



## Outer Cape Environmental Awareness Newsletter

[SafeHarborEnv.com](http://SafeHarborEnv.com)

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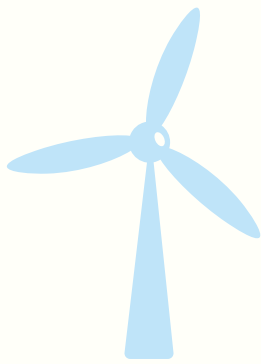
### A word from OCEAN's Editor:

**GORDON PEABODY**

My favorite article in **OCEAN 65** is about the COP28 summit in Dubai, where students from Northfleet Technology College, a secondary school in Kent, won significant recognition and \$150,000 reward for their innovative Bee Keeping business model. Thank you Alexandra Akmaeva. Another Fav but nerdy article describes new research on protist symbionts associated with zooplankton....double fascination for me and thank you Lindsey Stanton. Liam O'Hara's research on a wind energy system costing just a fraction of other wind energy systems is worth reading and I recommend the short video. This issue of **OCEAN** belongs to you, our readers and we encourage you to share it. **OCEAN** will never contain advertising or solicitations.

Regards,

Gordon Peabody, Editor



# A New Look at Bird Mortality in America

THANK YOU TO **OCEAN**  
RESEARCHER CAMILLE SMOKELIN



Wind turbines have a bad reputation for being dangerous for birds. While this is partially true (in America, wind turbines are responsible for killing around 250,000 birds a year), the data shows that turbines are not the greatest threat to birds. In fact, house cats are the number one cause of avian fatalities, preying on roughly two billion birds per year, followed by collisions with buildings and vehicles. Looking at the energy industry alone, wind turbines are not the largest danger. In reality, fossil fuel operations pose a greater threat to bird safety, since birds tend to collide with power lines and other electric infrastructure more frequently than wind turbines.

Beyond infrastructure, the fossil fuel industry has long term climatic and environmental impacts that put birds at risk. For example, coal mining and oil extraction destroy bird habitats and introduce pollutants into the environment that are linked to bird deaths and bird birth defects. Birds are also particularly vulnerable to fossil fuel induced climate change, with “about two-thirds of bird species in North America at increased risk of extinction due to rising temperatures and changes to the habitat where they live” (Climate Portal). Scientists argue that people concerned with bird safety should also be concerned with climate change. Considering this, experts argue that green energy systems like wind farms are helpful to bird health overall.

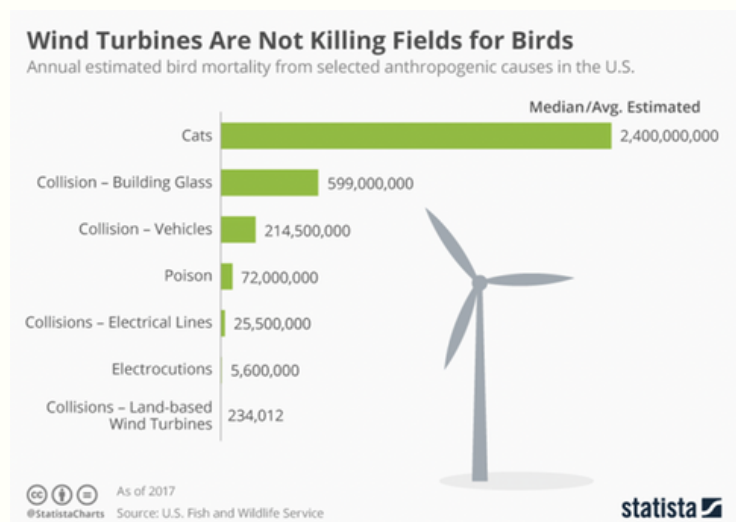
However, there are still ways to make wind farms safer for birds. It is common practice to conduct ‘environmental impact studies’ to determine where to place wind farms to avoid proximity to birds, especially protected species. Creative turbine designs deter birds from nearing the structures and innovative AI machine learning strategically idles the turbines to avoid bird interactions. As such, scientists are hopeful a combination of cutting-edge technology and climate mitigation strategies can come together to protect our vulnerable bird populations.

