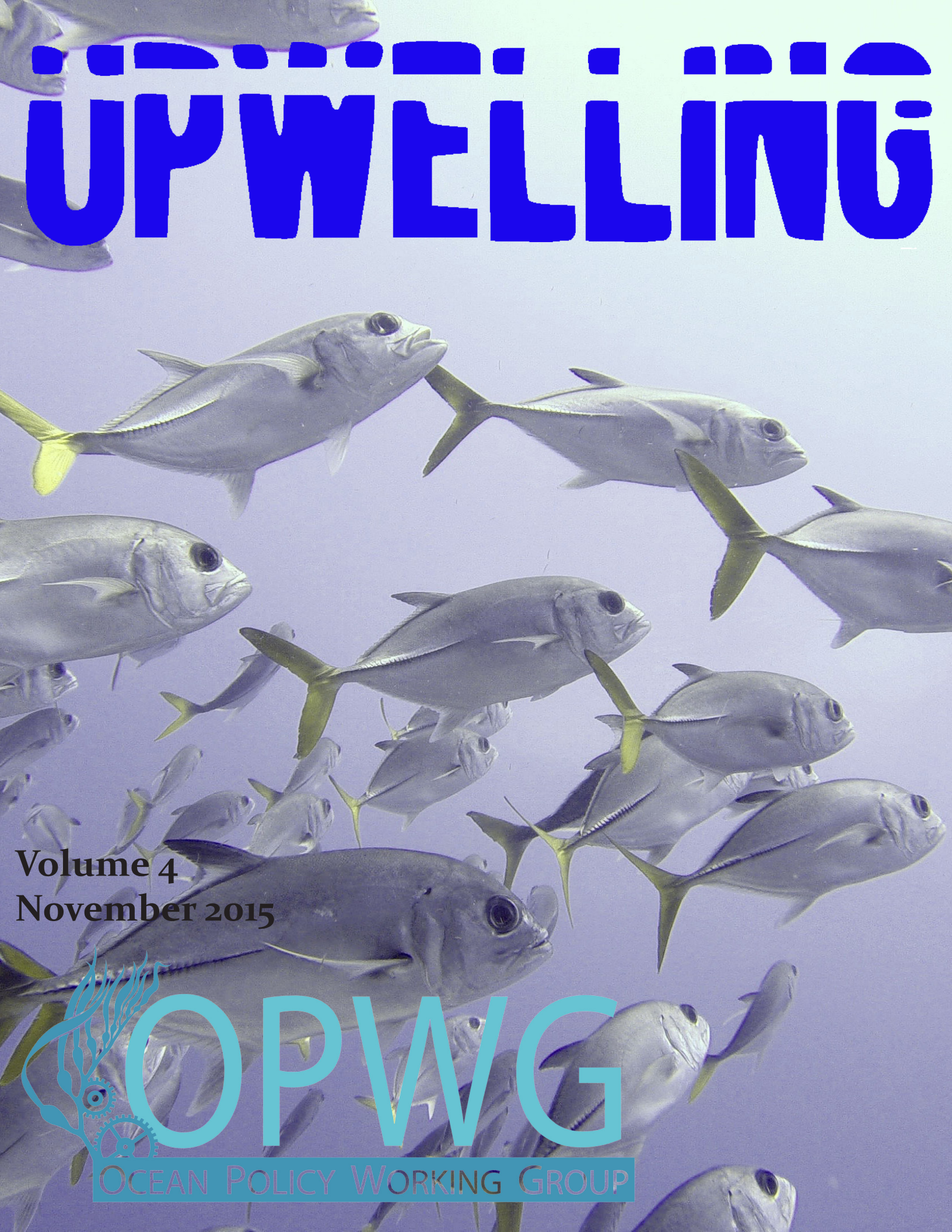
UPWELLING



Volume 4
November 2015

OPWG
OCEAN POLICY WORKING GROUP

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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.

