



## OUTER CAPE ENVIRONMENTAL AWARENESS NEWSLETTER



Our Ocean-Atmosphere environmental systems are not just linked to each other but connect all the plants and animals together in those systems. Some of our articles in **OCEAN 44** confirm these relationships. Many of us in New England consider mussels the “Poor Man’s Oyster” but recent research in the UK is disturbing. Another article I did not want to read is Lauren Goodwin’s “wake up” article on plastics getting trapped in the stomachs of seabirds, contributing to their starvation. We are also sharing an “unable to sleep at night” article about the mysterious proliferation of lizards in Florida. Safe Harbor ([SafeHarborEnv.com](http://SafeHarborEnv.com)) publishes **OCEAN** because we believe in the value of environmental education.

This publication belongs to each of you, our readers, who have our permission to share it.  
Thank you, Gordon Peabody, Editor.

November 2018 Issue No. 44

### PLASTICS CAUSING STARVATION IN SEABIRDS

As mentioned in previous **OCEAN** article, "[Why Marine Animals Eat Plastic](#)", our oceans are highly contaminated with plastic materials (both macro and micro) and this poses a major threat to marine life, with seabirds at a particularly high risk.

Scientists have actually been monitoring plastics in seabirds for decades. As the amount of plastic in the ocean has multiplied, so has the amount of plastic trash found in the stomachs of seabirds. A study published in 2015, found that currently 90% of seabirds (186 species sampled) contain plastic in their stomach. Regions with the greatest density of plastic in birds, include Southern Australia, South Africa and South America, but plastic in seabirds is becoming progressively widespread. This study predicts that with plastic production increasing globally, by 2050, 99% of seabirds will have plastic in their stomachs.

The complete health implications of plastics on seabirds have not been measured, but another study released in 2015, shows that there was a 69.7% decline in our seabird population from 1950 to 2010. This finding coincides with the observational data, deceased seabirds on remote islands that are full of plastic trash. These birds, many of which have evolved specifically to be generalist predators, die from sharp plastic edges puncturing their internal organs, or from their guts being so full of plastic, that they do not have room for nutritious food.

On the remote Lord Howe Island, seabirds are starving to death and a team of marine biologists have set out to do something about it. The team is capturing shearwater chicks that have recently left their burrows and are using a process called, lavage to physically flush out the stomach contents of the birds, without harming them. With more room in their stomachs, the hope is to give these chicks a chance, but with plastic so prevalent where they feed, it seems inevitable that plastic will once again fill their bellies.



More information in the links below:

<https://news.nationalgeographic.com/2015/09/15092-plastic-seabirds-albatross-australia/>, <https://www.bbc.com/news/science-environment-44579422>

Thank you to **OCEAN** Researcher Lauren Goodwin

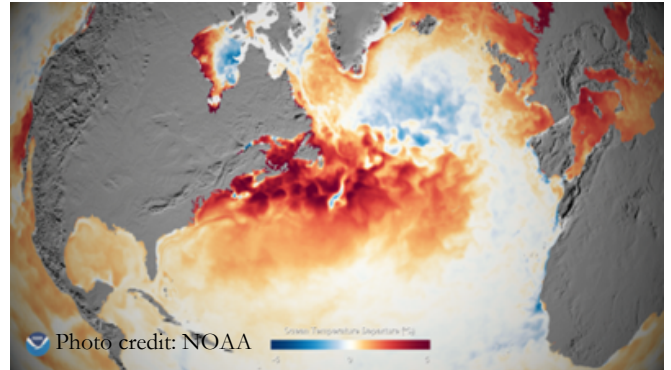
## WHAT'S COOKING IN THE GULF OF MAINE?

