Outer Cape Environmental Awareness Newsletter

Welcome to our 54th issue. **OCEAN** is your Environmental Newsletter, to be read and shared. Thank you to researcher Rae Taylor-Burns, for her article integrating complex, hemispheric energy systems to provide us with a simple explanation of why we had so many Hurricanes this season. We also have our continuing series of **"*Safe Suggestions During COVID*".** One of the most upsetting articles we debated sharing: an aggressive, water borne amoeba that deteriorates brain tissue. Perhaps this can be balanced by some good news: ***Purdue University researchers have invented a white paint with cooling properties.*** Please enjoy this issue, we wrote it for you.

Regards, Gordon Peabody, Editor.

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SAFE SUGGESTIONS DURING COVID (Part 4)

The New Year has arrived and brought with it more hope for 2021. Throughout 2020, **OCEAN** provided updated information and resources on COVID-19 to keep readers informed and this will continue in 2021. We encourage our readers to maintain following the health and safety precautions we became familiar with in 2020, while staying informed of any changes.

While we all continue to do our part by keeping social distance, wearing masks, washing hands, following MA travel orders, and staying home when possible, we look forward to a safe reopening. Staying informed on the latest COVID-19 vaccine information is one way to plan for the upcoming year. Barnstable County has shared the detailed vaccine distribution plans and vaccination has already started with Phase 1, including healthcare workers, long term care facilities and emergency services.

For readers interested in more up to date local information from the Barnstable County Department of Health and Environment please view: www.barnstablecountyhealth.org and for more up to date local information from the Massachusetts Department of Public Health please view: www.mass.gov/covid19. If readers have local questions, they can also email COVID-19@barnstablecounty.org. Staying informed and following local guidance and recommendations will help keep our community safe and better enable a safe reopening.

Further information:
https://www.reopeningcapecod.org, https://www.barnstablecountyhealth.org/covid-19/covid-19_vaccine_information, https://www.barnstablecountyhealth.org/covid-19/latest-updates-and-info, www.barnstablecountyhealth.org, www.mass.gov/covid19, https://www.barnstablecountyhealth.org/community_tips_

Photo credit: Barnstable County Public Health

HOW DID WE LOSE 350 ELEPHANTS?

There is continuing concern about low Elephant populations and endangered status. Elephant populations have significantly declined due to poaching for the illegal ivory trade. Although protection has increased and populations are growing, they still face the risks of habitat destruction and human-elephant conflict caused by the belief that elephants are destroying cropland. Botswana is considered to house the largest remaining elephant population with about 13,000 elephants and efforts are being made to maintain this valuable population.

In May of 2020, concerns arose during a fly over the Okavango Delta, over 350 elephant carcasses were identified. Due to tusks being intact, which many poachers want for ivory, poaching was ruled out for cause of death. This left an alarming question for conservationists and government officials of what caused so many elephant deaths in the delta. An update in October 2020 by the Botswana government stated that test results from carcass samples pointed to a naturally occurring Cyanobacteria as the cause of death. After hearing this, there was great debate over whether this explanation was plausible and if other causes were plausible. A conservationist by the name of Map Ives said the cyanobacteria explanation coincides from rising water levels in the area, which can cause the cyanobacteria to rise from lower soil levels to the surface. In addition, the deaths occurred starting from late April and ended in late June when water was drying up, which supported the cyanobacteria theory.

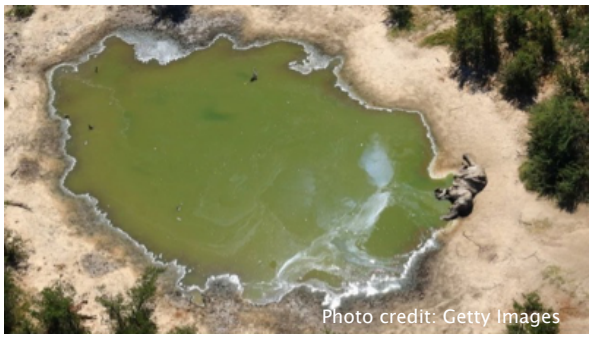


Photo credit: Getty Images

Those disagreeing with the Cyanobacteria explanation argue that tests did not rule out other neurotoxins that would be available to farmers, who may have reason to target elephants for destroying cropland. The question of why other species was not affected is also still a mystery and may need further research.

*Editor's Note: A toxic species of Cyanobacteria is a known, seasonal hazard on Cape Cod.