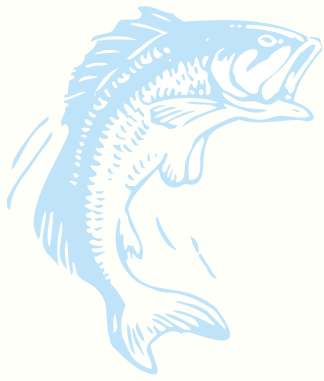
Further information:

- <https://climate.mit.edu/ask-mit/do-wind-turbines-kill-birds>
- <https://conbio.onlinelibrary.wiley.com/doi/10.1111/csp2.242>
- <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/to-protect-birds-wind-industry-turns-to-artificial-intelligence-62387986>

Image source:

<https://www.statista.com/chart/15195/wind-turbines-are-not-killing-fields-for-birds/>





# Bad Medicine at Tasmanian Salmon Farms



THANK YOU TO **OCEAN**  
RESEARCHER CAMILLE SMOKELIN



In January of 2024, people across Tasmania were alerted of a public health crisis when Tassal, Tasmania's largest salmon company, announced that wild fish near one of its farms contained antibiotics at five times more than the permitted level. The company revealed that it had used the antibiotic oxytetracycline (OTC) to treat disease outbreak at two of its aquaculture facilities on multiple occasions in the year prior. This is not an uncommon practice, but the company's conduct and impact were uncommonly concerning for many reasons.

First, further testing revealed that fish more than seven kilometres away from the aquaculture facilities also contained amounts of OTC, suggesting that the antibiotic had infiltrated the nearby water system. Australia's Environmental Protection Agency followed up on this news by publishing reports on the company's antibiotic usage, but people were still left looking for specifics about when and exactly how much of the antibiotics were used. As a result, independent groups like Marine Protection Tasmania spoke out about concerns over concealment and delayed notification of antibiotic use, arguing that Tasmanians should be certain that wild fish they catch contain no levels of antibiotics.

The specific antibiotic used also posed concerns. The World Health Organization (WHO) considers OTC to be very important for human health and cautions against its overuse, as it could lead to the development of antibiotic resistant bacteria and the subsequent development of a superbug. In fact, WHO declares antibiotic resistance "one of the biggest threats to global health", so worries over Tassal's OTC use are aptly placed (Burton, 2024).

Issues surrounding OTC use at Tassal aquaculture facilities opened up a conversation in Tasmania about antibiotic regulations. In Australia, the maximum limit for antibiotics like OTC is 200 µg/kg while in Europe the limit is 100 µg/kg. Marine Protection Tasmania now argues that the state should lower this threshold and continues to advocate for greater transparency in the aquaculture industry.

## Further Information:

- <https://www.theguardian.com/australia-news/2024/feb/26/antibiotics-found-in-wild-fish-near-tasmanian-salmon-farms-at-nearly-five-times-allowed-limit-reports-show#:~:text=Tasmania's%20largest%20salmon%20company%2C%20Tassal,from%20another%20Tassal%20salmon%20farm.>

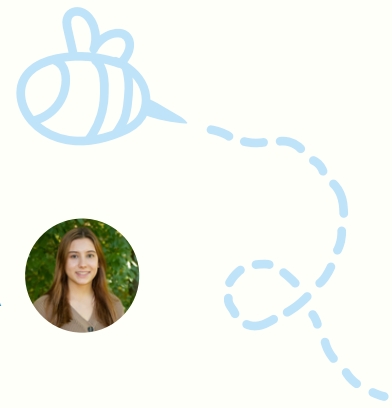
Image Source: <https://www.abc.net.au/news/2017-05-19/tassal-given-three-months-to-clean-up-macquarie-harbour-leases/8542900>





# Innovative Beehive Business Wins Prize

THANK YOU TO **OCEAN**  
RESEARCHER ALEXANDRA AKMAEVA



At the COP28 summit in Dubai, Northfleet Technology College, a secondary school in Kent, UK, achieved significant recognition by winning the Zayed Sustainability Prize, which comes with a \$150,000 award. The award celebrates the school's innovative beehive business, which is designed to promote sustainability and entrepreneurship among its students.

Northfleet Technology College operates two beehives that produce honey and wax. These products are utilized to create various sustainable items, providing a source of income for the school's 6,000 pupils across 10 associated schools. Beyond generating revenue, the initiative aims to enhance food sustainability. The surplus funds generated from the sale of these products are reinvested in smaller school projects, such as developing food crops, installing solar power systems, and implementing environmental monitoring.

The award was presented in a ceremony attended by global leaders and delegates at COP28. Callum and James, students of Northfleet, expressed their excitement and commitment to furthering their project. They plan to use the prize money to expand their efforts, taking mobile beehives across the UK to educate other schools about sustainability and green spaces.

Ólafur Ragnar Grímsson, chairman of the prize jury and former president of Iceland, praised the winners for the "ingenuity in their solutions to address urgent global challenges" (Grímsson, 2023). The recognition of Northfleet's project shows the importance of local, innovative solutions in the broader context of global sustainability efforts.