The end of this summer has brought a heat wave to the Gulf of Maine, an area of water stretching between Cape Cod and Nova Scotia. The sea surface temperature in this region was as much as nine degrees Fahrenheit warmer than normal temperatures this past August. Many regions of the world's oceans are warming, but the Gulf of Maine is warming particularly quickly. The Gulf of Maine Research Institute has used satellite imagery to determine that in the past 30 years, the region has warmed three times faster than the global average, and in the most recent 15 years, the region has warmed seven times faster than the global average. Though this trend is observed in the ocean, scientists believe the trend could be land based. As described in [OCEAN 43](#), melting glaciers in the North Atlantic are disrupting the normal flow of ocean currents. As freshwater enters the system, the current is prevented from sinking, because fresh water is less dense than seawater. Scientists believe this is causing a heat buildup in the North Atlantic. Typically, warm water moves towards the North Pole, sinks, and switches directions. However, fresh water from melting glaciers is beginning to prevent it from sinking, causing the warm water to accumulate in regions such as the Gulf of Maine. Scientists also suspect the warming could be caused by a shift in the Gulf Stream, a warm current that goes from the Gulf of Mexico, up the coast of the south eastern USA, and across the Atlantic Ocean to Europe. Scientists believe the Gulf Stream may be shifting northward and entering the Gulf of Maine, causing ocean temperatures to rise.

More information in the links below:

<https://www.nesdis.noaa.gov/content/warm-sea-surface-temperatures-western-north-atlantic>, <https://www.pressherald.com/2018/04/24/deep-current-of-unusually-warm-water-flowing-into-gulf-of-maine/>, <https://www.sciencedaily.com/releases/2017/09/170905202951.htm>

Thank you to [OCEAN](#) Researcher Rae Taylor-Burns



## GREEN CRABS, Selling an Invasive Species

In a previous issue of [OCEAN 35](#), March 2017, “If you Can’t Beat ‘Em Eat ‘Em” we discussed the possibilities of mitigating invasive green crabs by cooking and eating them. This summer the green crab working summit met in Maine to brainstorm the best ways to market and profit from green crabs.



Green crabs are invasive to New England, coming from Europe, and have harmed the New England soft-shell clam industry with their relentless predation. Green crabs have quickly thrived in New England, and with the waters of Maine rapidly warming an even more ideal habitat has been created. There is no sign they will die off in the near future. Adding to this unfortunate turn of events is the fact that green crabs are currently useless and unmarketable, however this summit met with the hope of finding a market or use in order to adapt to the new reality of their success in New England waters.

This will probably not result in green crabs being eaten into extinction in the area, or even effect their population by much, however it will help mitigate the financial problems they have cost. Last year's soft-shell clam harvest in Maine was the smallest since the 1930s. Establishing a market for green crabs would allow those whose yields have been harmed from the increase in predators such as green crabs, to sell to an additional market and thus mitigate losses. This innovative strategy shows promise and we look forward to hearing more about what they come up with, and perhaps we will soon get a chance to try some tasting green crab delicacies!

More information in the link below:

<https://www.seattletimes.com/nation-world/seafood-industry-gathering-for-invasive-green-crab-solution/>

Thank you to [OCEAN](#) Researcher Jessica Hillman

## A DIFFICULT ARTICLE TO TITLE

A popular dinner dish, mussels, have come into the spotlight recently in relation to ocean pollution. Mussels are filter feeders, which means they intake seawater and feed off nutrients in the water. This method of feeding means mussels are prone to consuming chemicals and materials present in seawater. Previous research has shown that mussels are capable of absorbing opioids in the ocean, which was concerning as the chemicals in the food we eat enters our bodies. A recent study now shows that the flesh of mussels harvested in British waters contain microplastics as well. Data reveals that in the mussels collected, for every 100 grams of mussel meat eaten, a person will consume 70 pieces of microplastic. Other studies have found microplastics in mussels in Norway, China, Chile, Canada, and Belgium. The health impacts of consuming these mussels is not fully understood, though Professor Jeanette Rotchell from Hull University explains that



Photo credit: plasticchange.org

“chances are that these [plastic particles] have no implications, but non the less, there is not enough data out there to say there is no risk”. Because chemicals in plastics are endocrine disruptors, presence of these particles in our bodies could impact hormone levels. These microplastic particles are caused by the larger issue of plastic pollution in our oceans. The consumption of single use plastic items contributes hugely to plastic pollution in our oceans, and by choosing reusable items rather than single use plastic items, we can begin the process of cleaning up our oceans.

