



Outer Cape Environmental Awareness Newsletter

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A word from OCEAN's Editor:

GORDON PEABODY

OCEAN is the environmental education publication of Safe Harbor, a small environmental consulting collaborative, on Duck Creek Marsh in Wellfleet, on Cape Cod. Our researchers always surprise me with their discoveries: Lindsay Stanton documenting the 42,000 year old reversal of our magnetic field from an ancient buried tree; Tess Holland looked at the counter-intuitive concept of "Ropeless" Lobstering; **OCEAN** Associate Editor Catherine Urquhart's troubling research about potential Radioactive discharge into Cape Cod Bay reminded me of when I attended College, where I was the only student using their Isotope Pit, researching biological magnification of Radioactive Isotopes between phytoplankton and zooplankton. Radioactivity doesn't disappear, it Bioaccumulates. Bioaccumulation of Radioactivity was not debatable at the time but maybe things have changed? **OCEAN** belongs to you, our readers and you have our permission to share.

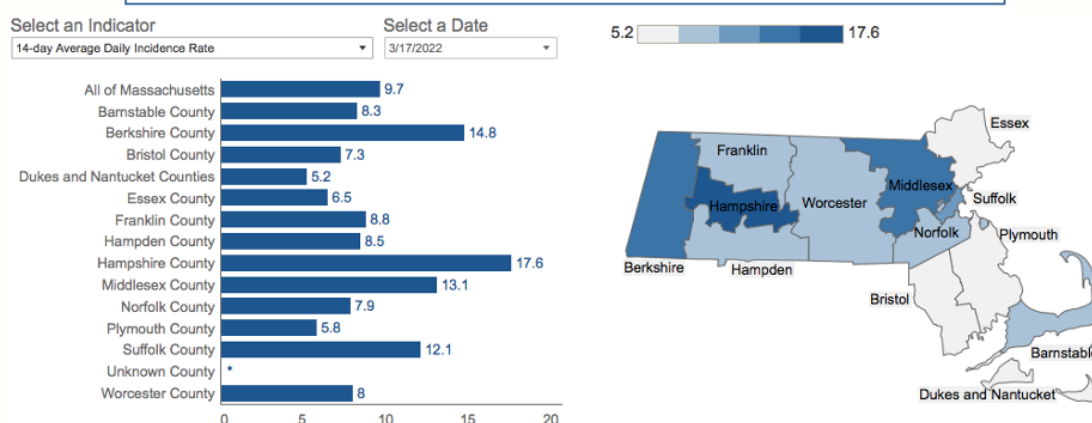
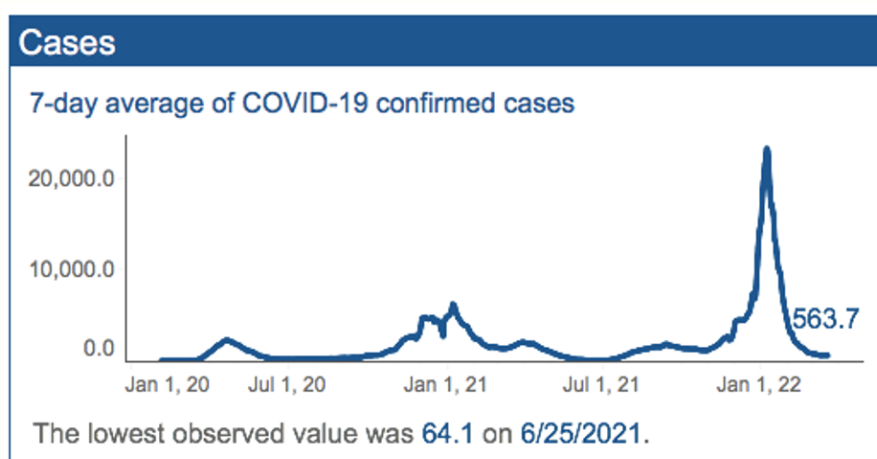
Regards, Gordon Peabody, OCEAN Editor

Healthier Cape Cod

Although COVID-19 has not disappeared, things are looking much better. Cases are down and with many people fully vaccinated and boosted, public health restrictions are beginning to ease. Barnstable County is currently at a low community risk level. While things are looking better on the Cape, it is also important to stay up to date on local recommendations, especially with the warmer Spring weather bringing many more people from out of town.