Further Information:

https://www.awf.org/country/botswana#:~:text=With%20over%20130%2C000%20elephants%20living,poaching%20continues%20to%20decimate%20populations, https://www.worldwildlife.org/species/elephant, https://www.bbc.com/news/world-africa-53257512, https://www.outdoorjournal.com/news/update-the-mystery-of-botswanas-dead-elephants/

Thank you to OCEAN Researcher Abigail Eilar

ANOTHER BROKEN RECORD

The 2020 Atlantic hurricane season resulted in 30 named storms, breaking the previous record of 28 from 2005. Typically, hurricanes are named in alphabetical order. In 2005 and again in 2020, the number of storms exceeded the 26 letters of the alphabet, and the World Meteorological Organization, which names hurricanes, had to resort to Greek letters for storm names. Twelve of these storms made landfall in the United States. Scientists think that the record number of storms was due to a combination of warmer water temperatures, a La Nina, and a strong African monsoon season. Warmer ocean temperatures have long been understood to fuel hurricane formation. In 2020, a La Nina developed in the fall. La Nina conditions reduce wind shear in the Caribbean and tropical Atlantic. Wind shear can disturb hurricane formation, and so less wind shear meant that more hurricanes may have been able to form. Scientists describe winds from African monsoons to act as "seedlings" for hurricane formation, and thus the busy 2020 monsoon season fed the busy 2020 hurricane season. These factors combined to result in a record shattering Atlantic hurricane season, resulting in an estimated $66 billion of damages in the United States alone, in addition to significant impacts in Central and South America.

Photo credit: Western Mass News

Further information:

https://www.noaa.gov/news/la-nina-develops-during-peak-hurricane-season, https://www.bbc.com/news/world-us-canada-54887071 , https://www.noaa.gov/media-release/record-breaking-atlantic-hurricane-season-draws-to-end

Thank you to OCEAN Researcher Rae Taylor-Burns

CLOSE TO HOME: CAPE COD


Photo credit: Town of Chatham

A vessel grounding in Mill Creek in Chatham caused damage to a shellfish bed last fall. Officials are conducting an investigation to determine exactly what happened and who caused the damage. Mill Creek is known as a Chatham "grow-out" area, and is one of several locations where seed that is grown in a nearby upweller can be planted once they reach 10 to 15 millimeters in size. The seed planted in Mill Creek are placed in fine mesh to protect them from predators until they are larger and less susceptible.

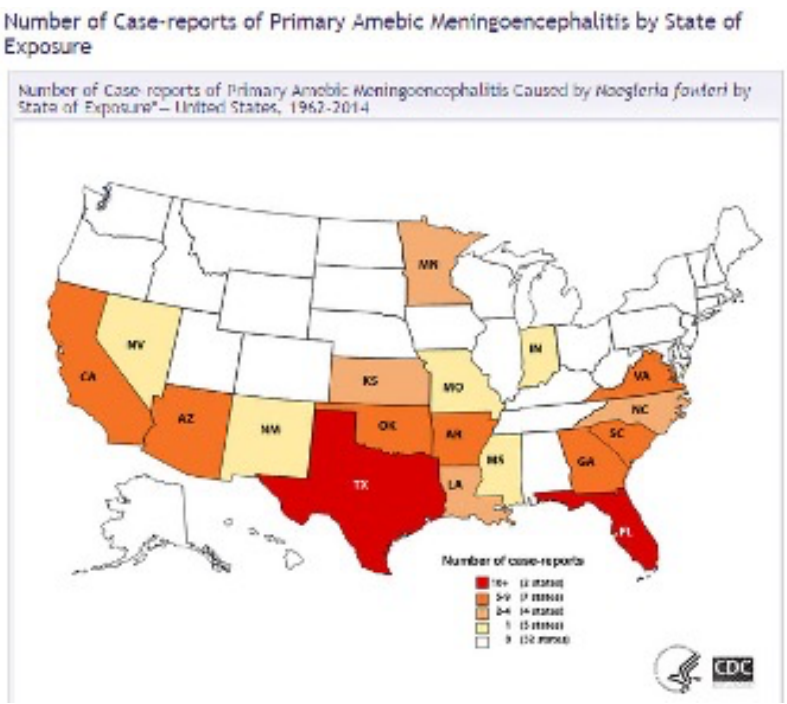
The vessel grounding on the flats tore the protective nets, and the Chatham Shellfish Constable has estimated that as many as 450,000 seed quahogs were compromised by exposure to predators and 100,000 lost. The monetary loss is estimated to be $7,000, which includes the loss of nets and 100,000 20 to 25-millimeter quahogs but does not include the labor required to transplant the seed, or the loss in future adult quahog harvest.