More information in the links below:

<https://www.bbc.com/news/uk-44414056>, **OCEAN 43**, <https://www.theguardian.com/environment/shortcuts/2018/jun/08/microplastics-in-our-mussels-the-sea-is-feeding-human-garbage-back-to-us>, <https://www.scientificamerican.com/article/plastic-found-in-mussels-from-the-arctic-to-china/>

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

## OCEAN STORAGE OF PLASTIC

The Great Pacific Garbage Patch was discovered in 1997 by Charles Moore, a boat captain sailing from Hawaii to California. His crew observed a sea of plastic surrounding their boat, and since then, many research vessels have visited the area to learn more about the debris. The Garbage Patch is also known as the North Pacific Gyre, and it is formed by swirling ocean currents in the Pacific Ocean, similar to water flushing down a toilet. This giant patch of debris consists mostly of plastic particles, most of which are smaller than a fingernail. Additionally, while some of the plastic particles float on the surface of the water, many are suspended beneath the surface, and scientists suspect that some sink to the bottom of the ocean. These qualities make the garbage patch difficult to clean up – any nets with small enough mesh size to collect the plastic will also collect marine animals.



Photo credit: Monterey Bay Aquarium Foundation

The amount of plastic in the water has been a concern for a long time – sea animals and sea birds have been found dead, with their intestines full of plastic material. A more recent emerging concern is the unknown toxic impact of plastics as they break down. Plastics contain chemicals known as endocrine disruptors, which mimic hormones in our bodies and can have impacts on fertility. One organism that seems to be benefiting from the plastic pollution in the ocean is the sea skater, or water strider, a marine insect that lives on water surfaces and lays its eggs on floating marine debris. The abundance of floating marine plastic has increased the animal's egg densities in the region, which could have rebounding impacts on the marine food chain.

More information in the links below:

<https://www.bbc.com/news/science-environment-44579420>, <https://www.nationalgeographic.org/encyclopedia/great-pacific-garbage-patch/>, [https://ucsdnews.ucsd.edu/pressrelease/plastic\\_trash\\_altering\\_ocean\\_habitats\\_scripps\\_study\\_shows/](https://ucsdnews.ucsd.edu/pressrelease/plastic_trash_altering_ocean_habitats_scripps_study_shows/)

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

## DANGEROUS SUNSCREEN

In our last issue of [OCEAN](#), we discussed the recent decision of Hawaiian legislation to ban certain sunscreens due to the impact of certain chemicals on coral reefs. This issue we have found out about more potentially hazardous impacts of sunscreen. Recently, the Environmental Working Group, conducted a study detailing shocking findings on the majority of the sunscreen market.

This study names the worst sunscreens on the market, including Banana Boat and Coppertone brands. The study found that nearly  $\frac{3}{4}$  of the sunscreens on the market don't work to the level they advertise. This further supports the idea that the chemicals in sunscreen needs to be closely checked by the consumer before purchase. The study also reveals the highest scoring sunscreen for kids such as Aveeno Baby and All Good Kid's Sunscreen. Be sure to check the list before you make your next sunscreen purchase. And remember – the best protection from the sun is covering up and staying in the shade!



Photo credit: The Renegade Tribune

More information in the links below:

<https://www.ewg.org/sunscreen/#.W5FeRC-ZPMK>, [https://www.news4jax.com/health/study-names-14-most-dangerous-sunscreens-for-children?\\_yfbz=medium%3Dsharebar](https://www.news4jax.com/health/study-names-14-most-dangerous-sunscreens-for-children?_yfbz=medium%3Dsharebar)

Thank you to **OCEAN** Researcher Jessica Hillman

## DEVASTATING RED TIDE IN FLORIDA

Florida is a state known widely for its sunshine and beautiful beaches. The naturally beautiful beaches surrounding Florida attract visitors and new residents annually, from college spring breakers to new retirees looking for sunshine. Much of Florida's tourism industry, a key component of Florida's economy, relies on the continued allure of these beaches.

Unfortunately, Florida has been experiencing a devastating red tide since June due to an algae bloom. While red tide algae blooms, unlike blue-green algae blooms, are naturally occurring and not started by fertilizer and waste run-off, red tide algae blooms can be strengthened and lengthened by these same man-made sources. These sources; fertilizer runoff, sewage, dust from the Sahara and pollution from the Mississippi river, have most likely been feeding and strengthening the current red tide enabling it to become the worst for Florida in over a decade.

