OPWG

OCEAN POLICY WORKING GROUP

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UPWELLING

Inaugural Publication of the 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 inaugural pubication of the Ocean Policy Working Group!

We are excited to share with you the thoughts, opinions, and research of members of the Duke community pertaining to the oceans. As you will see, our interests span a variety of topics, from mussel farms along Cape Cod, aquaculture, civil disobedience in the high seas, cultural conflict, marine spatial planning, and a narrative about a walk in the salt marshes.

We hope you will use this publication to connect with your peers at Duke who are working in fields that interest you. At the end of the publication, you will find a resources section designed for you to gain more insight into what others are working on and opportunities and avenues available to you to get involved in the marine community at Duke.

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

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Below: Few would guess this splay of intricate texture and color could belong to a worm, but indeed the wonders of evolution have crafted once antennae-like structures into a whorl of delicate feathers with which the "feather duster" Sabelid worm feeds.

Cover Photo: Professional water woman, Jenny Kalmbach, explores a reef on the north shore of Oahu, Hawaii. Photo by Shannon Switzer.

Above: Victims of human persecution throughout much of the tropical seas, green sea turtles often bolt with surprising speed at the sight of a snorkeller. This turtle, however, enjoys the protection of the Great Barrier Reef Marine park in Australia, and happily carries on devouring jellyfish as humans look on in awe.

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Inherently curious creatures, harbor seals often investigate divers who venture into their waters off the coast of Monterey, California. The friendliest of seals at times even crave contact and will insist on scratching at the curious plastic flippers or feeling the neoprene skin with the sensitive whiskers on their muzzles.

Mussel Farming in Massachusetts

Emma Kelley is a first-year MEM student at the Nicholas School of the Environment.

After years of intense debate over America's first offshore wind farm, the controversial Cape Wind project in Massachusetts is moving forward this year. In its shadow, however, is another proposal, which sets a precedent for innovative aquaculture in federal waters and represents a step forward for New England. The passing of this proposal and the development of mussel farms is one answer to the critical status of this region's fisheries.

The comment period for a Chatham shellfisherman's proposal to create a 30-acre mussel farm closed in early October. This would be the first offshore aquaculture project in federal waters. The proposed plan would place up to twenty-five 120-meter-long lines to the east of Horseshoe Shoals. From each line, up to 100 'mussel socks' may be deployed. These bags, containing mussel seeds, hang in the water column. As the mussels grow, they attach themselves to the line, and the bag dissolves. In a recent Cape Cod Times article, Scott Lindell, director of the Woods Hole Scientific Aquaculture Program, supported the project, explaining that mussels can be harvested in the project's first year.

The environmental effects from the mussel farm, which lies within essential fish habitat for cod and other groundfish, will not be substantial. This assertion is backed by a variety of studies, particularly in Canada, which have explored the impacts of mussel farming on the surrounding environment. The environmental impacts from this method of shellfish farming are mainly changes in the biochemistry of and community structures within the sediment beneath the farms. These impacts are considered insignificant in comparison to the complete destruction to the seabed caused by bottom trawling in other New England shellfish fisheries.

Another concern addressed in the Cape Cod Times, is that the mussel lines pose an entanglement danger to large marine animals, such as turtles and whales. The harming of these animals would violate the Marine Mammal Protection Act. However, the lines are designed to be taut enough to repel turtles, and, very few whales are found in the proposed area.

This project is one answer to a nation-wide issue of overconsumption and underproduction. According to NOAA's FishWatch and 2012 publication on U.S. Fisheries, the U.S. imports 91% of its seafood, totaling 16.6 Billion in 2011. Half of this total is from aquaculture, including mussels from Chile, New Zealand, and Canada. Meanwhile, many New England commercial fisheries are in shambles. Years of mismanagement have led to historical lows for some fish species, particularly cod. Fishermen face intense economic stress in the face of the necessary, but devastating catch quotas set this year. The U.S. must find new and innovative ways to decrease its dependence on foreign seafood while repairing domestic fisheries.