The vessel that grounded left two propellor scars on the flats, and inquiries have been made to the contractor of a barge being used to build a bulkhead nearby, which has dual motors. The barge contractor denied causing the damage, and the Harbormaster has been asked to conduct an investigation, comparing the span of the barge motors and the propellor scars in the flats.

Further information:
https://capecodchronicle.com/en/5546/chatham/6550/Thousands-Of-Seed-Shellfish-Destroyed-In-Mill-Creek-Commercial-fishing-and-shellfishing.htm?fbclid=IwAR243J5dck2kZSnS0eQ8R4H0pCXMXUb9mmoGW3_7woAIiDXitYyfCOj85mU

Thank you to OCEAN Researcher Rae Taylor-Burns

UNWELCOME AMOEBA IN OUR WATERS



In September 2020, 6-year-old Josiah McIntyre died due to a brain-eating amoeba he contracted in Lake Jackson, Texas, a city 55 miles south of Houston. It is suspected that he was exposed to the amoeba while playing in water at the city splash pad or from the hose at his home. An investigation into the water quality began while he was hospitalized on September 8. The Brazosport Water Authority released a "do not use" water advisory for cities in the region, and Lake Jackson Mayr Bob Sipple and Texas Governor Greg Abbott both issued disaster declarations.

The amoeba called Naegleria Fowleri is found in warm freshwater, though it can be found in lake or river sediments at lower temperatures. The organism cannot survive in properly chlorinated freshwater. When water containing the amoeba enters the nasal cavity of a swimmer, the amoeba travels to the brain, where it destroys brain tissue. Initial symptoms include headache, fever, nausea and vomiting, and progress to stiff neck, seizures, altered mental status, hallucinations, and coma. Infections are rare: between 2010 and 2019 only 34 infections have been reported in the United States, which is 1000 times less common than death by drowning. However, the fatality rate of this uncommon infection is 97%.

Further information:
https://www.bbc.com/news/world-us-canada-54313110, https://www.cnn.com/2020/09/26/us/brain-eating-amoeba-found-in-texas-water-supply-trnd/index.html, https://www.washingtonpost.com/health/2020/09/28/brain-eating-amoeba-texas/, https://www.nytimes.com/2020/09/27/us/water-supply-brain-eating-amoeba.html, https://www.cdc.gov/parasites/naegleria/pathogen.html

Thank you to OCEAN Researcher Rae Taylor Burns

ALTERNATIVES TO ANIMAL PRODUCTS

Interest in reducing intake of animal products has gained popularity over time for many reasons ranging from environmental concerns to animal ethics. Over the past few years the market for vegetarian or vegan food has grown, with many new products that mimic the taste and texture of meat. From an environmental standpoint the creation of more sustainable food products and diversification of meat production practices is an appealing idea.


Photo credit: Eat Just Inc.

Recently, Singapore gave approval for use of the fist lab grown chicken meat. This paves the way for other countries to approve and create similar products. This lab grown meat product could provide an answer to some ethical and environmental challenges of while utilizing actual animal muscle cells to grow real meat in a lab. While this is a breakthrough to some, there are still many challenges to be addressed.

One such challenge is the cost, "Eat Just" the company responsible for the newly approved lab-grown chicken meat plans to utilize the product in chicken nuggets, however, the price point may start as high as $50. While this product may not initially serve as the perfect answer to all of the environmental and ethical questions for the meat industry and the price may make it inaccessible to most, this is an interesting first step. Future advancements may prove to reduce cost and we are interested in seeing the future outcomes of lab grown meat and the impact they could have on environmental sustainability of food systems in the future.

Further information:
https://www.bbc.com/news/business-55155741, https://www.businesswire.com/news/home/20201220005063/en/

Thank you to OCEAN Researcher Jessica Hillman

GETTING PAID FOR PLASTIC

This year in Northern Ireland the founders of a new recycling app called Reward4Waste have teamed up with local officials and recycling companies with what they believe is a simple and effective way for people to return single use packaging. This App comes ahead of new recycling laws scheduled to bring in a Deposit Return Scheme. The app is the first of its kind in Northern Ireland and will be trialed across 2,000 households for an eight-week period exclusively in an area called Whitehead.The trial will cover items packed in single use packaging, purchased at a local store named SPAR in Whitehead, including plastic drinking bottles, plastic milk containers, cans, glass wine bottles, and even aluminum. Each participating item will have a unique sticker which residents can easily scan into the Reward4Waste app on their phone at point of recycling to get their Reward Points.