The red tide is created by toxic algae blooms that kill fish, sea turtles, manatees and even dolphins. These marine species have been dying in unprecedented amounts off the coast of Florida due to the bloom. Additionally, these blooms can have health effects caused by brevetoxins that are emitted by the tiny organisms creating the red tide, on humans as well. These health effects range from coughing and difficulty breathing if inhaled to nausea and vomiting if ingested and can have strong effects on those with Asthma. There have even been links to neurological disorders such as Parkinson's disease and Lou Gehrig's disease due to long-term exposure to toxic algae fumes (weather.com). These serious health effects are affecting locals, tourists, and the tourism industry, thus effecting Florida.

Although red tides are naturally occurring, some areas, such as Florida, are being affected by them at increasing rates and durations. While fish kills due to red tide have been documented all the way back to the 1500s new research is showing that the increase and longevity of these events could be due to man-made pollution. Researchers at Florida Gulf Coast University (FGCU) are studying the tide to determine if signature types of nitrogen, such as the ones found to be contaminating Lake Okeechobee in Florida, are affecting this red tide. If the connection is found, it will show that agricultural runoff from sugar cane farms are a key contributor, much as they are for the blue-green algae blooms in Florida lakes, and must be further regulated. We will continue to monitor this situation and update you on any future research discoveries or policy changes that could impact future red tides.

More information in the links below:

<https://weather.com/science/environment/news/2018-07-28-florida-fort-myers-red-tide-dead-animals-turtles>, <https://www.nbcnews.com/news/us-news/toxic-red-tide-florida-researchers-investigate-what-s-making-it-n900771>, [https://www.tampabay.com/news/environment/Another-reason-Florida-s-Red-Tide-is-so-bad-this-year-Pollution-from-the-Mississippi-River\\_171932427](https://www.tampabay.com/news/environment/Another-reason-Florida-s-Red-Tide-is-so-bad-this-year-Pollution-from-the-Mississippi-River_171932427), [https://www.tampabay.com/news/Red-Tide-arrives-in-Pinellas-killing-hundreds-of-thousands-of-fish\\_171618836](https://www.tampabay.com/news/Red-Tide-arrives-in-Pinellas-killing-hundreds-of-thousands-of-fish_171618836)

Thank you to **OCEAN** Researcher Jessica Hillman



Fish are seen washed ashore Florida's Sanibel causeway after dying in a red tide on August 1.

Photo credit: Joe Aedle/Getty Images

## RATS INFESTING THE REEFS

It has now become apparent that actions from the past can have unintended consequences in the present. Back in the 18<sup>th</sup> and 19<sup>th</sup> centuries black rats made their way to two-thirds of the Chagos islands due to shipwrecks. Now a few hundred years later, these invasive species are affecting the well-being of the surrounding reefs near the islands. These rats have decimated the bird populations by eating eggs, young, and even adult birds. At first glance, the dwindling bird population would seem to have no effect on the reefs, however birds play a crucial role in depositing nutrients to these reefs. The birds on the island feed on fish from the sea, and in turn nutrients from bird droppings are leached out to the surrounding reefs. Islands with the rats disturb the delicate ecosystem and are causing a deficiency in the amount of nutrients that the reefs require. One suggestion to help with this issue is to eradicate these invasive rats from the island, but that is much easier said than done. One successful effort has been recently completed and we are tracking that.



Photo credit: iStock images

More information in the links below:

<https://www.bbc.com/news/science-environment-44799420>, <https://www.theatlantic.com/science/archive/2018/07/how-rats-remake-coral-reefs/564899/>, <https://www.independent.co.uk/environment/rats-coral-reefs-eradicate-tropical-island-seabirds-fish-chagos-archipelago-indian-ocean-a8442371.html>