#### Further Information:

- <https://www.bbc.com/news/uk-england-kent-67600606>
- <https://zayedustainabilityprize.com/en/winners/winners>

Image Source:  
<https://www.kentwildlifetrust.org.uk/blog/nature-heroes-schools>



# Zooplankton Interactions We Never Knew



THANK YOU TO **OCEAN**  
RESEARCHER LINDSEY STANTON

In a recent study published by the “Journal of Plankton Research” the microbiomes of Zooplankton were analyzed, specifically interactions between protists; any eukaryote that is not an animal, land plant or fungus, with the goal of determining if there is any significant effect on Zooplankton productivity based on these symbiotic relationships. While zooplankton interact with a wide range of protists the significance of these interactions had not yet been deeply investigated and could have a large impact on our entire understanding of zooplankton.

The study was performed in the Strait of Georgia where the nine dominant groups of zooplankton were analyzed using DNA metabar coding; a method that allows identification of multiple taxa within the same sample. Using this method, it was determined which protists were closely associated with which zooplankton.

Based on the data collected there was a wide range of protist symbionts that were associated with the zooplankton; primarily associated with Alveolata; which is a large group of eukaryotes that include ciliates, dinoflagellates and apicomplexans. There was also some degree of host preference, meaning certain symbionts were more likely to be found with certain types of zooplankton. Previously host preference had not been appreciated. Within the dinoflagellates there are subgroups that are comprised exclusively of parasites. This is concerning because there is a strong likelihood that these symbionts could negatively impact zooplankton through a reduction in host growth, reproductive development, or even death.

More research is needed-- a better understanding of what influences the productivity of zooplankton will help ensure a healthy population in the long run.

#### Further Information:

- <https://scitechdaily.com/infecte-d-plankton-hold-secrets-to-preventing-pandemics/>  
[www.iisd.org/articles/zooplankton-and-fresh-water#:~:text=Why%20are%20zooplankton%20important%3F,and%20nutrient%20and%20contaminant%20cycling](http://www.iisd.org/articles/zooplankton-and-fresh-water#:~:text=Why%20are%20zooplankton%20important%3F,and%20nutrient%20and%20contaminant%20cycling)  
<https://academic.oup.com/plankt/article/45/2/338/7021940?login=false>

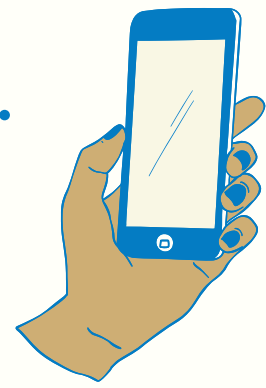
Image Source:

<https://new.nsf.gov/news/plankton-hold-secrets-preventing-pandemics>



# Flax Seed to Phone Cases... Who Knew?

THANK YOU TO **OCEAN**  
RESEARCHER LINDSEY STANTON



With each passing year the world looks to new innovations that can be better than the last, not only with what the product is able to do for us, but also in regard to sustainability. The current hot topic in the world of sustainability is the use of flaxseed in phone cases. The largest company currently advocating for flaxseed phone cases is Pela. Pela was the manufacturer of the world's first compostable phone case and use what they have termed Flaxstic™; which is a combination of flax straw waste, plant-based biopolymers, and recycled material, to make their cases.

Pela advertises the benefits of using this phone case, which includes a reduction of plastic waste and a compostable product, meaning an overall more sustainable future. In many cases just having a product made from a compostable material does not mean that the item will ultimately make it to the compost pile and not the landfill. In terms of the Pela, when the case is no longer useful/functional it can be composted at home or with a local municipality (as long as they accept biopolymers). The company also allows users to return their phone cases in order to be upcycled, if need be, which will undoubtedly increase the compliance for phone composting.

As this product undoubtedly gets more popular the use of Flaxstic™ may become more available in different industries. Pela itself has already begun to create various sustainable products, including a composting system for your own home.



#### Further Information:

- [earth911.com/living-well-being/compostable-phone-cases/](https://earth911.com/living-well-being/compostable-phone-cases/)
- [support.pelacase.com/en-US/are-they-compostable-324078](https://support.pelacase.com/en-US/are-they-compostable-324078)
- <https://livingwastefree.com/2016/09/16/phone-cases/>

Image Source:

<https://livingwastefree.com/2016/09/16/phone-cases/>

# The Continuing Challenge Between Birds and City Glass

THANK YOU TO OCEAN  
RESEARCHER TESS HOLLAND



Birds are not only beautiful to watch and admire, but they are also an important aspect in keeping our ecosystems thriving. Without them, the health of our planet would decline rapidly. Concerningly, nearly a billion birds are killed each year in the United States because of glass collisions. Because birds do not have the ability to detect the clear glass, they can only see through it. This causes much confusion and results in collisions, which leave birds severely injured or dead (Goldfarb, 2023).

