume of Upwelling! We are delighted to share with you all again the thoughts, opinions, and research of members of the Duke community pertaining to the oceans.

This volume features the Master's Project abstracts from Nicholas School students, a piece dicussing Overseas Seafood Operations at Madagascar and also a reflection on *Blue Mind*. We are especially honor to have a MEM alumna, Jessie Ritter, to write about the role of Alaska and the Arctic in future environmental management. At last, to connect students to John Virdin, the new director of the Oceans and Coastal Policy Program at the Nicholas Institute, we have done an interview with him discussing his previous experiences and his visions of his work at the Institute.

We would like to thank the Nicholas School of the Environment, the Duke University Center for International Studies, and the Graduate and Professional Student Council for their support of the Ocean Policy Working Group.

Scarlet Cheng & Jaya Ghosh
OPWG publication Coordinators
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Photo by ***Julia Livermore***
A young bar jack feeding near the surface in Cozumel, Mexico. Bar jacks generally change their body color to black when they feed near the bottom, but remain silver while feeding at the surface.

Cover photo by **Maria Prebble**. This photo was taken during a walk on the beach in Lima, Peru. It was the weekend before Christmas, and the beach was crowded with families picnicing and swimming, and tourists wiping-out during surfing lessons.

Contents

Volume 3 | April 2015
http://sites.duke.edu/opwg/publication/

Photo by ***Meghan Rickard***
An adult humpback whale, *Megaptera novaeangliae*, breaching in Stellwagen Bank National Marine Sanctuary off the coast of Massachusetts.

New Face, New Visions: One-on-one with John Virdin

John Virdin is the new director of the Ocean and Coastal Policy Program at the Nicholas Institute for Environmental Policy Solutions.

In this interview, John Virdin shares his background in fisheries policy, visions of leadership at the Nicholas Institute, views on the future of our ocean and recommendations for students who wish to work in the ocean and coastal field.

Previous experience

Having started as a political science major at Wake Forest University, Virdin found a way to combine his interest in poverty reduction together with ocean and coastal management through a Duke summer program.

"The idea that I can marry my two interests in ocean environment and poverty reduction by focusing on helping countries manage their ocean resources better and more sustainably—yet generate more jobs, livelihood and wealth—was exciting," Virdin said. From there, Virdin obtained his Master's degree in Environmental Studies at Yale University and went on to work for the World Bank.

In his ten years at the World Bank, Virdin held various positions and gained extensive experience in fisheries management. Virdin was part of the team that persuaded the World Bank to get back into the fisheries business with a shift of focus from development to resource management.

"Basically what I was doing at the Bank was helping to develop and manage large investment projects with governments, this included helping them better manage their fisheries resources and conserve biodiversity in the ocean and coastal zone," Virdin explained. His work primarily focused on West Africa and the Pacific Islands; among all these countries, Virdin found Guinea-Bissau, a tiny country just below Senegal, particularly attractive. "… fantastic people there and it's a really beautiful country," Virdin described.

Future visions

Drawing on his experience in the World Bank, Virdin pointed out some issues that he would like to address as the new director of the Nicholas Institute's Ocean and Coastal Policy Program. These include: fisheries and food security; the blue economy and marine ecosystem services; and blue carbon.

As explained by Virdin, most of the challenges affecting the ocean's health and the ability of the ocean to deliver the goods and services we need are related to the way people use ocean resources and ecosystems. This is fundamentally a policy problem. Therefore, Virdin believes that policy reform is a key solution to these challenges.

"I think the Nicholas Institute can play a huge role (in bringing policy changes), that's one of the reasons why I am so excited to come here because what is really needed in the ocean space right now is policy reform," he said. The Nicholas Institute, drawing upon some of the world's best minds and expertise from throughout the university, can give key policy advice and help governments and stakeholders develop policy reform, act as an important bridge to the vast knowledge within the Duke community, and help connect such expertise to the policy makers around the world that need it.

"I think the Nicholas Institute can play a huge role (in bringing policy changes), that's one of the reasons why I am so excited to come here because what is really needed in the ocean space right now is policy reform."

Given the wide variety of ocean problems we are facing currently, focusing and prioritizing is of utmost importance. To start off his work at the Nicholas Institute, Virdin believes that it's critical to build upon the research that the faculty is currently doing and find ways to connect this information to real-world problems that many countries are facing.