Mussel farming fits the bill. It is a low-investment way to create a new shellfish industry to feed the hungry New England markets without further degrading an already compromised environment. Thus far, the only impediment for the project is the lack of clear permitting. As the first offshore aquaculture project, regulatory precedent has not yet been set.

The proposal is currently under consideration by the US Army Corps of Engineers. To support this project, and foster similar ones, the Corp must develop and streamline the permitting process for aquaculture in federal waters. The passing of this proposal and the development of mussel farms in New England will hopefully be the first of many new sustainable fisheries solutions for the United States.

This OpEd is adapted from a piece written by Emma Kelley for the Duke Environmental blog, Devil Fish.

Jo Blasi

Right: Rachel Eveleth, a PhD student in Earth and Ocean Sciences, participated in a 6-week research cruise to the Western Antarctic Peninsula in early 2013 as part of the Palmer Long Term Ecological Research team. This annual cruise seeks to understand the polar marine biome in a changing climate with scientists studying circulation, sea ice, productivity, penguins, whales and much more. Rachel studies biogeochemical cycling with high-resolution net community production measurements.

Below: Torgersen Island, home to adélie penguin colonies, is across the harbor from Palmer Station, one of three US research stations in Antarctica. The R/V Laurence M. Gould brings supplies to Station before beginning offshore data collection along the peninsula.

Rachel Eveleth

OCEAN ACIDIFICATION: TELLING THE STORY

BY ALYSON MYERS AND NEKISHA DURRETT

Right: Scientists at the Ocean Acidification conference in Washington, DC, September 2013, were invited to refine their communication skills by simplifying complex science for the public. Graphic artist Nekisha Durrett and MEM candidate, Alyson Myers, welcomed the challenge by creating a graphic to tell the story.

Aquaculture and Seaweed: Partners in Sustainability

Alyson Myers is a Master of Environment Management candidate, and the owner of Kegotank Farm, an aquaculture company. **Alexander Monahan**, co-author, is the research assistant at Kegotank Farm.

Seafood consumption has doubled in the past three decades, yet wild populations are dwindling due to industry overexploitation.[1] Predictions suggest open-ocean harvesting has a maximum production capacity of 90 million tons of seafood per year. As a result, aquaculture, a relatively new industry to North America, has developed into the fastest growing food production system, increasing output by about 9.3% each year since 1985.[2] By 2030, experts predict aquaculture will provide 50% of the world's seafood.[1]

For aquaculture to grow sustainably as a food source, water generated from these practices must be treated before returning to production systems or to natural ecosystems. One method -- Integrated Multi-Trophic Aquaculture (IMTA) -- grows fed species (e.g. finfish) mutually with nutrient extractive plants, primarily seaweeds. Seaweeds, or macroalgae, absorb the dissolved inorganic nutrients from the waste of the cultured organism. IMTA restores the nutrient balance of water; plants help the nutrient, pH, carbon dioxide and dissolved oxygen levels remain stable. Seaweeds are apt subjects for biofiltration due to high nutrient uptake and fast growth.[1]

Ulva (Chlorophyta) and Gracilaria (Rhodophyta) species have been heavily examined for capability in IMTA practices. In these studies, Gracilaria and Ulva have efficiently reduced inorganic nutrient levels (TN > 70% and TP > 40%). IMTA can rival standard filtration techniques while providing valuable biomass. Ulva and Gracilaria, for example, have developed markets for creation of fish feed and fertilizers.[3] One abalone farm in South Africa produces over 60% of feed requirements using Ulva and Gracilaria manufactured from IMTA.[4] Given that demand for macroalgae has increased at an average annual rate of about 7.4 percent[3], it is anticipated that new production methods and markets will develop for Gracilaria and Ulva.