In Chicago, referred to by the Cornell Lab of Ornithology as “the country’s most perilous city for birds,” volunteers monitor city streets during peak migration seasons to save any birds that have fallen from their flight due to a collision with a building (Goldfarb, 2023). Volunteers have reported that most days, there are three times more dead birds discovered than injured, living birds. According to national bird surveys, bird populations in the United States have declined by 30 percent since 1970, with the leading cause being glass collisions (Goldfarb, 2023).

Many efforts have been made in to limit collisions. For example, Lights Out Chicago is a campaign that encourages tall, glass buildings in Chicago to dim their lights during migrations in effort to limit attraction to the buildings (Goldfarb, 2023). Additionally, dots and stripes have been placed on buildings to warn birds of the building in front of them (Goldfarb, 2023). However, this is not enough. Claire Halpin, a landscape architect and board member of the Chicago Ornithological Society, explained that “the best solutions are the ones that are designed into the building from the beginning” (Goldfarb, 2023). Examples of this include tilting glass downwards to the ground so it reflects the earth, and using fritted glass – glass with indentations and markings – to make buildings visible to birds. However, most glass

buildings throughout the United States are still unsafe to birds (Goldfarb, 2023). It is important to lobby for laws and regulations that consider the safety and health of bird populations in urban planning, especially in large, urban areas.

#### Further Information:

- <https://www.biographic.com/city-of-glass/?fbclid=IwAR3OZ0mmvkMqLB08QqqdUyFAClQ3VRJWKtDkETzlh6NaZ7XCyKf2agY6l8>
- <https://www.glassonline.com/satinal-strato-bird-friendly-the-first-anti-collision-eva-film-to-protect-birds/>

Image Source: <https://www.glassonline.com/satinal-strato-bird-friendly-the-first-anti-collision-eva-film-to-protect-birds/>





# Recycled Bottles Turned into Beach Sand

THANK YOU TO **OCEAN**  
RESEARCHER TESS HOLLAND



Glass Half Full, the first glass recycling company based out of New Orleans, Louisiana, is saving glass waste from landfills (Glass Half Full). Glass is most often recycled by first crushing it, mixing it with other materials, and then melting it to be formed into new glass products. Glass Half Full, however, does it a little differently; the donated glass waste is crushed then sorted based on the sizes of the glass pieces. The largest pieces are sold as gravel, which can be used in flooring or tilework. The smallest pieces, which are a fine powder, are packed into sandbags to be donated to the local community to be used as flood protection. Middle-sized pieces, known as coarse sand, are arguably the most important type of glass and are used in coastal restoration projects (Insider Tech, 2022).

Glass Half Full fills burlap bags with the recycled coarse sand, which are then placed along coastlines by local volunteers in areas where land degradation has occurred. The volunteers place new plants between the burlap bags as well. After 6-months, the burlap bags degrade leaving behind new land that has formed from the recycled glass sand and plants (Insider Tech, 2022). Although much skepticism exists surrounding the use of recycled glass in nature, Glass Half Full has researched and ensured that their work is safe and beneficial for both humans and the environment by partnering with Tulane University and the National Science Foundation. The research revealed that the glass does not leach any chemicals into the environment and can sustain plant life extremely well (Insider Tech, 2022).

The work that Glass Half Full is doing is extremely important for New Orleans and beyond. With increasing global temperatures and increasing frequency of severe storms, land degradation and coastal flooding is a serious threat to both humans and wildlife (Insider Tech, 2022). Creative and environmentally friendly solutions, such as creating glass sand to be used in coastal preservation efforts, will ultimately preserve our land and keep our communities safer and healthier.