Virdin is also particularly interested in building up a portfolio highlighting successful stories of ocean policy reform around the world, in order

to help leverage the finance and capital needed to implement policy reform. Innovative financing mechanisms—financial instruments that generate more public and private capital—can be useful tools for countries to fund ocean conservation projects and policies. The concept is relatively new in the ocean management field. Virdin would like to see the Nicholas Institute develop some metrics and tools needed to provide innovative financing for policy reforms and for them to be applied in a larger scale.

Ultimately, Virdin hopes to grow the Ocean and Coastal Policy Program in global scope by connecting different policy instruments that have worked around the world together.

"There is no one size fits all solution, but we can learn from examples of success around the world," said Virdin.

Future of our ocean

Human interactions directly and indirectly affect ocean health in various ways. Some of the most critical threats our ocean is facing nowadays include overfishing, degradation of natural habitat from coastal development, pollution, and climate change and ocean acidification.

"There is no better teacher than the experience gained by getting out there and seeing issues first-hand. Get your hands dirty and feet wet, find places where you can work on the ground and see these issues as they unfold."

Drawing from these four major threats, Virdin reiterates the importance of policy reform in institutions that govern human interactions with the ocean environment. Because he believes that policy reform is the key to solutions for ocean and coastal resource issues, Virdin is optimistic about the future well-being of our ocean.

"I don't think that we have passed the point of no return by any means," said Virdin. With successful stories of fish stocks bouncing back after reducing the pressures on them, the health of the ocean is not all gloom and doom.

Though Virdin is confident that there are many opportunities for policy reform, for some problems like sea level rise, adaptation would be the only solution. In these cases, reducing some of the other pressures exerted on the ocean would be the key.

"Keeping reefs and mangroves healthy is a great way to ameliorate, to some extent, the impact of sea level rise on the community," Virdin explained.

Advice to students

Lastly, Virdin stressed the importance of hands-on experience and how it can help build on classroom learning.

"There is no better teacher than the experience gained by getting out there and seeing issues first-hand. Get your hands dirty and feet wet, find places where you can work on the ground and see these issues as they unfold," Virdin said.