Cape Cod has always had a large number of seasonal tourists who often travel in from all over, and while we look forward to welcoming travelers, family, and friends we should all continue to stay healthy and safe by implementing recommended public health measures. For the most recent local Cape Cod public health info, be sure to check the [Barnstable County Department of Health and Environment website](#) and utilize it to schedule any needed testing, vaccination, or news advisory updates. The [Massachusetts Department of Public Health](#) is also a great resource for any further questions about COVID-19.

Pending unpredicted changes, this will end our COVID education series.



<https://www.mass.gov/info-details/covid-19-response-reporting>

Further information:

- <https://www.mass.gov/covid-19-updates-and-information>
- <https://www.barnstablecountyhealth.org>

Feathers in the Wind: Scotland's Seabirds

THANK YOU TO **OCEAN**
RESEARCHER ABIGAIL ELIAR

Scotland is home to many seabirds and is considered a habitat of “international importance” because it hosts 56% of the world’s breeding population of great skua, 20% of the world’s north gannet, and 43% of Europe’s common guillemot. The assessment of seabird populations has increased as seabirds are considered the more vulnerable group of birds. Seabirds serve as indicator species for understanding marine environments and are relatively easy to monitor due to on-land breeding. The number of breeding seabirds typically changes slowly over time, but their breeding success, or number of chicks produced, can vary year to year. This variation stems from food availability, predation, and weather events. Drivers of population decline are attributed to fisheries, climate change, and the presence of invasive non-native species.

Since the 1980s, Scotland breeding seabirds have decreased by approximately 50 percent. These numbers come from NatureScot’s biodiversity index which looks at 11 species of breeding seabirds in Scotland from 1986 to 2019. Although around 50% is the average, other species, including the Arctic skua, saw a drop of 81%. The Arctic skua faces challenges as a long-term breeding species in the future as their numbers have declined and previous established colonies have been depleted to a few pairs or disappeared. Monitoring efforts through the UK Seabird Monitoring Programme (SMP) have continued annually since 1986 and help produce the Scottish biodiversity indicator. Working towards the conservation of seabirds continues, and research is ongoing to understand population changes and population drivers better.

Further Information:

- <https://www.bbc.com/news/uk-scotland-tayside-central-58414580>
- <https://www.rspb.org.uk/about-the-rspb/about-us/media-centre/press-releases/new-report-reveals-declines-in-scotlands-seabirds-and-upland-birds/>
- <https://www.nature.scot/doc/scottish-biodiversity-indicator-numbers-and-breeding-success-seabirds-1986-2019>
- <https://marine.gov.scot/sma/assessment/seabirds-0>



Photo Credit: Oceanwide Expeditions. photograph, Svalbard.

Impacts of Lights on Insects

THANK YOU TO **OCEAN**
RESEARCHER ABIGAIL ELIAR

Bright streetlights can be seen in most neighborhoods and shopping centers today, usually with swarms of bugs around. However, other sources of artificial light exist and add up to covering approximately a quarter of the Earth's surface. Insects can be easily confused by artificial sources of light when trying to find bodies of water to lay eggs in or when reliant on bioluminescence to find mates. Insects are also drawn to sources of light such as streetlamps or car headlights, which may increase risk of being targeted by predators or meeting death when colliding with vehicles. Although artificial light has negative implications for insects, loss of habitat, pollution, and invasive species also contribute to drastic declines in insect populations.

