



## OUTER CAPE ENVIRONMENTAL AWARENESS NEWSLETTER



Though it seems we may not need any more climate records to be broken in the near future, they are appearing nonetheless. Our readers are entitled to the truth about events happening on this tiny planet, yet we still debated sharing the Australia Weather article by **OCEAN** Researcher Rae Taylor Burns. Another article featured in this issue describes Pacific crab Fishermen asking 30 fossil fuel companies to bear consequences of changes in their fishery. We are also glad to share some good ideas of making plastic bags from sea weed and using nets over outfall culverts to trap plastic before it reaches our Oceans. **OCEAN** is the environmental education newsletter of Safe Harbor, a small interdisciplinary, environmental consulting group on Cape Cod. **OCEAN** is self-funded and belongs to you our readers and is yours to share.

Thank you for your support, Gordon Peabody, Editor

April 2019 Issue No. 46

### WHAT COMES UP, MAY NOT GO DOWN



Photo credit: Alamy 2013

The impacts of sea level rise are affecting many communities, both from Cape Cod and globally. Many people wonder exactly how this will affect us, and to what extent. Our team at **OCEAN** has been researching potential impacts, especially on those who live and work on the Cape, who are regularly being affected by the changing tidelines surrounding us. These concerns led us to search for answers, and in our research, we found “Surging Seas” a sea level rise analysis website by Climate Central. They are a non-profit research and journalism organization dedicated to providing science-based

information about climate and energy.

This website serves as a tool for users to utilize through various maps. The user can simply select what they are interested in viewing, from the sea level rise predicted per 0.5°C global temperature increase, to risk zone mapping for water level compared with population, income, or social vulnerability. These maps are highly interactive, allowing the user to zoom and move to any location they wish to view. We hope you will see for yourself what the future could potentially hold.

Check out the link below:

[https://xs.climatecentral.org/?](https://xs.climatecentral.org/?fbclid=IwAR0L4KrV5FY1yP5ehHujRpehjaaLxHNh1dmEch_tK0YwnA-ySnCuo70OuMY#11/41.7769/-70.1065?scenario=extreme_p50)

[fbclid=IwAR0L4KrV5FY1yP5ehHujRpehjaaLxHNh1dmEch\\_tK0YwnA-ySnCuo70OuMY#11/41.7769/-70.1065?scenario=extreme\\_p50](https://xs.climatecentral.org/?fbclid=IwAR0L4KrV5FY1yP5ehHujRpehjaaLxHNh1dmEch_tK0YwnA-ySnCuo70OuMY#11/41.7769/-70.1065?scenario=extreme_p50)

Thank you to **OCEAN** Researcher Jessica Hillman



Photo credit: Climate Central

## SURPRISING NEW BOAT LIGHTS

Light Emitting Diodes are a popular, low energy alternative to traditional lighting. LED lights have also been observed to negatively impact radio reception in cars, due a phenomenon known as electromagnetic interference. This effect, known as EMI, happens because of the drivers in LED lights, which transition power sources to the low voltage direct current that LED lights require. These drivers operate at a frequency that can overlap with wavelengths used for radio, thus causing interference. Practices in LED manufacturing exist to eliminate this interference, but in poor quality LEDs these guidelines may not be followed. Radio interference in your car may be inconvenient, but in the summer of 2018, the United States Coast Guard put out a notice that LEDs have also been observed to interfere with their radio communications on VHF (which stands for Very High Frequency) and AIS (Automatic Identification Systems), posing a much more significant consequence of LED lights. In the safety notice put out by the Coast Guard, it was explained that electromagnetic interference due to LED lights caused a rescue coordination center to be unable to contact another ship, and the ship also had poor AIS reception. Luckily, this incident was a traffic control situation rather than a rescue mission, but since this effect has been documented in multiple ports, this communication issue could be extremely problematic and dangerous in more consequential situations. Solutions are to perform tests outlined in the safety notice put out by the Coast Guard to determine whether LED lights are causing interference, and if they are, to invest in LED lights engineered to produce less electromagnetic interference.