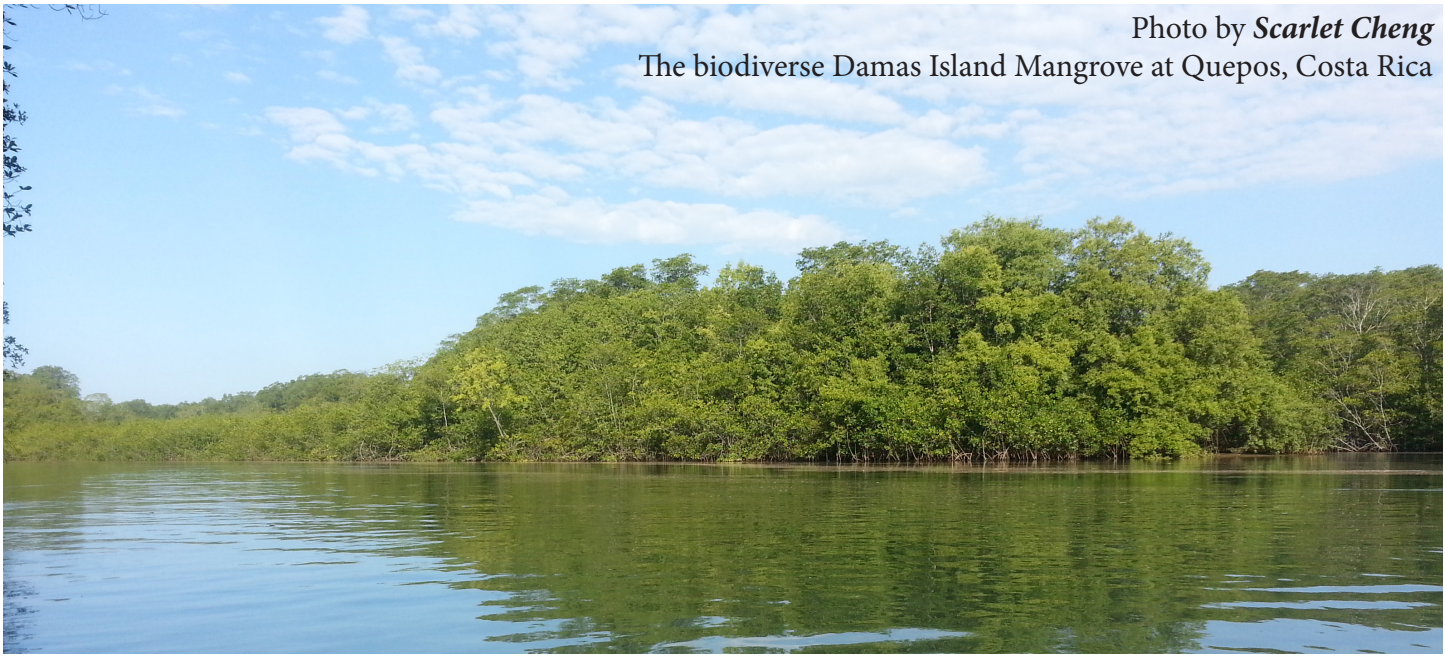


Photo by ***Scarlet Cheng***
The biodiverse Damas Island Mangrove at Quepos, Costa Rica

Looking North: Adventures and Changes in the Arctic

Jessie Ritter is a 2013 graduate from the MEM Program at the Nicholas School of the Environment and is also one of the founders of OPWG. She has recently completed a NOAA Sea Grant Fellowship with the Senate Commerce Committee, and is now a Policy Specialist with National Wildlife Federation.

Photo by ***Jessie Ritter***

The Taku Glacier, viewed here from above, is recognized as the deepest and thickest glacier in the world. Because more snow accumulates than ice melts from the glacier each year, this is one of the few glaciers in Alaska is not receding due to the impacts of a warming climate.

I braced myself for take off, gripping the seat edge and the plastic handle next to the window in the tiny four-seat float plane. Moments later we were in the air, with downtown Juneau falling out of view as we rounded a mountain corner. Our guide yelled over the engine, pointing out the expansive blue-white blanket of the Taku glacier as we passed over. While there are an estimated 100,000 glaciers in Alaska, the Taku is one of the few that isn't steadily receding due to the impacts of climate change.

About half an hour later we landed on the Taku River, where we were taken by Alaska Department of Fish and Game staff to see the fish wheels at work. Built along the sides of the river, these large, rotating cages capture salmon as they swim upstream to spawn. Several times a day, researchers stationed out in the field measure and tag the captured fish. The data is used to ensure that escapement goals set by AK Fish and Game and the Pacific Salmon Commission are met, with an adequate number of salmon crossing into Canadian waters.

The colorful Chinook and sockeye salmon were impressive, but I was even more amazed by the researchers tagging the flailing, determined fish and releasing them back to the river. These people spend several months each year camped along the Taku in order to complete this research.

Photo by ***Jessie Ritter***

Thousands of salmon reared in and released from the Macaulay Salmon Hatchery in Juneau return to the hatchery as adults to spawn, just as wild salmon do their native rivers.

Though Juneau is only 30 minutes by plane, the place feels incredibly remote and pristine, removed from any sort of civilization.

I was confronted by similar realizations time and time again during my two weeks in the state. I knew, of course, that Alaska is immense – over twice the size of Texas. But knowing it to be true and experiencing it are two very different things, and on multiple occasions I was left breathless by the sheer vastness of the landscapes, and, for lack of a better descriptor, the enduring wildness of the place.

The beautiful open spaces and diffuse communities of Alaska couldn't seem farther removed from the bustling, crowded, and (at times) stuffy city of Washington, DC that I now call home. Yet, on Capitol Hill and in the broader environmental policy community, Alaska has taken center stage in recent months. With climate change altering the Arctic landscape and opening up new potential routes for maritime transport, and persistent industry interest in developing offshore oil and gas resources in the inhospitable Beaufort and Chukchi seas, the U.S. finds itself in largely untrodden territory. Controversial actions recently taken by the Obama administration, including a proposal to permanently ban oil drilling in the Alaska National Wildlife Refuge's coastal plain, have prompted considerable discussion about priorities in managing Arctic resources. Further, with the United States' upcoming Chairmanship of the Arctic Council from 2015-2017, we now have a unique opportunity to guide international discussions surrounding environmental protection and sustainable development in the Arctic, the wellbeing of native communities, and the importance of scientific research and cooperation.

I'm fascinated by these discussions because it's all evolving now, in real time, at the international level in a very tangible way. Uniquely, we have an opportunity in the Arctic to do this right from the get-go – to be proactive and farsighted in our environmental management. The actions we take in the Arctic will have severe repercussions on our oceans, our climate, and our nation's economy writ large. Though it may seem worlds away, how we choose to conduct ourselves in this icy, uncharted territory will reverberate globally for decades to come. It's an important time for us all to look north.