A scientific review done in 2019 concluded that about 40% of species are experiencing dramatic declines in populations. Unlike other contributors to insect decline, artificial light is much easier and less costly to reduce by simply turning sources of light off or reducing their use. Motion-activated lights can also decrease amount of artificial light time. Shades of artificial light may also reduce impacts by avoiding white and blue lights and focusing on more amber shades that attract less insects. Insects are essential to ecosystem function because they serve as vital food sources for birds, amphibians, and reptiles while also supporting pollination for plants and efforts continue to better understand the impacts of artificial light and the future conservation of insect species.



Photo Credit: Shutterstock

Further Information:

- Boyes, D. H., Evans, D. M., Fox, R., Parsons, M. S., & Pocock, M. J. (2021). Street lighting has detrimental impacts on local insect populations. *Science Advances*, 7(35), eabi8322.
- <https://www.bbc.com/news/science-environment-58333233>
- <https://www.smithsonianmag.com/smart-news/light-pollution-contributes-insect-apocalypse-180973642/>

Alaska Experiences Climate Whiplash

THANK YOU TO **OCEAN**
RESEARCHER LINDSEY STANTON

This year Alaska has been experiencing some extreme high and low temperatures that are unlikely to stop in the future. On December 26th, the island of Kodiak reported a record-breaking temperature of 67 degrees Fahrenheit; this beat the previous monthly average by 9 degrees Fahrenheit. Around the same time, in a different area in Alaska, in the town of Ketchikan temperatures dropped to -0.4 degrees Fahrenheit. This was one of the town's coldest days in nearly a century. In Fairbanks Alaska the worst winter storm hit since 1937 resulting in more than 10 inches of snow; so much that a grocery shop nearby in Delta Junction caved in.

These weather extremes may be due to warm air from Hawaii pouring into Alaska, making the air unusually moist. The air in Alaska during December is typically cold and dry. This increase in moisture in the air has made it more likely that heavy rain and snowstorms will be present in the interior. Though this is unusual for this time of year, a more troubling trend is emerging. A phenomenon known as Arctic Amplification, which results in a large change in temperature near the poles compared to the average of the planet. It has already been observed that the Arctic is warming faster than the rest of the world. An example of Arctic Amplification here is when temperatures rise sea ice melts, there is less ice to reflect back, the area ends up warming even faster.

Unfortunately, these weather extremes are likely here to stay, and get more extreme with time. As the climate warms further, these anomalies may become the new normal as time goes on.

Further Information:

- <https://www.foxweather.com/weather-news/alaska-extremes-record-warm-record-cold-and-icemageddon-2021>
- <https://www.treehugger.com/what-is-arctic-amplification-5203873>
- <https://www.bbc.com/news/world-us-canada-59820999>
- <https://phys.org/news/2021-12-alaska-icemageddon-temperatures-wildly.html>
- <https://www.nps.gov/subjects/aknatur eandscience/hi-latclimatechange.htm>
- <https://mobile.twitter.com/NWSAlaska/status/1475566727127654400>
- <https://www.sciencedaily.com/releases/2020/07/200724161452.htm>

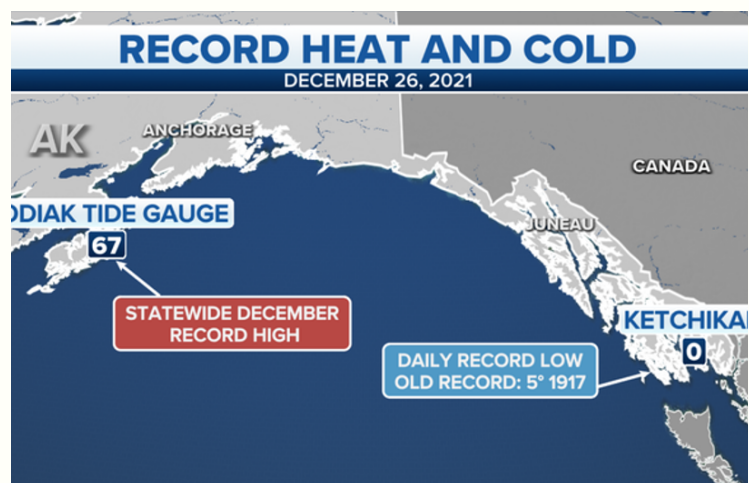


Photo Credit: Andrews, Hillary. Alaska Extremes.