Photo credit: PBD Magazine

Further information in the links below:

<https://www.ba-inc.com/2016/06/dont-take-static-issues-electromagnetic-interference-led-lighting/>, <https://www.passagemaker.com/trawler-news/led-vhf-interference>, [https://www.nationalfisherman.com/national-international/coast-guard-warns-led-lighting-could-interfere-with-communications/?utm\\_source=marketo&utm\\_medium=email&utm](https://www.nationalfisherman.com/national-international/coast-guard-warns-led-lighting-could-interfere-with-communications/?utm_source=marketo&utm_medium=email&utm)

Thank you to **OCEAN** Researcher Rae Taylor-Burns

## DISPATCH FROM ARIZONA

We have heard from last summer's Intern, Jon Bruce: "I'm writing to you guys from Safford, Arizona where my team and I are helping out the Gila Watershed Partnership in restoration efforts along the Gila River. Our primary task is to remove invasive salt cedar (tamarisk) through the Upper Gila River which are contributing to poor water quality and ecosystem degradation. The 11 other people and I are crammed into a tiny house sleeping on cots in the shadow of Mount Graham, but it's been a great experience. I'm the assistant team leader so I have to help manage everyone and all the tasks on a day to day basis. For May-July, it'll either be in Texas continuing Hurricane Harvey Relief efforts, or in Colorado doing Habitat for Humanity. Either project would just be incredible, and I can't explain how fortunate I feel to be able to do it. So not only did I want to check in, but I also wanted to reiterate how thankful I am to have worked with you and everyone at Safe Harbor. Not only did it solidify my interest in environmental work, but it brought me to the AmeriCorps program and eventually led me to where I am right now. So again, thank you for everything Gordon. I hope everyone's doing well and thank you again. Sincerely, Jon Bruce"



Photo credit: Jon Bruce

## CATASTROPHIC WEATHER IN AUSTRALIA

This summer season in the Southern Hemisphere has delivered both flooding and fires to Australia. In November, the northern state of Queensland put out a fire danger level of “catastrophic” for the first time in history as 150 fires raged across the region. Southern Australia is typically drier than Queensland, and November is typically the rainy season in Queensland, making these events highly unusual. Thousands of people were forced to evacuate, and the Emergency Services Commissioner gave warning that when evacuation orders are put out, residents may have less than 20 minutes to leave before facing flames. Meanwhile, the city of Sydney, in southern Australia, was receiving record precipitation - over the duration of a two-hour period the typical monthly rainfall was recorded. Flash flooding occurred, resulting in dozens of car crashes, over 100 flight cancellations, and resulted in two deaths. Shortly after, in the days following the Christmas holiday, a heat wave covered eastern Australia with temperatures above 100 degrees. Merely two weeks later, in mid-January, more record breaking weather returned. The days between January 12 and January 17 all make it into the list of Australia’s ten hottest days on record. A town in northern Australia reached 120°F, with over 20 days in a row above 104°F.



These weather events had severe impacts on Australia’s people, as well as its plants and animals. Roads were reported to begin to melt in the severe heat. More than one million fish died in a river basin. Excess water diversion from the river caused remaining water to increase temperature drastically due to the heat wave. This caused an algal bloom that consumed oxygen in the river leaving the fish no air to breathe. The heat also caused bats to die and fall from trees, wiping out a third of Australia’s flying fox bat population in a single afternoon. Rangers found 90 dead wild horses at a dried-up watering

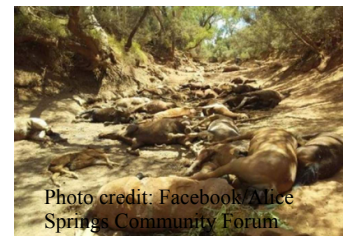
hole in central Australia. Local agriculture also felt the heat – the fruit on trees were cooking in the sunlight and from the heat of fruit pits, causing emergency harvesting and massive crop losses.

The 2018-2019 winter has been officially declared a weak El Nino year, potentially causing some of the warmer weather across the west Pacific. Scientists predict that with the impacts of El Nino, 2019 could be the warmest year ever.

Further information in the links below:

<https://www.cnn.com/2019/01/18/australia/australia-heat-wave-peak-intl/index.html>, <https://www.abc.net.au/news/2019-01-15/mass-fish-kill-in-darling-river-to-impact-other-states/10715640>, <https://www.abc.net.au/news/2018-12-19/heat-wipes-out-one-third-of-flying-fox-species/10632940>, <https://www.nationalgeographic.com/environment/2018/12/2019-may-be-hottest-year-yet-el-nino-climate-change/>

Thank you to **OCEAN** Researcher Rae Taylor-Burns



## CRAB FISHERMEN SUE OVER CLIMATE CHANGE



The impact of climate change is being felt globally. Changes in temperature, storm pattern, and sea level have been attributed to climate change and these changes are impacting many people and some livelihoods. Unsurprisingly, some of the most effected are those who live or make their livelihood on or near the ocean. Crab fishermen have noticed the changes in climate effecting their livelihood and are pushing to hold those deemed most responsible for climate change also responsible for its impact.