#### Further Information:

- <https://www.facebook.com/techinsider/videos/521818959631955/>
- <https://glasshalffull.co/what-we-do>

Image Source:

<https://glasshalffull.co/what-we-do>







# Back to the Future

THANK YOU TO **OCEAN**  
RESEARCHER PARKER DAVENPORT



Do you believe in miracles? If you answered yes, you may be surprised to find out that the most recent miracle has been around for over 450 million years. Through ice ages and mass extinctions, the horseshoe crab has withstood the test of time. This “living fossil” also holds the key to much of modern medicine. Their blue blood has saved millions of lives, playing a critical role in testing vaccines and insulin injections. Horseshoe crab blood contains important immune cells that are extremely sensitive to toxic bacteria, clotting around harmful toxins to protect the horseshoe crab. Scientists have exploited this clever mechanism to develop the Limulus Amebocyte Lysate (LAL). This technique has been used in medical scenarios since the 1970’s as a test of new medicine to ensure its safety. However, this exploitation leaves thousands of horseshoe crabs bled and left for dead each year (Figure 1). In a study conducted in 2021, “[of the] 718,809 horseshoe crabs collected for these bleedings, a total of 112,104 died, around 15 percent” (The Guardian). Thus, many are asking if this technique is sustainable.

There are four species of horseshoe crabs, found in India, Vietnam, China, Borneo, southern Japan, and the east coast of the United States. These creatures provide important functions to the ecosystem as they help ensure the health of sediment in coastal areas. They also leave behind eggs that are nourishment for many bird, and fish populations, while providing a habitat for many snail, sponge, and mussel populations. [cont...]

## Fun Fact...

Horseshoe crabs are not actually crabs. They are more related to spiders than they are to crabs or lobsters!

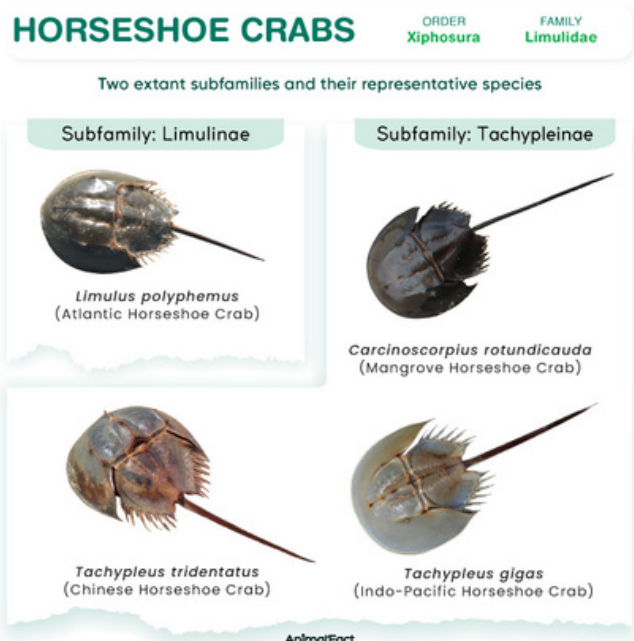


Image Source: <https://animalfact.com/horseshoe-crabs/>



## Back to the Future Cont.



Unfortunately, horseshoe crab numbers could begin to dwindle due to human interaction and reliance. Outside of medical applications, horseshoe crabs are a common bait for fisherman and can also be found as a delicacy in some street food markets. Other populations such as the Rufe Red Knot, a migratory bird that gorges themselves on horseshoe crab roe before spawning season, have also experienced a decline as horseshoe crabs decline in population.

Synthetics to counteract this reliance on horseshoe blood are in development worldwide and have been for some time. In the 1990's, biologists at the University of Singapore discovered that they could create a synthetic alternative called recombinant Factor C (rFC) by cloning a molecule in the blood using recombinant DNA technology. However, with little incentive to switch methods due to cost and availability to the new compound, many companies continue to use the LAL method. Although horseshoe crabs are not considered endangered, the International Union for Conservation of Nature is monitoring their numbers along with other conservation groups worldwide that are calling for stronger rules to protect our prehistoric pals and phase out the use of horseshoe crab blood for good.



### Further Information:

- [https://www.theguardian.com/environment/2024/mar/02/killed-in-vast-numbers-horseshoe-crabs-under-threat-from-overharvesting?CMP=oth\\_b-aplnews\\_d-1](https://www.theguardian.com/environment/2024/mar/02/killed-in-vast-numbers-horseshoe-crabs-under-threat-from-overharvesting?CMP=oth_b-aplnews_d-1)
- <https://www.smithsonianmag.com/innovation/new-synthetic-horseshoe-crab-blood-could-mean-pharma-wont-bleed-the-species-dry-180983054/>
- <https://www.nhm.ac.uk/discover/horseshoe-crab-blood-miracle-vaccine-ingredient.html>

### Image Source:

[www.smithsonianmag.com/innovation/new-synthetic-horseshoe-crab-blood-could-mean-pharma-wont-bleed-the-species-dry-180983054/](http://www.smithsonianmag.com/innovation/new-synthetic-horseshoe-crab-blood-could-mean-pharma-wont-bleed-the-species-dry-180983054/)