Extraordinary Discovery in Ancient Buried Tree

THANK YOU TO **OCEAN**
RESEARCHER LINDSEY STANTON

As many may already know, the Earth's magnetic field is generated from the molten iron within the Earth's core. This magnetic field helps to protect us and the planet from cosmic radiation and from charged particles that are emitted from the sun. Right now, the earth's magnetic field runs from the geographical south pole to the north pole, but from time to time the direction of the magnetic fields can change. The most recent time this change occurred was about 42,000 years ago and is known as the Laschamps event. Finding evidence of this event can be troublesome but from time to time a gem is found.

Recently in New Zealand during excavation for a power plant a 60-ton kauri tree was unearthed. This tree was preserved in a bog and grew during the Laschamps event. By analyzing radiocarbon levels in pieces of wood from the kauri tree scientists charted a surge in radiation as the Earth's magnetic field weakened and the direction of the earth's magnetic field flipped. This data is the first to detail the time and magnitude of the most recent magnetic shift in history.

This finding is significant because it is the first study to make an argument that the magnetic flips that occur on Earth have an effect on the global climate, though this is still speculative. The theory is that due to the change in direction of the magnetic field there was a change in the atmosphere leading to the disappearance of large mammals from Australia as well as Neanderthals disappearing from Europe. Though this is a good correlation at this point in time there is no direct evidence to prove this theory. More research will need to be done before it can be said for certain.



Photo Credit: Nelson Parker; Lab Manager

Further Information:

- <https://climate.nasa.gov/news/3105/earths-magnetosphere-protecting-our-planet-from-harmful-space-energy/>.
- <https://www.labmanager.com/news/measuring-earths-last-magnetic-field-reversal-with-ancient-trees-25205>.
- <https://www.labmanager.com/news/measuring-earths-last-magnetic-field-reversal-with-ancient-trees-25205>
- https://www.science.org/content/article/ancient-kauri-trees-capture-last-collapse-earth-s-magnetic-field?utm_campaign=SciMag&utm_source=Social&utm_medium=Facebook.

Safe Harbor Slope Stabilization Used in UK

THANK YOU TO **OCEAN**
RESEARCHER LINDSEY STANTON

As climate change continues to affect the globe, one area of concern that is becoming dire are the slopes along the coasts. These areas are greatly affected by weather patterns, rainfall, and wave action. This has the potential to cause erosion and landslides, which can occur along any coast. In the winter of 2013, a slope in Scotland known as Catterline Braes, slid, which resulted in a lot of damage to the slope. This was due to a combination of a damaged sea wall, soil erosion and coastal erosion. After this event the Catterline Braes action group was founded, and funding was eventually obtained to help with the restoration process.

In response to the landslide at the Catterline Braes, a new sea wall was constructed to help reduce climate impacts. Another strategy was the use of soil nails, which are tension-resisting steel nails that are driven into the soil to reinforce the soil to make a gravity retaining wall. A reduction in erosion was implemented to increase the resilience of the slope and an easier recovery was accomplished through sustainable vegetation. This technique is similar to the one used by the Safe Harbor team for their steep slope stabilization service. The overview of the Safe Harbor method can be seen here: [steep slope](#), as well as images showing the progression of various projects. Images from the Catterline Braes steep slope project and its progression can also be seen here [UK steep slope](#).

Issues of landslides especially around coastal areas are becoming a real problem, especially with the threat of climate change. Having realistic solutions that work is a huge part of maintaining our coastal areas.