Letter from the Editors:

Welcome to the fourth volume of Upwelling! We are delighted to share with you the thoughts, opinions, and reserach of members of the Duke community pertaining to the world's oceans.

This volume features a piece about ending illegal fishing by the the director of the Oceans and Coastal Policy Program at the Nicholas Institute, two pieces pertaining to the effects of traditional culture on ocean and coastal resources, including the perceptions of shark fin soup on shark populations in Hong Kong and of mangroves in Costa Rica and their surrounding communities. This volume also features the introduction of the new OPWG coordinators. For visual works, we include a wide array of photos that capture both the beauty and the essential functions that our oceans provide, including everything from recreation and wildlife to food subsistence and industry.

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 & Emily Hall
OPWG Publication Coordinators
dukeOPWG@gmail.com

Photo by ***Heather Afford***

Photo by ***Juli Mayhew***

Cover Photo: ***Juli Mayhew***. A school of jacks circle near the wall on the east side of Glover's Reef, an atoll that is part of Belize's barrier reef system

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Photo by ***Alyssa Dykman***
"A kayaker ponders the rapids of Great Falls" Great Falls Park, McLean, Virginia, USA

Meet the OPWG Coordinators

Brianna Elliot

Spending her summers growing up on the North Carolina coast, Brianna saw her first sea turtle nest hatch at age 10 and has been hooked on the ocean since then. She graduated in 2012 from the University of North Carolina Wilmington with a B.S. in Environmental Science, and spent her summers in college conducting fieldwork on sea turtles and shorebirds in Florida and North Carolina. After becoming interested in science outreach during her time interacting with the public in the field, Brianna moved into environmental journalism. She comes to the Nicholas School after working full-time as an editor for Oceana in Washington, D.C., and has also written for Audubon, NRDC and HuffPost Green. Now, Brianna is a first year Master of Environmental Management student at the Nicholas School of the Environment at Duke University and is planning on focusing on sea turtle conservation and biology.

Caitlin Starks

Caitlin grew up in dry, landlocked Phoenix, AZ and received her Bachelor of Science degree in Natural Resources from the University of Arizona in 2012. Before deciding to pursue a graduate degree, she enjoyed a variety of work experiences including wildlife research with the Arizona Game and Fish Department, volunteer work with a small marine conservation NGO in Chile, chasing frogs around Wyoming, and captive breeding programs for Arizona endangered species at the Phoenix Zoo. During her time in the workforce Caitlin realized she wanted to focus her career in marine spatial planning and community-based management of coastal resources in Latin America, so she became a MEM student in the Nicholas School at Duke.

Ashley Gordon

Ashley graduated from Miami University (OH) in the spring of 2015 with a Bachelor of Science in Zoology and Environmental Science. She is currently pursuing a Masters of Environmental Management with a concentration in Coastal Environmental Management. Through her undergraduate courses and research experience with NOAA along the coast of New Jersey, Ashley became interested in the impacts of climate change on coastal habitats and the use of spatial analysis tools for conservation. In her free time, Ashley enjoys running, snorkeling/ scuba diving, painting, and looking at pictures of baby sloths.

Nick Alcaraz

Nick graduated from U.C. Santa Cruz with a Bachelor's of Science in 2011. While working as an animal trainer in a marine mammal physiology lab, he developed an interest in the effects of anthropogenic noise on cetaceans. Nick assisted as a volunteer on several sound-related studies in the United States and Australia. Recently, he worked for a non-profit as a policy advocate raising awareness about endangered marine mammals. Nick hopes to become a consultant or researcher. He enjoys riding bikes, watching sports, and finding new places to eat around Durham.

Justin Pearce

Although originally from Miami, Justin had been living and working in Los Angeles for over a decade before coming to Duke. Somewhat abruptly, he decided to leave his entertainment industry pursuits behind to finish his undergraduate degree. In May 2015, he graduated from the University of Southern California with a B.S. in Environmental Studies. Through his research at USC, he was able to further his interests in fisheries, ecosystem-based management, coastal management, and marine spatial planning. After graduating from Duke, he hopes to work in the public sector where he can affect marine policy in order to better manage the natural resources off of our coast.