Photo credit: BBC

Residents will be rewarded 10 or 20 Reward Points every time they recycle a participating item, with 100 points being worth a monetary value. During this trial period, price points on participating items will not go up which means people will actually get rewarded for their recycling. The collected Reward Points can be redeemed as SPAR vouchers and may be used to purchase items at SPAR or donated to a choice of three local charities in that area. Not only does the new technology help the environment it also benefits the community. Local officials believe that packaging should never become waste and making the recycling process as easy as possible is vital to that mission. One official was noted as saying, "these simple changes may not seem like a lot individually but if everyone made a small change and became more aware, we could collectively make a massive difference."

Further Information:
https://reward4waste.com/discover-more/, https://www.bbc.com/news/uk-northern-ireland-54364090, https://www.brysongroup.org/news/whitehead-reward4waste-trial-theres-a-new-app-in-town

Thank you to OCEAN Researcher Madeline Conley

Photo credit: Reward4Waste.com

COOL PAINT HAS EVEN COOLER PURPOSE

Carbon dioxide is a greenhouse gas that is a large contributor to global warming. Since the mid 1800s, industrialization and carbon dioxide emissions have increased by about 40%. Currently, 28% of carbon emissions are due to necessary building functions such as lighting, and heating and cooling, according to the World Green Building Council. ***Purdue University researchers have invented a white paint with cooling properties*** to direct heat not only away from the surface of the building, but into space as well, so that heat can't become trapped in the earth's atmosphere. The paint is able to reflect 95.5% of sunlight via the calcium carbonate particles (largely found in rocks and shells) that are added to the paint, according to Professor Xiulin Ruan of Purdue University, which are then able to scatter the wavelengths they receive. This is the first reflective paint that is able to cool the building's temperature 18 degrees Fahrenheit below the ambient air. Joseph Peoples, a student at Purdue University, claims that "this paint is basically creating free air conditioning by reflecting that sunlight and offsetting those heat gains from inside your house".

The cooling paint proposes the possibility of decreasing air conditioner use thus lowering carbon dioxide emissions. Purdue's cooling paint is not available for commercial use yet and is undergoing more testing, however, the product has attracted large interest from manufacturers and a patent application has been filed. Inventions such as this reflective paint may help future generations to enjoy all the wonders earth has to offer.

Further information:
https://www.eia.gov/energyexplained/energy-and-the-environment/greenhouse-gases-and-the-climate.php, https://www.bbc.com/news/science-environment-54632523, https://www.purdue.edu/newsroom/releases/2020/Q4/this-white-paint-could-reduce-the-need-for-air-conditioning-by-keeping-surfaces-cooler-than-surroundings.html