Further Information:

- Mickovski, Slobodan B., and Craig Thomson. ICE, Innovative Approach in the Stabilization of Coastal Slopes.
- <https://www.cbag.org.uk/>.
- https://www.cbag.org.uk/media/2021_-_nbs/
- <https://www.safeharborenv.com/steep-slope-very-steep-slope-and-coastal-bluff-stabilization-1>.

Photo Credit: CBAG, Catterline Braes Action Group 2022

Counterintuitive "Ropeless" Lobstering

THANK YOU TO OCEAN
RESEARCHER TESS HOLLAND

Lobstermen have recently turned to alternative methods of trapping to minimize marine debris and protect ocean life. The traditional method of lobstering – a trap that contains a vertical fishing line that floats a buoy at the surface – poses a serious threat to many marine mammals, most significantly the right whales. Only about 350 right whales remain along the East Coast, of which 80% have scars and visible signs of damage as a result of trap lines. With entanglement as the leading cause of death for large whales, The National Oceanic and Atmospheric Administration (NOAA) found that most of these documented deaths and injuries occur as a result of trapping and pot gear. In lieu of these findings, many organizations are pushing for the use of rope-less lobster traps instead.

There are currently two types of rope-less lobstering techniques; when the lobsterman is ready to pick up a trap, they can remotely release a rope stowed inside the trap that is then carried by a buoy to the surface, or they can remotely inflate a balloon-like bag that floats the trap to the surface. The app to release the traps also offers lobsterman information as to where their traps are located, where other lobstermen's traps are located, and where lost traps are as well. Zack Klyver, the science director at Blue Planet Strategies, claims these technologies can make lobstering more efficient, for lobstermen are able to queue multiple traps to be pulled rather than pulling one at a time.

The Pioneers for a Thoughtful Co Existence, Inc., along with Woods Hole Oceanographic Institute, Northeast Fisheries Science Center, and the International Fund for Animal Welfare have teamed up to ask the Division of Marine Fisheries' approval to conduct testing near Boston Harbor and the South Shore between February and May of 2022. The testing will help determine the efficiency and effectiveness of rope-less lobstering. Although Massachusetts lobstermen are willing to try this new technique, Maine lobstermen are much more reluctant to change their old habits. They do not attribute right whale deaths to trapping gear and they fear this change will be more costly and less effective. Sean Brilliant, a wildlife biologist at the Canadian Wildlife Federation, explains there is hope for rope-less lobstering despite the hesitancy amongst lobstermen. Brilliant claims, "up until a few years ago, it was science fiction... we've come a long way already," OCEAN will report any future updates.

Further Information:

- <https://www.youtube.com/watch?v=WeeieRr7sTw>.
- <https://www.youtube.com/watch?v=LqrbLcwZbzl>.
- <https://www.pressherald.com/2021/08/05/researchers-test-ropeless-lobster-fishing/>
- <https://content.govdelivery.com/accounts/MADMFB/bulletins/3022aaf?>
- <https://www.fisheries.noaa.gov/species/north-atlantic-right->
- https://www.mass.gov/files/documents/2021/12/22/Pioneers%20LOA%20Application%20for%20Demand%20Buoyed%20Gear_2022.pdf?utm_medium=email&utm_source=govdelivery.

