



Outer Cape Environmental Awareness Newsletter

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A word from OCEAN's Editor:

GORDON PEABODY

Welcome to **OCEAN 59**. This is the environmental education publication of Safe Harbor Environmental Consulting, a small, interdisciplinary environmental collaborative, located on Duck Creek Marsh, in Wellfleet on Cape Cod. You will find no advertising or solicitations in your newsletter, because it is yours to read, discuss and share with friends, as Public Domain. Tess Holland's article on icebergs having left behind tracks in the Florida Keys was pretty surprising but then, I had to read Lindsey Stanton's article on Mechanical Trees twice. In this edition we are beginning a new series "CLOSE TO HOME," about some of the strategies and systems we use when working in or near protected wetland areas. These are also Public Domain. Thank you for supporting and sharing **OCEAN**.

Regards, Gordon Peabody OCEAN Editor.

Iceberg Tracks in Florida Keys

THANK YOU TO **OCEAN**
RESEARCHER TESS HOLLAND

Studies published by researchers at Woods Hole Oceanographic Institute (WHOI) reveal that 30,000 years ago, it would not have been unusual to see icebergs floating in the Atlantic Ocean off the coast of Florida. Data suggests that these icebergs were carried South more than 5,000 kilometers from Canada by strong, cold-water currents that formed as a result of glacial ice dams that had burst. This bursting released large amounts of water that effectively pushed the icebergs South.

To further examine this phenomenon, scientists traveled to South Carolina to examine the 700 scour marks—indentations caused by the moving ice—left behind on the seafloor. The scientists extracted sediment and shells and radiocarbon dated the samples to estimate when these icebergs likely had migrated from Canada. Dr. Alan Condron of WHOI explains that “[Scientists] also expect that there are younger and older scours features that stem from other discharge events, given that there are hundreds of scours yet to be examined,” (Woods Hole Oceanographic Institute, 2021).

Dr. Jenna Hill, a United States Geological Survey (USGS) research geologist, along with Dr. Condron, explains that examining the runoff from glaciers can reveal a lot more about the climate than previously expected. Dr. Hill explains, “As we are able to make more detailed computer models, we can actually get more accurate features of how the ocean actually circulates, how the currents move, how they peel off and how they spin around. That actually makes a big difference in terms of how that freshwater is circulated and how it can actually impact climate,” (Woods Hole Oceanographic Institute, 2021).

Further information:

- <https://www.whoi.edu/press-room/news-release/icebergs-drifting-from-canada-to-southern-florida/>
- <https://www.nature.com/articles/s41467-021-23924-0>
- https://www.usgs.gov/centers/pcmsc/news/timing-iceberg-scours-and-massive-ice-rafting-events-subtropical-north-atlantic?qt-news_science_products=3#qt-news_science_products

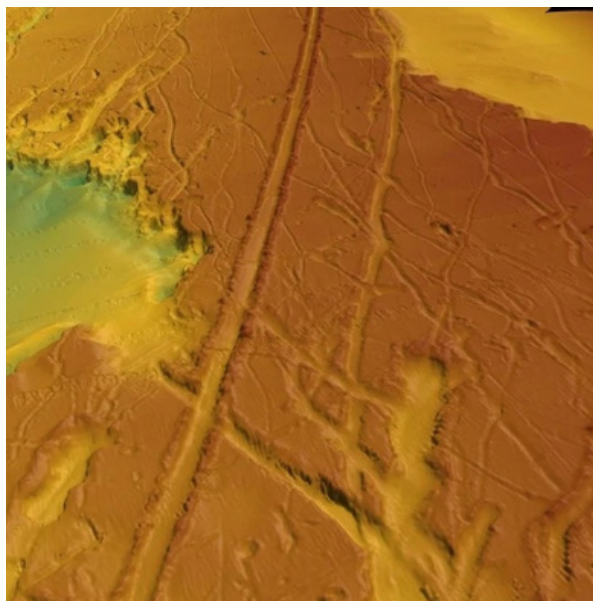


Image source:
<https://www.sciencealert.com/massive-icebergs-once-drifted-all-the-way-from-canada-to-florida>

Small Island Town, Big Challenge

THANK YOU TO **OCEAN**
RESEARCHER ABIGAIL EILAR

Excess nitrogen is harmful to coastal ecosystems including destroying shellfish beds, causing fish kills, impacting plant growth, and causing algal blooms. Many current wastewater treatment systems are not capable or effective at removing nitrogen, and communities may suffer without intervention. Implementing regulations are becoming necessary to reduce the potential negative impacts of excess nitrogen in communities, and the Town of Tisbury, Massachusetts is already acting.