# Getting Crabby

THANK YOU TO **OCEAN**  
RESEARCHER PARKER DAVENPORT



Although the war with invasive green crabs is still being waged, the tides seem to be turning. Constant monitoring of the invasive species occurs all over the United States, especially in coastal states. Furthermore, companies nationwide are now incorporating citizen-based invasive species monitoring into their estimates, making information more accessible and accurate. Alaska is one state leading this charge, as they have four main agencies that citizens can contact to report sightings to. Signs detailing how to spot and handle these critters are also starting to pop up in coastal regions where the green crabs reside. Organizations have been working to implement, “eradication protocols by increasing trapping, working with partners to collect data and samples for research, and expanding monitoring and outreach on the reserve and throughout southern Southeast Alaska” (NOAA). Nowadays, keeping an eye out for five spines behind each eye and four-inch shells seems like second nature to beachgoers.

The U.S. Fish and Wildlife Service has been drafting a management plan to deal with these invasive crabs as of June 2023. The plan outlines eleven main goals of the program to manage and eradicate the species, saving ecosystems nationwide. The most common means currently is to use the green crabs as bait or incorporate them into local cuisine after being caught. Some are even incorporating them into whiskey, as outlined in **OCEAN 63**. Other organizations such as USGS are refining methods to detect and dispose of invasive green crabs. They are evaluating the influence of tidal phase on the detection of green crab environmental DNA and assessing the efficacy of light traps for capturing larval green crab (USGS). Ultimately, green crabs are not going anywhere anytime soon, but efforts across the nation have increased public knowledge and management plans for these pests exponentially.

## Further Information:

- <https://www.usgs.gov/centers/western-fisheries-research-center/science/development-and-refinement-methods-early>
- <https://www.pbs.org/wnet/peril-and-promise/2023/05/green-crabs-are-decimating-coastal-ecosystems-and-shellfish-industries/>
- <https://www.invasivespeciesinfo.gov/aquatic/invertebrates/european-green-crab>

Image Source:

<https://www.fisheries.noaa.gov/alaska/habitat-conservation/look-out-invasive-crab>





## Better Idea Department: Spinning the Narrative

THANK YOU TO OCEAN  
RESEARCHER LIAM O'HARA



Unprecedented levels of atmospheric carbon dioxide and emergence of extreme weather patterns that have never been seen before in recorded history have all occurred in the past 265 years; the approximate amount of time that has passed since the beginning of the industrial revolution. Though a bane to climate security around the globe, this period also marked a leap in human ingenuity. Coincidentally, the same brand of pioneering brain power sparked all those years ago is required again. This time, the race is on for discovering new and efficient renewable solutions to meet our energy demands. An example of such innovation lies in Laramie, Wyoming at Airloom Energy. Producers of "Utility-Scale Wind Energy", this system harnesses the power of the wind to produce electricity by pushing wings on a lightweight track. The genius of Airloom's unique technology amounts to dollars and cents. To generate the same amount of electricity as conventional turbines, Airloom touts their system is "Less than 1/10 the cost of a turbine" and "Under 1/4 the cost to build a windfarm". Thus, this decade old company has the potential to make waves in an industry that is worth north of \$80 billion dollars globally. More importantly, Airloom and companies like it producing avenues to accessible and relatively clean electricity are evening the playing field and arguably brightening our future.