Emily Hall

Emily graduated from the SUNY College of Environmental Science and Forestry, majoring in Conservation Biology and minoring in marketing. Her past experience includes interning at the Riverhead Foundation for Marine Research and Preservation, where she aided in the rescue, rehabilitation, and release of marine mammals and sea turtles off the coast of Long Island, New York. She also gained some experience in research and science communication through her work at the College of Charleston, where she studied the effects of ocean acidification on sea urchins and their genetic resilience. Currently pursuing a Masters of Environmental Management concentrating in Coastal Environmental Management, her interests lie in coastal and marine spatial planning.

Photo by ***Sarah Deland***
One of the lighthouses in the San Juan Islands in Washington State

We can end illegal fishing in the ocean

This article originally appeared on The Hill and was written by ***John Virdin***. John is the director of the Ocean and Coastal Policy Program at Duke University's Nicholas Institute for Environmental Policy Solutions.

The killing of Cecil the lion has thrust the issue of wildlife crime into the international spotlight. And for good reason: wildlife crime is a highly profitable form of global organized crime that imperils precious natural resources and, at a minimum, offends our sense of equity and fair play. Far less publicized is that some of the largest volume of such crime happens not on land but in the sea through illegal fishing.

Overfishing is a key environmental challenge of our time. Experts estimate that, globally, 29 percent of assessed fish stocks are biologically overfished—up from 10 percent in 1970. Illegal, unregulated, or unreported fishing is a large contributor to this problem.

I've been working with governments to improve fisheries management for more than 10 years and have seen the devastating effects of illegal fishing, particularly by large vessels, on fish stocks, the environment, and the economies of coastal communities in places like Sierra Leone. However, in the past six months, I've noticed a convergence of improved surveillance technology, public awareness, and government interest that has given me hope that we can turn the tide on illegal fishing.

Technology for tracking fishing vessels is improving and its use is expanding. Many governments are requiring fishing vessels to use satellite transponders and are tracking the vessels' movements, even in the most remote locations of the sea. In May, I sat in a room with fisheries officials on a tiny Pacific Island watching a screen with real-time positions of fishing vessels throughout the country's waters, thanks to the region's satellite monitoring system. Finding vessels that do not use satellite transponders could soon become easier thanks to new initiatives. For example, Google, Oceana, and SkyTruth are developing a tool that will capture and publicly display satellite feeds from a system used by almost all ocean-going vessels—a tool that can classify the vessels' movements as "fishing" or "non-fishing." Fishermen also have new tracking tools. Off the coast of Liberia, some have used smart phones equipped with a trawler-spotter app to send government authorities both global positioning data and photos of vessels fishing illegally.

Consumers are increasingly checking eco-labels to see whether their seafood has been sustainably harvested. Major retailers such as Costco and Walmart have committed to stocking their shelves with eco-labeled seafood products. The number of seafood products certified with the Marine Stewardship Council label has grown exponentially in the last five years. The products bearing that label or in the process of review to obtain it represent more than 10 percent of the global fish catch.

Governments are taking illegal fishing seriously. Since mid-2014, Indonesia has dramatically increased surveillance and sanctions of illegal fishing vessels in its waters, in some cases sinking the boats after clearing their crews. In 2010, the European Union passed

a regulation requiring seafood products entering its market to be certified as legally caught by the country from which the products are exported or in which fishing vessels are registered. That regulation has increased enforcement in countries supplying the European market. Last year, the United States created a presidential task force to develop a plan to combat illegal, unreported, and unregulated fishing and seafood fraud. That group recommended measures to increase satellite tracking of fishing vessels and improve tracking of fish from boat to plate.

New monitoring technologies, greater awareness in the marketplace, and serious commitment (and action) by governments are real progress. But actually ending illegal fishing will require more. For example, governments could take a simple and virtually cost-free step: publicly disclosing the vessels they have licensed to legally fish in their waters. I've seen that one action significantly curb illegal fishing in West Africa, and I hope more governments will make the commitment to fishing transparency at the Our Ocean conference in Chile this October.