Aquaculture provides numerous benefits over open-ocean harvesting. For example, aquaculture decreases habitat degradation, enables waste containment, and prevents accidental interaction between cultured and native species.[5] Unfortunately, aquaculture produces inland water pollution. Only about 25% of feed supplied to the cultured species is turned into biomass; the other 75% remains uneaten or is excreted, leading to increased nutrient levels.[6] Intensive aquaculture without recirculation releases dissolved inorganic nitrogen and phosphorus in highest concentrations. Elevated total phosphorus (TP) and nitrogen (TN) levels can lower growth, reproduction, and even survival rate of some marine species.[5]

In other countries, IMTA is advancing in the scientific community. In contrast, common fluidized sand biofilters typically reduce TN and TP by about 60% and 40%, respectively.[7]

A reduction in environmental damage by aquaculture is necessary for long-term sustainability of the industry. Regarding open water aquaculture, policy makers may need to examine regulation to expressly allow co-production of seaweed. While EPA governs land-based aquaculture effluent, state regulators may need to examine and amend aquaculture lease regulation to allow seaweed farming. Waterways and the economy may be the beneficiaries.

[1] Neori, A., Chopin, T., Troell, M., Buschmann, A., Kraemer, G., Halling, C., Shpigel, M., & and Yarish, C. 2004. Integrated Aquaculture: Rationale, Evolution and State of the Art Emphasizing Seaweed Biofiltration in Modern Mariculture. Aquaculture, 231(1-4), 361-391.

[2] Diana, J. 2009. Aquaculture Production and Biodiversity Conservation. Bioscience, 59(1), 27-38.

[3] FAO, 2012. The State of World Fisheries and Aquaculture. FAO Fisheries Department, Rome, 153pp.

[4] Butterworth, A. 2010. Integrated Multi-Trophic Aquaculture Systems Incorporating Abalone and Seaweeds. Australian Government Fisheries Research and Development Corporation, Rep. No. 0914.

[5] Cahill, P., Hurd, C., & Lokman, M. 2010. Keeping the Water Clean: Seaweed biofiltration outperforms traditional bacterial biofilms in recirculating aquaculture. Aquaculture, 306(1), 103-59.

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[7] Mook, W., Chakrabarti, M., Aroua, M., Khan, G., Ali, B., Islam, M., & Abu Hassan, M. 2012. Removal of total ammonia nitrogen (TAN), nitrate and total organic carbon (TOC) from aquaculture wastewater using electrochemical technology: A review. Desalination 285, 1-13.

[8] Abreu, M., Pereira, R., Buschmann, A., Sousa-Pinto, I., & Yarish, C. 2011. Nitrogen uptake responses of Gracilaria vermiculophylla (Ohmi) Papenfuss under combined and single addition of nitrate and ammonium. Journal of Experimental Marine Biology and Ecology, 407(2), 190-19.

[9] Butt, N. 2007. The impact of cruise ship generated waste on home ports and ports of call. Marine Policy, 31(5), 591-598.

Above: Roxanne traveled to the Spanish Mediterranean with her internship at the Environmental Defense Fund. This photo was taken at a fish market in the province of Murcia in Spain, which is owned and operated by the local fishermen's guild. All small-scale fishers are required to belong to their local guild and sell in its market. This is the primary form of management for artisanal fishers in the country. It offers a way to limit the number of participants in the fishery and also tracks the fish being caught and sold. The label in the picture contains information about when, how, and where the fish was caught, which travels with it to its next point of sale.

Marine Environmental Protest and Civil Disobedience at Sea

Dr. James Kraska is the Mary Derrickson McCurdy Visiting Scholar at the Duke University Marine Laboratory.

This brief article captures interim findings from a broader study on the right of private individuals and organizations to engage in environmental activism in the maritime domain. The Sea Shepherd Conservation Society (SSCS), for example, engages in direct-action tactics to investigate, document, and confront threats to marine biodiversity and ocean ecosystems. Led by the mercurial Captain Paul Watson, SCSS has conducted a prominent campaign against international whaling. Similarly, activists from Greenpeace International have scaled offshore oil platforms in the Arctic Ocean to galvanize public action to stop drilling in the fragile, ice-covered region.