**CLICK HERE TO WATCH  
A VIDEO OF THE  
SYSTEM AT WORK!**

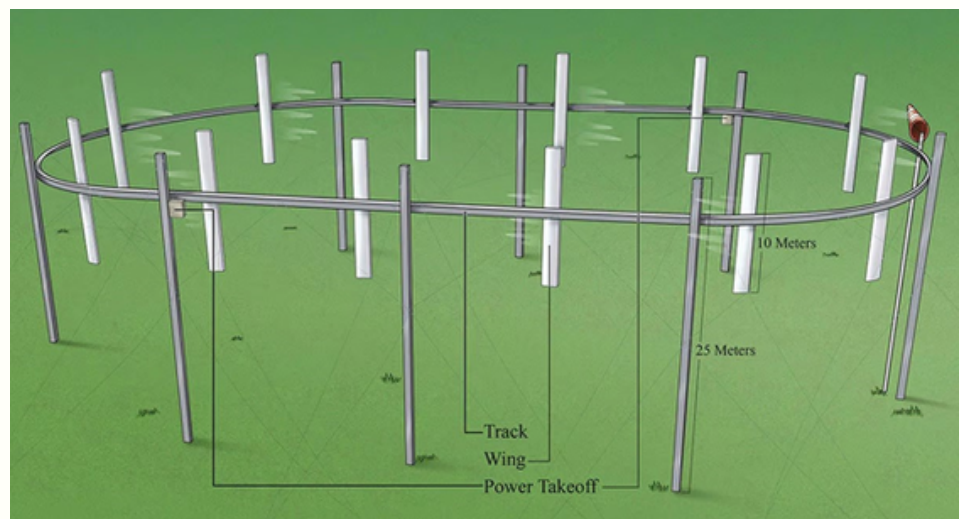


### Further Information:

- <https://www.precedenceresearch.com/wind-energy-market#:~:text=The%20global%20wind%20energy%20market,10.10%25%20from%202023%20to%202032.>

Image Source:

<https://newatlas.com/energy/airloom-energy-wind-track/>



# Printable Sea Wall

## Department

THANK YOU TO OCEAN  
RESEARCHER LIAM O'HARA



Grain by grain, the sands of time inevitably pass. Although many of us reconcile with this truth often, residents of coastal communities are the most familiar with this sentiment. More specifically, home and business owners with tidal adjacent property who have the unfortunate reality of fighting an uphill battle with erosion daily. For example, take Miami Beach, a coastal city in Florida that experiences an average annual rate of loss at around a foot<sup>1</sup>. There are many natural and artificial techniques to slow beach erosion, with varying levels of success. One of the most common is a seawall, a physical border meant to quell the driving force of erosion: wave energy. However, seawalls are riddled with flaws that cause pause when deciding how to keep the sand on the beach. Wave energy doesn't just hit the seawall and dissipate. Instead, it gets pushed to the nearest unprotected area and wreaks havoc there. These barriers can also act as enemies to biodiversity as they cause disruption to the ecosystem around them. Such problems paved the way for Kind Design's 3-D printed seawall that is being implemented in Miami Beach. This new design, through price matching, costs the same as traditional seawalls. It also takes about 1 hour to print, compared to the 24 hours it takes to shape a conventional mold. The icing on the cake is that the concrete used is non-toxic, yet another win for the marine life surrounding the build. Time will tell if this new technology will live up to the hype. However, what is known is that these types of solutions are beyond exciting; they're necessary for the safety of our coastal communities around the globe.



### Further Information:

- <https://www.tampabay.com/news/environment/2020/01/15/miami-beach-is-dumping-16-million-in-fresh-sand-to-push-back-against-erosion/#:~:text=Leatherman%2C%20known%20as%20Dr.,of%20one%20foot%20per%20year>

Image Source: <https://parametric-architecture.com/kind-designs-installed-the-worlds-first-3d-printed-living-seawall/>



# Living Shoreline Reduces Cape Erosion

THANK YOU TO **OCEAN** RESEARCH  
COORDINATOR ABIGAIL EILAR



As a New Englander or one that enjoys the beautiful Cape Cod beaches. It is likely you have seen news about flooding and erosion issues on the Cape. As flooding and storm events continue to increase in frequency and destruction our coastlines are in danger. On the Atlantic side of Cape Cod, average erosion rates are 3.8 feet per year but have been notably higher in areas such as Nauset Light which reached an average of 5.8 feet per year during 1987-1994. This variability causes alarm bells as some years erosion may be worse than others and citizens and scientists alike must find ways to conserve their shorelines.

Although there is no one miraculous answer to coastal erosion in the Cape, the biggest contender has been *Ammophila breviligulate*, or Cape American beach grass. A local farmer in Barnstable, MA, Tim Friary, has about fifty percent of his farm dedicated to beach grass and sells it all around Cape and Cod and New England. One of the most notable customers to readers is our very own Gordon Peabody of Safe Harbor Environmental Services who uses Tim Friary as his main supplier of beach grass to help with environmental restoration.

Beach grass has proven to be a successful method in stabilizing shorelines and preventing further erosion therefore protecting properties and habitats along the coast. During weather events, beach grass can capture sand moving through the air causing it to collect and form dunes around itself and as the beach grass and its roots mature, they help hold dunes together. On his website, Tom Friary describes the best planting methods for beach grass success including spacing 2 stem groups referred to as culms, 6 to 8 inches deep in the sand, and about a foot apart in staggered rows. With proper planting methods that mimic the natural environment, Cape beach grass is helping to provide a multi-faceted beneficial solution to coastal erosion that may have longer lasting beneficial effects.