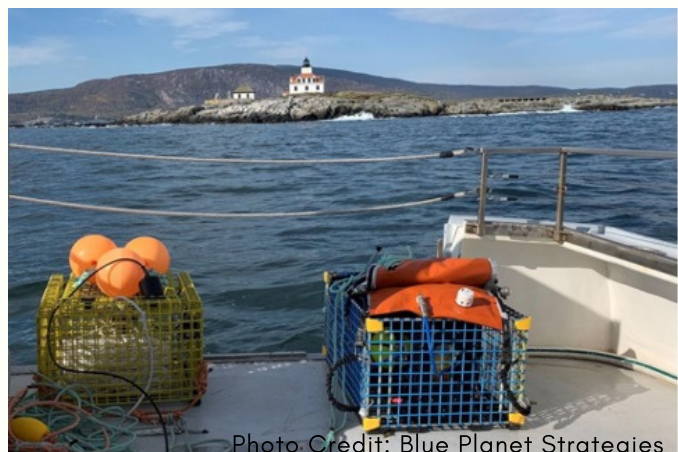


Photo Credit: Blue Planet Strategies

Cargo Ships that can Kite Surf

THANK YOU TO **OCEAN**
RESEARCHER TESS HOLLAND

It is undeniable that greenhouse gas emissions need to be reduced, or better yet eliminated, to protect and preserve Mother Earth. The big question now: how do we effectively achieve this? In regard to the shipping industry, Airseas has recently made significant strides in reducing carbon emissions with Seawing, a wind-powered system of propulsion for cargo vessels.

Seawing is a 1,000 square meter kite that ships can implement as an alternative to burning fossil fuels. Seawing is an automated system in which the kite is deployed from the deck of the cargo ship, flies at a minimum of 200 meters, and communicates with the pod, the technology aspect of the system, by recalculating the kite's position every 300 milliseconds and adjusting it as needed. According to Airseas, Seawing can be used on any ship and on average is able to minimize carbon emissions by from 10-40%. If successful, this is a big step towards decarbonization considering that the shipping industry transports nearly 80% of all globally traded goods.

The shipping industry has continuously struggled to keep up with Paris Agreement goals and found it difficult to find decarbonization solutions that are effective and accessible. Proposed methods have included hydrogen or synthetic fuels as an alternative to burning fossil fuels, nuclear-powered vessels designed to break any ice in the ship's path (particularly in the Arctic Ocean), and solar powered cargo ships. However, these methods are not viewed as immediate fixes because they are either years away from implementation or too expensive and difficult to produce.

Airseas predicts that Seawing production will increase in 2022 and proceed with another installation of a 1000 square meter kite on a KLINE vessel. As of right now, there is only one installation of a 500 square meter kite on an Airbus vessel. By 2024, Airseas hopes to have the building of a new factory underway and install a second 1000 square meter kite on another KLINE Vessel. Although still in its early stages, Seawing offers a new and effective method to reduce greenhouse gas emissions in the shipping industry by utilizing wind, a free and powerful resource available at our fingertips, eager to aid in the preservation of our globe.



Photo Credit: Bloomberg

Further Information:

- <https://time.com/6116582/shipping-cop26-emissions/>.
- <https://www.airseas.com/>
- <https://www.bloomberg.com/news/articles/2021-12-16/coming-to-an-ocean-near-you-ships-dragged-along-by-giant-kites?fbclid=IwAR3sTtQfOJSwFwMpGoLGJw8BdErWz3yTxWqPNwmytECKV29p-jl54a914zY>.

Oyster Partnership Cleans Up Hudson

THANK YOU TO **OCEAN**
RESEARCHER TESS HOLLAND

Nowadays, many New Yorkers would shriek in horror at the mere thought of eating an oyster harvested from the Hudson River. In 100 years, however, with the help of the Hudson River Park Trust, there is a chance that Hudson River oysters will be delicacies. A \$1.5 million-dollar innovative project, aiming to restore and improve the quality of the Hudson River with the help of oysters, has resulted in roughly 75 million of them being placed in the River. Given that oysters are filter feeders, animals that remove particles out of the water to use as food, they do more than just cleaning the water. Senior habitat restoration manager of Reicon Group, George Jackman, explains that “along with reducing sewage overflows, adding oyster reefs and other bivalves is one of the best ways to restore the health and maintain the biodiversity of the Hudson River Estuary.” Attached to subtidal habitats including cages and mesh wraps, the oysters are able to filter 50 gallons of water a day. This is a major help in the effort to clean the Hudson, given that the River harbors untreated sewage, industrial waste, and PCB’s.