As compelling as the substantive environmental issues of marine policy are to a sustainable future, the rights of marine environmental protest and civil disobedience at sea are even more important because they concern the process and methods of participatory decision-making in marine environmental governance. As a fundamental element of international human rights, protest and civil disobedience at sea reflect a dimension of social justice that largely has been ignored. This study explores whether the law of the sea and the law of human rights can form a coherent framework that preserves the maritime order of maritime safety and the rule of law at sea, while also protecting free expression and liberal values embodied in international human rights law.

The principle of state sovereignty means that states have wide latitude to shape laws that best promote cultural values and varying levels of security. At sea, however, the equation is immeasurably more complex. Rather than considering the laws of just a single state, incidents of maritime protest typically involve the laws of several states, as well as international law.

A better understanding of the rights and limits of private organizations such as Sea Shepherd and Greenpeace is important because these groups have been particularly influential in shaping the public debate on marine environmental protection and resource conservation. The SSCS, for example, collected evidence to demonstrate that Japan's whaling program constitutes illegal commercial whaling in violation of the International Convention for the Regulation of Whaling, refuting Japan's claim that its whaling is permissible marine scientific research. The evidence helped Australia to bring proceedings against Japan at the International Court of Justice—a case still pending before the World Court.

Similarly, on September 18, 2013, Greenpeace International activists climbed on board Prirazlomnaya, a massive Gazprom offshore oil platform in Russia's exclusive economic zone. The direct action peacefully protests oil production that will begin in early-2014, and it follows Greenpeace protests on oil rigs in Greenlandic waters in 2010 and 2011, and a previous assault on Prirazlomnaya. Frustrated over a lack of public dialogue and after release of a video documentary that exposed lackadaisical safety standards on the platform, Greenpeace returned to the platform.

Photo courtesy of Sea Shepherd

Russian coast guard officers intercepted the protesters and detained them. The next day, the Greenpeace ship Arctic Sunrise was boarded, and the ship and entire crew was seized. Thirty activists were taken to Murmansk, where they were arraigned on criminal charge of maritime piracy, which carries a maximum sentence of 15 years in prison. On October 23, charges were reduced to "hooliganism," which carries a prison sentence of up to seven years.

In the United States, the Institute of Cetacean Research of Japan brought suit against Sea Shepherd under the Alien Tort Statute (ATS). The ATS provides a cause of action for "a tort…committed in violation of the law of nations…."[1] The "law of nations" for the oceans is codified by the United Nations Convention on the Law of the Sea (UNCLOS). UNCLOS defines "piracy," as any illegal act of violence, detention or depredation committed for private ends by crew or passengers of a private ship or aircraft against another ship, persons or crew, and committed outside of a State's territorial waters.[2] The U.S. district court dismissed the tort action by Japan because the protests did not rise above a threshold of violence, and they were targeted at ships and equipment rather than people. On appeal, the Ninth circuit rejected the narrow definition of piracy, noting that article 101 of UNCLOS proscribes violence against another ship, persons, or property. "Ramming ships, fouling propellers and hurling fiery and acid-filled projectiles easily qualify as violent activities, even if they could somehow only be directed at inanimate objects."[3] Judge Kozinski of the Ninth Circuit concluded:

"You don't need a peg leg or an eye patch. When you ram ships; hurl glass containers of acid; drag metal-reinforced ropes in the water to damage propellers and rudders;

launch smoke bombs and flares with hooks; and point high-powered lasers at other ship, you are, without a doubt, a pirate, no matter how high-minded you believe your purpose to be."[4]

These cases largely ignore the internationally recognized civil right to free speech, protest, and assembly that are reflected in the International Covenant on Civil and Political Rights (ICCPR) and the Universal Declaration on Human Rights (UDHR). All people enjoy an inherent right to protest the activities of governments and other corporate and individual actors. This right is derived from the "inherent dignity and equal and inalienable rights of all humans."[5] Although national laws differ, each state is obligated to adopt rules that give effect to the ICCPR.[6]