Thank you to **OCEAN** Researcher Lindsey Stanton

## ELECTRICITY FROM ROOT VEGETABLES

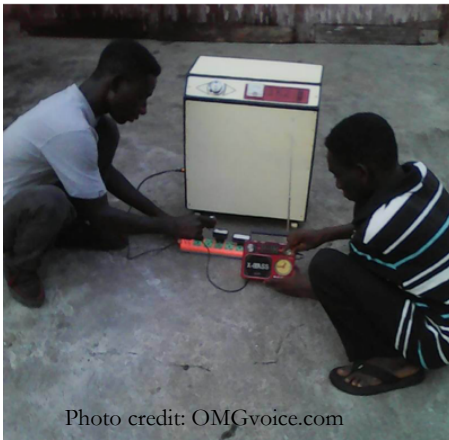


Photo credit: OMGvoice.com

In the Eastern Region of Ghana, brothers James and Kwesi Ansah have discovered a potential solution to provide affordable electricity for their community. Despite their lack of professional training, the two have created the “JK2 power table,” a machine that creates electricity from the root vegetable cassavas. They were inspired to use cassavas because it is a very abundant crop in Ghana, and much of what is produced goes to waste. By grinding the cassavas waste and adding the juice to a bowl containing a copper electrode, the brothers are able to utilize cassavas’ electrolyte properties to create electricity. Their invention has a voltage range of 11-12 V and can be used to power phones, radio sets and light bulbs. According to their mother Maame Fante, the brothers currently use their invention to provide electricity within their home. They hope that with support from the government that they can use their invention to help provide villages, schools and hospitals with affordable electricity.

Scientists at the University of Jerusalem in Israel have also explored the use of root vegetables to create affordable electricity. The potato battery, a popular science experiment for children, uses the combination of potatoes and copper and zinc electrodes to create a battery strong enough to power a clock. Phosphoric acid ( $H_3PO_4$ ) within the potato reacts with the zinc electrode, causing it to lose electrons. These electrons flow to the copper electrode and create an electric current. A 2010 study found that boiling the potatoes creates a battery that is 10 times stronger than a raw potato battery and suggest that the findings may be a potential way to provide affordable and sustainable electricity to developing countries.

More information in the links below:

<https://www.primenewsghana.com/general-news/two-ghanaian-boys-use-cassava-waste-to-generate-electricity.html>, [https://www.tau.ac.il/~agolberg/pdf/2010\\_3.pdf](https://www.tau.ac.il/~agolberg/pdf/2010_3.pdf), [https://www.risingafrica.org/success-stories/technology-and-innovation/science\\_technology/ghanaian-brothers-invent-device-that-generates-electricity-using-cassava-and-we-are-way-too-proud/](https://www.risingafrica.org/success-stories/technology-and-innovation/science_technology/ghanaian-brothers-invent-device-that-generates-electricity-using-cassava-and-we-are-way-too-proud/)

Thank you to **OCEAN** Researcher Isabella Backman

## THE CLOSER LOOK DEPT: Record Breaking Hot Rain?



Photo credit: Jeff Berardelli/Twitter

A light rain on July 24<sup>th</sup>, 2018 in the small town of Imperial, California has recently caught the attention of several media outlets. It was an exceptionally hot day for Imperial, reaching a scorching 121°F. This is the hottest temperature this town has seen since it reached its 124°F record in 1995. Even more remarkable was that rain was recorded at 119°F, which would be the highest temperature rain has fallen at in world history. In response to this event, extreme weather expert Jeff Berardelli (@WeatherProf) tweeted: "This is an amazing stat!! Rain at 119 degrees. Hottest temp on record to produce rain. It means that not only is Earth getting hotter but also more humid. And that is the link between a changing climate and health."

However, shortly after this event, the National Weather Service reported that there was no rain on July 24<sup>th</sup>. Despite high temperatures, the weather sensor in Imperial was actually identifying the precipitation on that day as snow. It is likely that strong winds prior to the event caused dust to accumulate on the sensor, resulting in the false reporting. Furthermore, there are several other weather sensors located in Imperial County, none of which reported rain.

Interestingly, Dr. Jeff Masters, co-founder of weather service Weather Underground, conducted interviews with Imperial residents who reported experiencing rain on that hot day. However, the official climate record has since been updated to show that no rain fell in Imperial on July 24<sup>th</sup>.

More information in the links below:

<https://www.weather.gov/psr?DidItRainAtImperialOnJuly242018>, <https://www.wunderground.com/cat6/Hottest-Rain-Record-Rain-falls-119F-Imperial-California>

Thank you to **OCEAN** Researcher Isabella Backman

## INVASIVE REPTILES IN FLORIDA

Southern Florida's subtropical climate provides a perfect habitat for many plant and animal species to survive. This can become a problem when non-native species are introduced, thrive, and begin to out-compete native species or cause additional problems. The green iguana is an example of an invasive species gone wild.