Oysters once made up a significant part of the Hudson River ecosystem before their population was depleted by overharvesting and lack of care to the environment. Recent observations have shown, however, that wild oysters have once again been found along piers, a sign that the health of the River is improving. Carrie Roble, the vice president for estuary and education at the Hudson River Park Trust’s River Project, explains that the oysters still are not safe enough for humans to eat, claiming that right now, “they’re habitat builders”. The Hudson River Park Trust continues to collect data and monitor the oysters each year and encourages community members to take part in the process.

Further Information:

- <https://www.dictionary.com/browse/filter-feeder>.
- <https://hudsonriverpark.org/the-park/parks-river-project/science/current-research/oysters/#:~:text=Oysters%20are%20filter%20feeders%20that,ways%20to%20bring%20them%20back>.
- <https://www.nytimes.com/2021/12/10/nyregion/oysters-new-york-hudson-river.html>.

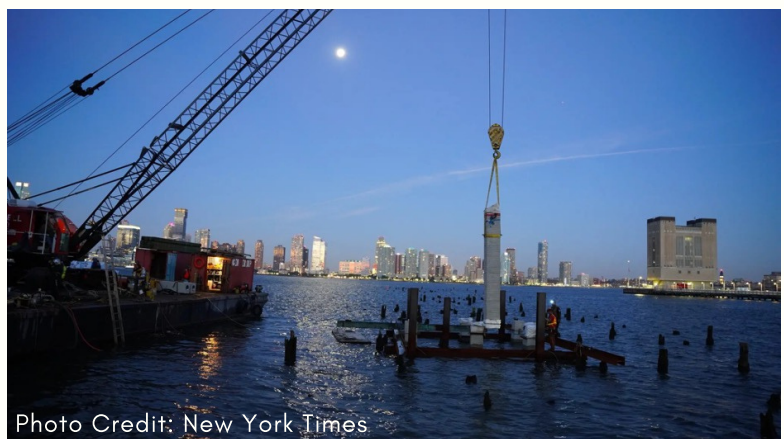


Photo Credit: New York Times

Too Close to Home

THANK YOU TO **OCEAN**
RESEARCHER CATHERINE URQUHART

The Pilgrim is Massachusetts' last nuclear power station located in Plymouth, which was finally shut down in 2019 after 46 years of providing energy for Cape Cod and surrounding areas. Ultimately, after its closure, the power plant was sold to a nuclear cleanup company called Holtec Decommissioning International (HDI), who was allotted 60 years to successfully decommission the nuclear waste but planned to do it in 8. Decommissioning is the process of safely retiring a nuclear power plant from service by reducing radioactivity, dismantling the structure, and removing contaminated materials while considering human health and environmental concerns.

Despite their initially conservative plans, in November 2021 at a meeting of the Nuclear Decommissioning Citizens Advisory Panel, information came forth that HDI had been forced to overfill their large storage "spent-fuel pools" with uranium bundles because the Department of Energy hadn't come through with their nuclear waste removal program. Ultimately, HDI was considering dumping radioactive water into the Cape Cod Bay, a process known as "Overboarding". Unsurprisingly, this information raised much outcry from residents worried about their own health or the environmental impacts of pouring nuclear contaminated water into the bay. A representative of HDI explained that the radioactive water would undergo rigorous testing before dumping it into the bay to make sure it met the strict levels set by the Nuclear Regulatory Commission for human and environmental health. Yet, for residents of Cape Cod, any amount of man-made waste in the water leads to concern about our delicate ecosystems.

After public and political pressure to consider safer options, HDI has stated that they will not perform any radioactive dumping in 2022 and are awaiting an evaluation by the Nuclear Regulatory Commission. According to HDI's website, The Pilgrim is set to have the remaining fuel transported to an offsite location where it will be monitored; however, they fail to mention consideration of dumping radioactive water into the bay. To stay up to date with the decisions on this topic, you can attend the Nuclear Decommissioning Citizens Advisory Panel here: <https://www.mass.gov/orgs/nuclear-decommissioning-citizens-advisory-panel>.