Above:
Photo by ***Jessie Ritter***

Matanuska Glacier, about 100 miles north of Anchorage, is 26 miles long and 4 miles wide at its terminus.

Right:
Photo by ***Jessie Ritter***

The Taku River fish wheel is operated by the Alaska Department of Fish and Game to estimate spawning and ensure that salmon escapement goals are met each year.

Spotlight on Master's Projects

As a prerequisite for graduation from the Nicholas School of the Environment, each student completes a Master's Project, an opportunity to apply knowledge from the classroom to real-world analyses. Here are the abstracts from four graduates of the class of 2015.

Dock to Doorstep: Community Supported Fishery (CSF) Programs in the United States & Canada

by Alexis Bolton MEM'15 **Advsior: Dr. Xavier Basurto**

In response to an increasingly globalized seafood industry, Community Supported Fishery (CSF) programs have gained popularity over the last decade. Based loosely on the Community Supported Agriculture (CSA) model, CSFs alter the traditional seafood supply chain by connecting fishermen more directly to consumers. While there are a number of potential benefits to this direct marketing strategy, CSF programs can vary with respect to their goals, institutional structure, sourcing practices, distribution methods, and supplementary seafood sales, which may result in differential benefits to consumers and harvesters. To further investigate these differences and why they may occur, I conducted phone interviews with 22 CSFs, representing 56% of the CSFs currently in operation the United States and Canada. Results indicate CSF programs are diverse and greater consideration should be taken to understand the potential benefits of each unique model.

Photo by ***Ashleigh McCord***

Starfish at sunset

Photo by **Ashleigh McCord**

Shells on beach

Utilizing Mobile Apps for Marine Conservation Efforts

by Courtney Edwards MEM'15 **Advisor: Dr. Dave Johnston**

With 75% of Americans owning a smartphone, such devices and subsequent apps are effective, but underutilized resources to promote marine conservation issues. This project consisted of three components. First, I built a web-based app called The Nai'a Guide based off an existing app to educate those looking to participate in swim-with Hawaiian spinner dolphin programs about the biology of the animal and proper interaction etiquette. This type of app has many advantages for organizations looking to design similar apps, including responsiveness across multiple device types and platforms and ease of use for non-developers. Second, I searched iTunes and Google Play to determine the number and relevance of apps using four keywords. I found environmental conservation apps make up an insignificant portion of the total apps available and a vast majority of the search results are not relevant. Finally, I did a series of interviews with organizations that have relevant apps available to learn more about their outreach strategy, resulting in a number of key recommendations for future app development.

Evaluating the potential for using species presence data collected by commercial fishermen for species distribution modeling in the Gulf of Maine

Julia Livermore MEM'15 **Advisor: Dr. Patrick Halpin and Kathy Mills**

Fishermen and scientists have noted that fish species distributions are changing along the Northeast Continental Shelf. NEFSC trawl survey data have been modeled to demonstrate these distributional shifts in species assemblages, but many New England fishermen argue that the survey has failed to identify certain changes. Data collected by fishermen themselves may be suitable for gaining a deeper understanding of moving fish populations. Trawl data were used to produce a baseline maximum entropy model of red hake habitat for comparison to maximum entropy models made using a proxy for fishermen's citizen science data. Data from fishermen are suitable for presence-only species distribution models, though the distribution of fishing effort and therefore the areas in which fishermen might collect data have profound effects on the model outputs.

TAKING STOCK: Community perception of a mangrove restoration and alternative livelihood program in the Verde Island Passage, Philippines

by Shannnon Switzer MEM'15 **Advisors: Drs. Xavier Basurto & Lisa Campbell**

Community-based management has a long history in the Philippines, especially when it comes to marine resources. The Verde Island Passage (VIP), located in the northern Philippines and dubbed the "center of the center" of the world's marine biodiversity, is no exception. This case study looked at community perception of a mangrove protected area located in the VIP, in the small barangay (village) of Silonay, within the province of Oriental Mindoro. Using the Community Voice Method, this project sought to reveal the community's perception of the current state of Conservation International's mangrove restoration and alternative livelihood program established several years earlier. This study represents the first time CVM has been implemented specifically as a program evaluation tool.