Ending illegal fishing has been a goal of the international community for decades, but for the first time it may just be achievable with the cooperation of all stakeholders: communities, consumers, companies and governments. We've thus far proved unequal to the task of protecting many of our charismatic land animals, like Cecil, but we're now in a position to better protect the fish in our oceans—and, in the process, to sustain a valuable source of food and livelihoods for millions.

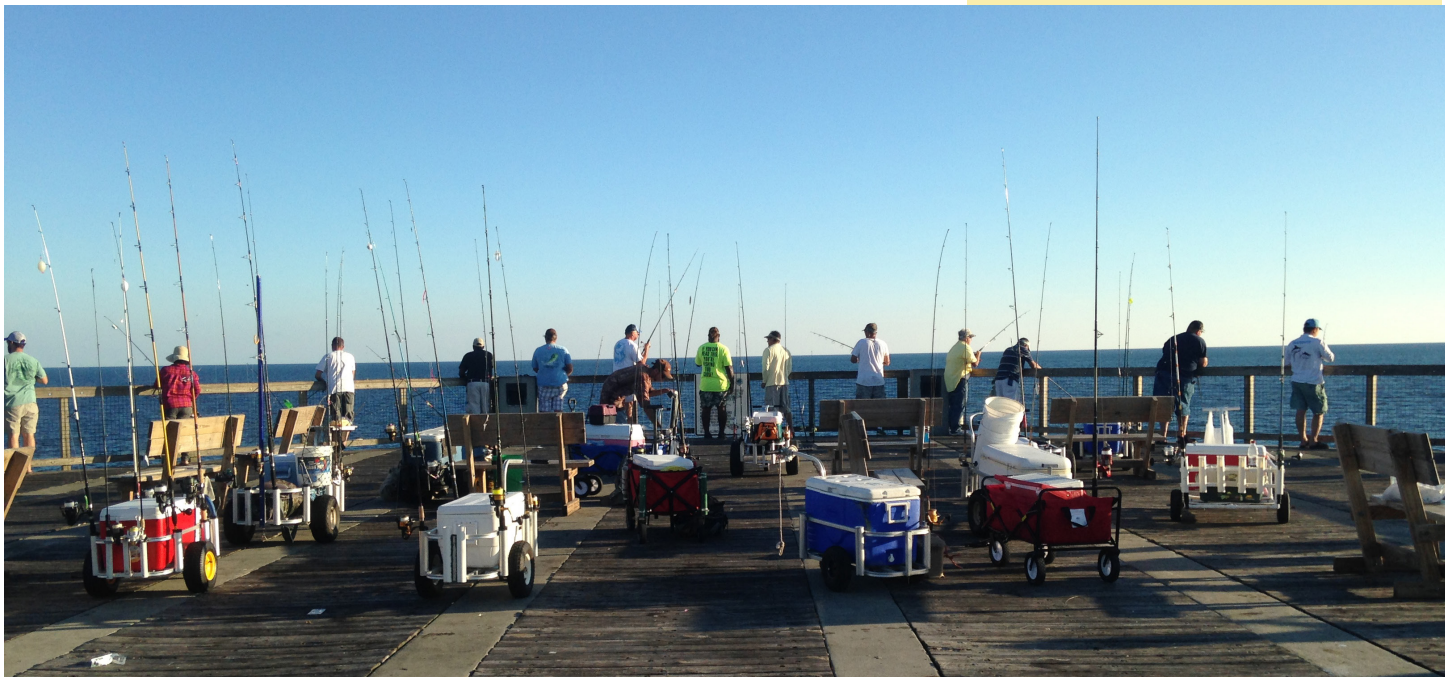


Photo by ***Heather Afford***
Navarre Beach Fishing Pier in Florida

Above:
Photo by ***Justin Pearce***
"My lunch break in Palau" -- This photo was taken on a break from underwater research being conducted during an undergraduate field course.
Below:
Photo by ***Sarah DeLand***
A blue button jellyfish on the beach on Shackleford Island, near Beaufort, NC.