Furthermore, under the United Nations' World Charter for Nature, states, public authorities, international organizations, and individuals have an obligation to "safeguard and conserve nature in areas beyond national jurisdiction."[7] All persons also have an inherent right to participate, individually and with others, in formulation of decisions that affect their natural environment.[8] Finally, "each person has a duty to act" in accordance with the World Charter for Nature, and to "strive to ensure that the objectives and requirements" of the Charter are met.[9] There is little experience in giving meaning to these human rights instruments in the maritime domain, however, and no "road map" exists for ensuring that the rights of marine environmental protest and civil disobedience at sea are protected.

Albert Chan

Above: Jessie Ritter MEM '13 touching a whale calf seeking to interact with a human in San Ignacio Lagoon, Mexico. San Ignacio Lagoon, is one of several coastal lagoons where gray whales calf their young. These lagoons are protected by the Mexican government and most management is in hands of the local fishing communities.

[1] Alien Tort Claims Act, 28 U.S.C. § 1350.

[2] United Nations Convention on the Law of the Sea, opened for signature Dec. 10, 1982, UN Doc. A/CONF.62/122 (1982), 1833 U.N.T.S. 3, 397, 21 I.L.M. 1261 (1982), entered into force Nov. 16, 1994), art. 101.

[3] Institute of Cetacean Research v. Sea Shepherd Conservation Society (9th Cir. D.C. No. 2:11-cv-02043-RAJ, Feb. 25, 2013).

[4] Ibid.

[5] UN Doc. GA Res. 2200A (XXI), Dec. 16, 1966, ICCPR pream.

[6] Ibid., para. 2(2).

[7] U.N. Doc. A/37/51, The World Charter for Nature (1982), art. 21(e).

[8] Ibid., art. 23.

[9] Ibid., art. 24.

The Disputed Islands of Dokdo/Takeshima:
How a Group of Small Islets are Reopening Old Wounds of WWII

Maria Trimarco Prebble is a first-year MEM student at the Nicholas School of the Environment concentrating in Environmental Economics and Policy. In 2012, Maria worked at the Korean National Commission for UNESCO in Seoul through a fellowship. Maria would like to thank the beautiful and charming country of Korea for its extraordinary kindness and hospitality.

In the summer of 2012, Seoul, South Korea became one of the most popular cities in the world with artist Psy's hit, "Gangnam Style," but the frivolity and humor depicted in the music video overshadowed the national and political security crisis Korea and Japan were facing over claims to the Dokdo/Takeshima islets.

The Dokdo/Takeshima islets are located in the Sea of Japan between South Korea and Japan. Consisting of only two islets and 35 smaller rocks, the total surface area of the islands is approximately 0.2 square kilometers. The islets' only human inhabitants are members of the South Korean National Police.

For outsiders, the dispute over Dokdo/Takeshima seems purely politically and economically motivated, as either Japan or Korea would have full rights under their exclusive economic zone (EEZ) to the rich fishing waters and surrounding methane hydrate reserves. However, a closer look reveals that the dispute is so deeply woven in historical and emotional legacies, that no UN Convention or International Court of Justice (ICJ) ruling could ever untangle.

In recent times, the United States has remained seemingly neutral on the issue, perhaps because it views both South Korea and Japan as strong allies against China's expanding global influence. When working in Asia, the US needs to understand the emotional and historical legacies that underscore every aspect of its Asian interests and policy.

That summer in Seoul, I was working with the Korean National Commission for UNESCO on various advocacy projects regarding the "Comfort Women,"—the hundreds of thousands of Korean women (and girls) forced into sexual slavery by occupying Japanese soldiers during Japanese colonization and WWII. Today—after being silenced by shame for decades—these women are viewed as a national tragedy in Korea, and often fuel nationalist rhetoric against Japan. Conservatives in the Japanese government consistently refuse to apologize and often deny that the events ever took place.