The town of Tisbury is located on the North side of Martha's Vineyard, and like other coastal New England areas, is having a problem with excess nitrogen. With approval from the Massachusetts Department of Environmental Protection (MassDEP), the board of health of Tisbury established enhanced denitrification regulations that affect the nitrogen watershed overlay districts of Lake Tashmoo and Lagoon Pond, which encompasses a large portion of the town. To meet the standard of nitrogen groundwater discharge, the regulations will call for no more than 13mg/liter or the removal of 75% of septic nitrogen waste. To achieve this, they are requiring the installation of onsite denitrification wastewater disposal technology to meet these standards. With many residents utilizing septic tanks, Massachusetts does require inspection of septic systems to determine "whether or not the system is adequate to protect public health and the environment" (MassDEP). For more on the properties and properties with specific conditions that the regulations include, see the article from [MV Times](#) and the [Town of Tisbury report](#).

Further Information:

- <https://www.wbur.org/news/2018/01/01/new-england-septic-systems>
- <https://www.mass.gov/guides/guidance-for-the-inspection-of-on-site-sewage-disposal-systems>
- https://www.mvtimes.com/2022/01/19/tisbury-establishes-denitrification-regulations/?fbclid=IwAR01wJvKkCoxwXg_gg_a8NljM4Jhbiv9PbUAT8HB4ArAbQfyDQSNSqOHWF_Y

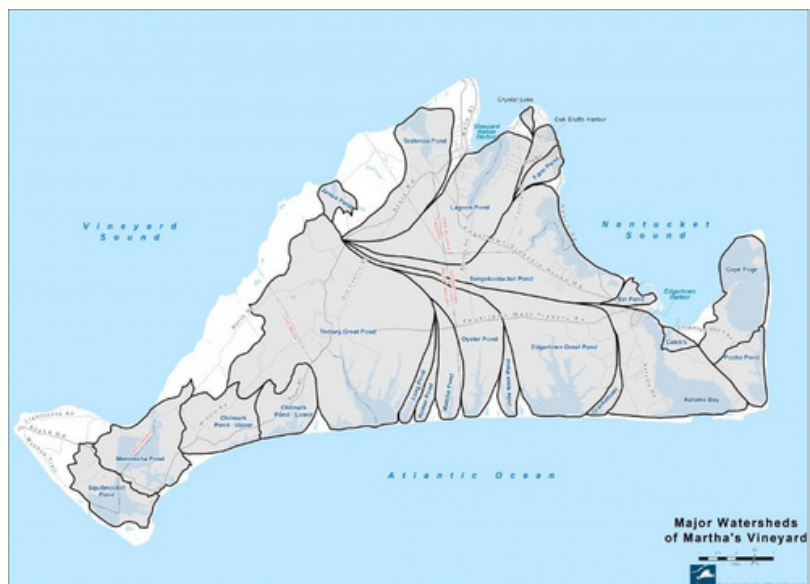


Image Source: <https://www.mvcommission.org/coastal-ponds-and-their-watersheds>

How Much is Too Much?

THANK YOU TO **OCEAN**
RESEARCHER ABIGAIL EILAR

Growing concerns of pharmaceutical pollution in rivers has ignited the need for global research into these water contaminants. A recent publication studied active pharmaceutical ingredient (API) pollution on a global scale and monitored 258 rivers with over a 1000 sampling points in 104 countries. Results highlighted the three most detected API's were present in over 50 percent at sites monitored and around 25 percent of the sampling sites had at least 1 API present that was present at harmful levels to organisms. Contaminated areas were more prevalent in low- to middle-countries associated with lack of adequate wastewater and waste management infrastructure and pharmaceutical manufacturing.

Pharmaceuticals, when found at low doses in waterways, may not pose severe problems, but prolonged and chronic exposure to numerous compounds may cause health risks. One concern is the presence of endocrine disruptors that affect development, growth, and reproduction and are regulated by hormones. Additionally, the increase in antibiotics in rivers may be a global health risk as antibiotics may become less effective. To address these issues more research is needed to continue understanding the effects of pharmaceuticals in rivers, disposing of drugs properly will help reduce contaminants from entering waterways, and addressing updated infrastructure to help use and dispose of products safely.



Image Source: <https://environmentjournal.ca/new-resources-on-pharmaceutical-pollution-management/>

Further Information:

- <https://www.americanrivers.org/threats-solutions/clean-water/pharmaceuticals-personal-care/#:~:text=Pharmaceutical%20compounds%20are%20found%20at,to%20cause%20adverse%20health%20effects>
- <https://www.bbc.com/news/science-environment-60380298>
- Wilkinson, J. L., Boxall, A. B., Kolpin, D. W., Leung, K. M., Lai, R. W., Galbán-Malagón, C., ... & Teta, C. (2022). Pharmaceutical pollution of the world's rivers. *Proceedings of the National Academy of Sciences*, 119(8), e2113947119.