Further Information:

- <https://provincetownindependent.org/news/2021/12/01/radioactive-water-could-be-dumped-in-bay/>
- <https://www.wickedlocal.com/story/old-colony-memorial/2022/01/01/local-state-matters-decommissioning-pilgrim-nuclear-power-plant/8937532002/>
- <https://holtecinternational.com/company/divisions/hdi/our-fleet/pilgrim/>



Photo Credit: Cape Cod Times

Got Arachnophobia? Beware of Australia's "Ballooning" Spiders

THANK YOU TO **OCEAN**
RESEARCHER CATHERINE URQUHART

In June of 2021, the Victoria region in southeast Australia faced an unprecedented amount of rain and resulting flooding. When residents emerged from their homes after the storm to evaluate the flood damage, many were surprised to see large sheets of thin, silky material covering the ground, plants, trees, and anything tall. We soon learned that these were gossamers— thin spiderwebs—thrown out by panicked spiders attempting to escape the floodwaters. With some webs stretching over half a mile, experts explain that when ground-dwelling spiders sense danger or need to migrate large distances in a short amount of time, they will use a survival technique called “Ballooning” to travel. Ballooning is a simple technique—a spider throws out a large amount of silk hoping for it to catch onto a surface on higher ground. When the silk does strike a high point, it quickly pulls them away from the flood. An expert in insects, Dr. Ken Walker, predicted that for long sheets of silk to occur, as they did in Victoria, millions of spiders may have had to shoot out silk to balloon away from the flood.

If the thought of millions of spiders makes your skin crawl, don't fret. Doctors explain that the bites of these ground dwelling spiders are not dangerous to humans, and their fangs may even be too short and weak to pierce through human skin. In fact, the people of Victoria did not fear these giant webs, but described them as beautiful and wave-like, iridescent under the strong Australian sun. For environmental purposes, people were advised to leave the webs alone as they disintegrate naturally, and experts did not want to disturb the masses of spiders seeking refuge on higher ground. Experts explain that ballooning occurs semi-regularly, leaving us curious if we'll get to see the beautiful phenomenon again as the 2022 rainy season looms for southern Australia.

Further Information:

- https://www.huffpost.com/entry/spider-webs-australian-town_n_60ca926ae4b0b80b49eb245a
- <https://www.bbc.com/news/world-australia-57492960>



[Click here to watch a video of these webs in the wind](#)



Photo Credit: Carolyn Crossley

Thank you!

Editor's Final Words:

Many thanks are due to our Researcher Coordinator, Jessica Hillman (recently Married) and to our retiring Associate Editor, Samantha Thywissen (soon to be Married), and of course to Catherine Urquhart, our new Associate Editor (and Captain of her University Equestrian Team).

-Gordon Peabody (Editor)



Jessica Hillman,
(Research Coordinator)
at her recent wedding.



Gordon Peabody,
*Safe Harbor
Director*



Jessica Hillman,
*Research
Coordinator*



Samantha Thywissen,
*Retiring Associate
Editor*



Catherine
Urquhart,
Associate Editor

www.safeharborenv.com

SAFE HARBOR ENVIRONMENTAL MANAGEMENT AND HABITAT RESTORATION

We specialize in restoring native Coastal areas that have been damaged by humans or storms. The Native vegetation we plant reduces erosion and provides food and shelter for Native Birds, Insects, Amphibians, Reptiles and small Mammals. The interactions of Native plants and Native animals together, creates a resilient, sustainable habitat that protects our future.

We are hired by property owners, attorneys, people under Enforcement Action for destroying habitat and sometimes Local Communities. Our Website and Outreach, focus on Education: Public presentations; High School Field Trips; Free Publications; an Intern Program offering College Credit; We also publish this environmental e-newsletter OCEAN, which goes out to 5,000 readers.

Check out our website for other free publications:

www.safeharborenv.com/ocean-newsletter

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