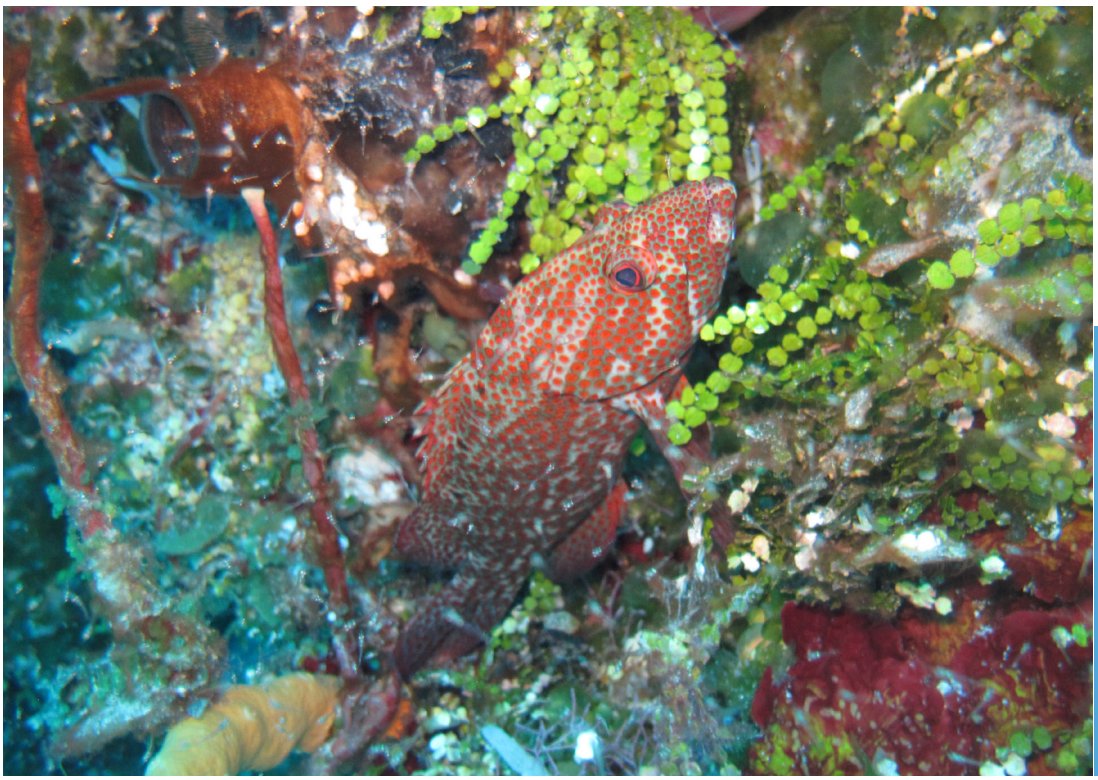


Photo by ***Julia Livermore***

A graysby resting against the reef. Graysbys are in the grouper family but generally stay very small. They are benthic during the day, usually resting their pectoral fins on reef structures, but move up the water column at night to hunt.

Les Gambas de L'Ankarana

Chelsea Clifford is a 2nd year PhD student in the Environmental Science and Policy Division. Her research focuses on artificial aquatic systems, like ditches. More broadly, she is interested in the interdependence of human and non-human nature, particularly in human-dominated spaces, and how water connects ecosystems.

"With utmost regard for the environment," Overseas Seafood Operations (OSO) works for "the protection of coastal areas, mangroves, and natural marine nurseries," and "provides support... for the implementing, establishment, and maintenance of social infrastructures."[1]

In fall 2008, this statement lured me to Les Gambas de l'Ankarana (LGA), a 425 ha shrimp farm in northwestern Madagascar owned by the European company OSO. I had learned the devastation of estuaries and coastal communities wrought globally by pollutant-spewing shrimp basins in former mangrove swamps. However, OSO's shrimp have French Agriculture Biologique (AB) organic status, and UNESCO[2] and many journalists have recognized OSO's sustainability efforts, so I thought LGA would demonstrate shrimp farming done right. The more complicated reality included serious socio-environmental problems, and reminded me not to believe everything I read.

Surprised, at first I suspected translation problems. Then, a foreign LGA executive ranted to me in perfect American English about the laziness, backwardness, and ingratitude of the local Malagasy. He bragged of turning down the youngest child prostitutes, and predicted the promiscuity of his own three-year-old half-Malagasy daughter. This executive confirmed Malagasy complaints of LGA importing employees rather than hiring locals, contrary to promises, and of failing to respect Malagasy taboos and sacred places.