Mechanical Trees?

THANK YOU TO **OCEAN**
RESEARCHER LINDSEY STANTON



In order to effectively reduce the amount of carbon in the atmosphere and help prevent the climate from warming it would take about 1 trillion trees. The amount of land it would take to make that kind of commitment isn't exactly realistic, not to mention the time necessary to grow that many trees. This is the genius of Professor Klaus' invention; it effectively removes carbon from the atmosphere without the waiting time necessary for tree growth. These mechanical trees have the potential to be installed in areas that may not be possible for typical trees.

Professor Klaus Lackner of Arizona State University is working on a prototype for a "Mechanical Tree" which works by sucking CO₂ out of the atmosphere. If the prototype is successful it should remove carbon 1,000 times faster than real trees. These trees are 10 meters tall and 1.5 meters wide with a drum at the bottom. The column contains 150 circular discs that are designed to capture CO₂ as air blows through it. The CO₂ is then stored at the drum at the bottom.

The hope is that in the next year or two these mechanical trees will be up and running. Potentially, in 10 years, 1 billion will be available worldwide. Though there are no promises that this prototype will actually work, the potential may change the course of the planet. With so much carbon being removed there may also be the option to sell the stored carbon for other sources of fuel, or in beverage drinks, giving the carbon a second life.

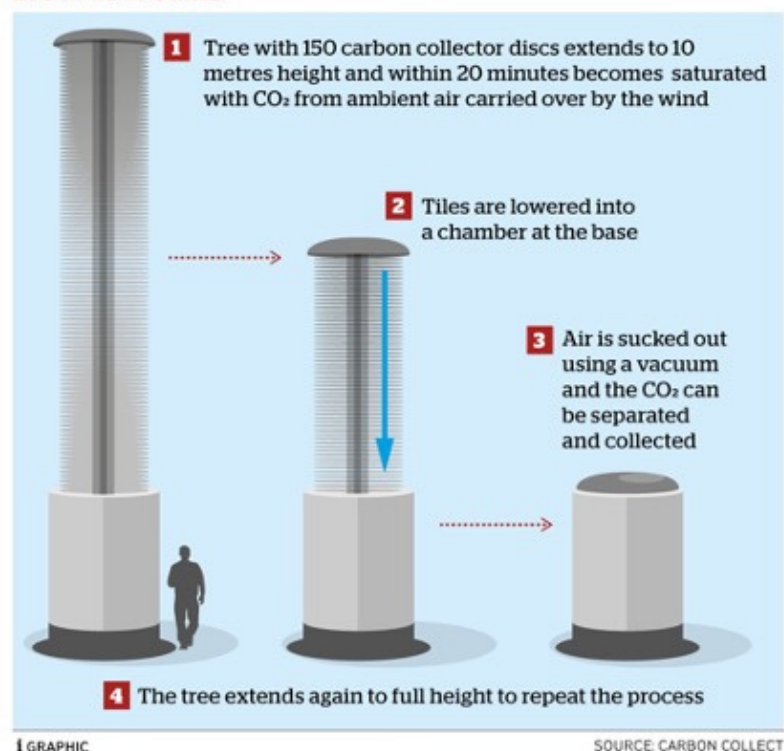
Further Information:

- [https://inews.co.uk/news/environment/climate-change-mechanical-trees-suck-c02-out-atmosphere-trial-1361189?](https://inews.co.uk/news/environment/climate-change-mechanical-trees-suck-c02-out-atmosphere-trial-1361189?ito=social_ifb_thepaper&utm_medium=Social&utm_source=Facebook&fbclid=IwAR3Pe-KB9SIN4PJA_3CYTTiZtzqWX2uN59ZxDMxb_takGgRZSBWcemaTmZQ#Echobox=1640853682)
[ito=social_ifb_thepaper&utm_medium=Social&utm_source=Facebook&fbclid=IwAR3Pe-KB9SIN4PJA_3CYTTiZtzqWX2uN59ZxDMxb_takGgRZSBWcemaTmZQ#Echobox=1640853682](https://inews.co.uk/news/environment/climate-change-mechanical-trees-suck-c02-out-atmosphere-trial-1361189)
- <https://inews.co.uk/news/environment/climate-change-mechanical-trees-suck-c02-out-atmosphere-trial-1361189>
- <https://www.oregonmetro.gov/news/power-trees>.