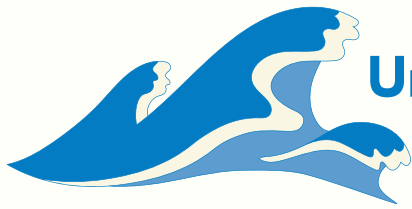
L: Tom Friary of Cape Cod Organic Farm



R: Catie Urquhart plants beach grass for one of Safe Harbor's coastal erosion projects

#### Further Information:

- <https://provincetownindependent.org/local-journalism-project/next-generation/2024/02/14/cape-cods-beach-grass-is-farm-grown/>
- <https://www.nausetlight.org/coastal-erosion#:~:text=It%20has%20been%20earned%20that,been%203.8%20feet%20a%20year.>
- <https://www.capecodorganicfarm.org/cape-american-beach-grass>



# Understanding Longshore Sediment Transport

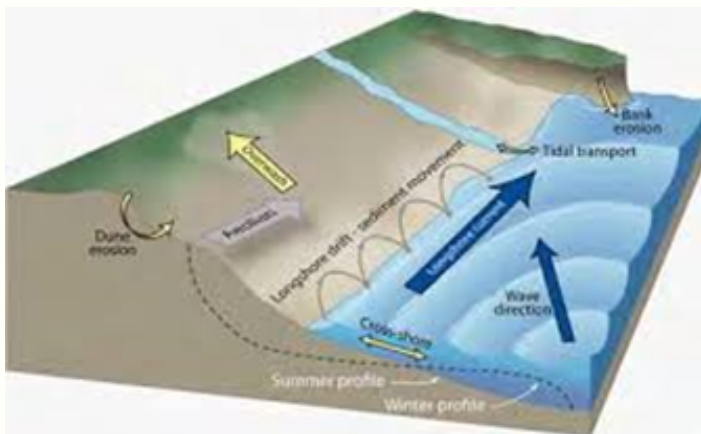
THANK YOU TO **OCEAN RESEARCH**  
COORDINATOR ABIGAIL EILAR



Longshore sediment transport describes the parallel movement of sand by wind, tides, and waves that cause shore-parallel currents. Longshore sediment transport is continuous and varies with time and is therefore best understood over multiple wave periods and with time periods up to a year. A visual timelapse of Cape Cod from 1984 to 2020 provided by NASA shows Cape Cod coastlines are always changing as the deposition and movement of the sediment changes.

Due to its unique geographic region of Massachusetts which extends its island like feature into the choppy Atlantic Ocean, Cape Cod is susceptible to changes caused by extreme events such as nor'easters. Due to its shape and areas open to the Atlantic versus bay protected areas, Cape Cod is divided into littoral cells, which are areas with a sediment budget. This is a good way to describe different regions of Cape Cod, as found in "Longshore Sediment Transport".

As we continue to develop the coast on Cape Cod and additional coastal structures to protect these developments, changes in sediment transport are inevitable which may cause concern for the region. Sediment influx may occur in unwanted places such as covering up vital salt marshes while also depleting other areas that will cause further erosion and land loss over time. Structures such as jetties that may help nourishment of one area, has caused depletion of sediment in other areas and therefore furthering erosion. As time progresses, consideration has to aimed towards cost/benefit of projects, predicting future erosion, and if beach nourishment projects may help restore coastlines on Cape Cod. But, as timelapse and history has told us, sediment transport is always occurring and changes to the coastline are natural, and we have to find ways of adapting to changes and ways to prevent erosion in the beneficial ways that don't disrupt natural movement.



#### Further Information:

- <https://earthobservatory.nasa.gov/world-of-change/CapeCod>
- [https://link.springer.com/referenceworkentry/10.1007/1-4020-3880-1\\_199#:~:text=Longshore%20transport%20refers%20to%20the,parallel%20currents%20produced%20by%20them.](https://link.springer.com/referenceworkentry/10.1007/1-4020-3880-1_199#:~:text=Longshore%20transport%20refers%20to%20the,parallel%20currents%20produced%20by%20them.)
- <https://www.capecod.gov/wp-content/uploads/2022/03/LST.pdf>

Image Source:

[https://seagrant.whoi.edu/wp-content/uploads/2015/02/LST\\_report\\_web.pdf](https://seagrant.whoi.edu/wp-content/uploads/2015/02/LST_report_web.pdf)

## Thank you!

I would like to thank our Researchers and the OCEAN Research Coordinator Abigail Eilar. This issue would not be possible without the creative work of our multi-tasking, Associate Editor, and so, a special thank you to Catie Urquhart. The next issue of **OCEAN** will feature our Summer Interns and include some Cape Cod Coastal Resiliency materials.

-Gordon Peabody, **OCEAN** Editor.

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### Thank you for your support!



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