One day in late June, a right-wing Japanese extremist planted a stake claiming, "Takeshima is Japanese Territory!" on a memorial statue to the Comfort Women. Earlier that week, the same man planted another stake with another Japanese nationalist message at the War and Women's Human Rights Museum, where I had been working. These incidents hit a cultural nerve, and the Korean Times reported the vandalism with the headline, "Japanese Stake the Heart of Korea." The article barely covered current events surrounding the islet dispute, but instead focused on the emotional and historical legacies of Japanese colonization.

Now well into their eighties and nineties, many of the surviving Korean Comfort Women live just outside of Seoul at the House of Sharing, which also houses memorials and a museum. Silenced for years, today the women have no problem speaking their mind to the groups of students and tourists that visit the House. "Japan needs to leave Korea," one woman said, perhaps in reference to the islands. Walking around the House and seeing the horrific images, documents and artifacts from such a dark period of time, I realized that these women are in fact Dokdo in its manifested form.

In August of that summer it

Erika Zambello

Left: Sunset in Virginia Beach, facing the Chesapeake Bay Bridge.

seemed possible that the dispute would be resolved through international arbitration. Japan filed a claim with the ICJ to resolve the sovereignty question through the International Tribunal for the Law of the Sea, and agreed to accept any decision the ICJ made. However, Korea has refused to accept the submission. Reconciling the Dokdo/Takeshima dispute through the ICJ will demonstrate exemplary international governance and provide and example for the many island territorial disputes between Asian states in the Pacific. However, if the dispute ever reaches the courts of the ICJ, it will bear little significance to either a winning or losing country until there is some sort of historical reconciliation between Seoul and Tokyo.

The Japanese claim to Dokdo/Takeshima is a painful reminder of the fear, helplessness and horror Koreans experienced during Japanese colonialism and the war—which is fading fast from recent memory. Most Koreans will never visit Dokdo/Takeshima. Plane tickets are cheaper to Tokyo than to charter a ferry to the islets. After spending time in Korea, I realized that Dokdo is not just a physical island with natural resource and economic benefits, but it represents a part of Korean identity.

Ian Markham

The term "sea slug" seems almost a slur when applied to the Opalescent nudibranch (*Hermissenda crassicornis*) commonly found off the coast of California. Surprisingly, this elegant invertebrate is also a fierce competitor known to defend food sources with lunges and "bites" when challenged.

Melody Jue

Right: Fiddler Crab, encountered in Beaufort, NC during a NOAA community field trip.

The complexities of ocean management and the initiatives towards Marine Spatial Planning.

Xiao Recio-Blanco is a SJD Candidate at the Duke Law School.

Regulation concerning the management of marine resources has traditionally been a challenge to policymakers. Marine Spatial Planning (MSP) is currently being proposed, both in the United States and in the European Union, as an effective answer to this problem. At the state level, regulatory initiatives are being developed in Scotland, the Netherlands, Germany, or Portugal, and in Oregon, Washington or Massachusetts. In contrast to previous environmental management efforts, MSP has not an exclusive environmental conservation goal. On the contrary, MSP is aimed at simultaneously achieving environmental, economic, and social objectives.

The broadly accepted UNESCO definition of MSP, that inspires both the European and American regulatory processes, highlights the following five features: ecosystem based, area based, integrated, adaptive, and participatory. However, the reality of marine resources management challenges each of these features. Since contemporary science still struggles to assess marine ecosystems, defining an ecosystem-based policy may not be an easy task. Area-based policies must deal with the limitations imposed by administrative boundaries. Integration of uses may not be feasible due to cumulative impacts of human actions on the environment. Excessive adaptation may end up in legal uncertainty. Adaptation with respect to certain uses may be impossible. A participatory process is vulnerable to agency capture, corruption, cartels, and other parochial interests.