The Pacific Coast Federation of Fishermen's Associations have been seeking to hold 30 major fossil fuel companies responsible in the San Francisco County Superior Court for the damages they have created impacting crab fishermen. This lawsuit claims that the major fossil fuel companies listed have known about the harmful impact of greenhouse gas pollution on the climate, particularly the warming of the oceans, for over 50 years.

## **CRAB FISHERMEN SUE OVER CLIMATE CHANGE (cont.)**

These impacts have affected pacific crab fishermen over this past winter as a neurotoxin, domoic acid, has been found in the crab fishing waters, preventing boats from even leaving the dock and thus highly impacting crab fishermen during one of their busiest seasons. This suit is not without precedence as a Seattle Court recently ruled in favor of the necessity that the U.S. EPA protect salmon and steelhead trout from the impact increasing water temperatures. This lawsuit is promising for the future of environmental protection and the accountability corporations that act against the environment will face.

Further information in the links below:

<https://www.smithsonianmag.com/smart-news/crab-fishermen-sue-energy-companies-over-climate-change-180970957/>, <https://www.nationalfisherman.com/west-coast-pacific/climatic-closures-crabbers-file-suit-over-warming-waters/>

Thank you to **OCEAN** Researcher Jessica Hillman

## **WHY DIDN'T WE THINK OF THIS?** **2019 OCEAN ENVIRONMENTAL AWARD** **FOR INNOVATIVE USE OF EXISTING MATERIALS**



Photo credit: Facebook/City of Kwinana

Plastic pollution is a major concern for waterways. **OCEAN** has featured many articles on the impacts of microplastics in the ocean and even in tap water. Recently, we found out about a fantastic innovative new way that these concerns could be mitigated. Australia implemented a new method of plastic trash collection from waterways in the summer of 2018. This method was first used in the Henley Reserve in the city of Kwinana, but it was quickly decided that it should be implemented throughout the city due to its success.

This new method involves the installation of large nets encompassing the drainage pipes throughout waterways. These nets catch plastics keeping the pollution out of the larger bodies water they feed into. While they are a costly investment, about \$10,000 in production and installation costs per net, they are immensely successful. In the first few weeks the new net system caught over 800 pounds of garbage. Additionally, these nets cut the city's costs elsewhere, such as paying for labor to collect litter manually. Furthermore, once the net is full of trash the city can empty them and replace them on the drain to continue collecting while the trash is transported to sorting and recycling.

Although this method may be expensive and labor-intensive up front, over the long run it has the potential to save the community not just money, but also from pollution in their waterways. We applaud their initiative and are hopeful that more cities will join in and use these plastic nets in the future and as always we will continue to keep an eye out for innovative ways to reduce pollution.

Further information in the link below:

<http://www.thinkinghumanity.com/2018/12/australia-found-a-simple-and-helpful-way-to-save-water-from-plastic-pollution.html?fbclid=IwAR26J57otvLp1vd19Qxwn9euRuAi9q-xUIe22r6ryupNDULMduAQg0xz13Y>

Thank you to **OCEAN** Researcher Jessica Hillman

## WHEN IT RAINS SPIDERS

Arachnophobes beware, a Facebook video filmed by 14-year-old João Pedro Martinelli Fonseca in southeast Brazil capturing “raining spiders” has become widely shared. The video shows hundreds of spiders dangling in the Brazilian summer air, appearing to be falling from the sky. According to his grandmother, Jercina Martinelli, there were far more spiders than the video portrayed and that this is an occurrence she has seen before at dusk following hot days. In 2013, web designer Erick Reis captured this same phenomenon after leaving an engagement party, his YouTube video went viral within a week.



There are currently around 41,000 known species of spiders. Only about 50 of these species engage in social behavior. *Parawixia bistrriata*, as captured by Fonseca’s video, is an orb-weaving spider that shares a community web during the day before returning to its own nearby web in the evening. It is found in Paraguay, Argentina, and Brazil. While a sky full of spiders may sound like something out of a horror film, these nonvenomous spiders are actually beneficial to humans through controlling mosquito populations as well as other insects.