Below:
Photo by ***Heather Afford***
Aligator River: Here's an alligator sitting close to the river bank in Puerto Jimenez, Costa Rica. What you can't see is why the alligator sits so close to the bank, and why are alligators so abundant there. Costa Ricans often come here with tour groups and they throw out meat to attract these creatures, which could cause future consequences to the alligators if such human behavior was to stop.

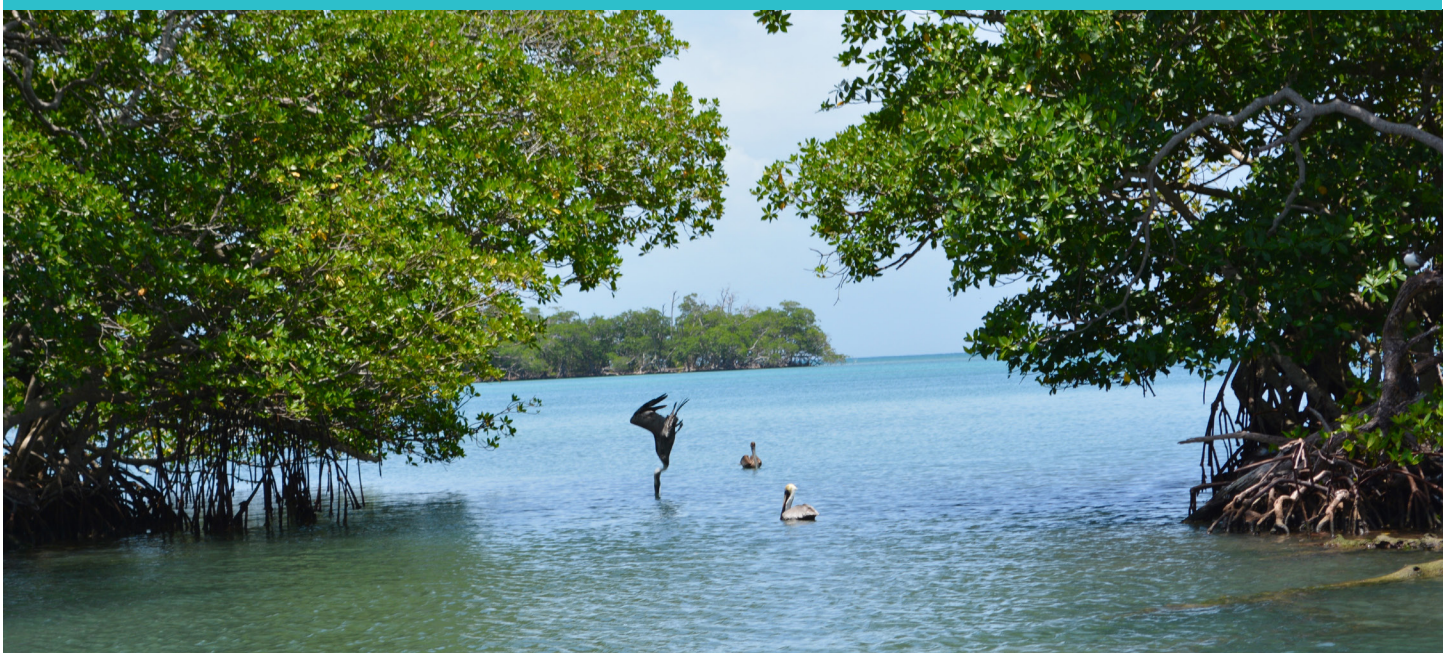
Shark fin soup: A brutal oriental delicacy

Scarlet Cheng is a second-year Master of Environment Management student at the Nicholas School of the Environment, concentarting in Coastal Environmental Management.