Moreover, if as mentioned MSP has three sets of different objectives (environmental, social, and economic), an assessment of the success of an MSP plan may be especially difficult to conduct.

MSP has significant potential to effectively balance conflicting interests between a wide variety of users of the seas, from fishers to renewable energy corporations to shipping lines or tourism companies. However, the enthusiasm about MSP on both sides of the Atlantic should not lead us to overlook the fact that some MSP-inspired initiatives have already failed (see, for example, the cases of the Galapagos Islands MPA fishing zones, or the Colorado River Delta Biosphere Reserve).

MSP may provide a useful regulatory baseline, but each marine region might need to be governed by specific case-by-case rules. As different studies suggest, collaboration on the side of the users is paramount for the success of any management scheme. Consequently, the regulatory framework that establishes an MSP scheme must balance two complexities: it must be stringent enough to provide legal certainty to investors, but must also be flexible enough to be sensible to the needs of local users and populations.

Xavier Basurto

Below: Elegant terns on Isla Rasa, Gulf of California, Mexico, hold the largest breeding grounds for the entire species, which migrates thousands of kms to north and south america in the winter.

Erika Zambello

Left: A channel marker washed ashore after a fall storm in Virginia Beach.

A Walk in the Marshes

Erika Zambello is a first year MEM student at the Nicholas School of the Environment studying Ecosystem Science and Conservation

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I tried to take a walk in the salt-marshes every day this summer. Across Shore Drive from my neighborhood, the Pleasure House Point marshes of Virginia Beach were only a quick five minute trek from my house. Rain or shine, hot or cold (it is Virginia in the summer, so usually hot) I set out with my goofy baseball hat and comfy sneakers. I would plod through the pines growing on the solid ground and then the sand and saw-grass of the marshes themselves.

As any coastal enthusiast knows, there are hundreds if not thousands of species that call marshes their homes. From the blue-tailed skinks that darted across my path, to the yellow-crowned night herons stalking for prey in the shallows, to the cow nose rays whose thin fins gracefully broke the surface of the water, there are so many things to see. Still, there's a double catch: you have to be there, and you have to look them up.

You have to be there, not just physically but mentally, even emotionally if you want to. To see birds and fish and lizards by and large you have to be on the look-out - keep your peepers peeled - even for the most obvious great blue herons or great egrets. Too often I saw sea-doos buzzing through the shallows like bats out of hell, their wakes causing waves to break against the delicate shoreline. I am the first to admit that sea-doos are fun, but it is impossible to get the feel of a marsh when you are careening through it at thirty miles an hour.

It is so easy in today's world of smart phones and instant internet connections to have knowledge at your fingertips, yet the question "what's that?" is so seldom followed up by a simple Google search. Hey, I am no exception. Until this year I could see a bird and only think, "aw, nice," before moving on with my day. God forbid if I paid a snake any more attention than a groan and a grimace. But it is through naming that we recognize the migration patterns and separate the common residents from the rare visitors. When I stop to look up a bird or a lizard, my knowledge of the intricate interactions of the world becomes just a little bit deeper. To inspire love of nature you have to understand it.

The good news is, it is easy! Pleasure House Point and the surrounding marshes are public land. To force people to slow down, the local government should post signs advertising the restricted use of sea-doos and heavy motors, and also explain why such action is forbidden. Furthermore, signs describing common species would be incredibly helpful for the casual observer to pick out species and to remember what they have seen. With a little effort from both the local government and users of the trails, we can all really appreciate the marshes, even if we are not lucky enough to visit them every day. As for me, it is months later and I definitely miss them.

Erika Zambello

A beached boat on a windy day.