When I told local fishermen that a Malagasy LGA representative had assured me that the farm did not drain its effluents into the local Tenga ny Ankarana river, the fishermen paddled me from that river through a drainage ditch into the farm. Residents of the village at

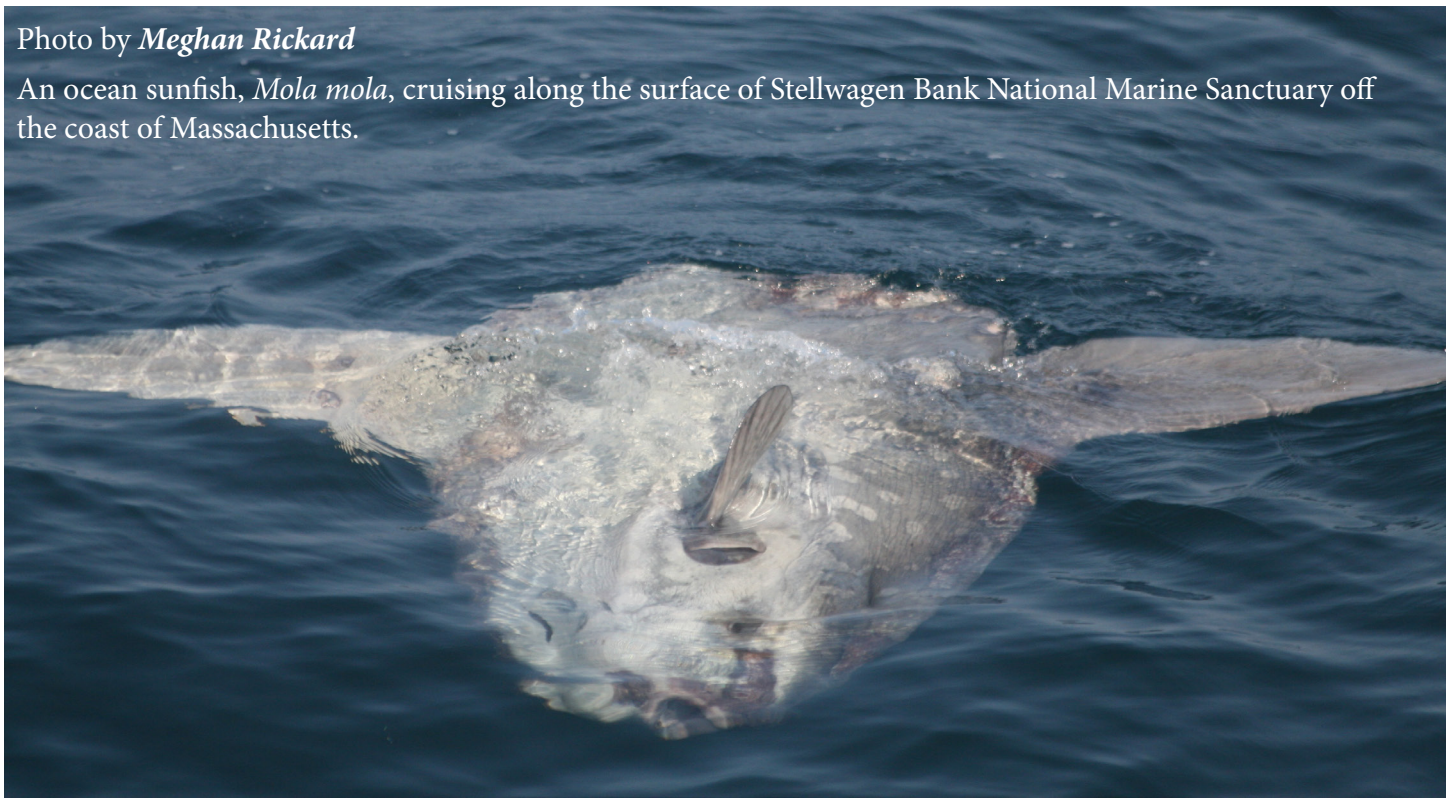


Photo by ***Meghan Rickard***

An ocean sunfish, *Mola mola*, cruising along the surface of Stellwagen Bank National Marine Sanctuary off the coast of Massachusetts.

the mouth of the Tenga ny Ankarana, Ambavanankarana, complained that they used to drink from this river, but since the construction of the farm and company village Ampapamena upstream, the water sometimes smelled of gasoline and chemicals, and made them sick. Villagers also described a few incidents in which clouds of gas that made them cough drifted from the shrimp factory. A European LGA executive admitted that one gas escape had occurred, but insisted that the gas was a harmless refrigerant, quickly cleared up.