Image Source:

<https://inews.co.uk/news/environment/climate-change-mechanical-trees-suck-c02-out-atmosphere-trial-1361189>

How it works



When the Road Drives the Car

THANK YOU TO **OCEAN**
RESEARCHER LINDSEY STANTON

The next generation of electric charging technology is here and could take the nation and even the world by storm. Electric roadways, which are roads that have the infrastructure necessary for charging under the asphalt of the roads, are the next iteration of electric charging. Developed by Electreon, based in Televiv this technology allows electric vehicles that drive while charging continuously; meaning they can essentially run nonstop. Though the charging would only occur on the stretch of road that has the electric roadway installed under the asphalt.

This could be huge in large cities with a lot of public transportation including buses, vans and eventually private vehicles. Electric roadways have already been implemented in Sweden, Italy, Germany and soon a mile long stretch in Detroit. The technology works by using a magnetic frequency to transfer power from the coils under the asphalt to a receiver placed on the car which in turn allows that car to charge while driving, it can even save any excess charge in battery banks. For non-electric cars the roadway would still function as normal. The initial cost of changing traditional roadways to the electric roadway is quite high, the estimated cost is 1.2 million dollars per mile.

If the small stretch of road in Detroit goes well, we could all be seeing more electric roadways in the United States in the near future.



Further Information:

- <https://www.axios.com/2022/02/02/a-roadway-will-charge-your-ev-while-youre-driving>
- <https://newatlas.com/erodarlanda-sweden-electric-highway/54197/>
- <https://fb.watch/dfgpVyEkQF/>

Image Source:

<https://newatlas.com/erodarlanda-sweden-electric-highway/54197/>

Ethiopian Banana Tackles Climate Change

THANK YOU TO **OCEAN**
RESEARCHER CATIE URQUHART

Although many might not have heard of *Ensete ventricosum*, the enset, a banana-like plant that is native to only one part of Ethiopia, the fruit is a staple for over 20 million people in the country. Ethiopians use it primarily for food, commonly fermenting the starchy stems and roots to make porridge and bread. An Ethiopian research team tested the potential for distributing the enset outside of Ethiopia with hopes of using it to aid sustainability in the face of climate change. As the world warms, many edible plants may not be resilient to the heat, which makes agriculture more difficult and worsening food insecurity globally. However, some argue that the enset has the potential to feed as many as 111.5 million people across other African countries, such as Kenya, Uganda, and Rwanda.

This plant's resiliency is astounding. The enset is not typically grown or eaten outside of Ethiopia but could likely be cultivated in climates as far south as South Africa and areas of high elevations that see frost. Additionally, the enset can be planted and harvested at any time of the year, a trait which not many plants bear. Finally, the enset is a perennial, meaning it survives and produces fruit for many years, rather than having to be replanted yearly such as a tomatoes, peppers, or corn. The Ethiopian researchers are not proposing to replace other native fruits and vegetables with the enset, but to use it as a backup plan for emergencies and seasons when other crops don't thrive.

Before this step will be taken, however, researchers have explained that the permission of the Ethiopian government is required, as the fruit is a part of the indigenous heritage of Ethiopia, and it is complicated to harvest, process, and ferment. This knowledge should be shared equitably, ensuring the plant will not create ecological or cultural harm where it is introduced.



Further Information:

- <https://www.bbc.com/news/science-environment-60074407>
- <https://doi.org/10.1088/1748-9326/ac40b2>
- <https://www.treehugger.com/ethiopian-banana-climate-global-hunger-5217741>

Image Source:

<https://www.treehugger.com/ethiopian-banana-climate-global-hunger-5217741>

Close To Home: Saving Trees



Image by Jaimie Binder. Protecting trees from construction equipment requires some work. We recommend wrapping selected trees with wood and bright pink Contractor fencing.

We use ratchet straps to hold the 2 x 3 wood in place. This avoids nailing or using screws, which would not be good for the tree. We then staple contractor fencing around the wood to provide good visual performance. (Our booklet on Protecting Trees is available online [here](#).)



Close To Home: Re-Using Trees



Image by Gordon Peabody. Small diameter trees scheduled for removal and or replacement are specially flagged to be redistributed through Safe Harbor's free firewood program for Cancer survivors and the elderly on the Outer Cape. The small diameter makes handling easier for recipients.

Thank you!

Editor's Final Words:

The Editor sends a special thank you to Jessica Hillman, for coordinating our far flung research team and to Catherine Urquhart, our Associate Editor, for applying the final creative touches to this issue of **OCEAN**. Thank you!

-Gordon Peabody, **OCEAN** Editor.

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www.safeharborenv.com/ocean-newsletter

Thank you for your support!



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