Ocean Resources @ Duke

Duke MARINE LAB | Duke NICHOLAS INSTITUTE FOR ENVIRONMENTAL POLICY SOLUTIONS | DUKE UNIVERSITY Center *for* International Studies

Duke University Marine Lab

The Duke University Marine Lab is a campus of Duke University, and is part of the Nicholas School of the Environment. It is located within the Outer Banks of North Carolina and operates year round to provide opportunities to better understand marine ecosystems and develop conservation and restoration strategies. As a part of its mission to engage individuals and improve understanding of the ocean, the Marine Lab addresses the human component of maintaining healthy ocean ecosystems and the sustainable use of ocean resources.

http://nicholas.duke.edu/marinelab/

Nicholas Institute: Ocean & Coastal Policy Program

The Nicholas Institute for Environmental Policy Solutions is part of Duke University and was established with the intention of assisting decision makers create timely, effective and economically feasible solutions to environmental challenges. The Ocean & Coastal Policy Program focuses on developing strategies to better manage the world's oceans and their resources. Its areas of focus include: ocean acidification, coastal management, marine ecosystem services, deep sea minerals and conservation planing, carbon sequestration in coastal habitats, and strategies and policies for monitoring coral reefs.

http://nicholasinstitute.duke.edu/ocean

Duke University Center for International Studies

The Duke University Center for International Studies (DUCIS) is one of twelve federally funded National Resources Centers in International studies. DUCIS promotes internationalization across campus through facilitating innovations in learning, instruction in foreign languages, and sponsoring programs with global themes. As apart of their efforts to improve understanding of critical global issues DUCIS sponsors graduate seminars on multidisciplinary topics including human rights global health, and the environment. DUCIS is a co-sponsor of the Ocean Policy Working Group.

http://ducis.jhfc.duke.edu/

Ian Markham

Off the coast of Kaikoura, New Zealand pods of dusky dolphins number in the thousands take breaks from their breakfast hunts to enjoy the bizarre antics of human visitors. The dolphins delight in our attempts to entertain them swirling excitedly around those tourists who struggle to dive down in bouyant wetsuits or sing to them most vocally through their snorkel tubes.

Sara L. McDonald

PhD candidate in Marine Science and Conservation

Sara McDonald has worked as a government biologist (state and federal) for over a decade, and amassed a collection of research and resource management experiences, and an understanding of how government functions. Most of her experiences lie in the field of marine mammal research and conservation and her career path has focused at the nexus between the science and policy of marine mammal protection in the U.S. Sara is now exploring this marine science-policy interface by evaluating the U.S. regulatory process that aims to protect marine mammals from accidental capture or entanglement in fishing gear, called bycatch.

Dr. Linwood Pendleton

Nicholas Institute for Environmental Policy Solutions

Linwood Pendleton is a Senior Fellow at Duke University's Nicholas Institute for Environmental Policy Solutions. Pendleton's work focuses on policies that affect human uses and enjoyment of ocean and coastal resources – both living and non-living. Pendleton's current projects include work with the United Nations Environment Program's Green Economy Project, GRID Arendal's High Level Steering Committee on Deep Sea Mineral Resources in the Pacific, and Blue Carbon Economics (joint with Brian Murray, also from the Institute). Pendleton served as Acting Chief Economist at NOAA from January 2011 through August 2013.

Reny Tyson

PhD candidate in Marine Science and Conservation

Reny Tyson's interests lie within marine mammal behavioral ecology, including foraging ecology, population ecology, and bioacoustics. Currently she is using biologging tools and quantitative techniques to research the fine-scale foraging behavior of humpback whales (Megaptera novaeangliae) in the Western Antarctic Peninsula for her PhD dissertation. Ultimately, she seeks ways to better understand the behaviors and needs of these upper level marine predators so that more accurate predictions can be made regarding how fluctuations in the marine environment may affect them and the sustainability of the marine ecosystem.

Yasmin J. von Dassow

Driftwood piles on South Beach, San Juan Island, Washington
The ocean currents around South Beach deliver a constant supply of driftwood: remnants of old boats, timber from logging operations, branches broken by storms. The histories of all those different pieces converge in giant piles on the sand, where the waves and wind subtly change the landscape every day.


Ian Markham

Get Involved

The Ocean Policy Working Group publication, Upwelling, is a biannual 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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