Further information in the links below:

<https://www.smithsonianmag.com/science-nature/its-raining-spiders-in-brazil-19885877/>, <https://www.theguardian.com/world/2019/jan/11/raining-spiders-brazil>

Thank you to **OCEAN** Researcher Isabella Bachman

## UPDATE: FINE TUNING KELP FARMING

On November 21<sup>st</sup>, 2018, Members of the Scottish Parliament voted in favor of limitations on commercial seaweed harvesting, particularly prohibiting harvesting methods that remove entire plants from the seabed. The issue gained attention after 14,000 people signed a petition calling for banning mechanical kelp harvesting in response to a proposal by Marine Bipolymers Ltd. (MBL) to harvest 30,000 tons of sea kelp. The company is developing a variety of seaweed-based products, including “transparent armor” for the armed services, cancer drugs, medical implants, and biocompatible packaging, and could potentially be a \$300 million industry. It claims its proposed harvesting methods are sustainable, only targeting 0.15% of Scotland’s 19.7-million-ton kelp population and planning to avoid harvested beds for five years to allow seaweed recovery.



Conservationists, however, are skeptical. Mechanical harvesting of sea kelp will strip away a vital ecosystem that countless marine organisms from anemones to seabirds depend on. Sea kelp also protects coastlines from erosion, flooding and storm damage through buffering the waves. It absorbs much of the carbon dioxide released into the atmosphere, absorbing more than even rainforests. The Marine Conservation Society recommends other ways of harvesting kelp, such as harvesting by-hand or growing seaweed cultures.

Further information in the links below:

<https://www.fauna-flora.org/news/huge-relief-momentous-decision-future-scotlands-kelp-forests>, <https://www.mcsuk.org/news/kelp-dredge-ban>, <https://www.theguardian.com/environment/2018/aug/24/kelp-dredging-proposal-criticised-by-conservationists-scotland>

Thank you to **OCEAN** Researcher Isabella Bachman

## WHERE THE PENGUINS ARE GOING

### OCEAN 46 EDITOR'S CHOICE ARTICLE

Many species of penguins migrate between their established breeding colonies in southern latitudes to northerly foraging grounds. These aquatic, flightless birds are practically exclusive to the Southern Hemisphere and are dependent on the ocean for their survival. Magellanic penguins (*Spheniscus magellanicus*), named aptly after the explorer, have been studied for decades and data suggests that they are particularly sensitive to ecosystem perturbations like oil spills, prey availability, and oceanic pollutants.

A recent study published in the journal *Current Biology* found that more Magellanic penguins are becoming “stuck” in their feeding areas off of the South American coast during the austral winter, and that the majority of those who strand are female (about every two out of three). Researchers tracked these penguins after their breeding season and found that typically females travelled further north than males (Argentina to southern Brazil compared to Uruguay). They also found that though males migrated shorter distances they dove deeper to forage, which suggests a sex-specific difference in feeding strategy and/or target prey. The further the penguins travel the more likely they are exposed to threats and strand, when found stuck they are often dead, injured, malnourished, and/or covered in oil. The perils may not be only anthropogenic; sexual dimorphic differences in body and beak size may also be contributing to females’ higher mortality rates.

Disproportionate removal of breeding females can have long-term effects on a population level, but this is particularly problematic because Magellanic penguins’ mate for life. The skewed male-to-female ratio is compounded annually because the difference in survival, resulting in less pairings (and chicks) each year. Studies are ongoing to detect changes in population numbers and their causes, so only time will tell if the population of Magellanic penguins continues to decline, plateaus, or bounces back.

Further information in the links below:

[https://www.cell.com/current-biology/fulltext/S0960-9822\(18\)31489-1](https://www.cell.com/current-biology/fulltext/S0960-9822(18)31489-1), <https://www.washington.edu/news/2019/01/02/single-male-magellanic-penguins/>, <https://www.bbc.com/news/av/science-environment-46785510/why-more-female-penguins-are-washing-up-dead-in-south-america>

Thank you to **OCEAN** Researcher Brigid McKenna



## ANOTHER BAG IDEA

### 2019 OCEAN ENVIRONMENTAL INNOVATION AWARD

One of the problems looming over the global population is the threat from plastic, specifically plastic used for packaging. Currently there are substitutes for plastic derived from corn, sugar cane, and cassava. Though these substitutes are a step in the right direction they have their own set of problems. Some of these problems include a huge investment of land in order to grow crops, as well as the use of pesticides and fertilizers. A new, potentially game changing innovation is the use of seaweed for packaging instead of the previous plastic substitutions.