Green iguanas were first documented in Florida in the 1960s, and it is reported that more than 300 individuals were released in Miami-Dade County between May and September 1964. These individuals were believed to be non-breeding, but after significant native species re-planting efforts following Hurricane Andrew in 1992, populations all across southern Florida began to increase. Green iguanas have also been found in central Florida, but it is thought that these individuals are escaped or released captive animals. Green iguanas cannot survive in cooler climates, so it is believed that these central Floridian individuals will not establish populations and that the distribution of the iguanas in southern Florida will not expand northward. Warming temperatures due to climate change, however, could have an impact on this in the future.

Green iguanas have become a nuisance species in southern Florida. Some of the many problems they are causing include damage to native and landscape vegetation, damage to powerlines, burrowing underneath and subsequently causing the collapse of various infrastructure, and preying upon endangered species of tree snails. Green iguanas can also transmit Salmonella through direct contact with water or with indirect contact through their feces; droppings have been found all over sidewalks, porches, and in swimming pools.

In an attempt to control the population, the state is allowing members of the public to trap and either keep or humanely euthanize iguanas. According to researchers, however, the populations in southern Florida "appear to have exceeded the point of human control", and it remains to be seen whether removal and preventative techniques will have any significant impact on this issue.

More information in the links below:

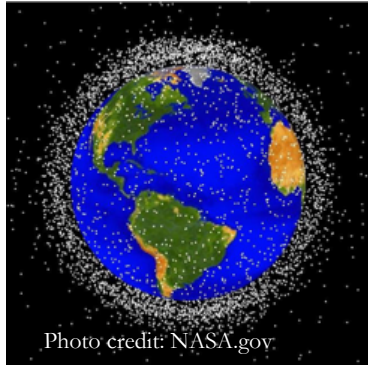
<https://www.researchgate.net/publication/267333606/download>, <http://myfwc.com/wildlifehabitats/nonnatives/invasive-species/>, <http://myfwc.com/wildlifehabitats/nonnatives/reptiles/green-iguana/>

Thank you to **OCEAN** Researcher Lauri Leach



Photo credit: Mike Stocker

## LITTER IN ORBIT: Space Junk



Human impact on earth has been enormous, from changing the planet's climate to potentially causing a sixth mass extinction event. However, our impact extends beyond the Earth's atmosphere. Orbiting in space above us are over 500,000 pieces of "space junk", or man-made debris that no longer has a meaningful purpose, including fragments from old rockets or satellites, tools left behind by astronauts and even paint flecks. The size of space junk ranges from pieces that are too small to be tracked to debris larger than a softball, and they travel around the Earth at speeds up to 17,500 miles per hour (10 times faster than a bullet!).

Space junk poses a threat to current space missions and there have been numerous documentations of debris colliding with and destroying functioning satellites. Even tiny, undetectable pieces can collide with and impair space shuttle windows. The Space Surveillance Network (SSN), a program led by the US government, reported 308,984 close calls with space junk in 2017. This problem may increase exponentially as collisions lead to even more debris orbiting the Earth.

More information in the links below:

<https://www.bbc.com/news/science-environment-44603780>, [https://www.nasa.gov/mission\\_pages/station/news/orbital\\_debris.html](https://www.nasa.gov/mission_pages/station/news/orbital_debris.html), <https://www.businessinsider.com/space-junk-collision-statistics-government-tracking-2017-2018-4>

Thank you to **OCEAN** Researcher *Isabella Backman*

## WHY IS JAPAN BECOMING A WEATHER TARGET?

This summer Japan was hit with one of the strongest typhoons in over 25 years. The Pacific region where Japan is located is no stranger to tropical cyclones, which usually weaken as they approach Japan. However, this summer Japan experienced a direct hit with full force. Typhoon Jebi brought very heavy wind and rain, shortly after Typhoon Jongdari as well as an extreme heatwave. Prior to the heatwave that took place in late June to early July, parts of Western Japan experienced heavy rain that caused flooding and landslides that took lives of more than 200 people.