Thank you to OCEAN Researcher Tess Holland

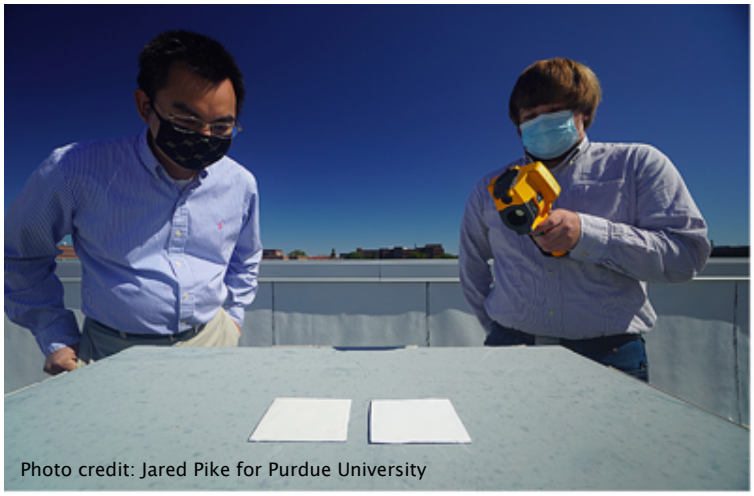


Photo credit: Jared Pike for Purdue University

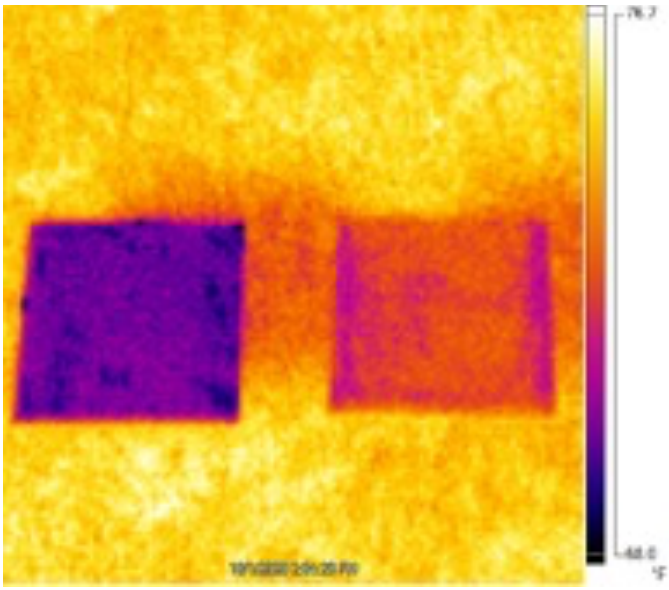


Photo credit: Jaoseph Peoples for Purdue University

KELP SPECIES SURPRISING SCIENTISTS

Recently, scientists from Heriot-Watt University's International Centre for Island Technology in Stromness, Scotland have analyzed samples taken from Kirkwall Bay of the genetic composition of *Laminaria digitata,* which is commonly known as oarweed, from 14 different populations. The genetic analysis of the oarweed showed three genetic clusters of populations off of Scotland and Ireland, and around Brittany that have survived in that area for about 16,000 years. *Laminaria digitata* is a very common type of brown seaweed which is found in the low water shore area along the Irish, North European and Eastern North American Coastline at depths of up to 10 meters. Typically, laminaria digitata lives for 6-10 years.

Photo credit: Irish Central News

This finding is significant because of how the oarweed populations have been distributed since the last ice age. The oarweed distribution is found off of Scotland and Ireland and Brittany. correlates with how the ice sheets retreated; allowing the oarweed to be recolonized at higher latitudes. The concern is that with the rise in temperatures there will be a rapid loss of biodiversity, which could be catastrophic due to the role the kelp plays in buffering the effects climate change on marine life.

Further Information:
https://www.bbc.com/news/uk-scotland-north-east-orkney-shetland-53558308,
https://www.hw.ac.uk/news/articles/2020/refugee-kelp-from-last-ice-age-found-in-the.htm,
https://www.marlin.ac.uk/species/detail/1386

Thank you to OCEAN Researcher Lindsey Stanton

HELPFUL HEAT POWERED FANS

Do you enjoy a toasty-warm home in the chilly winter months? If so, are you concerned with the exorbitant costs of heating a home? Well there might be an answer to such concerns. ***Heat powered fans*** are an efficient and safe addition to your home as a supplement to electric heat or wood burning stoves. These fans require no batteries or electricity, but instead, are powered by the heat produced from wood burning stoves or fireplaces. The four-blade fan is made of anodizing aluminum and circulates warm air throughout a room when placed on top of or beside a stove top. Typically, heat powered fans have a tiny motor that creates a voltage large enough to power the blades when the fan is exposed to heat, specifically when two different metals are used. The more heat there is, the faster the blades will spin. There are many retailers selling heat powered fans, many receiving 5-star reviews that often emphasize their effectiveness in heating a room, as well as the efficiency of the operation of the fan. During the winter months in the Northeast, when homes and large buildings are being heated for long periods of time, heat powered fans can play an important role in reducing the emissions from oil or gas commonly used to heat houses.

Photo credit: Valiant Fans

Further information:
https://reeniescooldeals.com/product/heat-powered-fireplace-fan?fbclid=IwAR0AB8uJvUlWWQThY246_cx2IsbAmvlNuWgFSbiBgL6m8Ux0GKsidJbixvE, https://valiantfireside.com/pages/secrets-of-the-stove-fan

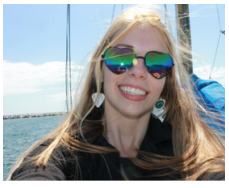
Thank you to OCEAN Researcher Tess Holland

MYSTERY BONE FOUND ON THE BEACH!

A photo of a bone that was found several weeks ago by a Cape Cod beachcomber was making the rounds on social media.

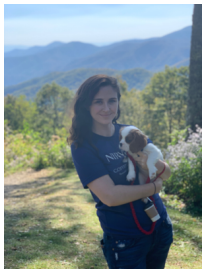
As it turns out, it's not a mystery, it's a sea turtle!

Thanks to Bob Presccott



This issue of **OCEAN** would not be possible without the extraordinary commitment to Environmental Education from our ***Research Coordinator Jessica Hillman*** (right) and ***Associate Editor Samantha Thywissen*** (left).

Thanks to both of you for leading our Education Team, Gordon Peabody, Editor.



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