As for the mangroves, satellite imagery suggests that OSO built the farm in a mud flat, not a deforested mangrove swamp. However, a local environmental official and villagers agreed that LGA contributes substantially to net local mangrove deforestation indirectly, by buying posts to support the sides of shrimp basins. Fishermen and homebuilders demonstrated to me that the sizes of mangrove wood that they use differ from the distinctive posts LGA buys. Afterwards, I noticed piles of LGA-style posts brought in and stored seemingly everywhere. Local fishermen complained of declining harvest in the region, which they blamed on mangrove deforestation, bycatch from water pumped through the basins (which I did observe), and an influx of people looking for jobs.

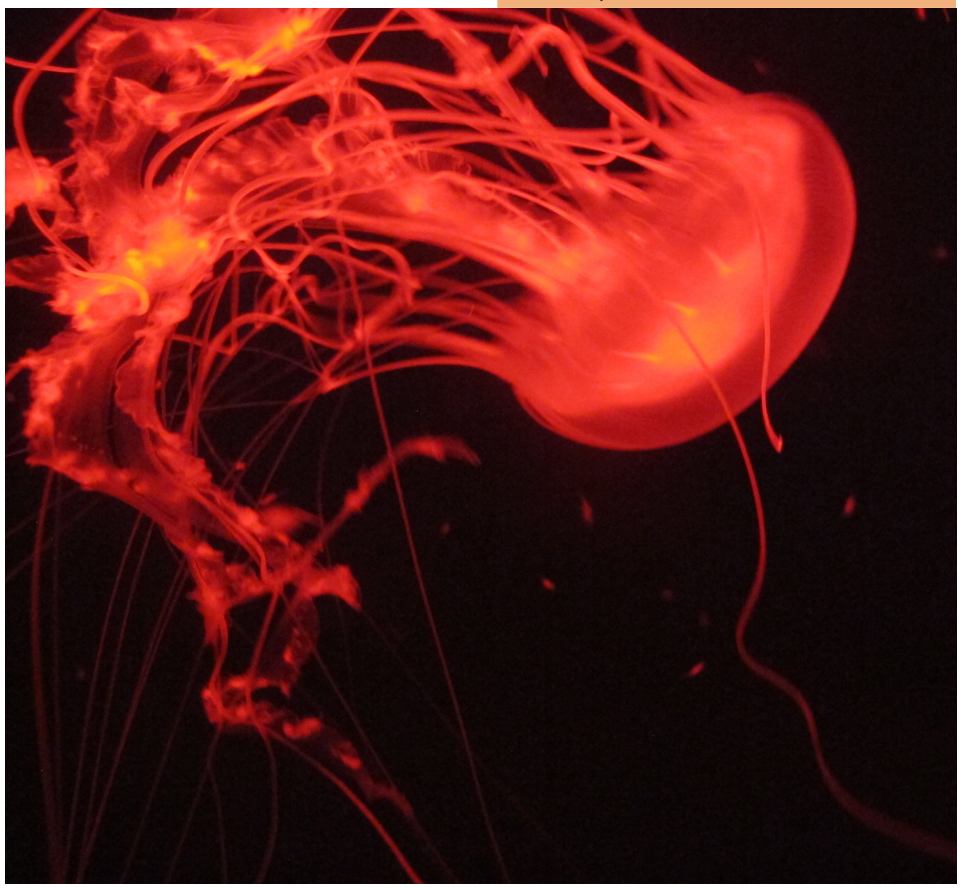
In theory, government oversight, local community resource management boards, and collaboration with NGOs like the World Wildlife Fund exist to mediate environmental and stakeholder interests. However, in practice, LGA appeared to have few limitations on its power over the region, a situation bound to foster resentment, if not outright abuse. Even the European press appeared to have accepted the view LGA staff provides of the farm, without digging further. In fairness, when I asked around, I also heard many reports corroborating LGA's philanthropy. LGA has donated to schools and provided low-cost drinking water to Ampapamena, limited medical care for all local villages, and material support of Ankarana royal ceremonies. However, the Ankarana complained that LGA's negative effects upon their environment and livelihoods outweighed these benefits. What I saw led me to seriously mistrust what I read about sustainable operations in remote locations in developing countries.

1. "OSO." 2008. Overseas Seafood Operations. 3 Nov. 2008. Available WWW: <http://www.madagascar-gambas.com>

2. Our Natural Resources Sustainable Management." 2015. Overseas Seafood Operations. 18 Mar. 2015. Available WWW: <http://www.madagascar-gambas.com/en/index_en.htm>

Photo by ***Julia Livermore***

A lion's mane jellyfish suspended over red light. The lion's mane jellyfish is the largest species of jellyfish, growing up to 6 feet in diameter and 100 feet in length! This is just a little one.