One start-up in Indonesia, Evoware, is trying to put this innovation on the industrial scale. Currently using seaweed costs about 30% more than current plastic items, which may be a deterrent for many companies. However, as the product becomes more developed the cost of production may decrease. It is estimated that only 0.03% of the total amount of brown seaweed in the world would be enough to replace all plastic bottles made from polyethylene terephthalate greatly reusing the amount of single use plastics. Many of the benefits to transitioning to seaweed are environmental— seaweed is more sustainable than plastic, it grows quickly, absorbs carbon from the atmosphere, and does not require chemicals or fresh water in order to grow.

The transition to seaweed is still in its early stages, however the potential is unparalleled. In the coming years as this technology continues to grow it may become more affordable and will potentially begin the transition away from plastics.

Further information in the links below:

<https://thespoon.tech/in-2018-seaweed-is-the-new-plastic/>, <https://www.naturalnews.com/2017-10-12-biodegradable-and-edible-seaweed-may-soon-replace-plastic-packaging-on-food-in-an-effort-to-reduce-pollution.html>, <https://www.theguardian.com/environment/blog/2018/jun/27/could-seaweed-solve-indonesias-plastic-crisis>

Thank you to **OCEAN** Researcher Lindsey Stanton

## THE ECONOMIC COST OF STORMS



Photo credit: Reuters/Siphiwe Sibeko

Pictured above: Mozambique, after cyclone Idai.

large internal food resources and therefore rely mainly on trading relationships with other countries. Due to the increasing level of storms that developing countries are experiencing, it is recommended that these countries focus on expanding trading integrations with other countries. Furthermore, utilizing emergency programs and stockpiles to feed people after the occurrence of a natural disaster could benefit them.

The United States financial market has grown over time into what is known as a developed economy. This means we have natural and financial resources to protect us from disaster. One such resource is insurance, as here in the United States, our federal government insures people through FEMA. Additionally, we can hedge on financial markets. These are just a few of the various resources used in the United States that create a security net for natural disasters. Developing countries on the other hand do not always have such resources available and thus their economies are much more vulnerable to the effects of storms. People in the developing countries instead are urged to take more personal measures to protect themselves during and after a disaster.

Preparing for a storm ahead of time can have a beneficial effect on the economy. When a disaster strikes the standard protocol is for the government to allocate funds to cover the costs of the damage left behind by the storm. If people are made aware they are at-risk they tend to invest their money into safer ventures, education, and human capital which helps the economy grow. This awareness also tends to increase the amount individuals allocate into savings which could have benefits to a developing economy as well.

Further information in the links below:

[https://www.worldbank.org/en/news/immersive-story/2019/01/08/storm-clouds-are-brewing-for-the-global-economy,](https://www.worldbank.org/en/news/immersive-story/2019/01/08/storm-clouds-are-brewing-for-the-global-economy)

[https://www.brown.edu/academics/institute-environment-society/news/story/economics-natural-disasters-storms-and-risk-impact-economic-growth-important-ways,](https://www.brown.edu/academics/institute-environment-society/news/story/economics-natural-disasters-storms-and-risk-impact-economic-growth-important-ways) [nj.pseg.com/safetyandreliability/stormsafety/beforeastorm](http://nj.pseg.com/safetyandreliability/stormsafety/beforeastorm)

*Thank you to **OCEAN** Researcher Darya Lilie*



Warm thoughts that spring is coming!  
From Safe Harbor and our **OCEAN** team.



**OCEAN** newsletter supports restoration of our degraded resource areas.

<http://www.friendsofherringriver.org/>

Stay tuned for our next issue **OCEAN 47!**

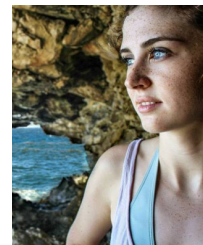
In the next issue of **OCEAN**:

We feel that Mariculture has the potential to reconfigure our vanishing fisheries but some new ideas are creating unwelcome conflicts. Oyster Farming; Seaweed Farming; Fish Farming and Lobstering, all have one thing in common: independent, hard-working people but they have something else in common, the lack of a framework for communication about shared resources.



Thank you to Samantha Thywissen, for continuing for her work as *Associate Editor* all the way from San Francisco to make **OCEAN 46** a publication we are all proud of.

To Jess Hillman,  
for her fantastic work as *Research Coordinator*  
keeping us all connected to bring you this issue.



Check out our website for other free publications: <http://safeharborenv.com/free-publications/>

Thank you for your support!