I believe most people who are reading this article haven't ever tried shark fin soup in their lives and would say 'ewww' just by the idea of it. However, on the other side of the globe, shark fin soup is one of the most commonly served dishes at weddings, celebrations and banquets, and the dish is enjoyed by a lot of people. Personally, I had no problem eating shark fin soup until I learned about the facts behind this Chinese delicacy in an article when I was in high school. After that, all I could think of were sharks being brutally slaughtered by fishermen for their fins and I stopped eating shark fin soup all together.

In case anyone would like to know, shark fin itself is tasteless and its texture is in between crunchy and chewy. The taste of the soup mainly comes from the soup base, and common ingredients include mushroom, chicken breast, ham and chicken stock. This delicacy originated from the Ming Dynasty in the 15th Century. Because shark fins were expensive and rare, only the elites and the wealthy were able to afford it, so it was considered a luxury food item. Being able to serve shark fin soup at weddings or banquets reflected the social status and wealth of the host and it also represented the host's respect to his/her guests. However, this has changed over time. With mainland China's economy growing quickly in the past few decades, the emerging middle class are also able to

Photo by ***Juli Mayhew***
A pelican dives for fish in the mangrove-dominated cayes off the coast of Belize.



afford shark fin soup, and so, the demand and popularity of the dish have increased drastically. Unfortunately, even with increasing availability, the traditional belief that serving shark fin soup at weddings and banquets symbolizes wealth and generosity is still prevalent, especially among the older generations.

The misleading name of shark fin in Chinese might also be a reason for the problem. Shark fin is called "Yu Chi" in Chinese, which translates directly to "fish wing" in English. According to a survey conducted by WildAid in 2006[1], there was a gap between people's perception and facts about sharks and shark fins. The survey results showed that 75% of the respondents did not know that "Yu Chi" are indeed shark fins; also, 19% of the respondents thought shark fins are able to grow back.

Luckily, this phenomenon has started to change in recent years. Green groups like WWF and Hong Kong Shark Foundation have been running education programs to educate the public about shark fin soup. Now more and more people realize the brutality involved with the collection of shark fins and have stopped eating shark fin soup. Because weddings are one of the most common events where shark fin soup is served, green groups have also implemented Shark-free or Fin-free Wedding Program, where they encourage wedding couples to replace shark fin soup with alternatives.

Photo by ***Alyssa Dykman***
"The many shades of blue on a lazy afternoon" Nacula Island, Yasawa, Fiji

Pressure from green groups has also lead to global hotel companies like Starwood and InterContinental Hotel Group to stop serving shark fin related food items in their restaurants. Also, airline companies like Cathay Pacific, American Airlines, and Air New Zealand have banned all shark fin cargo. All these measures showed positive results. According to WWF Hong Kong[2], data in 2013 revealed that import of shark fins to Hong Kong experienced a 35% fall, compared to the previous year. Shark fins are usually further processed in Hong Kong before being re-exported to mainland China, and mainland China has always been Hong Kong's biggest shark fins re-export market. However, there was a 90% decrease in re-export volume in 2013 (from 1.2 million kg in 2012 to 113,973 kg in 2013), indicating a declined demand in mainland China. More importantly, a significant shift in attitude towards shark fin soup was observed among Hong Kong citizens. Based on a study conducted by marine conservation group Bloom and the University of Hong Kong[3], 92% of the respondents believed that it is acceptable to exclude the dish from weddings or celebrations.

It is truly encouraging to see such a change in people's perception of shark fin soup and its corresponding consumption behavior. With more and more people realizing that eating shark fin soup does more harm than good, hopefully one day, sharks can only be found where they truly belong - in the sea, rather than on the dining table.

[1] http://www.wildaid.org/sharks

[2] http://www.scmp.com/news/hong-kong/article/1469412/hong-kong-shark-fin-imports-fall-35pc?page=all

[3] http://www.natureworldnews.com/articles/14288/20150423/progress-fewer-people-want-shark-fin-soup.htm

Photo by ***Emily Hall***
A sunset over Charleston Harbour, Charleston, SC

Above:
Photo by ***Juli Mayhew***
A spotted eagle ray scoops up part of a lobster tossed overboard by local fishers. Several Belizean fishing boats would anchor off the Silk Cayes to clean the day's catch, attracting spotted eagle rays, southern stingrays, loggerhead sea turtles, and nurse sharks.