Reflections on *Blue Mind*, Just in Time for Earth Day

Bette Rubin is a first-year Master of Environment Management student at the Nicholas School of the Environment, concentarting in Coastal Environmental Management. She is also the Action Team Coordinator in Ocean Policy Working Group.

On March 23, MEM alumnus Wallace 'J' Nichols visited Environment Hall to speak with some CEM students. Nichols received his Master of Environmental Management in 1992, before a CEM program existed. Still, he spent time at the Marine Lab in Beaufort, and concentrated on coastal and ocean issues. Nichols has made waves over the past few years with his groundbreaking concept (now also a New York Times bestselling book) of Blue Mind, the blending of water and neuroscience. Specifically, Nichols's theory is that humans are strongly influenced - physically and mentally – by water. People tend to be happier and healthier when they are in, on, or near water. Of course, this comes with a caveat: obviously, if the source of water is a leaking pipe, or a flooded town (in other words, water with a negative association), the theory does not hold true.

Sitting down to lunch, J asked us to each say the first emotion that came to mind that best explains our intentions for pursuing an MEM degree, and what keeps us pursuing our coastal interests. He listened intently, and responded to every student with a unique, thought-provoking idea. Constantly advocating for the incorporation of neuroscience into every other aspect of our lives, it was quite inspirational to hear his thoughts on each person's motives.

With slight trepidation, we each told J (and each other) what brought us to this program. More than a few of us prefaced with sayings like, "this might sound stupid, but…" and "this is really embarrassing, but…" At one point, J told us that when he hears things like that, he knows it's time to pay special attention. That usually, we only admit to being embarrassed or saying something foolish as a way to protect ourselves from feeling too vulnerable. Saying "I know this is dumb, but…" is like a security blanket: it makes us feel better before we expose our deepest

Photo by ***Alyssa Dykman***

A sea of Yellow-Tailed Fish in North Stradbroke Island, Australia

and most honest feelings. This is exactly why J listens closely: it is when we reveal the foundation of who we are, and why we're here. He aptly pointed out that scientists are often discredited or ignored when they incorporate emotion into their work. Scientists are supposed to follow the facts, and leave all emotion at the door. Yet ironically, most scientists probably wouldn't be doing what they do if they didn't actively want to do it for one reason or another. It is that emotion – whatever emotion it is – that brought scientists to their fields and keeps them working on important issues that people should care about. So in a way, we do a disservice to ourselves and to science by trying to ignore the underlying emotion.

So this Earth Day, do yourself – and everyone around you – a favor by being honest and emotional. Tell people your story. Explain what drove you to pursue your degree, what brought you to Duke, and what keeps you going at 2am in the computer lab, working on GIS, filling out FAFSA forms and looking at your bank account to see how much money you have left to spend on a beer or two this month. We are grad students – largely in debt, sleep-deprived, and stressed out. But we are also willing to accept these conditions – why? We each have our reasons. Share yours. You might inspire others to pursue their dreams, or to want to save the world, to do their part, to recycle, compost, turn the lights off, take faster showers, eat locally-sourced food… the list goes on and on. If you can get one person to modify one behavior – or even consider modifying a behavior – you are contributing to the mission of the greater NSOE community, and all environmental students and professionals everywhere. Don't discount the emotions that spur your life goals; embrace them. Giving others insight into your motivation just might ignite a new flame in someone else. And that is the best way to participate in Earth Day.

Photo by ***Julia Livermore***

A spotted cleaner shrimp among the tentacles of a giant Caribbean sea anemone. These shrimp sway their bodies and wave their antennae to attract fish from which they eat dead tissue, algae, and parasites.

Photo by ***Alyssa Dykman***

Blacktip Reef Shark in Beqa Lagoon, Fiji

Get Involved!

The Ocean Policy Working Group publication, Upwelling, is a semi-annual publication with the purpose of showcasing the work of members of the Duke community as related to the oceans. We are interested in any **short research articles or OpEds (500 words or less for both)** on ocean policy-related subjects as well as any **ocean-related pictures** to publish. We welcome work from **graduate students, researchers, alumni, and professors**.

If you are interested in contributing to the upcoming edition, or if you have any questions about the publication, please contact us at **dukeOPWG@gmail.com**.

For more information, visit:
http://sites.duke.edu/opwg/publication

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