According to Japan Meteorological Agency's (JMA) Tokyo Climate Center, global warming may have been a contributing factor to the unusual weather in Japan. Global warming; meaning an ongoing trend of higher than average tropospheric air temperatures. These higher air temperatures are associated with the northward shift of the subtropical jet stream that brings warm, humid air with high water vapor content. When atmospheric temperatures increase by 1°C, the amount of water vapor increases by about 7%. Some areas in Japan experienced 2-4 times the precipitation of the monthly average in July, which were recorded at some of the JMA's Automated Meteorological Data Acquisition System (AMeDAS) stations throughout Japan. The precipitation in Japan in early July 2018 was the highest for any 10-day period since 1982.

Following the heavy rain event in July, a total of 130 AMeDAS stations recorded maximum temperatures during a heatwave in mid-July. At the peak of the heatwave several stations reported temperatures exceeding 40°C (104°F) and on July 23<sup>rd</sup> a new maximum temperature of 41.1°C was recorded in Kumagaya a city in the Saitama Prefecture. Several factors are thought to have contributed to the heatwave. Meteorological phenomena such as the expansion of the North Pacific Subtropical High (NPSH) and the Tibetan High, as well as the higher than normal global surface air temperature could have played a role.



Photo credit: KYODO News

More information in the links below:

<https://www.bbc.com/news/world-asia-45406857>, [https://www.washingtonpost.com/news/capital-weather-gang/wp/2018/07/26/jongdari-is-nearly-a-typhoon-and-has-its-eyes-on-overheated-and-flood-ravaged-japan/?noredirect=on&utm\\_term=.e83e90a5bd1e](https://www.washingtonpost.com/news/capital-weather-gang/wp/2018/07/26/jongdari-is-nearly-a-typhoon-and-has-its-eyes-on-overheated-and-flood-ravaged-japan/?noredirect=on&utm_term=.e83e90a5bd1e), [http://ds.data.jma.go.jp/tcc/tcc/news/press\\_20180822.pdf](http://ds.data.jma.go.jp/tcc/tcc/news/press_20180822.pdf)

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

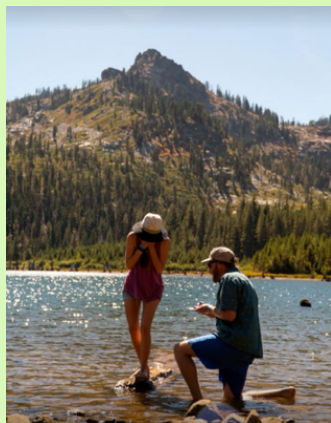
## DISPATCH FROM MONTANA

Charles Post Interned with Safe Harbor some years ago and has kept in touch with us. He and long-time partner Rachel Pohl joined us for coffee and catch up, when they visited Cape Cod recently. Last year, Charles Directed the extraordinary, short documentary ([Sky Migration](#)) about a group of dedicated stewards who, for 30 years, have traveled mountaintop to mountain top, tracking migrating Eagles and Hawks. Rachel, an Artist and Outdoor Athlete, was recently featured in an Outdoor TV Special on Bozeman, Montana (<https://vimeo.com/278535900>) showcasing her successful artwork, ice climbing skills and cold powder skiing. This recently married team has been referred to as an influential, “Outdoor Power Couple”.



Photo credit: Gordon Peabody

## DISPATCH FROM LAKE TAHOE

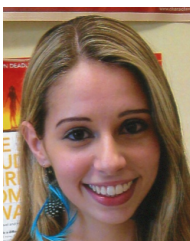


Bree Lewis, a previous Safe Harbor Intern, currently working at the Tahoe Environmental Research Center, recently posted this great image of her long-time friend, Graham Jones, proposing on the shore of the Lake. We send our congratulations to them.



Stay tuned for our next issue **OCEAN 45!**

Where we bring you important information on 14 year oil spills, 100 year storm surges, and 1,000 year rainfall events. We will also share some insight into our unique research experiments to reduce whale entanglements, using seaweed gelatin and sand to create timed, dissolvable counterweights for buoys.



A special thank you to Samantha Thywissen, for her continuing creativity and hard work as *Associate Editor* to make **OCEAN 44** a publication we are all proud of.

To Jess Hillman,  
for her hard work as *Research Coordinator*  
for our far flung Researchers, on **OCEAN 44**.



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