Below:
Photo by ***Alyssa Dykman***
"The many shades of blue on a lazy afternoon" Nacula Island, Yasawa, Fiji

Hidden cultural tensions surrounding mangrove reforestation in Costa Rica

Heather Afford is a second-year Master of Environment Management student at the Nicholas School of the Environment, concentarting in Coastal Environmental Management.

"Why not here?" was the usual question asked by research assistants like myself on the "Mangrove Days" our organization, LAST (Latin America Sea Turtles) which is part of the larger organization, Wider Caribbean Sea Turtle Conservation Network (WIDECAST), ran throughout the year along the Golfo Dulce coast in Costa Rica. Mangrove Days were days when the research assistants, the biologist/coordinator, and various volunteers participated in various activities for our mangrove education and reforestation program. Such activities included cleaning up the mangrove nursery or vivero after tidal flooding and storms, improving the vivero structure to improve shading for young mangroves, transplanting mangroves from the coast, where competition is high, to the protected nursery. Mangrove seeds were moved from the Golfo to the vivero in bags and replanted in order to increase the survival rate and likelihood of reaching adulthood. When established, these mangroves were taken from the vivero and replanted in test plots along the coast. Monitoring of the test plots occurred on a monthly basis and included making observations and collecting quantitative data to determine if the test plot area was successful; with success defined as 70% healthy, non-broken or snapped mangroves, per plot.

On days when our main focus was planting a new test plot of young, healthy mangroves (red, white, or tea species) our team always started to look for and ask where to plant the next test plot based upon ideal habitat conditions as well as obvious lack of mangrove abundance within an area. One day I asked this same usual question, except this was about an area along the beach of the remote village of Playa Blanca, south of the vivero and LAST's residential area. Here no mangroves had been planted by our team, or teams before us, except during an educational day for the children of Playa Blanca. This area, although covered sporadically with small clumps of white mangroves, was much less mangrove abundant compared to areas surrounding Playa Blanca to the north and south. The obvious lack of mangroves along Playa Blanca's 2 mile coastline, and the intense increase in mangrove abundance north of Playa Blanca's boundaries, and south beyond their main beach was interesting to me. Although historically a large portion of mangroves along the coast had been removed, mangroves had been growing back, and we were trying to help that growth, but in Playa Blanca, growth remained low and it was clear that there was something else happening. When I posed this question, if our group could plant Mangroves along the Playa Blanca coastline, I thought it was perfectly reasonable and actually quite a great idea considering the space to plant new test plots was quickly waning north of the vivero. However, my boss, Beth Pynnonen, quickly rejected my idea to plant in the open areas near Playa Blanca. At first I was deeply confused, but her reasoning explained the cultural tensions within Playa Blanca and, I suspect, throughout other

areas of Costa Rica.

Playa Blanca is a small village on the Osa Peninsula of southwest Costa Rica. As mentioned, the village is situated along the coast of the Golfo Dulce, a large body of water fully protected from fisherman, except for lines and the occasional permitted nets to catch organisms for research through university's or organizations, such as the one I was involved with this past summer, Latin American Sea Turtles. LAST's In-Water program with sea turtles focuses on the collective ecosystem approach, which incorporates the mangrove reforestation program mentioned in detail above. Mangroves serve as a nursery for multiple species, filter pollution, and benefit sea turtle foraging in this area of Costa Rica. However, in the past these mangroves (along with coral and seagrass) were damaged by both anthropogenic and natural forces. Although the area was rich with terrestrial diversity, the coastal ecosystem was less than impressive and it all related back to Costa Rica's past.

Although Costa Rica is known for their environmental stewardship today, they still had the same need to develop as other countries. As development increased to accommodate the needs of a growing population and tourism industry, mangroves were removed to build homes and increase beach front views. Mangroves were also damaged through the introduction of rice plantations, which caused excessive runoff of nutrients and drastically reduced their numbers. Mangroves were also harvested for products such as ink. Due to the reasons above, the mangroves were removed from most of the coast, leaving fragmented areas and damage to the entire coastline. Much of what I have learned about mangrove history was from local Costa Ricans in Playa Blanca, and therefore may have been biased. However, there has been cultural progress and now Costa Ricans seem to appreciate preservation of the ecosystem.

To encourage mangrove reforestation, LAST attempts to rebuild these habitats to increase benefits to endangered sea turtles and reduce damage to the shoreline. The residents

Photo by ***Heather Afford***
Mangrove plots

of Playa Blanca regularly help through volunteer efforts with LAST's educational program and by providing LAST with supplies when possible. Although LAST only allows volunteers from private organizations and funders participate in mangrove reforestation, sea turtle in-water research, and other research projects Playa Blanca residents remain interested in our efforts, interact with volunteers by housing them throughout their stay, and actively listen and watch LAST's work with foreign volunteers, usually from the United States. The residents are interested in LAST's environmental efforts to increase healthy sea turtle environment in the Playa Blanca area.

Yet my boss, Beth, a representative of LAST, would not plant in front of the village. Why is this the case? The answer lays hidden in a world I still wonder if I completely understand; the cultural divide between an American citizen and a Costa Rican resident. At the time, I didn't understand why such a village wouldn't want to benefit from an increase of mangroves. They are beautiful, reduce erosion of the beaches, prevent damage from storms, and increase sea turtle habitat which the community shows genuine interest in helping with. However, Playa Blanca is not just a secluded village. In actuality it is a vacation spot and home to multiple residents, which could disrupt an environmentally beneficial process. Beth quickly told me that although my idea was possible, and has been attempted in the past, it was unsuccessful. Not due to the mangroves not taking to the soil, tides pushing them out of the ground, snapping the stems, or excessive inundation from pooling water (the issues we usually experience with bad test plots), but from unknown Costa Rican's, possibly not even locals of Playa Blanca, physically removing or damaging the trees.

At first I was appalled and frustrated with this issue; I even walked around the beach one day sprinkling white mangrove seeds (much smaller in size then red and tea seeds) directly along the village beach front in my own attempt to "reforest" the area and not link it back to LAST. However, as my understanding grew I began to see how LAST's actions, though environmentally beneficial, were not understanding of Costa Rican cultural needs. Costa Ricans generally embrace the environment, but they may not necessarily see mangroves as a solution, or at least not the most helpful or important solution. Without diligent research I cannot possibly give a reason for Costa Rican values, but I have thoughts on the matter. They may be removing mangroves due to personal values we do not understand as an outsider. They may even be resentful of outsider influence, although I do not think that is the case. However, residents of Playa Blanca grew up without mangroves on the coastline, and may see a beach with no mangroves as a normal and healthy ecosystem; therefore an outside organization trying to change the immediate beach near their village may actually impose on Costa Rican values and offend them fundamentally as a culture. Although mangrove reforestation can continue elsewhere with no disruption, some areas in Costa Rica are less likely to accept such impositions regardless of the important environmental and protective effects of such efforts. Here is where science, management, and local people need to come together if we ever expect to understand each other and move forward to improve our ecosystems.

Above:
Photo by ***Scarlet Cheng***
The photo depicts one of the most famous seafood markets in Hong Kong - Sai Kung.

Below:
Photo by ***Scarlet Cheng***
In Sai Kung Seafood Market, customers can buy seafood from local fishermen direcly from their boats. Cutomers pick the seafood they want and fishermen will deliver the seafood to them with a long pole.

Photo by ***Juli Mayhew***
A close encounter with a loggerhead sea turtle near the Silk Cayes, Belize.

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) 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 **dukeOPWG@gmail.com.**

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

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